

# U.S. Army North in the Hurricane Maria Response

ERIC V. LARSON, BRYAN BOLING, DEREK EATON,  
SUZANNE GENC, DAVID KRAVITZ, KRISTIN J. LEUSCHNER,  
ANDREW LEWIS, JASON LIGGETT, LINDSEY POLLEY

Prepared for the United States Army  
Approved for public release; distribution unlimited



ARROYO CENTER

For more information on this publication, visit [www.rand.org/t/RR2967](http://www.rand.org/t/RR2967)

Published by the RAND Corporation, Santa Monica, Calif.

© Copyright 2020 RAND Corporation

**RAND®** is a registered trademark.

#### Limited Print and Electronic Distribution Rights

This document and trademark(s) contained herein are protected by law. This representation of RAND intellectual property is provided for noncommercial use only. Unauthorized posting of this publication online is prohibited. Permission is given to duplicate this document for personal use only, as long as it is unaltered and complete. Permission is required from RAND to reproduce, or reuse in another form, any of its research documents for commercial use. For information on reprint and linking permissions, please visit [www.rand.org/pubs/permissions](http://www.rand.org/pubs/permissions).

The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest.

RAND's publications do not necessarily reflect the opinions of its research clients and sponsors.

#### Support RAND

Make a tax-deductible charitable contribution at  
[www.rand.org/giving/contribute](http://www.rand.org/giving/contribute)

[www.rand.org](http://www.rand.org)

## Preface

---

This report documents research and analysis conducted as part of a project entitled “Lessons from USARNORTH’s Response to Hurricane Maria in Puerto Rico,” sponsored by U.S. Army North (USARNORTH). The purpose of the project was to conduct an analysis and assessment of USARNORTH’s support to U.S. Northern Command’s response to Hurricane Maria; document interagency coordination between USARNORTH as the Joint Forces Land Component Commander, U.S. Northern Command, and the Federal Emergency Management Agency; compare operations in Puerto Rico with existing authorities, policy, doctrine and other guidelines for disaster responses; and identify gaps and shortfalls and potential remedies to challenges encountered to develop lessons learned and improve future capabilities and capacity to respond to catastrophic incidents.

This research was conducted within RAND Arroyo Center’s Forces and Logistics Program. RAND Arroyo Center, part of the RAND Corporation, is a federally funded research and development center (FFRDC) sponsored by the United States Army.

RAND operates under a “Federal-Wide Assurance” (FWA00003425) and complies with the *Code of Federal Regulations for the Protection of Human Subjects Under United States Law* (45 CFR 46), also known as “the Common Rule,” as well as with the implementation guidance set forth in DoD Instruction 3216.02. As applicable, this compliance includes reviews and approvals by RAND’s Institutional Review Board (the Human Subjects Protection Committee) and by the U.S. Army. The views of sources used in this study are solely their own and do not represent the official policy or position of DoD or the U.S. Government.

# Contents

---

|                                                                                                     |            |
|-----------------------------------------------------------------------------------------------------|------------|
| <b>Preface .....</b>                                                                                | <b>iii</b> |
| <b>Figures, Tables, and Boxes .....</b>                                                             | <b>vi</b>  |
| <b>Summary .....</b>                                                                                | <b>ix</b>  |
| <b>Acknowledgments.....</b>                                                                         | <b>xx</b>  |
| <b>Abbreviations .....</b>                                                                          | <b>xxi</b> |
| <br>                                                                                                |            |
| <b>1. Introduction .....</b>                                                                        | <b>1</b>   |
| Approach .....                                                                                      | 3          |
| Organization of this Report .....                                                                   | 4          |
| <b>2. Background on the 2017 Hurricane Season .....</b>                                             | <b>6</b>   |
| Unique Conditions in Puerto Rico .....                                                              | 7          |
| The 2017 Hurricane Season .....                                                                     | 8          |
| Hurricanes Harvey, Irma, and Maria.....                                                             | 9          |
| Comparing the Characteristics of Hurricanes Maria, Harvey, and Irma.....                            | 12         |
| Comparing the Impacts of Hurricanes Maria, Harvey, and Irma.....                                    | 13         |
| Chapter Conclusions .....                                                                           | 15         |
| <b>3. The Framework for Federal Responses .....</b>                                                 | <b>18</b>  |
| Basic Authorities for Federal Disaster Responses .....                                              | 18         |
| National-Level Preparedness Guidance .....                                                          | 19         |
| The Department of Defense’s Role in Disaster Responses.....                                         | 24         |
| The Mission Assignment Process in Brief .....                                                       | 28         |
| USNORTHCOM’s Role .....                                                                             | 30         |
| U.S. Army North’s Role.....                                                                         | 33         |
| Chapter Conclusions .....                                                                           | 37         |
| <b>4. Overview of the Response to Hurricane Maria .....</b>                                         | <b>38</b>  |
| Title 10 and National Guard Peak Forces in Hurricanes Harvey, Irma, and Maria .....                 | 38         |
| The Response to Hurricane Irma.....                                                                 | 41         |
| The Run-Up to Maria .....                                                                           | 42         |
| The Response to Hurricane Maria.....                                                                | 43         |
| Overview of Force Levels, October 11 to November 19, 2017 .....                                     | 56         |
| Chapter Conclusions .....                                                                           | 57         |
| <b>5. DSCA Command-and-Control Arrangements: Doctrine and Practice During Hurricane Maria .....</b> | <b>59</b>  |
| Command and Control in Doctrine and as Observed.....                                                | 59         |
| Defense Coordinating Officer and Element in Doctrine and as Observed.....                           | 72         |
| The Dual-Status Commander in Doctrine and as Observed.....                                          | 75         |

|                                                                     |            |
|---------------------------------------------------------------------|------------|
| Decision Logic for Choosing a JFLCC or JTF for Operational C2 ..... | 80         |
| Chapter Conclusions .....                                           | 85         |
| <b>6. Mission Assignments .....</b>                                 | <b>87</b>  |
| Overview of the Mission Assignment Process.....                     | 87         |
| Overview of Mission Assignments in the USVI and Puerto Rico .....   | 91         |
| Challenges Associated with Mission Assignments.....                 | 101        |
| Options and Recommendations.....                                    | 109        |
| Chapter Conclusions .....                                           | 112        |
| <b>7. DSCA Training for Effective Command and Control .....</b>     | <b>113</b> |
| Requirements for Effective C2 in a DSCA Response.....               | 113        |
| DSCA Training Conducted .....                                       | 114        |
| Organizations and Personnel Receiving DSCA Training .....           | 120        |
| Potential Gaps in DSCA Training.....                                | 122        |
| Recommendations .....                                               | 123        |
| Chapter Conclusions .....                                           | 127        |
| <b>8. Public Affairs and Strategic Communication .....</b>          | <b>128</b> |
| Public Affairs Organization, Planning, and Guidance .....           | 130        |
| Analysis of Execution .....                                         | 136        |
| Analysis of Effects .....                                           | 146        |
| Chapter Conclusions .....                                           | 157        |
| <b>9. Cross-Cutting Questions .....</b>                             | <b>159</b> |
| Required Changes to Doctrine .....                                  | 159        |
| Ways DoD Might Improve the Speed of Response .....                  | 161        |
| How Best to Prepare for Future Responses? .....                     | 166        |
| What DoD Capabilities Might Be Required?.....                       | 167        |
| Chapter Conclusions .....                                           | 177        |
| <b>10. Conclusions .....</b>                                        | <b>179</b> |
| <br><b>Appendixes</b>                                               |            |
| <b>A. Chronology of the 2017 Hurricane Season.....</b>              | <b>181</b> |
| <b>B. Public Affairs and Strategic Communication Data .....</b>     | <b>186</b> |
| <br><b>Bibliography.....</b>                                        | <b>190</b> |

## Figures, Tables, and Boxes

---

|                                                                                                             |    |
|-------------------------------------------------------------------------------------------------------------|----|
| Figure 2.1. Atlantic Basin Storm Time Series, 1851–2017 .....                                               | 7  |
| Figure 2.2. Atlantic Basin Storm Time Series, 1987–2017 .....                                               | 8  |
| Figure 2.3. Atlantic Basin Storms: 2017 Predictions Versus 30-Year Average .....                            | 9  |
| Figure 2.4. The 2017 Atlantic Basin Hurricane Season, August–October 2017 .....                             | 10 |
| Figure 2.5. Characteristic Comparison: Hurricane Maria, Hurricane Harvey, and Hurricane Irma<br>.....       | 12 |
| Figure 2.6. Characteristic Comparison: Hurricane Maria, Hurricane Katrina, and Hurricane<br>Sandy .....     | 13 |
| Figure 2.7. Impact Comparison: Hurricanes Maria, Harvey, and Sandy .....                                    | 14 |
| Figure 2.8. Impact Comparison: Hurricanes Maria, Katrina, and Sandy .....                                   | 16 |
| Figure 3.1. Authorities and Process for Coordination of a Federal Disaster Response .....                   | 19 |
| Figure 3.2. National Response Framework .....                                                               | 21 |
| Figure 3.3. Federal Support to Response Activities in NIMS .....                                            | 23 |
| Figure 3.4. NIMS Command and Coordination Framework .....                                                   | 24 |
| Figure 3.5. Summary of Process Leading to Mission Assignments .....                                         | 29 |
| Figure 3.6. NORAD-USNORTHCOM Plans Construct .....                                                          | 32 |
| Figure 3.7. CONPLAN 3500-14 Mission and Commander’s Intent .....                                            | 32 |
| Figure 3.8. USARNORTH Command-and-Control (C2) Including DCO/E .....                                        | 35 |
| Figure 3.9. Example of a Defense Coordination Element Organization .....                                    | 35 |
| Figure 4.1. The Military Response to Hurricane Maria (as of 15 October 2017) .....                          | 53 |
| Figure 4.2. Title 10 and National Guard Personnel: Puerto Rico .....                                        | 57 |
| Figure 4.3. Title 10 and National Guard Personnel: U.S. Virgin Islands .....                                | 58 |
| Figure 5.1. Dual-Status and Parallel Command Structures .....                                               | 63 |
| Figure 5.2. Command, Control, and Communications Template for a USARNORTH<br>Sourced Joint Task Force ..... | 66 |
| Figure 5.3. JFLCC Command-and-Control Organization for Hurricane Maria on<br>October 15 ,2017 .....         | 69 |
| Figure 5.4. Composition of Military Forces Executing DSCA Operations in Puerto Rico,<br>October 2017 .....  | 71 |
| Figure 5.5. Illustrative Augmented DCE Structure .....                                                      | 73 |
| Figure 5.6. DCO/E Force Package Deployment Template .....                                                   | 73 |
| Figure 5.7. Integrated DSC Staff .....                                                                      | 78 |
| Figure 5.8. Operational C2 Decision Logic Tree .....                                                        | 83 |
| Figure 6.1. The Mission Assignment Process .....                                                            | 88 |

|                                                                                                              |     |
|--------------------------------------------------------------------------------------------------------------|-----|
| Figure 6.2. Cumulative Mission Assignments Initiated in Puerto Rico, September 19 to December 31, 2017 ..... | 93  |
| Figure 6.3. Cumulative Mission Assignments Initiated in USVI, September 19 to December 31, 2017 .....        | 94  |
| Figure 6.4. Cumulative Estimated Financial Obligations for Puerto Rico Response .....                        | 97  |
| Figure 6.5. Cumulative Estimated Financial Obligations for USVI Response .....                               | 97  |
| Figure 6.6. Active DoD-Assigned Mission Assignments in Puerto Rico and the USVI .....                        | 99  |
| Figure 6.7. Cumulative Number of DoD Mission Assignments, by Priority, Puerto Rico .....                     | 100 |
| Figure 6.8. Cumulative Number of DoD Mission Assignments, by Priority, USVI.....                             | 101 |
| Figure 6.9. Example of Aviation Operations Progress.....                                                     | 107 |
| Figure 6.10. Example Route Clearance Operations Progress.....                                                | 108 |
| Figure 8.1. FEMA Press Releases on Hurricane Maria in Puerto Rico, September–November 2017 .....             | 142 |
| Figure 8.2. FEMA Press Releases on Hurricane Maria in USVI, September–November 2017 .....                    | 142 |
| Figure 8.3. JFLCC Command Group Disaster Area Circulation, September 30, 2017–November 10, 2017 .....        | 145 |
| Figure 8.4. CNN and Fox News Reporting on Hurricane Maria in Puerto Rico, September–November 2017 .....      | 149 |
| Figure 8.5. Puerto Ricans’ Google Searches on Hurricane Maria Response .....                                 | 153 |
| Figure 8.6. Twitter Activity in Puerto Rico, September–November 2017.....                                    | 154 |
| Figure 8.7. Twitter Activity Related to <i>Puerto Rico</i> , September–November 2017 .....                   | 155 |
| Figure 8.8. Twitter Activity Related to <i>Hurricane Maria</i> , September–November 2017 .....               | 155 |
| Figure 9.1. NOAA’s 2018 Hurricane Season Outlook.....                                                        | 169 |

## Tables

|                                                                                                                                                      |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Table 2.1. Direct and Indirect Deaths in Hurricanes .....                                                                                            | 15 |
| Table 3.1. DoD Authorities and References for Natural and Man-Made Disasters and Emergencies .....                                                   | 25 |
| Table 4.1. Peak Numbers of Title 10 and National Guard Boots on the Ground in the Joint Operational Area for Hurricanes Harvey, Irma, and Maria..... | 39 |
| Table 4.2. JFLCC Force Packages .....                                                                                                                | 48 |
| Table 4.3. 1st MSC Mission Assignments, as of September 30, 2017.....                                                                                | 50 |
| Table 4.4. JFLCC Supported Mission Assignments .....                                                                                                 | 53 |
| Table 6.1. Mission Assignment Types .....                                                                                                            | 90 |
| Table 6.2. DoD MAs with Numbers of MATOs, Puerto Rico.....                                                                                           | 95 |
| Table 6.3. Top DoD MAs, by MATO Count, Puerto Rico .....                                                                                             | 95 |
| Table 6.4. MAs with Numbers of MATOs, U.S. Virgin Islands.....                                                                                       | 96 |

|                                                                                                             |     |
|-------------------------------------------------------------------------------------------------------------|-----|
| Table 6.5. Example of Aviation MAs Tracked Through JFLCC Analysis Scrub,<br>October 21, 2017 .....          | 106 |
| Table 6.6. Example of Route Clearance MAs Tracked Through JFLCC Analysis Scrub .....                        | 107 |
| Table 9.1. Key Challenges Affecting Speed of Response in Hurricane Maria Response .....                     | 163 |
| Table 9.2. Projected Trends in Extreme Weather Events .....                                                 | 171 |
| Table 9.3. 28 DoD Prescribed Mission Assignments, as of June 2014 .....                                     | 175 |
| Table 9.4. Additional and Refined Mission Assignments from Hurricanes Irma and Maria .....                  | 176 |
| Table A.1. Chronology of Key Events in 2017 Hurricane Season, August–December 2017 .....                    | 181 |
| Table B.1. Analysis of Events in General Buchanan’s Interview Log, September 29–<br>November 13, 2017 ..... | 186 |
| Table B.2. Locations of Events .....                                                                        | 187 |
| Table B.3. Analysis of Local Newspaper Reporting .....                                                      | 188 |
| Table B.4. Newspaper Reporting Locations .....                                                              | 189 |

## Boxes

|                                                                            |     |
|----------------------------------------------------------------------------|-----|
| Box 5.1. Potential C2 Decision Factors .....                               | 82  |
| Box 6.1. Example of Aviation Transition Conditions, October 21, 2017 ..... | 106 |
| Box 6.2. Example of Route Clearance Transition Conditions .....            | 108 |

# Summary

---

## Introduction

When hurricanes Irma and Maria struck Puerto Rico and the U.S. Virgin Islands (USVI) in September 2017, there was a whole-of-government response involving local, state, federal, civilian, and military responders. In late September, U.S. Northern Command (USNORTHCOM) designated U.S. Army North (USARNORTH) as the joint force land component commander (JFLCC) for Department of Defense (DoD) support to civilian disaster-response operations in the wake of the two hurricanes, a role USARNORTH played until mid-November 2017. To evaluate its response to the hurricanes in Puerto Rico and USVI, USARNORTH directed RAND Arroyo Center to answer five main questions:

- How did the DoD response in Puerto Rico and USVI match or deviate from the National Response Framework (NRF), doctrine, authorities, and organizational templates?
- How did the defense coordinating officer (DCO) and dual-status commander (DSC) roles in the Maria effort differ from their doctrinal roles, and why?
- What Headquarters training is required for an effective response, and what baseline preparations would another organization need to effectively command and control (C2) a large disaster response?
- What changes to the mission assignment (MA) process are required, and how should DoD mitigate challenges in future incidents?
- What was the significance of public affairs at different levels: Puerto Rican, national, and internal military audiences?

RAND Arroyo Center was also asked to answer four additional cross-cutting questions:

- What changes to doctrine do the lessons learned from Hurricane Maria suggest are required?
- How could DoD improve the speed of response, including early situational awareness and understanding of the problem in a catastrophic incident?
- How could DoD better prepare to respond to incidents where the state or territory has limited capability and capacity?
- Considering the unique conditions in Puerto Rico and the USVI— islands more than 1,000 miles from the nearest U.S. state—versus potential common challenges in other states and territories, what DoD capabilities might be required?

To answer the questions, we interviewed many of those involved in the whole-of-government response to Hurricane Maria in Puerto Rico and USVI, attended after-action reviews and workshops reviewing potential lessons from USARNORTH's involvement in Maria, and analyzed available documentary materials and data. The following sections provide a brief overview of the response effort and discuss our answers to these questions.

## Overview of the Response

Hurricane Maria effectively shattered both the Puerto Rico Emergency Management Agency and the Puerto Rico National Guard (PRNG). The agency's staff members were unavailable, for example, and members of the PRNG and Puerto Rican U.S. Army Reserve (USAR) personnel—many of whose homes had been damaged or destroyed—were initially preoccupied meeting the urgent needs of their immediate families and neighbors. In addition, the destruction of power and communications infrastructures and the limited mobility that the extensive debris left in the wake of the storm caused impeded the development of situational awareness and a common operational picture (COP).

In effect, Hurricane Maria left the commonwealth unable to carry most of the burden of the needed response and recovery operations or to provide clear direction to federal, DoD, and state response efforts. The resulting decisionmaking vacuum at the local and commonwealth levels in Puerto Rico and the USVI limited the ability of local, commonwealth, federal, and other state responders to quickly and effectively mass response and recovery capabilities. It also challenged federal civilian, DoD, and Emergency Management Assistance Compact state national guard responders, whose efforts typically are predicated on the assumption that local and state (or commonwealth) officials will make specific requests for assistance (RFAs) that, once authenticated, can then be translated into MAs and MA task orders (MATOs) that address identified needs. Filling the response vacuum that Hurricane Maria created required significant adaptation and improvisation from the Federal Emergency Management Agency (FEMA), USNORTHCOM, and USARNORTH's JFLCC.

## How Did the DoD Response Match or Deviate from the National Response Framework, Doctrine, Authorities, and Organizational Templates?

The involvement of DoD and Title 10 forces in disaster responses is regulated by provisions of the Stafford Act of 1988 and by various additional authorities, including the NRF, the *Response Federal Interagency Operational Plan*, and other federal guidance.<sup>1</sup> These authorities and guidelines make it clear that the principal burden of responses and incident command resides at the lowest possible level of governance but that state, local, tribal, or territorial (SLTT) governments overwhelmed by a natural disaster can request federal assistance. When the president approves requests from civilian authorities for federal assistance, the Department of Homeland Security typically delegates its authority as lead federal agency for the federal disaster response to FEMA, with other federal departments and agencies, including DoD, providing additional support, as needed. In nearly all cases, FEMA operates in support of SLTT governments, and DoD operates in support of FEMA.

---

<sup>1</sup> Title 10 is the portion of U.S. Code that concerns the U.S. military. In our context, Title 10 refers to forces on active duty at the federal level.

Although the response to Hurricane Maria made extensive use of extant guidance, that guidance did not address the specific requirements of the actual contingency: a major catastrophic disaster in which both local and commonwealth institutions were incapacitated and incapable of directing the overall response effort. Accordingly, DoD support included collaboration with FEMA and the commonwealth on the performance of functions that are normally conducted solely by SLTT actors, the aggressive use of available authorities, and adaptation of doctrinal machinery not normally observed in defense support of civil authorities (DSCA) responses.

The basic doctrine for DSCA is in reasonably good shape and proved adaptable for the response but should be updated to reflect the recent experience of the 2017 hurricane season. Doctrinal changes might address lessons learned from managing the multiple, overlapping hurricane responses and the unique demands of the Hurricane Maria response and how to incorporate the various doctrinal adaptations that were devised in the response for Puerto Rico and the USVI.

Although there appears to have been a brief debate over whether to use a joint task force (JTF) or functional component command for the 2017 hurricane responses, either choice could have been supported by doctrine, USNORTHCOM's existing concept of operations (CONOP) plan, and the USNORTHCOM commander's 2017 estimate. In the event, during the 2017 hurricane season, the USNORTHCOM commander preferred componency and relied on JFLCC as the C2 element for the disaster-related DSCA responses of Title 10 forces, although the joint force maritime component commander (JFMCC) was USNORTHCOM's initial choice for responding in Puerto Rico and the USVI, up to the transition to JFLCC in late September.

## **How Did the DCO and DSC Roles in the Maria Effort Differ from Their Doctrinal Roles, and Why?**

Both doctrine and the existing DSCA CONOP plan present either/or options for the tactical control of units executing DSCA MAs: They either operate under a DSC when activated or operate under a parallel command structure when a DSC has not been activated. The principal deviation from the doctrinal norm during this period, and one that influenced the effectiveness of the military response, was JFLCC's retention of operational control of Title 10 forces assigned to it during Maria rather than attaching them to the DSC-led JTF–Puerto Rico (JTF-PR).

Moreover, although the DSC is the doctrinally and statutorily preferred C2 arrangement during DSCA disaster response operations, during Maria, the JFLCC commander opted for a hybrid C2 structure that used a parallel command structure in the presence of an activated DSC. Although using the DSC to provide C2 to Title 10 and National Guard forces executing MAs during a DSCA operation is considered the usual and customary—and even preferred—approach, it is not doctrinally mandated. Doctrine, policy, and USARNORTH CONOPs provide

the commander with flexibility and discretion to organize forces to best fit the tactical situation at hand.

This deviation from doctrinal norms occurred in the broader context of the breakdown of the National Incident Management System structure in Puerto Rico. The commonwealth and local incident response system broke down in the wake of Maria and was initially unable to plan and oversee disaster response activities and was unable to generate RFAs in a timely and effective fashion. In addition, USAR and National Guard forces and personnel in the region were deeply affected by the disaster, involved in tending to their families and neighbors, already involved in relief operations as civilian first responders, and unavailable for military duty in the immediate aftermath of the disaster.

This resulted in several important deviations from standard National Incident Management System procedures; notably, FEMA personnel were required to act in the unaccustomed role of RFA generators, planners, and synchronizers rather than as facilitators and generators of MAs in response to commonwealth and local RFAs. This, in turn, led JFLCC, DCO, and defense coordinating element (DCE) personnel to be more deeply involved in supporting FEMA's joint field office planning and execution processes than would normally be the case. One result was a demand for liaisons that exceeded or taxed the deployed DCO, DCE, and JFLCC capacity for serving as liaisons.

During the response to Maria, JFLCC did not attach Title 10 operational units to the DSC because of concerns that JTF-PR would be unable to provide adequate C2 to such forces. This decision was made while a new DSC with Army National Guard staff deployed from New Jersey was being established at roughly the same time as JFLCC. The DSC was also augmented by Title 10 staff personnel, although by a smaller contingent than is doctrinally recommended. This suggests several potential issues:

1. Small states (or states with small Army National Guard structures) may lack the requisite headquarters organizations to fully staff a DSC during a large, complex, or catastrophic disaster.
2. Greater attention may need to be paid to USNORTHCOM's capacity to provide the required joint enabling capability to the DSC and to USARNORTH's ability to support this effort by providing augmentees, if required.
3. Given the potential importance of the DSC during a crisis, understanding the capability and capacity of a state's or territory's DSC prior to a disaster would be helpful for planning response efforts.

## What Headquarters Training Is Required for an Effective Response?

Although USARNORTH personnel had extensive training prior to the hurricane season, our analysis identified some gaps related to providing and retaining information about DSCA guidance and principles and to providing potential DSCA responders with adequate experience during training exercises. One of the greatest challenges to ensuring that all DoD personnel are

prepared to respond to a DSCA event is in maintaining familiarity with relevant DSCA doctrinal principles and guidance. In the response to Maria, for example, several sources suggested that some of the deployed forces initially lacked knowledge about the DSCA process and terminology and about the MA process.

An understanding of the MA process, which is the mechanism for directing and funding most response activities, is also critical to providing response continuity. In the Puerto Rico response, some DoD forces, including JFMCC, JFLCC, subordinate commands, USNORTHCOM staff sections, and augmented DCE personnel, had different understandings of the MA process, which led to unnecessary delays throughout the response.

Finally, there were indications that sustaining a shared understanding of force flow procedures during the response to Hurricane Maria was a challenge. The erosion of relevant knowledge could present a significant issue if leadership wrongly assumes a base level of knowledge across the responding force. This potential gap may need to be addressed through refresher courses or other exercises that will help with long-term retention of DSCA fundamentals.

The Army currently has a continental United States (CONUS)–based DSCA training model, which USARNORTH and USNORTHCOM manage and conduct. This training model includes courses designed to provide familiarity with DSCA operations and applicable doctrinal and other guidelines and exercises to provide DSCA experience. USARNORTH updates its DSCA Phase 2 training courses after lessons learned are published from real-world responses. Interviews within USARNORTH showed that most individuals did not realize they would have to stretch DSCA doctrine as far as they did. Incorporating examples of these adaptations into real-world exercises could provide a level of problem-solving experience to potential DSCA responders beyond the basic level of doctrinal familiarity that is the current standard.

Our analyses suggest that it may be valuable to modestly increase training on DSCA principles and doctrine, and the MA process, for selected headquarters and nonheadquarters personnel and to enhance supplemental quick-reference materials for personnel to refresh their understanding of DSCA. It also may be helpful to consider additional ways to benefit from existing exercise opportunities. For both training and exercises, it will be important to avoid incurring undue risk to other mission areas and activities, both for headquarters and other units.

## **What Changes to the Mission Assignment Process Are Required, and How Should DoD Mitigate Challenges in Future Incidents?**

MAAs are the mechanism for translating RFAs into specific federal civilian and military responders' mission taskings. The process normally begins with a specific RFA from SLTT leaders that the federal coordinating officer and joint field office translate into an MA to the relevant federal assignee (the lead federal agency for the relevant emergency support function). MAAs may be further divided into task-level MATOs. Federal mission assignees conduct their

missions until they are judged to have been completed, at the MA's specified end-date, or when the funding associated with the MA has run out.

Five challenges, arising from multiple sources, were associated with MAs during the Hurricane Maria response:

1. a lack of understanding of the MA process
2. the need to adapt the process to compensate for the incapacitation of the commonwealth's emergency management machinery
3. issues related to transitioning from immediate response authority—in which commanders can undertake life-saving and life-sustaining actions without covering MAs—to taskings under an approved MA
4. misalignment of FEMA-generated MAs with the expectations of the DoD units responsible for providing the response
5. ill-defined transition conditions within the MAs.

Although these challenges did not prevent the success of the overall DSCA mission, each should be addressed to help identify potential solutions for future DSCA events. This is all the more important because a catastrophic event, incident, or complex catastrophe could, under some circumstances, result in the same sort of incapacitation that was observed in Puerto Rico after Hurricane Maria.

Challenge 1 can be addressed through additional education and training on the MA process and immediate response authority. Challenge 2 should be addressed by developing additional procedures with FEMA to guide MA development, measurement, and evaluation in cases of major catastrophic disasters that result in a vacuum at the SLTT level. To address Challenge 3, DoD should (in parallel with the efforts for the first two challenges) review guidelines and procedures for immediate response authority and ensure that DoD personnel participating in DSCA understand them. Also, expanding pre-scripted MAs and MATOs for common mission areas may provide more rapid establishment of MAs/MATOs and reduce the need to operate under immediate response authority. Challenge 4 can be addressed by ensuring MA generation is conducted at the lowest level possible and by better ensuring the essential involvement of the DCO in the MA development, validation, and assignment process. Finally, challenge 5 can be addressed by developing a more robust set of pre-scripted MAs and MATOs that can be linked to notional campaign measures of outcome, effectiveness, performance, and desired end states and transition conditions.

## What Was the Significance of Public Affairs at Different Levels: Puerto Rican, National, and Internal Military Audiences?

Our analyses of USARNORTH's public affairs efforts found that JFLCC planned and devoted considerable efforts to engagements with local Puerto Rican audiences without notably sacrificing attention to national or military audiences. For example, to avoid the public affairs problems encountered during the Hurricane Katrina response in 2005, USARNORTH's public

affairs planning aimed to ensure that local leaders, media, and other Puerto Rican audiences received significant levels of attention in public affairs and strategic communication efforts and directed a roughly comparable level of attention to national news audiences. Military audiences were addressed through public affairs officers at the unit level, standard command information systems, and Facebook Live events that were designed explicitly to reach larger numbers of military personnel and their families.

The Army's public affairs for the initial response was at a disadvantage because of the prevailing public perception of a slow start to the overall response effort. Nonetheless, USARNORTH seems to have achieved its objectives with regard to being seen in a support role and communicating effectively to multiple audiences, especially local audiences. In the end, available local media reporting and sentiment analyses of Twitter data suggest that the military's role seems to have been viewed in a generally positive way. Much as in the Katrina response, the Army seems to have avoided negative media coverage, even though overall feelings about the governmental response efforts remained negative.

Still, although efforts to engage local audiences appear to have garnered goodwill from Puerto Ricans, available public opinion data suggest that public affairs efforts were unable to overcome the apparently settled view of a majority of the national public that the initial response to Hurricane Maria took far too long and that the U.S. government was not doing nearly enough to quickly and effectively restore Puerto Rico to its predisaster conditions. This challenge, of course, goes well beyond USARNORTH's public affairs campaign and reflects the inherent difficulties associated with the consequences of Maria and broader perceptions of the overall federal response effort.

## Cross-Cutting Questions: How Can the Speed of the Response Be Improved in the Future?

### *What Changes to Doctrine Are Required?*

We identified three areas where changes to doctrine may be desirable to improve the speed of response.

#### Doctrine on DSCA C2

There is general agreement that C2 that is based on componentcy—especially relying on a JFLCC organization—is generally preferable to a JTF, at least from the perspective of speed of response. JFLCCs also seem to be preferable to JFMCCs in large responses, such as Maria, although that could change if JFMCC (and/or joint force air component commander) organizations develop more-robust capabilities for joint reception, staging, onward movement, and integration of ground forces and other capabilities that would improve JFMCC's ability to C2 large responses. Given that current DSCA doctrine was largely written in 2013–2014, the

joint and Army doctrinal communities should consider revising some of this doctrine to incorporate lessons from the 2017 hurricane season, including clarifying it to state that different C2 organizations are more or less appropriate under specified conditions and discussing when and at what echelons each of these arrangements would be appropriate.

#### Doctrine for DSCA Situational Awareness

A major impediment to speedy progress is related to the difficulties associated with developing situational awareness and a COP of the postlandfall situation. Existing doctrine could expand its discussion of gaining and maintaining situational awareness and explore additional means of bootstrapping earlier situational awareness and a COP in the wake of a major catastrophic disaster.

#### Doctrine Related to the DSC and the Role of the USAR in DSCA Responses

The DoD response to Hurricane Maria saw an unprecedented use of USAR personnel in a DSCA operation. Mobilized USAR personnel stationed on Puerto Rico made up the bulk of JFLCC's tactical forces executing MAs and roughly 50 percent of total JFLCC personnel. This suggests DSCA doctrine and DoD policy should increase consideration of USAR (and other reserve personnel) in DSCA operations and any unique conditions or requirements involved in their mobilization and employment.

#### *How Could DoD Improve the Speed of Response?*

Our research identified several key challenges that affected the speed of the response, including:

- lack of understanding of predisaster conditions to provide a baseline for the response
- lagging understanding of the enormity of the challenge, and the required response, and continued challenges with situational awareness and COP
- the commonwealth's inability to plan and lead the response and the early need for FEMA and other federal responders to fill the vacuum and take the lead
- limited federal and other capabilities and capacity to substitute for commonwealth leadership in the early phases of the response
- overcoming the great distance from CONUS and adapting to the insular nature of Puerto Rico and USVI
- lagging recognition of the need for a land-based, JFLCC-led response, with the associated capabilities for joint reception, staging, onward movement, and integration were indicated, and of the time needed to transition operational-level C2 from JFMCC to JFLCC
- interagency planning, coordination, cooperation, and synchronization issues that hindered the development of unity of effort.

To help prepare for future responses to major disasters in Puerto Rico and USVI, the commonwealth, FEMA, and USNORTHCOM should develop prehurricane, prelandfall, and

postlandfall options to mitigate the key challenges. **Prior to a hurricane season**, one of the most effective options for mitigating future challenges would involve improving Puerto Rican capabilities, including DoD efforts to improve PRNG and USAR capabilities for responding to Puerto Rico for future hurricanes. Such efforts could include hardening key facilities; constructing shelters; and prepositioning key enablers, e.g., for opening air- and seaports and clearing debris. Immediately **preceding landfall**, several actions might be taken to better prepare for rapid-response operations, including predeployment of additional capabilities (personnel and equipment) to shelters; mobilizing additional forces by sending prepare-to-deploy orders to active-duty Army component forces and key elements of USAR in Puerto Rico; placing mobility assets on alert or reposturing them for potential use; and ensuring planners revise generic plans, review pre-scripted lists of actions and MAs, and materials to familiarize deploying forces with the Puerto Rico human terrain, and key infrastructure and systems. In the **immediate aftermath of landfall**, it makes sense to pursue enhanced integration of Title 10 capabilities with presumptive Puerto Rico and USVI DSCs. This could include DoD ensuring that the DCE is appropriately sized and staffed for the mission and that qualified state liaison officers from appropriate DoD organizations are deployed to critical federal touchpoints, developing synchronized situational awareness and COP by identifying a single element or individual to serve as an integrator and clearinghouse for COP-related information from various sources, executing “disaster area circulation” (the circulation of the commander and senior FEMA personnel to verify situational awareness), developing a COP, and incorporating “crowd-sourced” situational awareness information from the population using social media or special-purpose disaster-reporting smartphone apps. Such an operational concept also should be useful for other cases that involve islands that are distant from CONUS and have vulnerable infrastructure and populations.

### *How Best to Prepare for Future Responses?*

To help prepare for future responses to situations that, as with Puerto Rico and USVI, involve islands, are distant from CONUS, and have vulnerable infrastructure and populations, the commonwealth, FEMA and USNORTHCOM should develop an operational concept for how FEMA would temporarily stand in and fulfill the functions of a state-level emergency management organization in a future response, should it again be needed. This operational concept should lay out the organization in such a situation; the support that would be required from the U.S. military; and procedures for data sharing, situational awareness and COP development, and development of a common set of performance metrics to be used in planning and assessment.

As noted, USNORTHCOM and USARNORTH were challenged by the need to provide liaisons, planners, and other staff personnel. Accordingly, USNORTHCOM should undertake an assessment of potential future needs for such personnel in a catastrophic event and should

develop the required policies and procedures to help ensure that adequate numbers of such personnel are properly trained and rapidly available for future contingencies.

The response to Hurricane Maria also exposed gaps in how DoD personnel understand DSCA procedures, particularly in regard to MAs. USARNORTH should consider expanding the participation of its staff in DSCA exercises and seek to ensure it has insight into FEMA response plans through close communication with its DCOs when these plans are being developed. In a similar vein, operations in response to Hurricane Maria exposed problems in the process of developing top-down MAs. USNORTHCOM or DoD should thus consider permanently embedding an MA strike team or DCO-like capability in the National Response Coordination Center to provide military advice and support the development of MAs. FEMA, DoD, and USNORTHCOM should also collaborate to refine MA processes and procedures to improve the connections between MAs and MATOs and planning and assessment metrics.

### *What DoD Capabilities Might Be Required?*

Forecasts of more-intense tropical cyclones, more-extreme sea levels, and heavier precipitation events suggest that the threat of more frequent and violent storms making landfall in Puerto Rico and the USVI suggest that Puerto Rico and USVI may be at heightened risk of additional Maria-like hurricanes in the future. Potentially destructive seismic activity during a hurricane also could present post-Maria-like conditions for responders.

Although several actions can be taken that might improve future responses to such events, the actual impact of future hurricanes—and the potential requirements for Title 10 and other CONUS-based military responders—will depend in no small measure on the success of post-Maria efforts in Puerto Rico and the USVI to harden key infrastructure, including telecommunications infrastructure; improve indigenous preparedness and emergency management capabilities; and increase the islands' future resilience. Although the burden should mainly fall on Puerto Rico, the USVI, and federal civilian investments, DoD, working through the Defense Logistics Agency and the Defense Excess Property Program and other programs, would seem to have mechanisms for making selective, judicious, and high-leverage investments that could substantially increase Puerto Rican and USVI capability levels and reduce the need for Title 10 forces in the future. Of course, given that DoD does not normally invest in capabilities whose sole purpose is to support DSCA requirements, any such investments would need to be authorized at senior DoD levels.

## Conclusions

Beyond the tropical cyclones and warming trends that affected Puerto Rico and the USVI, other catastrophic incidents, events, or complex catastrophes—major earthquakes along the San Andreas or New Madrid faults or in the Cascadia subduction zone, for example, or even a nuclear attack from a nation-state actor, such as North Korea—would likely create governance

vacuums at the local level and require a significant response. The likelihood is probably reasonably low that *both* local and state response capabilities would simultaneously be incapacitated in such incidents as they were after Hurricane Maria in Puerto Rico and that local and state governments would be isolated from neighboring states that could provide assistance. Nonetheless, a complex catastrophe could still present many of the same challenges encountered in Puerto Rico and the USVI, including the need to develop situational awareness and a COP on the scope and scale of harm and to prioritize and synchronize life-saving and life-sustaining relief efforts to ensure unity of effort.

The multiple, overlapping disasters during the 2017 hurricane also suggest that a larger conversation needs to take place about a U.S. governmentwide strategic concept for DSCA responses. Such a concept would center on policy decisions on the number, types, and sizes of overlapping incidents that will be used as a pacing function for determining future response capabilities—whether those of FEMA and its civilian partners or of DoD, USNORTHCOM, or USARNORTH—and what capabilities SLTT governments will provide. Such a conversation would appear to be an essential starting point for the necessary policy and operational analyses to guide the development of whole-of-nation response capabilities, workforce training and management, and other matters.

## Acknowledgments

---

The authors would like to express their gratitude for the assistance of a large number of individuals. Within U.S. Army North (USARNORTH), we would like to thank LTG Jeffrey S. Buchanan, Commanding General, USARNORTH, and Joint Forces Land Component Commander (JFLCC) in the Hurricane Maria response; MG Brian C. Harris, Commander, Task Force 51, JFLCC(Forward), and Deputy Commanding General; BG Richard Kim, DCG Operations, USARNORTH; COL Niave Knell, Chief of Staff, USARNORTH; COL Ed Hayes, Task Force 51 G-3; COL Beachman, JFLCC G-3; COL Tim Kreuttner, JFLCC G-5; COL Steve Vrooman and Patti Bielling, JFLCC Public Affairs Officer; LTC Harrington, JFLCC G-3; LTC Prentice, JFLCC Chaplain; Ruben Perales; Michael Broadbent; and Robert Townsend.

Within the Federal Emergency Management Agency (FEMA), we would like to thank Mike Byrne, Federal Coordination Officer; J. B. Cuertas, Director, FEMA Branch 2; Jeff Schneider, FEMA Operations Planning; Joe Girot, Chief, FEMA Branch 3; and David Kang.

We also would like to thank BG Moore, National Guard Bureau; CSM Ingram, National Guard Bureau; BG Diana M. Holland, Commander, South Atlantic Division, U.S. Army Corps of Engineers; BG Dustin Shultz, U.S. Army Reserve, Commanding General, 1st Military Support Command; COL David Chase, Region VIII Defense Coordinating Officer (DCO); COL Scott Heintzelman, Region II DCO; COL Shannon Miller, Region V DCO; COL Tim Coakley, 44th Infantry Brigade Combat Team (New Jersey National Guard), Joint Task Force–Puerto Rico; COL Joseph M. Lindquist, U.S. Military Academy, West Point, New York; CAPT Tubbs, U.S. Coast Guard; LTC Pipas, 119th Combat Sustainment Support Battalion; MAJ Darden, G-3, 3rd Expeditionary Sustainment Command; 1st Armored Division, Combat Aviation Brigade Staff; 1st Mission Support Command Staff; Task Force Medical Staff; Joint Task Force–Puerto Rico, 44th Infantry Brigade Combat Team (New Jersey National Guard) Staff; and Steve Mogan, Mission Assignment Strike Team.

For comments on an early draft of this report, we would like to thank the following individuals in USARNORTH: BG Rich Kim; COL Niave Knell; COL Tim Kreuttner; COL Scott Heintzelman, Region II DCO; Patti Bielling, Public Affairs Officer; Angela Brohammer, G-5; Gillis, G-3; and LTC Risius, G-5. We also would like to thank colleague Jeffrey Kendall of the RAND Corporation and Bert Tussing of the U.S. Army War College for their helpful reviews of the final draft of the report.

## Abbreviations

---

|               |                                                 |
|---------------|-------------------------------------------------|
| AAR           | after-action review                             |
| AC            | active component                                |
| ACE           | Accumulated Cyclone Energy                      |
| AD            | Armored Division                                |
| ADP           | Army Doctrine Publication                       |
| ADRP          | Army Doctrine Reference Publication             |
| AOR           | area of responsibility                          |
| ARG           | amphibious ready group                          |
| ARNG          | Army National Guard                             |
| ATP           | Army Techniques Publication                     |
| BOG           | boots on the ground                             |
| C2            | command and control                             |
| C2CRE A       | Command and Control CBRN Response Element Alpha |
| C2CRE B       | Command and Control CBRN Response Element Bravo |
| C3            | command, control, and communications            |
| CAISE         | civil authorities information support element   |
| CAB           | combat aviation brigade                         |
| CBRN          | chemical, biological, radiological, and nuclear |
| CDRUSARNORTH  | Commander U.S. Army North                       |
| CDRUSNORTHCOM | Commander U.S. Northern Command                 |
| CFR           | Code of Federal Regulations                     |
| CG            | commanding general                              |
| CJCS          | Chairman of the Joint Chiefs of Staff           |
| CONPLAN       | concept plan                                    |
| CONUS         | continental U.S.                                |
| COP           | common operational picture                      |

|       |                                                                   |
|-------|-------------------------------------------------------------------|
| CRE   | CBRN Response Enterprise                                          |
| CSSB  | combat sustainment support battalion                              |
| CTF   | combined task force                                               |
| CUB   | commanders' update brief                                          |
| DAC   | disaster area circulation                                         |
| DCE   | defense coordinating element                                      |
| DCG   | deputy commanding general                                         |
| DCO   | defense coordinating officer                                      |
| DCO/E | defense coordinating officer and defense coordinating element     |
| DCRF  | Defense CBRNE Response Force                                      |
| DDASS | DoD Defense Support of Civil Authorities Automated Support System |
| DHS   | Department of Homeland Security                                   |
| DMAT  | disaster medical assistance team                                  |
| DoD   | Department of Defense                                             |
| DoDD  | Department of Defense Directive                                   |
| DoDI  | Department of Defense Instruction                                 |
| DoDM  | Department of Defense Manual                                      |
| DSC   | dual-status commander                                             |
| DSCA  | defense support of civil authorities                              |
| EMAC  | Emergency Management Assistance Compact                           |
| EMEDS | Expeditionary Medical Support                                     |
| EOC   | emergency operations center                                       |
| EPLO  | emergency preparedness liaison officer                            |
| ESC   | Expeditionary Sustainment Command                                 |
| ESF   | emergency support function                                        |
| ESG   | Expeditionary Strike Group                                        |
| EXORD | execute order                                                     |
| FCC   | functional component command                                      |
| FCO   | federal coordinating officer                                      |

|         |                                                            |
|---------|------------------------------------------------------------|
| FEMA    | Federal Emergency Management Agency                        |
| FIOP    | federal interagency operational plan                       |
| FRAGO   | fragmentary order                                          |
| GAO     | Government Accountability Office                           |
| GCC     | geographic combatant command                               |
| GSAB    | general support aviation battalion                         |
| IBCT    | infantry brigade combat team                               |
| IPCC    | Intergovernmental Panel on Climate Change                  |
| J3      | Operations                                                 |
| JDOMS   | Joint Director of Military Support                         |
| JEC     | joint enabling capability                                  |
| JFACC   | joint force air component commander                        |
| JFC     | joint force commander                                      |
| JFHQ    | joint force headquarters                                   |
| JFLCC   | joint force land component commander/command               |
| JFMCC   | joint force maritime component commander                   |
| JFO     | joint field office                                         |
| JIC     | Joint Information Center                                   |
| JOA     | joint operations area                                      |
| JP      | Joint Publication                                          |
| JRSOI   | Joint Reception, Staging, Onward Movement, and Integration |
| JTF     | joint task force                                           |
| JTF-CS  | Joint Task Force—Civil Support                             |
| JTF-N   | Joint Task Force—North                                     |
| JTF-NCR | Joint Task Force—National Capital Region                   |
| JTF-PR  | Joint Task Force—Puerto Rico                               |
| LNO     | liaison officer                                            |
| LSA     | logistics support area                                     |
| MA      | mission assignment                                         |

|       |                                                 |
|-------|-------------------------------------------------|
| MAST  | mission assignment strike team                  |
| MATO  | mission assignment task order                   |
| MCT   | Movement Control Team                           |
| METL  | mission essential task list                     |
| MEU   | Marine Expeditionary Unit                       |
| MSC   | mission support command                         |
| NCR   | National Capital Region                         |
| NGO   | nongovernmental organization                    |
| NHC   | National Hurricane Center                       |
| NIC   | National Intelligence Council                   |
| NIMS  | National Incident Management System             |
| NOAA  | National Oceanic and Atmospheric Administration |
| NOC   | National Operations Center                      |
| NORAD | North American Aerospace Defense Command        |
| NRCC  | National Response Coordination Center           |
| NRF   | National Response Framework                     |
| NSSE  | National Security Special Event                 |
| OPCON | operational control                             |
| OPORD | operational order                               |
| PA    | Public Affairs                                  |
| PAO   | public affairs officer                          |
| PERLS | Pervasive Learning System                       |
| POD   | point of distribution                           |
| PR    | Puerto Rico                                     |
| PREMA | Puerto Rico Emergency Management Agency         |
| PRNG  | Puerto Rico National Guard                      |
| PSMA  | pre-scripted mission assignment                 |
| PTDO  | prepare to deploy order                         |

|             |                                                      |
|-------------|------------------------------------------------------|
| RFA         | requests for assistance                              |
| RFF         | request for forces                                   |
| RRCC        | regional response coordination center                |
| RSA         | regional support area                                |
| RSG         | regional support group                               |
| SAD         | State Active Duty                                    |
| SEPLO       | state emergency preparedness liaison officer         |
| SLTT        | state, local, tribal, and territorial                |
| SOW         | statement of work                                    |
| TACON       | tactical control                                     |
| TF          | task force                                           |
| Title 10    | federal-level active duty                            |
| UCG         | unified coordination group                           |
| UPAR        | unit public affairs representative                   |
| USACE       | U.S. Army Corps of Engineers                         |
| USAR        | U.S. Army Reserve                                    |
| USARNORTH   | U.S. Army North                                      |
| U.S.C.      | U.S. Code                                            |
| USGS        | U.S. Geological Survey                               |
| USINDOPACOM | U.S. Indo-Pacific Command                            |
| USNORTHCOM  | U.S. Northern Command                                |
| USMC        | U.S. Marine Corps                                    |
| USPACOM     | U.S. Pacific Command (now U.S. Indo-Pacific Command) |
| USTRANSCOM  | U.S. Transportation Command                          |
| USVI        | U.S. Virgin Islands                                  |

# 1. Introduction

---

According to the National Oceanic and Atmospheric Administration (NOAA), the 2017 Atlantic hurricane season was the seventh most active hurricane season in the historical record, dating back to 1851, and the most active season since 2005, the year Hurricane Katrina struck New Orleans.<sup>1</sup> In the end, the 2017 hurricane season entailed a total of 17 tropical cyclones, including six major hurricanes. And, according to some sources, 2017 also may well have been the most expensive hurricane season in U.S. history.<sup>2</sup>

No less impressive were the whole-of-government—local, state, and federal, civilian and military—responses to three of the most significant hurricanes in the 2017 hurricane season. hurricanes Harvey, Irma, and Maria struck in quick succession between late August and late September, hitting Texas, Florida, the U.S. Virgin Islands (USVI), and Puerto Rico.

The response to Hurricane Maria was the largest disaster response for both the Federal Emergency Management Agency (FEMA) and the Department of Defense (DoD) in the nation's history. As will be described, Hurricane Maria's impact on Puerto Rico and the USVI fulfills the U.S. government definitions of catastrophic incident, event, and/or complex catastrophe:

- *A catastrophic incident is*  
any natural disaster, act of terrorism, or other man-made disaster that results in extraordinary levels of casualties or damage or disruption severely affecting the population (including mass evacuations), infrastructure, environment, economy, national morale, or government functions in an area.<sup>3</sup>
- *A catastrophic event is*  
any natural or man-made incident, including terrorism, which results in extraordinary levels of mass casualties, damage, or disruption severely affecting the population, infrastructure, environment, economy, national morale, and/or government functions.<sup>4</sup>
- *A complex catastrophe is*  
any natural or man-made incident, including cyberspace attack, power grid failure, and terrorism, which results in cascading failures of multiple, interdependent, critical, life-sustaining infrastructure sectors and caused extraordinary levels of mass casualties, damage, or disruption severely affecting

---

<sup>1</sup> NOAA, "Extremely Active 2017 Atlantic Hurricane Season Finally Ends," November 30, 2017b.

<sup>2</sup> Willie Drye, "2017 Hurricane Season Was the Most Expensive in U.S. History," *National Geographic*, November 30, 2017.

<sup>3</sup> Public Law (Pub. L.) 109-295, Department of Homeland Security Appropriations Act, 2007, October 4, 2006, p. 40.

<sup>4</sup> Joint Publication (JP) 3-28, *Defense Support of Civil Authorities*, Washington, D.C.: Joint Chiefs of Staff, July 2013.

the population, environment, economy, public health, national morale, response efforts, and/or government functions.<sup>5</sup>

Therefore, the Hurricane Maria response offers numerous insights into the sorts of challenges that can be faced in such incidents and the sorts of solutions that have been devised to overcome these challenges.

U.S. Northern Command (USNORTHCOM) designated Commander, U.S. Army North (USARNORTH) as the standing joint force land component commander (JFLCC) to support civilian disaster response operations in the wake of Hurricane Maria in the USVI and Puerto Rico between September and November 2017. This report summarizes the results of a RAND Arroyo Center examination of USARNORTH's response efforts, conducted between October 2017 and May 2018.

The purpose of our research was to address nine questions from USARNORTH, including five specific questions, and four cross-cutting ones. The five specific questions were:

- How did the DoD response in Puerto Rico and USVI match or deviate from the National Response Framework (NRF),<sup>6</sup> doctrine, authorities, and organizational templates?
- How did the defense coordinating officer (DCO) and dual-status commander (DSC) roles in the Maria effort differ from their doctrinal roles, and why?
- What headquarters training is required for an effective response, and what baseline preparations would another organization need to effectively command and control (C2) a large disaster response?
- What changes to the mission assignment (MA) process are required, and how should DoD mitigate challenges in future incidents?
- What was the significance of public affairs at different levels: Puerto Rican, national, and internal military audiences?

The four cross-cutting questions relate to the speed of response, with a particular focus on the unique circumstances encountered during the Hurricane Maria response operation:

- What changes to doctrine do the lessons from Maria suggest are required?
- How could DoD improve the speed of response, including early situational awareness and understanding of the problem in a catastrophic incident?
- How could the DoD better prepare to respond to incidents in which the state or territory has limited capability and capacity?
- Considering the unique conditions in Puerto Rico (and the USVI) relative to potential common challenges in other states and territories, what DoD capabilities might be required?

This analysis is not intended to cover all aspects of USARNORTH's Hurricane Maria response operations. Our team was asked to focus specifically on issues and challenges

---

<sup>5</sup> JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, Washington, D.C.: Joint Chiefs of Staff, June 2019, p. 46.

<sup>6</sup> U.S. Department of Homeland Security (DHS), *National Response Framework*, 3rd ed., Washington, D.C., June 2016.

associated with strategic and interagency aspects of the Hurricane Maria response operation. Others are conducting analyses at the operational and tactical levels.

## Approach

We interviewed many of those involved in the whole-of-government response to Hurricane Maria in USVI and Puerto Rico, attended after-action reviews (AARs) and workshops reviewing potential lessons from USARNORTH's involvement in Maria, and analyzed available documentary materials and data. In particular,

- To better understand the context for Hurricane Maria and the disaster response, we collected and analyzed data on the 2017 hurricane season and on past major hurricanes and hurricane seasons.
- To understand the details of the response to Hurricane Maria,
  - We conducted dozens of interviews with military and civilian personnel involved in the Maria response, producing over 100 pages of interview notes. The notes covered two rounds of interviews in San Juan, Puerto Rico from October 7 to October 12, 2017, and from November 9 to November 12, 2017, including military, FEMA, U.S. Coast Guard, and other personnel. They also included additional interviews conducted at the time of USARNORTH's AAR on December 13, 2017.
  - We attended USARNORTH's AAR of its responses during the 2017 hurricane season, held in San Antonio, Texas, on December 13, 2017, and a conference on defense support of civil authorities (DSCA) doctrine titled "Doctrine for DSCA in the Aftermath of Harvey, Irma and Maria," which was organized by the Center for Strategic Leadership, U.S. Army War College, Carlisle Barracks, Pennsylvania, on January 17–18, 2018.
  - We reviewed documentation produced during and after the Maria response. USARNORTH provided daily commanders' update briefs (CUBs), situation reports, incident action plans, and other materials, including those associated with USARNORTH's 2017 hurricane season AAR. Other materials included briefings given at the U.S. Army War College's conference on DSCA doctrine, the Center for Army Lessons Learned review of lessons and best practices from Hurricane Maria relief operations,<sup>7</sup> USNORTHCOM's history of its responses to the 2017 hurricanes,<sup>8</sup> a U.S. Fleet Forces Command AAR briefing on DSCA operations in 2017,<sup>9</sup> FEMA's AAR on the 2017 hurricane season,<sup>10</sup> and the Government Accountability Office's

---

<sup>7</sup> George Chigi and Donald Haus, *Hurricane Maria Relief Operations: Lessons and Best Practices*, Fort Leavenworth, Kan.: Center for Army Lessons Learned, January 5, 2018.

<sup>8</sup> USNORTHCOM, *Response to Hurricanes Harvey, Irma, and Maria, 25 August 2017–01 November 2017*, Peterson Air Force Base, Colo.: Office of the Command Historian, November 10, 2017f.

<sup>9</sup> Philip S. Davidson, *2017 Defense Support of Civil Authorities (DSCA)*, briefing, U.S. Fleet Forces Command, December 21, 2017.

<sup>10</sup> FEMA, *2017 Hurricane Season FEMA After-Action Report*, Washington, D.C., July 12, 2018e.

(GAO's) report on the federal response to the 2017 hurricanes and wildfires.<sup>11</sup> We also relied extensively on official chronologies and press releases from DoD, USNORTHCOM, and FEMA.

- We collected and analyzed data on force buildups in USVI and Puerto Rico, MAs and MA task orders (MATOs), fragmentary orders (FRAGOs) associated with the standing DSCA execute order (EXORD), and other data.
- Finally, to address questions related to how the response in Maria compared with existing authorities, doctrine, and organizational templates, we reviewed the Robert T. Stafford Disaster Relief and Emergency Assistance Act (P.L. 93-288, as amended),<sup>12</sup> the NRF,<sup>13</sup> the National Incident Management System (NIMS),<sup>14</sup> and other national-level guidance, as well as relevant DoD and service doctrine, including doctrine for DSCA and C2, and relevant planning and other documents.

## Organization of this Report

The report is organized as follows:

- Chapter Two provides a historical overview of Atlantic storms and briefly reviews the 2017 hurricane season and the sequence of hurricanes Harvey, Irma, and Maria, to set the context for understanding the response to Hurricane Maria.
- Chapter Three provides background on the basic authorities, frameworks, and plans that guide the conduct of domestic disaster responses, including DSCA.
- Chapter Four provides an overview of the whole-of-government response to Hurricane Maria in the USVI and Puerto Rico, with an emphasis on USARNORTH's role in that response.
- Chapter Five describes the doctrinal and organizational features of the response to Hurricane Maria, compares these with standard authorities and doctrinal and organizational templates, and identifies potentially fruitful changes to these authorities and templates to better meet future challenges.
- Chapter Six analyzes data on MAs in the Hurricane Maria response, identifies challenges encountered in the management of MAs, compares adaptations observed in Hurricane Maria compared with FEMA's standard policy and process,<sup>15</sup> and suggests possible ways to mitigate future challenges in the management of MAs.
- Chapter Seven reports the results of an analysis of current training on DSCA and identifies possible changes to ensure effective responses in the future.
- Chapter Eight analyzes public affairs and messaging during the Maria response, including Puerto Rican, national, and internal military audiences.

---

<sup>11</sup> GAO, *2017 Hurricanes and Wildfires: Initial Observations on the Federal Response and Key Recovery Challenges*, Washington, D.C., GAO-18-472, September 2018.

<sup>12</sup> Pub. L. 100-707, Robert T. Stafford Disaster Relief and Emergency Assistance Act, November 23, 1988, as amended August 2016.

<sup>13</sup> DHS, 2016a.

<sup>14</sup> The system is documented in FEMA, *National Incident Management System*, 3rd ed., Washington, D.C., October 2017c.

<sup>15</sup> FEMA Policy 104-010-2, *Mission Assignment Policy*, November 2015.

- Chapter Nine focuses on the four cross-cutting questions listed earlier.
- Chapter Ten provides conclusions and implications.

The report also contains several appendixes providing additional detail.

## 2. Background on the 2017 Hurricane Season

---

According to NOAA, storms regularly occur in seven tropical cyclone basins across the world:

1. the Atlantic basin, including the North Atlantic Ocean, the Gulf of Mexico, and the Caribbean Sea
2. the Northeast Pacific basin, from Mexico to about the dateline
3. the Northwest Pacific basin, from the dateline to Asia including the South China Sea
4. the North Indian basin, including the Bay of Bengal and the Arabian Sea
5. the Southwest Indian basin, from Africa to about 100E
6. the Southeast Indian/Australian basin (100E to 142E)
7. the Australian/Southwest Pacific basin (142E to about 120W).<sup>1</sup>

Tropical storms occur within the Atlantic basin throughout the summer and fall as the result of four key factors:

1. ocean water temperatures of at least 80°F
2. a tropical atmosphere that easily lends itself to convection (the production of thunderstorms)
3. a troposphere with low vertical shear
4. a substantial source of large-scale spin (generally derived from easterly waves or the monsoon trough).<sup>2</sup>

The degree to which these key factors align corresponds with the intensity of the storm.

As Figure 2.1 shows, the actual number of tropical storms, hurricanes, and major hurricanes has varied wildly by season. Even so, a general upward trend across all three categories has been observed over the past century and a half.<sup>3</sup> The pattern of tropical storms since 1987 has been particularly powerful (see Figure 2.2), with this period including both the most active hurricane season on record (the 2005 hurricane season) and seven of the top ten hurricane seasons with the

---

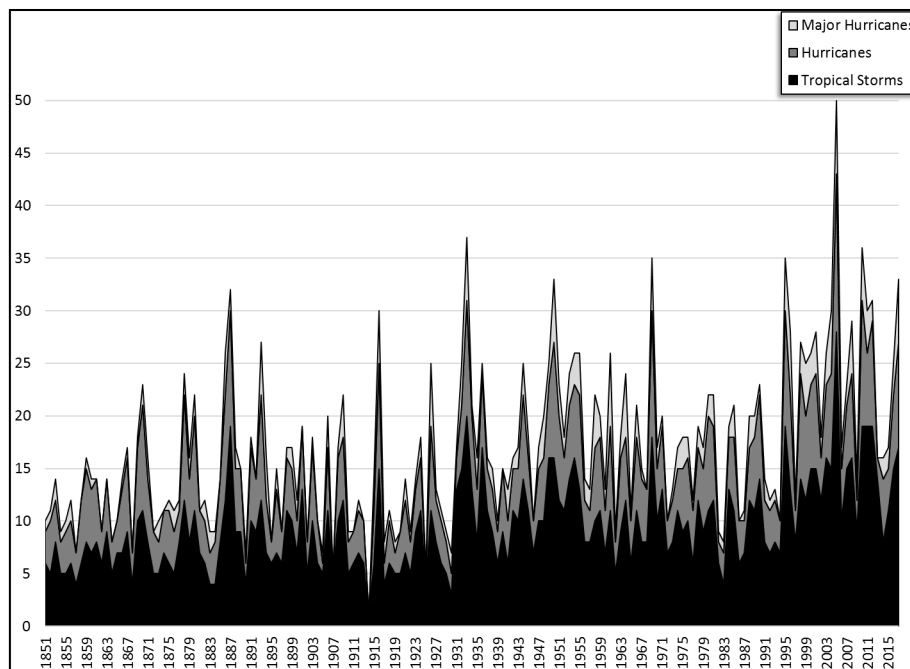
<sup>1</sup> NOAA, “Tropical Cyclone Heat Potential: Seven Basins,” webpage, undated b.

<sup>2</sup> National Hurricane Center (NHC), Hurricane Research Division, “Why Do Tropical Cyclones Occur Primarily in the Summer and Autumn?” Tropical Cyclone Climatology FAQs, 2017.

<sup>3</sup> The NHC in Miami, Florida is responsible for forecasting and monitoring tropical cyclones within the Atlantic basin. Once detected—and throughout the monitoring process—a storm is classified as either a *tropical depression* (sustained surface winds of less than 34 knots or 39 mph), *tropical storm* (sustained surface winds of at least 34 knots [39 mph]), *hurricane* (sustained surface winds of reaching 64 knots [74 mph]), or *major hurricane* (sustained surface winds of at least 96 knots [111 mph]—equivalent to a category 3, 4, or 5 hurricane on the Saffir-Simpson scale). The NHC tracks and publishes seasonal totals for tropical storms, hurricanes, and major hurricanes for the Atlantic basin each year—with data stretching back to 1851. See NHC, “What Regions Around the Globe Have Tropical Cyclones and Who Is Responsible for Forecasting There?” Tropical Cyclones Forecasting FAQs, Miami, Fla., 2014.

most named storms on record, five of the top ten hurricane seasons with the most hurricanes on record, and three of the top five hurricane seasons with the most major hurricanes on record.<sup>4</sup>

**Figure 2.1. Atlantic Basin Storm Time Series, 1851–2017**



SOURCE: Based on data from NHC, “Atlantic Basin Storm Totals by Year (including subtropical cyclones),” table, Miami, Fla., c. 2017a.

## Unique Conditions in Puerto Rico

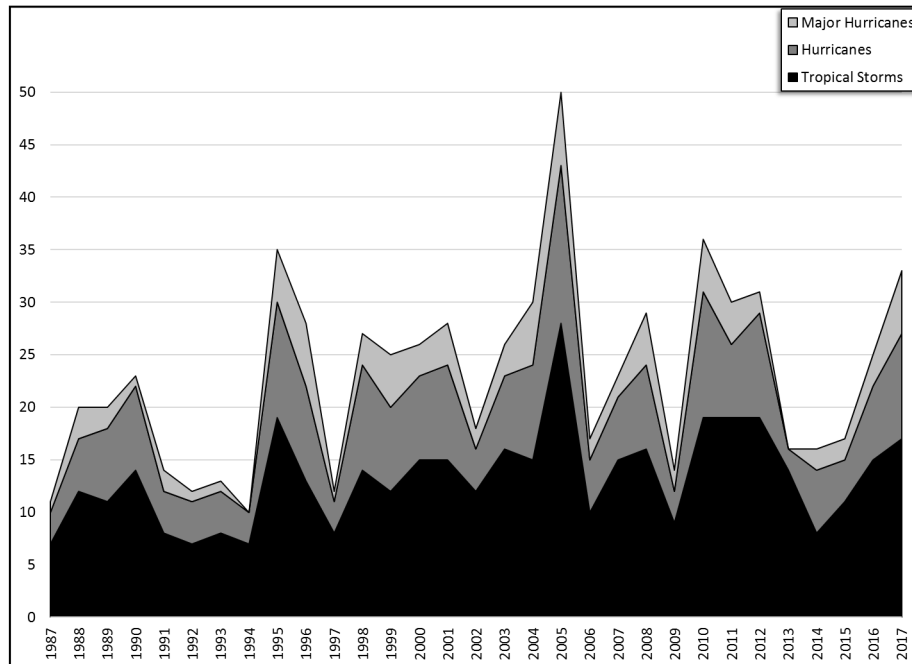
Puerto Rico presented a somewhat unique set of conditions that affected the shape of the response to Hurricane Maria. According to the Government of Puerto Rico,

Critically, Puerto Rico has been grappling with preexisting conditions that exacerbated the impact of the hurricanes, including an economic crisis spanning more than a decade and structural, demographic, health, social, and infrastructure stresses; in addition, it has been responding to demands for improved government transparency.<sup>5</sup>

<sup>4</sup> Weather Underground, “Hurricane and Tropical Cyclones: Top 10 Most Active Hurricane Seasons,” webpage, 2018.

<sup>5</sup> Government of Puerto Rico, *Transformation and Innovation in the Wake of Devastation: An Economic and Disaster Recovery Plan for Puerto Rico*, San Juan, August 2018, p. viii. For reviews of relevant statistics, see Central Intelligence Agency, “Puerto Rico,” The World Factbook website, undated; Civic Impulse, LLC, “Puerto Rico,” GovTrack website, undated; Antonio Flores and Jens Manuel Krogstad, “Puerto Rico’s Population Declined Sharply After Hurricanes Maria and Irma,” Pew Research Center website, July 26, 2019; Jens Manuel Krogstad, “Puerto Ricans Leave in Record Numbers for Mainland U.S.,” Pew Research Center website, October 14, 2015; Jens Manuel Krogstad, “Historic Population Losses Continue Across Puerto Rico,” Pew Research Center website,

**Figure 2.2. Atlantic Basin Storm Time Series, 1987–2017**



SOURCE: Based on data from NHC, 2017a.

## The 2017 Hurricane Season

As previously noted, the 2017 hurricane season was extremely active and was, in fact, the Atlantic basin’s seventh most active season on record. Actual counts of recorded events exceeded not only NOAA’s predictions for above-normal activity—see the “Prediction (high)” bars in Figure 2.3—but also drastically exceeded the 30-year average for 1981–2010.

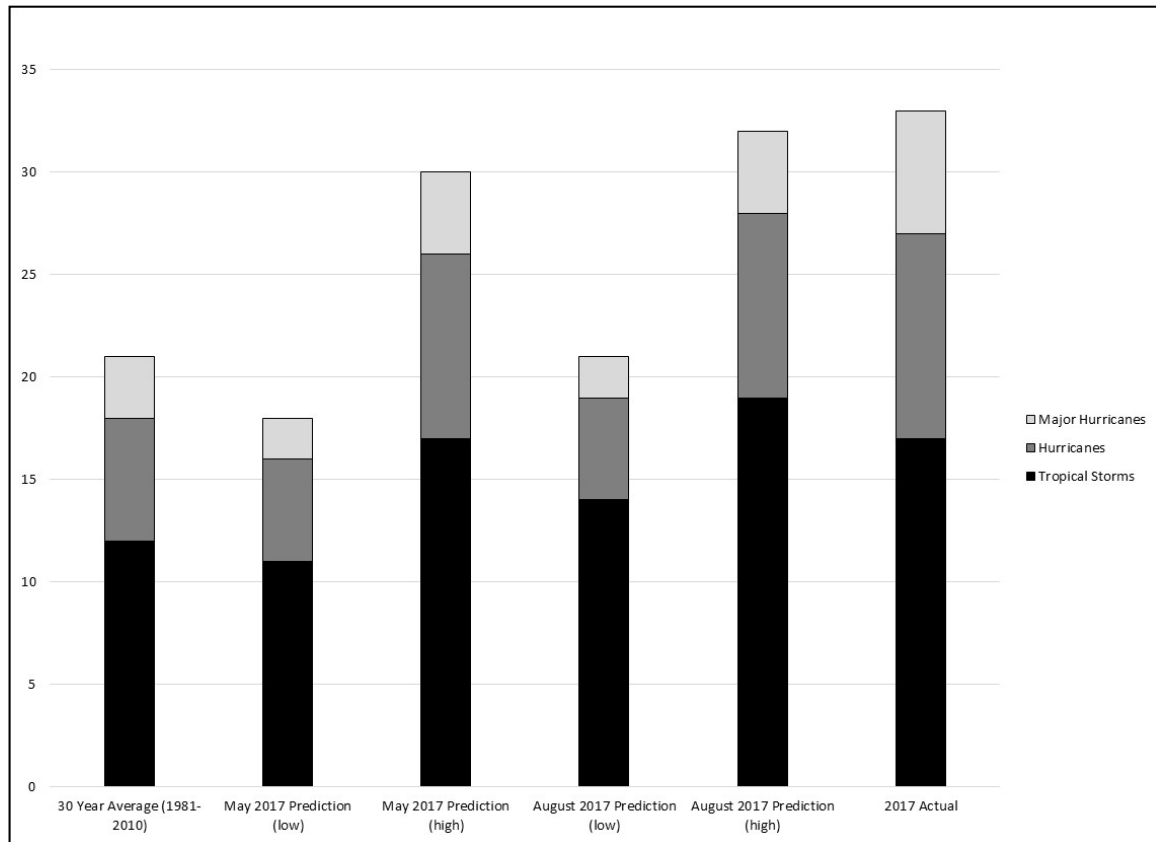
The 2017 hurricane season closed with 17 named storms, ten hurricanes, and six major hurricanes. Of the major hurricanes, three made landfall: Hurricane Harvey in Texas, Hurricane Irma in the southeastern United States and the Caribbean, and Hurricane Maria in Puerto Rico and the Caribbean.<sup>6</sup>

---

March 24, 2016; Jens Manuel Krogstad, Mark Hugo Lopez, and Drew DeSilver,” Puerto Rico’s Losses Are Not Just Economic, But in People, Too,” Pew Research Center website, July 1, 2015; Jens Manuel Krogstad, Kelsey Jo Starr, and Aleksandra Sandstrom, “Key Findings About Puerto Rico,” Pew Research Center website, March 29, 2017; and U.S. Census Bureau, “Quick Facts: Puerto Rico,” webpage, July 1, 2018.

<sup>6</sup> A fourth major hurricane, Nate, also made landfall on the U.S. mainland in October 2017 but had weakened by then. Three weaker storms—Cindy, Emily, and Phillipe—also made landfall.

**Figure 2.3. Atlantic Basin Storms: 2017 Predictions Versus 30-Year Average**



SOURCE: Based on data from NOAA, "NOAA's Updated 2017 Atlantic Hurricane Season Outlook," 2017a.

## Hurricanes Harvey, Irma, and Maria

There were five major hurricanes during the August–October period of the 2017 hurricane season: hurricanes Harvey, Irma, Jose, Maria, and Nate (see Figure 2.4). Of these, the most consequential were Harvey, Irma, and Maria; we will discuss each briefly. As the discussion will show, Hurricane Maria stands out because of the scale and scope of its destruction, the distance separating Puerto Rico and the USVI from responders in the continental United States (CONUS), and the fact that Maria was the second major hurricane to hit Puerto Rico and the USVI in less than a month and the third within a short period requiring overlapping federal—including DoD—responses.

Figure 2.4. The 2017 Atlantic Basin Hurricane Season, August–October 2017



SOURCE: Adapted from USARNORTH, “Hurricanes 2017 JFLCC AAR,” briefing, San Antonio, Tex., December 13, 2017q.

### *Hurricane Harvey—August 23, 2017–September 15, 2017*

NHC identified Tropical Storm Harvey on August 17, 2017 and subsequently issued hurricane warnings for the Caribbean islands within its projected path. NHC monitoring over the next few days showed that Harvey’s intensity was varying. On August 23, 2017, Texas Governor Gregory Abbott issued an emergency declaration for his state. When the storm reached a wind speed of 100 mph on August 24, 2017, the NHC briefly upgraded Harvey to a Category 2 hurricane, when the storm was approximately 220 miles off Port O’Connor, Texas. The storm developed a wind speed of 120 mph on August 25, 2017, increasing further, to a Category 3 hurricane, at 2 p.m., when it was just 75 miles southeast of Corpus Christi, Texas. By 6 p.m. that day, it was only 45 miles outside Corpus Christi, Texas, when it increased to a Category 4 hurricane. At 10 p.m., Hurricane Harvey made landfall at Rockport, Texas, as a Category 4

hurricane, and a presidential major disaster declaration (DR-4332) was issued for Texas.<sup>7</sup> On August 26, 2017, Hurricane Harvey was downgraded to a Category 1 hurricane as it continued to pass over land.

### *Hurricane Irma—September 4, 2017–October 18, 2017*

NHC identified Tropical Storm Irma on August 30, 2017. Irma progressed rapidly into a hurricane; by September 1, 2017, the storm had developed into a major hurricane, fluctuating between categories 2 and 3 until September 4, 2017. On September 5, 2017, Hurricane Irma became a Category 5 hurricane with a wind speed of 175 mph, and hurricane warnings were issued for the Bahamas and the Turks and Caicos. Simultaneously, an emergency declaration was issued for Puerto Rico (EM-3384), the USVI (EM-3383), and the State of Florida (EM-3385). On September 6, 2017, Hurricane Irma passed over multiple territories as a Category 5 hurricane: Barbuda at 2 a.m., St. Martin at 8 a.m., the USVI at 2 p.m., and Puerto Rico at 8 p.m. Extensive damage was reported all along Irma’s path, and widespread blackouts occurred in Puerto Rico. Fearing Hurricane Irma would continue along its projected path, the NHC issued hurricane and surge warnings for Florida on September 7, 2017; a major disaster declaration was also issued for the USVI (DR-4335).

Hurricane Irma’s path and intensity both continued as projected, striking the northern coast of Cuba as a Category 5 hurricane on September 8, 2017. As Irma approached the U.S. mainland, it downgraded to Category 4, ultimately making landfall at Cudjoe Key, Florida, on September 10, 2017, with a sustained wind speed of 130 mph. Later that day, Irma—losing force—veered out into the ocean and downgraded to a Category 3 hurricane before making a second U.S. landfall on Marco Island, Florida, ultimately becoming a Category 2 hurricane as it continued overland and dissipated. Major disaster declarations were also issued on September 10, 2017, for Puerto Rico (DR-4336) and the State of Florida (DR-4337).

### *Hurricane Maria—September 17, 2017–November 15, 2017*

NHC identified Tropical Storm Maria On September 16, 2017, approximately 620 miles east-southeast of the Lesser Antilles. Reminiscent of Hurricane Irma, Maria rapidly intensified into a major hurricane—being declared a Category 5 hurricane on September 17 and achieving a wind speed of 125 mph. On September 18, 2017, Hurricane Maria passed over the island of Dominica, devastating it. Observing the hurricane’s path and intensity, the President issued emergency declarations for Puerto Rico (EM-3391) and for the USVI (EM-3390). Hurricane Maria downgraded to a Category 4 hurricane just before it hit the island of St. Croix in the USVI on September 19, 2017. Staying true to course, Hurricane Maria next made landfall near Yabucoa, Puerto Rico, on September 20, 2017, as a Category 4 hurricane. With Puerto Rico already reeling

---

<sup>7</sup> For information on all the disaster and emergency declarations cited by number in this report, see FEMA, “Disasters,” search tool, 2018a.

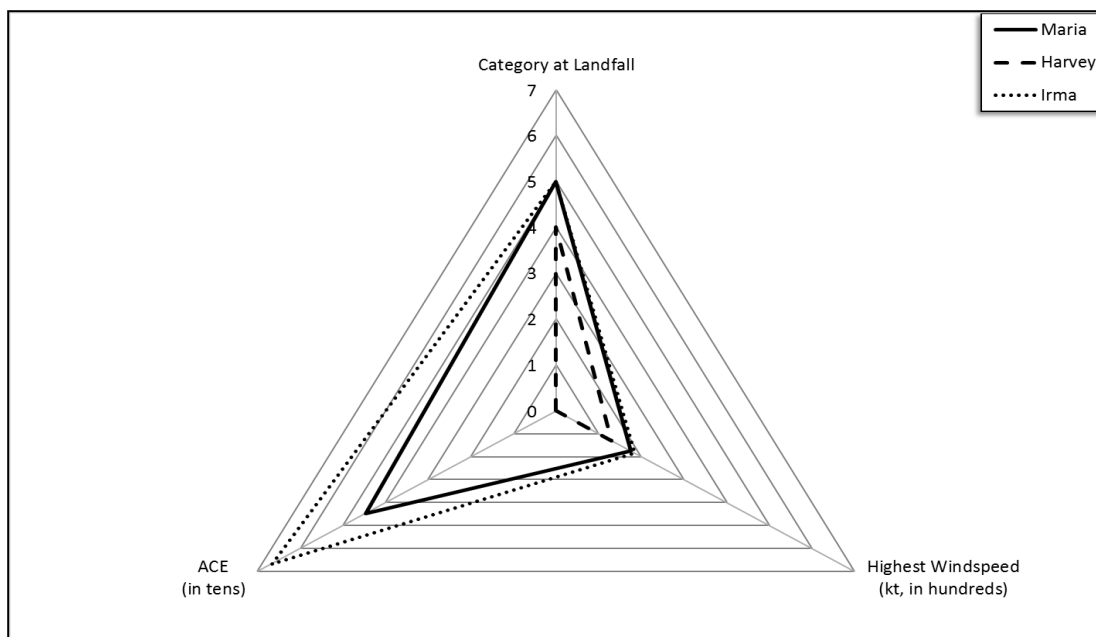
from Hurricane Irma, Maria caused an islandwide power outage, greatly affected the island’s water supply systems, and caused widespread destruction of homes and other buildings. A major disaster declaration was issued for Puerto Rico (DR-4339) later that day, as well as for the USVI (DR-4340), which also sustained a second round of damage. On September 22, 2017, the Turks and Caicos became the final territory Hurricane Maria hit—as a Category 3 hurricane—before it was finally downgraded to a tropical storm and continued back out into the ocean.

## Comparing the Characteristics of Hurricanes Maria, Harvey, and Irma

Hurricanes Maria, Harvey, and Irma shared very similar characteristics (see Figure 2.5): All were categorized as major hurricane (Category 4 or higher) at landfall; all attained maximum wind speeds of more than 120 mph; and all three contributed to an above-normal seasonal Accumulated Cyclone Energy (ACE) score.<sup>8</sup>

To put Hurricane Maria into perspective, Figure 2.6 compares the same characteristics used in Figure 2.5 across Hurricane Maria and two of the most devastating hurricanes to hit the United States in recent history: Hurricane Katrina (2005) and Hurricane Sandy (2012).

**Figure 2.5. Characteristic Comparison: Hurricane Maria, Hurricane Harvey, and Hurricane Irma**

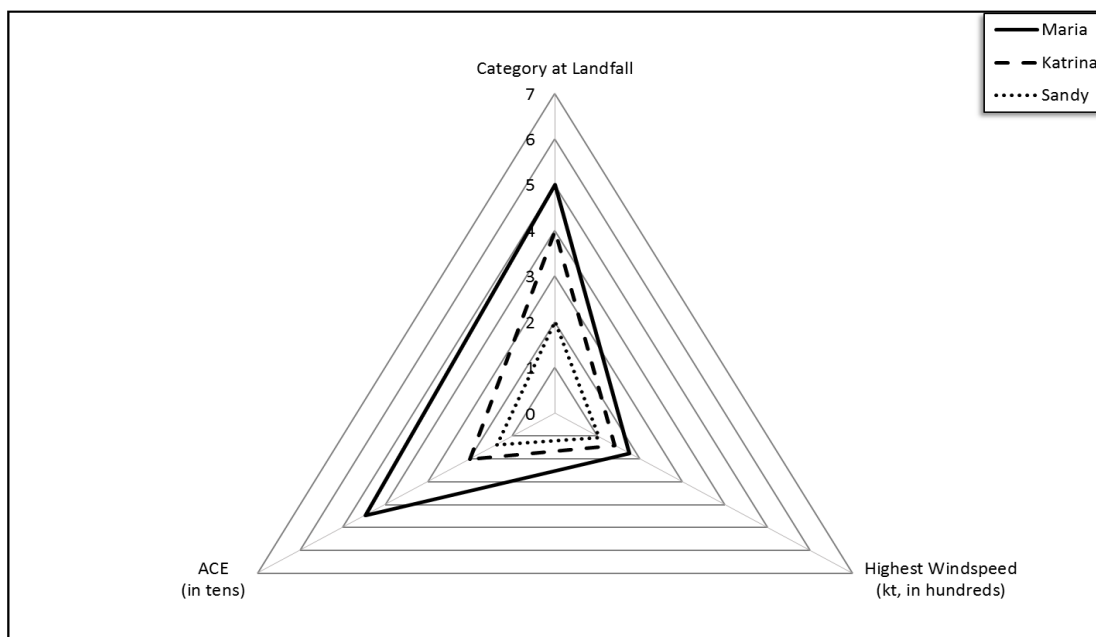


SOURCE: National Hurricane Center and Central Pacific Hurricane Center, “2017 Atlantic Hurricane Center,” webpage, undated.

<sup>8</sup> The ACE index is one measure of tropical cyclone activity that takes into account the combined strength and duration of tropical cyclones. See NOAA, “Hurricanes and Tropical Storms—Annual 2017,” webpage, January 2018d.

From Figure 2.6, it is clear that Hurricane Maria was the largest—with the highest hurricane category at the time of landfall, as well as the highest wind speed and ACE. Hurricane Katrina was a Category 4 at the time of landfall and had a maximum wind speed similar to that of Hurricane Maria but had a considerably lower ACE score. Both hurricanes, however, overshadow Hurricane Sandy, which made landfall at Category 2 and a relatively low maximum wind speed of 105 knots.

**Figure 2.6. Characteristic Comparison: Hurricane Maria, Hurricane Katrina, and Hurricane Sandy**



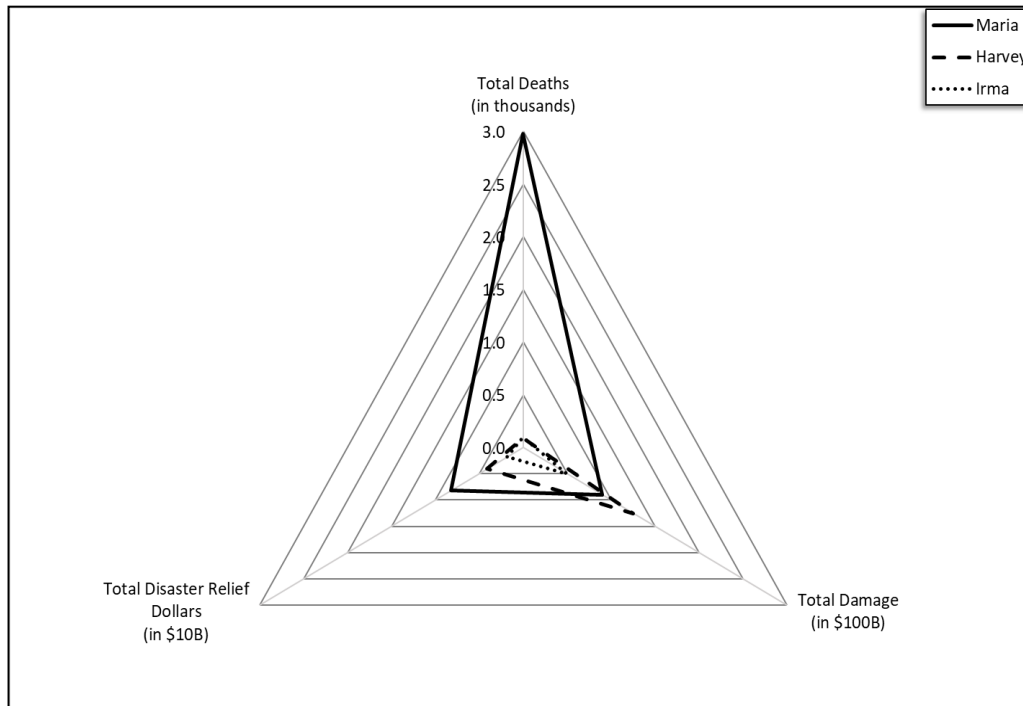
SOURCE: Based on data from NOAA, “State of the Climate,” search tool, 2018c; NOAA, “National Hurricane Center Tropical Cyclone Report: Hurricane Katrina,” 2005.

## Comparing the Impacts of Hurricanes Maria, Harvey, and Irma

The 2017 hurricane season was devastating in terms of impact.<sup>9</sup> The impacts of hurricanes Maria, Harvey, and Irma, in terms of total deaths, total damage, and total disaster relief dollars allocated, all differed somewhat (see Figure 2.7).

<sup>9</sup> For example, insured losses from Harvey, Irma, and Maria are estimated at \$92 billion, the second costliest Atlantic hurricane season after 2005, when Katrina struck (“2017 Saw Record Insured Losses from Disasters, Study Finds,” Associated Press, April 20, 2018).

**Figure 2.7. Impact Comparison: Hurricanes Maria, Harvey, and Sandy**



SOURCE: Based on data from FEMA, 2018a; FEMA, *Disaster Relief Fund: Monthly Report, as of July 31, 2018*, Washington, D.C., August 9, 2018g; NOAA, “Billion-Dollar Weather and Climate Disasters: Table of Events,” webpage, 2018a.

As shown in the figure, Maria resulted in a total of 2,975 deaths (65 individuals died as a direct result of the hurricane; an estimated 2,910 died of indirect causes).<sup>10</sup> In comparison, Irma caused 97 direct deaths, and Harvey resulted in 89. Another noticeable difference was the total damage inflicted during each hurricane: Hurricane Harvey incurred the most total damage (approximately \$126.3 billion); Hurricane Irma incurred the least (approximately \$50.5 billion); and Hurricane Maria fell in between (approximately \$91.8 billion). Finally, total disaster relief dollars allocated to each of the three hurricanes was between \$10 billion and \$20 billion. Table 2.1 breaks out the direct and indirect deaths in Harvey, Irma, and Maria.

<sup>10</sup> *Direct* deaths are those directly attributable to the storm, e.g., those resulting from structural collapse, flying debris, floods, and drownings. *Indirect* deaths are estimated on the basis of mortality in excess of what would have been expected based on historical experience. See Milken Institute School of Public Health and the University of Puerto Rico Graduate School of Public Health, *Ascertainment of the Estimated Excess Mortality from Hurricane Maria in Puerto Rico*, Washington, D.C., George Washington University, August 2018, and GAO, *Disaster Response: Federal Assistance and Selected States and Territory Efforts to Identify Deaths from 2017 Hurricanes*, Washington, D.C., GAO-19-486, September 2019.

**Table 2.1. Direct and Indirect Deaths in Hurricanes**

| <b>Hurricane</b> | <b>Direct Deaths</b> | <b>Indirect Deaths</b> |
|------------------|----------------------|------------------------|
| Harvey           | 89                   | N/A                    |
| Irma             | 97                   | N/A                    |
| Katrina          | 1,833                | N/A                    |
| Maria            | 65                   | 2,910                  |
| Sandy            | 160                  | N/A                    |

SOURCES: NHC; Milken Institute School of Public Health and the University of Puerto Rico Graduate School of Public Health, 2018.

Figure 2.8 compares the impacts of hurricanes Maria, Katrina, and Sandy. Maria’s estimated total of 2,975 direct and indirect deaths greatly exceeded Katrina’s 1,833 direct deaths and Sandy’s 160 direct deaths. A similar story can be seen in the total disaster relief allocated for each hurricane: As of April 2018, \$174 billion in disaster relief had been allocated to Sandy victims and \$126.6 billion to Katrina victims. To date, total disaster relief for Maria stood at \$16.4 billion in August 2018,<sup>11</sup> although that number will almost certainly continue to grow.

## Chapter Conclusions

Among the key features that distinguished Hurricane Maria from earlier hurricanes were the sheer scale and scope of the destruction, the expanse of water separating Puerto Rico from would-be responders in the U.S. mainland,<sup>12</sup> and the fact that Maria was the second major hurricane to hit Puerto Rico and the USVI in less than a month and the third major hurricane in overlapping time frames that required a federal and DoD response.<sup>13</sup>

As USNORTHCOM Operations (J3) summarized the post-Maria situation in Puerto Rico:

You have to remember, that the entirety of Puerto Rico was affected by this storm. All of these people were affected: the government, the National Guard, the first responders. Their homes, their roads, were all impacted. This alone helped create a logistical problem not present in any other response. Back in the U.S., during our Harvey and Irma response, the people in the Texas and Florida governments could still go to work. What occurred in Puerto Rico hindered the ability to organize a response.<sup>14</sup>

---

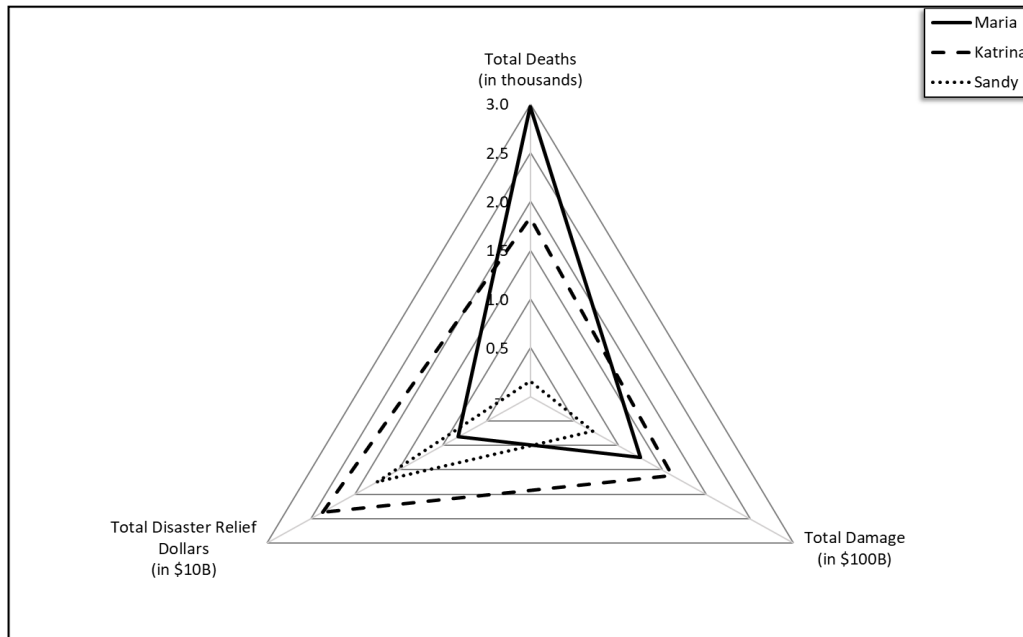
<sup>11</sup> FEMA, 2018g, p. 11. As of August 2018, total obligations for public assistance stood at \$5.7 billion, and obligations for individual assistance stood at \$2.5 billion. In addition, total obligations at that time also included \$79 million for mitigation, \$5.2 billion for operations, and \$2.9 billion for related administrative expenses. Most of the \$16.4 billion in total obligations—\$15.0 billion—was incurred in fiscal year 2018, which began on October 1, 2017.

<sup>12</sup> It is roughly 1,000 miles from Puerto Rico to Florida, for example.

<sup>13</sup> A recurring statement in our interviews, especially with FEMA personnel, was that, by the time Hurricane Maria struck Puerto Rico and the USVI, they were “out of Schlitz,” a play on the phrase from a 1960s beer commercial. (Interviews conducted between October 2017 and January 2018.)

<sup>14</sup> USNORTHCOM (2017e, p. 43), quoting the USNORTHCOM J3.

**Figure 2.8. Impact Comparison: Hurricanes Maria, Katrina, and Sandy**



SOURCES: Based on data from FEMA, 2018a; FEMA, 2018g; NOAA, 2018a.

The magnitude of the natural disaster shattered the ability of the Puerto Rico Emergency Management Agency (PREMA) to effectively lead the response operations. The Puerto Rico National Guard (PRNG), as well as Puerto Rico–stationed U.S. Army Reserve (USAR), were too small and were themselves partially incapacitated by the disaster and could not fully provide the personnel required to execute the necessary response operations. PREMA staff were unavailable, for example, and many members of the PRNG and USAR—many of whose homes were damaged or destroyed—were preoccupied meeting the urgent needs of their immediate families and neighbors or serving as first responders.<sup>15</sup>

As a result, on September 20, 500 of PRNG’s 8,000 members had been activated;<sup>16</sup> nine days later, on September 29, the number stood at 2,750.<sup>17</sup> In a similar vein, only 3 percent of USAR

<sup>15</sup> In its recovery plan, the Government of Puerto Rico acknowledged that “emergency services were immobilized” (Government of Puerto Rico, 2018, p. 69). The availability in the wake of a disaster of first responders—whether civilian or military—is an issue that could greatly reduce the effectiveness of local capabilities in future disasters and deserves more consideration than we are able to give it in this report.

<sup>16</sup> Juanita Philip and Jessica Barnett, “National Guard Assets Plan Relief Efforts as Hurricane Maria Slams Puerto Rico,” press release, September 20, 2017.

<sup>17</sup> Dan Lamothe, “Maria Hit 9 Days Ago. Less Than Half of the Puerto Rico National Guard Is on Duty.,” Washington Post, September 29, 2017. Moreover, the DSC (COL Narciso Cruz) reportedly did not assume command as DSC; General Reyes assumed the position of DSC about 12 days after Maria made landfall (interview with 1st Mission Support Command ([MSC]) official, November 10, 2017).

personnel had reported three days after Maria made landfall, and full accountability was not achieved until three weeks had passed.<sup>18</sup>

In effect, Hurricane Maria left the commonwealth unable to carry most of the burden of the necessary response and recovery operations or to provide clear direction to DoD and its interagency and state partners. Under these conditions, the response to Hurricane Maria required significant adaptation and improvisation on the part of FEMA and USARNORTH's JFLCC.

As will be discussed further in subsequent chapters, the resulting vacuum at the local and commonwealth levels limited the ability of local, commonwealth, federal, and other state responders to quickly and effectively mass response and recovery capabilities. This vacuum also posed great challenges for federal, DoD, and National Guard responders operating under the Emergency Management Assistance Compact (EMAC),<sup>19</sup> whose efforts typically are predicated on the assumption that local and state (or commonwealth) officials will make specific RFAs that, once authenticated, can then be translated into MAs and MATOs that address identified needs.

Filling the response vacuum Hurricane Maria created required significant adaptation and improvisation on the part of FEMA and USARNORTH's JFLCC.

In the next chapters, we provide, respectively, a more-detailed description of the framework for federal disaster responses (Chapter 3) and an overview of the response to Hurricane Maria (Chapter 4). In later chapters, we look more closely at specific aspects of USARNORTH's response, as indicated by our research questions.

---

<sup>18</sup> Interview with 1st MSC official, November 10, 2017.

<sup>19</sup> EMAC is the nation's state-to-state mutual aid system, which has been ratified by U.S. Congress and is law in all 50 states, the District of Columbia, Puerto Rico, Guam, and the USVI (Pub. L. 104-321, Joint Resolution Granting the Consent of Congress to the Emergency Management Assistance Compact, October 19, 1996). Under EMAC, governors can request assistance the assistance of National Guard forces from other governors. The requesting state uses a Request for Assistance (RFA) form to ask for specific support from an assisting state; the assisting state then offers to provide the requested support at a specified reimbursement cost. Once the requesting state accepts the offer, the agreement is treated as a contract. Under EMAC, assisting states can deploy National Guard personnel to requesting states for humanitarian purposes either under state active duty (SAD) or under Title 32. In the case of hurricanes Harvey, Irma, and Maria, the Secretary of Defense did not authorize the use of Title 32 funds for National Guard efforts. Rather, all the National Guard responders were under SAD status, and the requesting states reimbursed the costs. National Guard forces also can also be federalized and operate under Presidential C2; deployment under Title 10 is outside EMAC, and costs are reimbursed by the federal government. See National Emergency Management Association, Emergency Management Assistance Compact website, undated., and other web pages at this site.

### 3. The Framework for Federal Responses

---

The involvement of military forces (Title 10) in disaster responses is regulated by provisions of the Stafford Act of 1988 and various additional authorities, including statutory, policy, doctrinal, and other guidance.<sup>1</sup> This chapter provides background on the basic authorities, frameworks, and plans that guide the conduct of domestic disaster responses, including DSCA.

The chapter begins with an overview of the basic authorities for federal disaster response, then describes national-level preparedness guidance and DoD's role in supporting disaster response efforts, and then discusses the MA process and the specific roles of USNORTHCOM and USARNORTH.

#### Basic Authorities for Federal Disaster Responses

The Stafford Act of 1988 provides the basic authorities and framework for federal emergency management activities in support of state, local, tribal, or territorial (SLTT) responses to major disasters and emergencies. How much support these authorities receive from the federal government depends heavily on the severity of the incident, the specific authorities invoked, and the capabilities of the SLTT entities to manage the incident.<sup>2</sup> Figure 3.1 depicts the different federal entities responsible for coordinating a federal response to an incident.

The Stafford Act states in part that: "All requests for a declaration by the President that a major disaster exists shall be made by the Governor of the affected State," although this authority has since been extended to other SLTT actors.<sup>3</sup> Accordingly, when the resources of local and state authorities appear about to be or have become overwhelmed, a governor will request federal assistance, and the President will declare a major disaster, directing the secretary of DHS to coordinate a federal response.<sup>4</sup> The secretary typically delegates responsibility for coordination of a Stafford Act response to the FEMA administrator (FEMA is DHS's executive agent), who in turn delegates responsibilities to a federal coordinating officer (FCO), who has authority to task and fund federal agencies lacking their own authority to save lives and protect property.

---

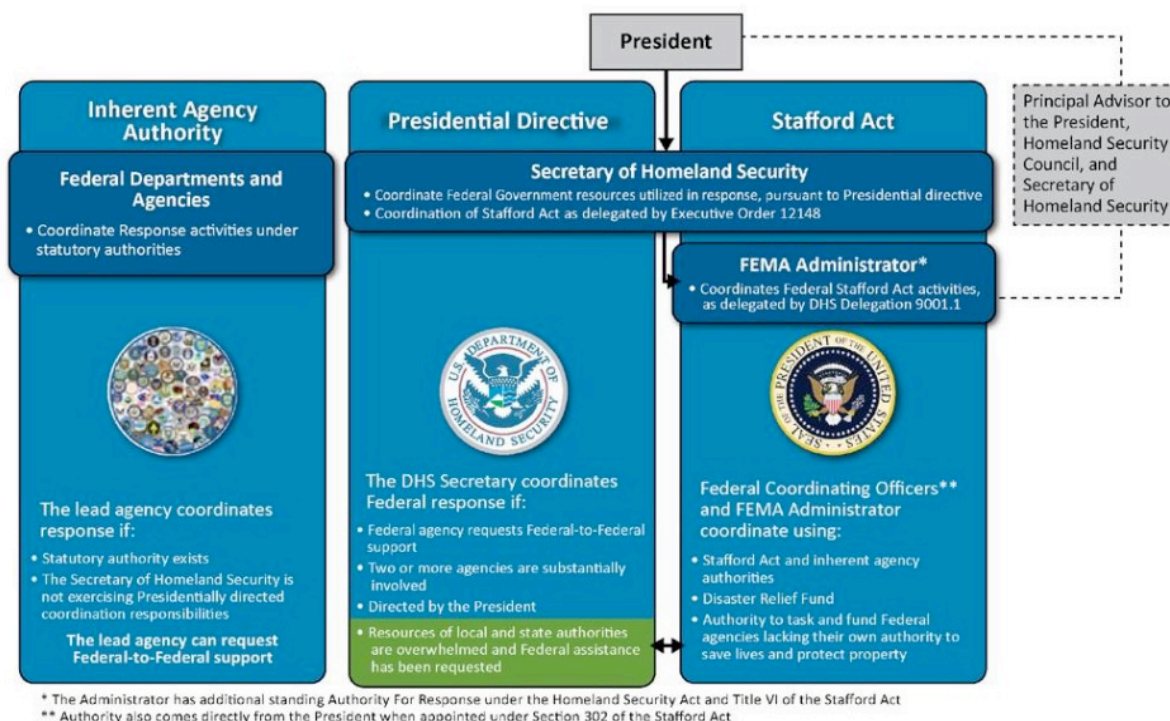
<sup>1</sup> Pub. L. 100-707, 1988, as amended. In this report, Title 10 refers to forces on active duty at the federal level.

<sup>2</sup> FEMA, 2016a, p. 13.

<sup>3</sup> Pub. L. 100-707, 1988, §401. In this context, the term *state* also includes the District of Columbia, the Commonwealth of Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands. The Republic of Marshall Islands and the Federated States of Micronesia are also eligible to request a declaration and receive assistance through the Compacts of Free Association. In addition, as a result of the Sandy Recovery Improvement Act (Division B of Pub. L. 113-2, Disaster Relief Appropriations Act, 2013, January 29, 2013), federally recognized Indian tribal governments now have the option of pursuing a declaration directly from the President. FEMA, "The Disaster Declaration Process," webpage, January 8, 2018b.

<sup>4</sup> DHS is the lead federal agency for preparation for, response to, and recovery from major disasters and catastrophic events.

**Figure 3.1. Authorities and Process for Coordination of a Federal Disaster Response**



SOURCE: FEMA, *Response Federal Interagency Operational Plan*, Washington, D.C., August 2016a, p. 13.

## National-Level Preparedness Guidance

DHS and FEMA have developed an integrated set of documents providing overall guidance for federal responses to major disasters and emergencies. Among the more notable of these are the following:

- *National Preparedness Goal*<sup>5</sup>—This document promotes a “secure and resilient Nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk,” to be achieved by using 32 core capabilities that support the five preparedness mission areas: prevention, protection, mitigation, response, and recovery.
- *National Preparedness System*<sup>6</sup>—This document “outlines an organized process for the whole community to move forward with its preparedness activities and achieve the National Preparedness Goal.”<sup>7</sup>

<sup>5</sup> DHS, *National Preparedness Goal*, 2nd ed., Washington, D.C., September 2015. The relationship between the five missions and 32 core capabilities is described in FEMA, “Mission Areas,” webpage, May 2, 2018d.

<sup>6</sup> DHS, *National Preparedness System*, Washington, D.C., November 2011.

<sup>7</sup> DHS, 2016a, p. 1.

- *National Response Framework*<sup>8</sup>—This document “provides the structure and mechanisms for national level policy of incident response”<sup>9</sup> and “a guide to how the Nation responds to all types of disasters and emergencies . . . [and] is always in effect and describes the doctrine under which the Nation responds to incidents.”<sup>10</sup>
- *National Incident Management System*<sup>11</sup>—is a companion document to the NRF that “provides a consistent nationwide template to enable partners across the Nation to work together to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity.”<sup>12</sup>
- *Federal Interagency Operational Plans (FIOPs)*<sup>13</sup>—Each of the five preparedness mission areas—prevention, protection, mitigation, response, and recovery—has a plan that “describe[s] how the federal government aligns resources and delivers core capabilities.”
- *Emergency Support Function Annexes*<sup>14</sup>—These “provide the structure for coordinating federal interagency support for a federal response to an incident. These are mechanisms for grouping functions most frequently used to provide federal support to states and federal-to-federal support, both for declared disasters and emergencies under the Stafford Act and for non-Stafford Act incidents.”

Together, these documents provide the foundation for disaster response efforts and interagency operations and coordination. We next describe the NRF and NIMS as they relate to DoD roles and functions.

### *The National Response Framework*

Figure 3.2 depicts the different layers involved in incident responses and the process that can lead to a request for DoD assistance.

---

<sup>8</sup> DHS, 2016a is the framework’s base document. Additional elements of the framework include the emergency support function (ESF) annexes, support annexes, and incident annexes, and partner guides (DHS, 2016, p. 2).

<sup>9</sup> “How does NIMS relate to the National Response Framework (NRF)?” in DHS, “NIMS: Frequently Asked Questions,” Washington, D.C., undated a.

<sup>10</sup> DHS, 2016a, p. i. In 2004, the Homeland Security Council developed 15 planning scenarios designed to identify assets needed in response to emergencies, and these planning scenarios, one for each ESF, formed the basis for the development of the NRF (GAO, *Homeland Defense: DoD Can Enhance Efforts to Identify Capabilities to Support Civil Authorities During Disasters*, Washington, D.C., GAO-10-386, March 2010, p. 9).

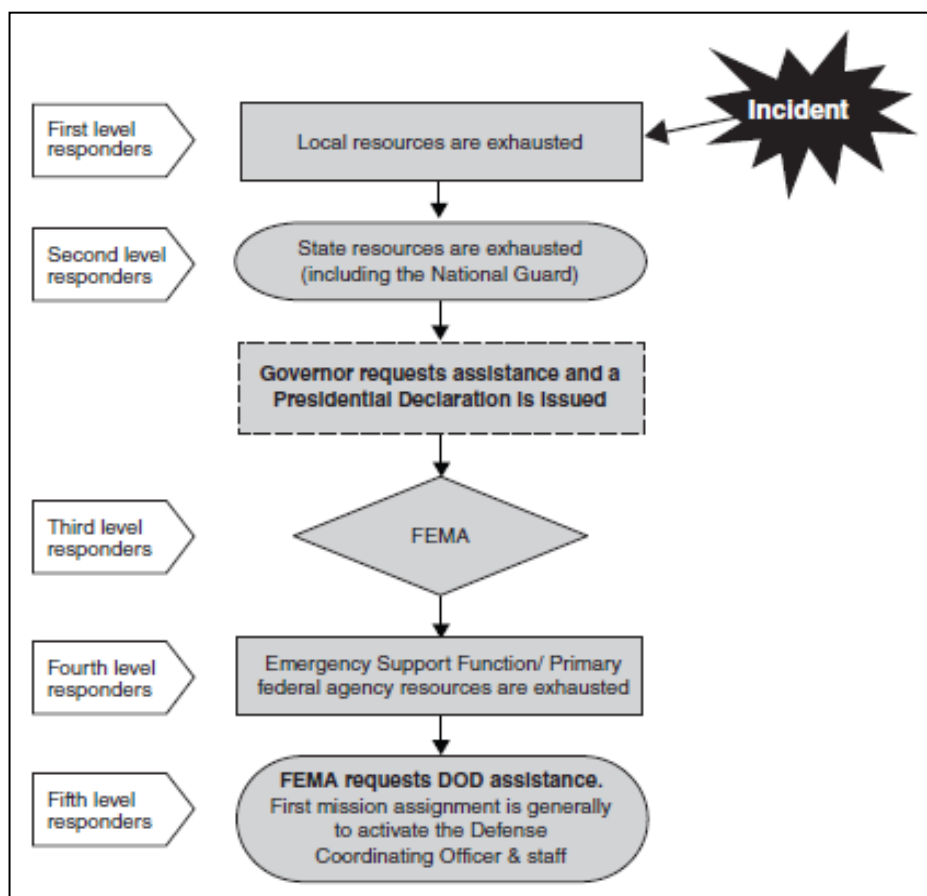
<sup>11</sup> FEMA, 2017c.

<sup>12</sup> FEMA, 2017c, p. iii.

<sup>13</sup> FEMA, “Federal Interagency Operational Plans,” webpage, updated May 2, 2018c. As of May 2018, four of the five plans were available for download.

<sup>14</sup> As of May 2018, the 15 ESF annexes were available at FEMA, “Emergency Support Function Annexes,” webpage, updated September 13, 2016b. The ESFs require the capabilities of different departments and agencies executing their core competencies in response to an incident (FEMA, 2016a, p. 15).

Figure 3.2. National Response Framework



SOURCE: GAO, *Homeland Defense: DoD Can Enhance Efforts to Identify Capabilities to Support Civil Authorities During Disasters*, Washington, D.C., GAO-10-386, March 2010, p. 12.

As the figure suggests, the NRF makes clear that any incident response should be tiered and handled *at the lowest possible level that is capable of handling the disaster or emergency*. As shown, when local and state capacity are judged inadequate for a disaster response, the governor of a state, commonwealth, or territory requests assistance, and the President issues a major disaster declaration.<sup>15</sup> FEMA, as the executive agent for DHS, is responsible for coordinating the federal response to a disaster once the President has made the declaration and for integrating these efforts into SLTT efforts to foster unity of effort across all responders.<sup>16</sup>

Requests for DoD assistance usually begin with a request that the Secretary of Defense activate a DCO, who can assist the FCO in managing DoD contributions to the response. Once the Secretary of Defense authorizes forces, DoD personnel essentially act as the fifth-level

<sup>15</sup> Recall that the Stafford Act defines *state* as referring to any state of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

<sup>16</sup> GAO, *Homeland Defense: DoD Can Enhance Efforts to Identify Capabilities to Support Civil Authorities During Disasters*, Washington, D.C., GAO-10-386, March 2010, p. 10.

responders and can provide capabilities and capacity to assist lead federal agencies in the performance of their respective ESFs. Unity of effort is generally achieved through the principle that DoD is in a supporting role to FEMA and the lead federal agencies and is not in competition with them.

### *The National Incident Management System*

As noted earlier, the NIMS provides a common framework for all supporting agencies to cooperate and communicate during crisis management and emergency and disaster responses. It provides a structure, common processes, and terminology that enable agencies with varying roles and capabilities to work together toward a clear end state.<sup>17</sup>

Figure 3.3 depicts how the NIMS envisions federal agencies will work with SLTT emergency managers to respond to an incident and set the conditions for recovery. As shown, incident management can be a complicated process because federal departments and agencies have differing authorities, and all must work toward meeting the specific RFAs that the state or territory generates.

According to NIMS, local emergency management officials generally retain command of incident response efforts and employ emergency operations centers (EOCs) to integrate their efforts with contributions from other localities and nongovernmental organizations (NGOs). Incidents typically begin and end locally and are managed on a daily basis at the lowest possible geographical, organizational, or jurisdictional level.<sup>18</sup> Local RFAs are generally cleared through a state EOC and may be resourced through state assets; the assets of other states that are linked via EMAC; or, when these capabilities have become exhausted, federal capabilities.<sup>19</sup>

In the last case, FEMA typically acts as the lead federal agency and works closely with the state EOC to clarify RFAs and translate them into MAs and MATOs that apply specific federal capabilities and resources to these requirements.

Figure 3.4 provides additional detail on the integration of coordination and command functions among local, state, and field- and national-level federal responders within NIMS. This system can be ideal for a single incident, including one that covers a very large area, because it encourages effective cross-jurisdiction coordination and information sharing.

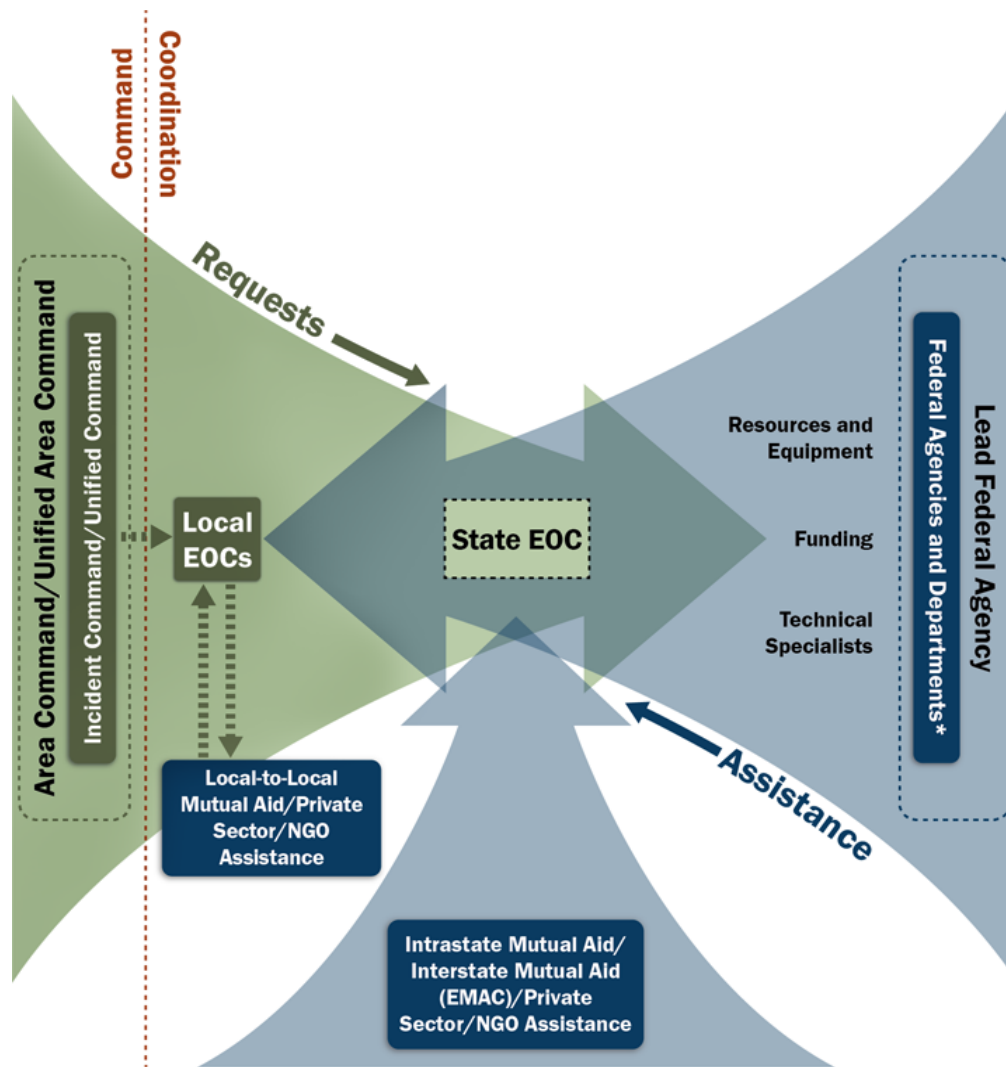
---

<sup>17</sup> FEMA, 2017c, p. 47.

<sup>18</sup> DoD, *Defense Support of Civil Authorities Handbook: Tactical Level Commander and Staff Toolkit*, Washington, D.C.: Government Printing Office, GTA 90-01-020, July 2010b.

<sup>19</sup> All the National Guard forces operated under SAD status; none were operating under Title 32 (National Guard) or Title 10 (Armed Forces).

**Figure 3.3. Federal Support to Response Activities in NIMS**



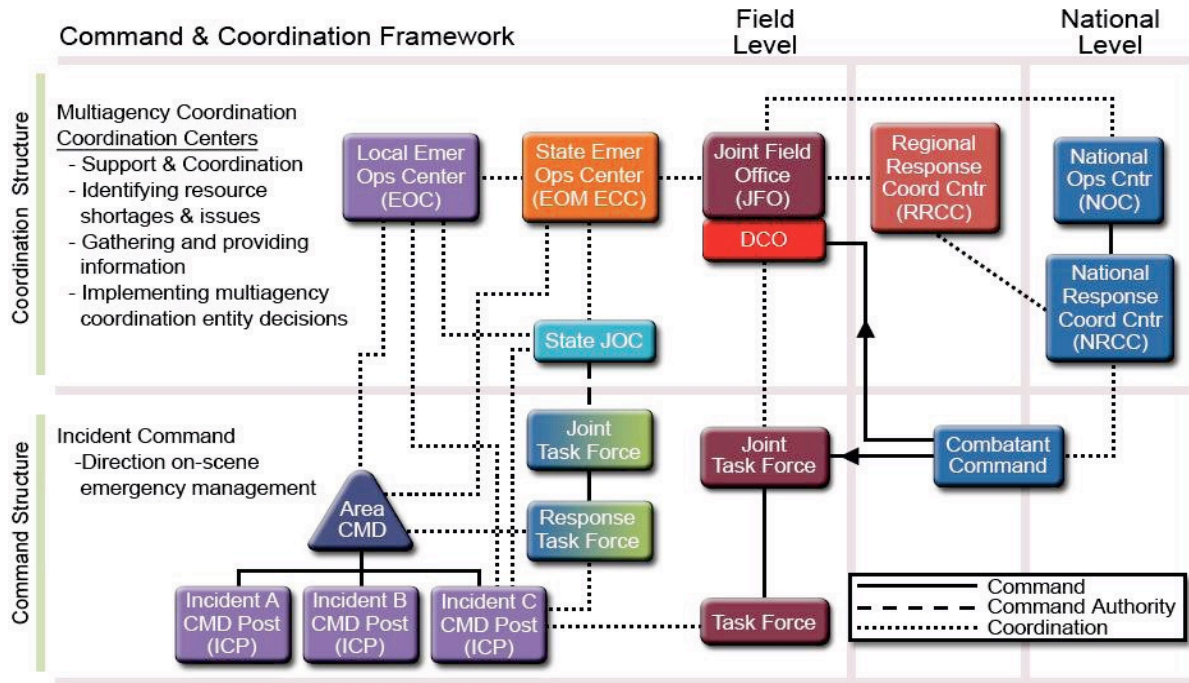
\*Some Federal agencies (U.S. Coast Guard, Environmental Protection Agency, etc.) have statutory responsibility for response and may coordinate and/or integrate directly with affected jurisdictions. During responses conducted under Stafford Act declarations, FEMA establishes a Joint Field Office (JFO) to coordinate Federal response activities.

SOURCE: FEMA, 2017c, p. 48.

There is, however, a deliberate delineation between command authority and coordination authority in this structure: Coordination is accomplished through several coordination centers, including a local EOC; a state EOC and joint operations center; FEMA's joint field office (JFO), which includes a DCO, FEMA's regional response coordination centers (RRCCs), and National Response Coordination Center (NRCC); and DHS's National Operations Center (NOC). Coordination officers have the authority to make only the decisions within their jurisdictions.<sup>20</sup>

<sup>20</sup> DoD, 2010b, p. 2-6.

**Figure 3.4. NIMS Command and Coordination Framework**



SOURCE: DoD, 2010b, p. 2-4.

NOTE: CMD = command; ECC = Emergency Coordination Center.

Meanwhile, command authority resides with the incident commander for a single incident or the area commander for multiple incidents, and the incident command structure can include area commands, state and federal task forces (TFs), and Title 10 combatant commands.

When using a JFO, both FEMA and the Secretary of Homeland Security recommend a FCO to oversee federal operations. The FCO, appointed by the President, is responsible for integrating all federal activities when assisting state and local authorities during a catastrophe.<sup>21</sup> The FCO works with state and local governments—who remain in the lead—and ensures that appropriate federal assistance is available to address the problem at hand. The JFO also is responsible for providing a common operational picture (COP) to all federal agencies.<sup>22</sup>

## The Department of Defense's Role in Disaster Responses

The Stafford Act prescribes federal department and agency roles in responding to a major disaster or emergency. Under the Stafford Act, it is the responsibility of the Secretary of Defense

<sup>21</sup> Army Doctrine Reference Publication (ADRP) 3-28, *Defense Support of Civil Authorities*, June 2013, p. 1-18.

<sup>22</sup> Lynn E. Davis, Jill Rough, Gary Cecchine, Agnes Gereben Schaefer, and Laurinda L. Zeman, *Hurricane Katrina: Lessons for Army Operations and Planning*, Santa Monica, Calif.: RAND Corporation, MG-603-A, 2007, p. 13, citing DHS, National Response Plan, Washington, D.C., 2004, p. 16. Neither the current (2016) NRF nor FEMA, 2016a, mentions that the JFO is responsible for providing a COP.

to ensure the availability of assets within DoD that will be used to support civil authorities under the NRF.<sup>23</sup>

Table 3.1 gives a more detailed overview of authorities and references related to DoD in disaster and other DSCA responses.

**Table 3.1. DoD Authorities and References for Natural and Man-Made Disasters and Emergencies**

| Key Authority or Reference                                                                                                                                                                | Description                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Stafford Act (Pub. L. 100-707, 1988, as amended)                                                                                                                                          | Establishes the President's ability to declare an emergency or major disaster, thereby permitting mobilization of federal assistance. FEMA reimburses DoD pursuant to this authority.                                                                                                              |
| U.S. Code, Title 31, Money and Finance, Subtitle II, The Budget Process, Subchapter III, Transfers and Reimbursements, Section 1535, Agency Agreements, (also known as "The Economy Act") | Provides authority for the provision of support and reimbursement from one federal department or agency to another for goods or services. This authority is rarely used when there is a Stafford Act declaration for major disasters and emergencies.                                              |
| Code of Federal Regulations (CFR), Title 44, Part 206, Federal Disaster Assistance                                                                                                        | FEMA regulations that implement the Stafford Act and provide that FEMA reimburse DoD for incremental costs.                                                                                                                                                                                        |
| Homeland Security Presidential Directive-5, <i>Management of Domestic Incidents</i> , February 28, 2003                                                                                   | Directs the Secretary of Homeland Security to develop and administer the NIMS and NRF.                                                                                                                                                                                                             |
| Presidential Policy Directive 8, <i>National Preparedness</i> , March 30, 2011                                                                                                            | Guidance that seeks to strengthen the security and resilience of the United States through systematic preparation for the threats that pose the greatest risk to U.S. security, including acts of terrorism, cyberattacks, pandemics, and catastrophic natural disasters.                          |
| Executive Order 12656, <i>Assignment of Emergency Preparedness Responsibilities</i> , November 18, 1988                                                                                   | Assigns national security emergency preparedness responsibilities to federal departments and agencies.                                                                                                                                                                                             |
| Executive Order 13618, <i>Assignment of National Security and Emergency Preparedness Communications Functions</i> , July 6, 2012                                                          | Directs the Secretary of Defense to oversee the development, testing, implementation, and sustainment of national security and emergency preparedness communications that are directly responsive to the national security needs of the President, Vice President, and senior national leadership. |
| NRF (DHS, 2013)                                                                                                                                                                           | Presents the guiding principles that enable all response partners to prepare for and provide a unified national response to disasters and emergencies, from the smallest incident to the largest catastrophe.                                                                                      |
| Department of Defense Directive (DoDD) 3025.18, <i>Defense Support of Civil Authorities (DSCA)</i> , Washington, D.C., December 29, 2010, incorporating change 1 dated September 21, 2012 | Establishes DoD policy and assigns responsibilities for DSCA, including for incidents involving natural and man-made disasters; provides guidance for the execution of DSCA; authorizes immediate response authority.                                                                              |
| DoD Instruction (DoDI) 3001.02, <i>Personnel Accountability in Conjunction with Natural or Manmade Disasters</i> , May 3, 2010                                                            | Specifies accounting and reporting of DoD-affiliated personnel following a natural or man-made disaster.                                                                                                                                                                                           |
| DoDI 6055.17, <i>DoD Emergency Management (EM) Program</i> , February 13, 2017, change 3 June 12, 2019                                                                                    | Provides guidance for "all hazards" emergency management programs at DoD installations.                                                                                                                                                                                                            |
| DoD 7000.14-R, <i>Department of Defense Financial Regulation (DoD FMR)</i> , Vol.11A:                                                                                                     | Provides procedures for reimbursement for support provided pursuant to the Economy Act, including during major disasters and emergencies.                                                                                                                                                          |

<sup>23</sup> 42 U.S. Code (U.S.C.), Section 5121 et seq.; The Stafford Act, as amended; and emergency-related provisions of Pub. L. 107-296, Homeland Security Act of 2002, November 25, 2002, as amended; and FEMA, 2016a.

| Key Authority or Reference                                                                                                                                                                                                                                                                                                                                                                                                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Reimbursable Operations Policy</i> , Ch. 3, "Economy Act Orders," March 2012; DoD 7000.14-R, <i>Department of Defense Financial Regulation (DoD FMR)</i> , Vol. 11A: <i>Reimbursable Operations Policy</i> , Ch. 1, "General Reimbursement Procedures and Supporting Documentation," November 2014; DoD 7000.14-R, <i>Department of Defense Financial Regulation (DoD FMR)</i> , Vol. 11A: <i>Reimbursable Operations Policy</i> , Ch. 4, "User Fees," July 2016 | Provides policy and procedures for establishing appropriate fees for authorized services that DoD organizations supply.                                                                                                                                                                                                                                                                                                                                  |
| DoD 7000.14-R <i>Department of Defense Financial Regulation (DoD FMR)</i> , Vol. 12: <i>Special Accounts, Funds and Programs</i> , Ch. 23, "Contingency Operations," December 2017                                                                                                                                                                                                                                                                                  | Specifies incremental costs that are eligible for reimbursement, including for DoD support in response to major disasters and emergencies.                                                                                                                                                                                                                                                                                                               |
| Standing DSCA EXORD                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Delegates limited approval authority to combatant commanders with DSCA responsibilities, normally commander, USNORTHCOM (CDRUSNORTHCOM) or commander, U.S. Pacific Command (USPACOM), <sup>a</sup> for routine and historical RFAs to provide a rapid and flexible DoD response to other federal departments and agencies for potential or actual disasters or emergencies within the United States and its territories, possessions, and protectorates. |
| Domestic Chemical, Biological, Radiological, Nuclear (CBRN) Response EXORD                                                                                                                                                                                                                                                                                                                                                                                          | Directs DoD to maintain and be prepared to provide a domestic CBRN response capability. Delegates limited approval authority to CDRUSNORTHCOM and commander, USPACOM to provide a rapid and flexible federal response for domestic CBRN emergencies and disasters.                                                                                                                                                                                       |
| JP 3-28, 2013                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Provides guidelines and principles for DSCA, including in response to incidents, such as major disasters and emergencies.                                                                                                                                                                                                                                                                                                                                |
| SOURCE: Adapted from Department of Defense Manual (DoDM) 3025.01, Vol. 2, <i>Defense Support of Civil Authorities: DoD Incident Response</i> , Washington, D.C., August 11, 2016, pp. 13–14.<br><sup>a</sup> Subsequent to the period of our research, USPACOM was renamed as U.S. Indo-Pacific Command (USINDOPACOM).                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

The key authorities for DoD DSCA can be summarized as follows:

- The authorities for provision of DSCA are found in U.S. law, DoD policy, Chairman of the Joint Chiefs of Staff (CJCS) orders, and combatant commander orders.
- The authorities for DoD components to conduct DSCA operations are found in DoDD 3025.18 and standing CJCS, USNORTHCOM, and USPACOM DSCA EXORDs.<sup>24</sup>
- JP 3-28 and service-specific doctrine and tactics, techniques, and procedures provide additional implementation guidance.<sup>25</sup>

DoDD 3025.18 provides DoD policy on DSCA, as follows:

d. Provides guidance for the execution and oversight of DSCA when requested by civil authorities or by qualifying entities and approved by the appropriate DoD official, or as directed by the President, within the United States, including the

<sup>24</sup> The most recent version of the directive is DoDD 3025.18, *Defense Support of Civil Authorities (DSCA)*, Washington, D.C., December 29, 2010, change 2, Effective March 19, 2018.

<sup>25</sup> JP 3-28, 2013; ATP 3-28.1, *DSCA: Multi-Service Tactics, Techniques, and Procedures for Defense Support of Civil Authorities (DSCA)*, Air Land Sea Application Center, September 2015, p. 2.

District of Columbia, the Commonwealth of Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and any territory or possession of the United States or any political subdivision thereof.

e. Authorizes immediate response authority for providing DSCA, when requested.<sup>26</sup>

As previously noted, the basic premise of DoD's DSCA planning that is shared with the NRF and NIMS is that all incidents are generally handled at the lowest jurisdictional level possible. For the vast majority of incidents, local resources and assistance will be the first line of emergency response. Assistance from DoD is typically requested only when SLTT and federal civilian capabilities are insufficient to meet the requirements of an incident.

DoD guidance dictates that the commanders of USNORTHCOM and USINDOPACOM are the supported combatant commanders for DSCA responses in their respective areas of responsibility (AORs).<sup>27</sup> Under this construct, DoD functions under standard DSCA doctrine and reports through normal DoD channels.

In addition, some DoD organizations have the authority to provide direct support to FEMA. For example, DoD is the lead federal agency for coordinating ESF 3 (Public Works and Engineering<sup>28</sup>) and is a supporting agency for ESF 6 (Mass Care, Housing, and Human Services).<sup>29</sup> U.S. Transportation Command (USTRANSCOM) and the Defense Logistics Agency also can play key roles in logistics and sustainment in disaster relief operations. The Defense Logistics Agency serves as the supplier for DoD forces, and USTRANSCOM identifies transportation shortfalls and synchronizes movement and force flows to support operations.<sup>30</sup>

We also note that the Joint Chiefs of Staff developed a DSCA standing EXORD that preidentifies typical forces that a supported combatant commander may use for DSCA responses, basing the EXORD on an analysis of historical requests for DoD assistance.<sup>31</sup>

---

<sup>26</sup> DoDD 3025.18, 2018, p. 1.

<sup>27</sup> DoDM 3025.1, 2016, p. 12. According to JP 3-28, 2018, p. xiv: "For DSCA operations, SecDef designates a supported combatant commander. Ordinarily, this will be Commander, US Northern Command, for the continental US, Alaska, Puerto Rico, and the US Virgin Islands and Commander, US Pacific Command, for Hawaii, Guam, American Samoa, and the Northern Mariana Islands." These commanders also have responsibilities for humanitarian assistance and disaster relief in their respective AORs. For USNORTHCOM, this covers the Gulf of Mexico; the Straits of Florida; and portions of the Caribbean region, including the Bahamas and, for USINCPACOM, the 36 nations in its AOR (U.S. Northern Command, "About USNORTHCOM," webpage, undated, and U.S. Indo-Pacific Command, "About USINDOPACOM," webpage, undated).

<sup>28</sup> DoD delegates this role to its executive agent, the U.S. Army Corps of Engineers (USACE).

<sup>29</sup> JP 3-28, 2013, p. V-8.

<sup>30</sup> JP 3-28, 2013, pp. V-6 to V-7.

<sup>31</sup> GAO, *Homeland Defense: DoD Can Enhance Efforts to Identify Capabilities to Support Civil Authorities During Disasters*, Washington, D.C., GAO-10-386, March 2010, p. 39. The standing EXORD is reissued on an annual basis. For an example, see CJCS, "Defense Support of Civil Authorities," August 14, 2009, and CJCS, "Defense Support of Civil Authorities (DSCA) Standing EXORD," September 10, 2010, as cited in CJCS Instruction 3125.01C, *Defense Response to Chemical, Biological, Radiological, and Nuclear (CBRN) Incidents in the*

## The Mission Assignment Process in Brief

FEMA uses MAs to task other federal agencies in disaster responses and to ensure that all direct assistance outside FEMA is managed and reimbursed accordingly.<sup>32</sup>

Figure 3.5 describes the process for assigning missions to DoD. After federal agency RFAs are processed by the DoD executive secretary, the DCO coordinates with the supported federal agency (typically FEMA) to develop and validate RFAs. The Assistant Secretary of Defense for Homeland Defense and Global Security and the Joint Director of Military Support (JDOMS) processes orders for Secretary of Defense approval, and once approved, these orders are issued to the combatant commander or services.

As a practical matter, FEMA simultaneously forwards state RFAs from DoD to USNORTHCOM's Operations Center and to the JDOMS in the Joint Staff.<sup>33</sup> This allows USNORTHCOM to plan in parallel and to begin coordination with all parties involved while awaiting final approval from the Secretary of Defense before taking action. This coordination includes validation of state RFAs by the DCO in the affected region. RFAs are routed through the Joint Chiefs of Staff and to the Secretary of Defense for approval, with the final approval issued through JDOMS.<sup>34</sup> Once the MAs are approved, the DCO forwards them to subordinate and supporting defense organizations to ensure the proper use of DoD resources.<sup>35</sup>

In response to the Post-Katrina Emergency Management Reform Act of 2006,<sup>36</sup> several actions were taken to speed the employment of federal capabilities during responses to major disasters and emergencies. One such action was the development of pre-scripted MAs (PSMAs), which can reduce unnecessary delays in federal responses by providing a sense of likely assets and the funding that would be required.<sup>37</sup> FEMA and DoD define PSMAs as follows:

FEMA: A preliminary statement of work [SOW] and cost estimate developed prior to an incident by FEMA and an OFA [Office of Federal Assistance].

DoD: A preliminary statement of work [SOW] prepared and agreed upon jointly by a department or agency with responsibilities in the NRF and FEMA. It is

---

*Homeland*, Washington, D.C., June 4, 2012. In addition to the DSCA standing EXORD, the CJCS publishes a CBRN response EXORD, e.g., CJCS "CBRN Response EXORD," June 21, 2011, as cited in CJCS Instruction 3125.01C, 2012.

<sup>32</sup> DoD, 2010b, p. F-1; FEMA, *2017–2019—FEMA Daily Mission Assignments*, July 26, 2018f. We will return to questions related to MAs in the response to Hurricane Maria in Chapter Six.

<sup>33</sup> In May 2003, DSCA functions within DoD were transferred from the Director of Military Support, which was under the Secretary of the Army, to the JDOMS within the Joint Staff's J-3 organization.

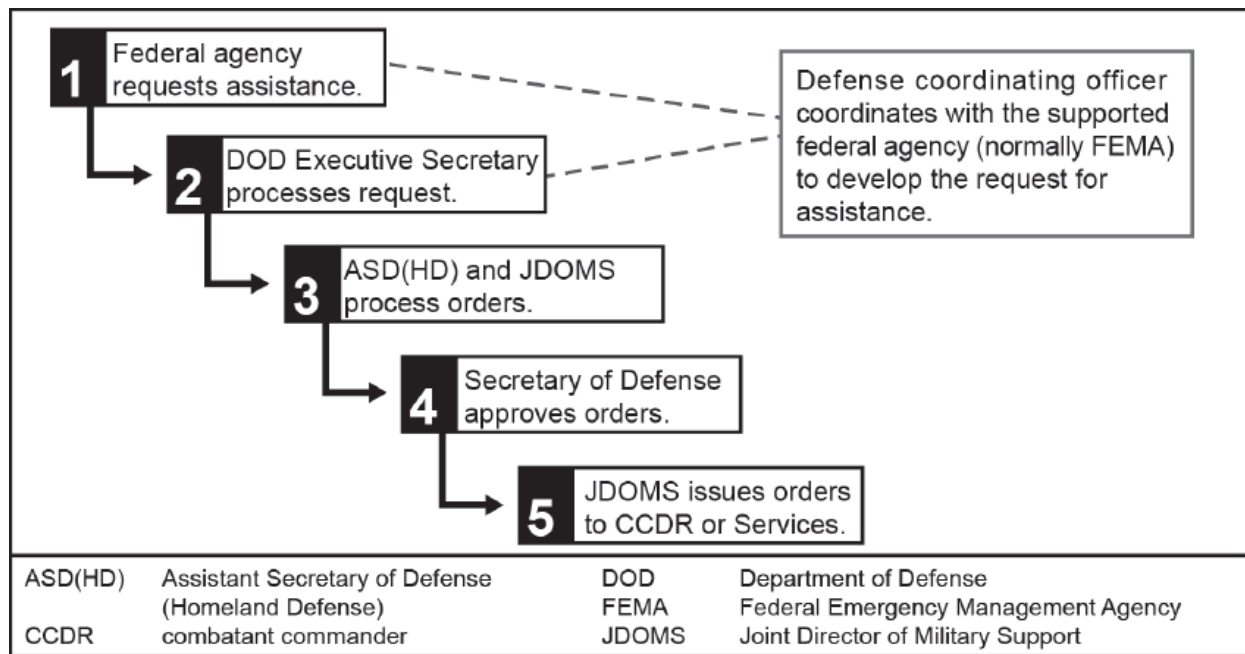
<sup>34</sup> GAO, *Homeland Defense: DoD Can Enhance Efforts to Identify Capabilities to Support Civil Authorities During Disasters*, Washington, D.C., GAO-10-386, March 2010, pp. 38–40.

<sup>35</sup> JP 3-28, 2013, p. GL-6.

<sup>36</sup> Enacted as Title VI of Pub. L. 109-295, 2006.

<sup>37</sup> As of 2008, FEMA had developed a catalog of 223 PSMAs, which were organized by ESF. See GAO, *Actions Taken to Implement the Post-Katrina Emergency Management Reform Act of 2006*, Washington, D.C., GAO-09-59R, November 21, 2008, p. 56.

**Figure 3.5. Summary of Process Leading to Mission Assignments**



SOURCE: ADRP 3-28, 2013, p. 1-25.

developed before any incident to expedite the delivery of federal assistance. The PSMA may be a not-yet-approved starting point in the development of an MA. It is a method for developing FEMA requests in coordination with other federal departments and agencies to meet its forecasted operational requirements.<sup>38</sup>

FEMA worked with other federal departments and agencies to develop PSMA that address specific capability gaps within the ESFs and has aligned resources to fill the gap.<sup>39</sup> DoD has a list of PSMA addressing its ability to support each ESF,<sup>40</sup> and USNORTHCOM has developed its own set of PSMA, which were vetted by DoD officials and FEMA.

Importantly, DoDD 3025.18 gives, under limited conditions, immediate response authority to commanders to act “to save lives, prevent human suffering, or mitigate great property damage within the United States” in the absence of MA:

In response to a request for assistance from a civil authority, under imminently serious conditions and if time does not permit approval from higher authority, DoD officials may provide an immediate response by temporarily employing the resources under their control, subject to any supplemental direction provided by higher headquarters, to save lives, prevent human suffering, or mitigate great property damage within the United States.

... An immediate response shall end when the necessity giving rise to the response is no longer present (e.g., when there are sufficient resources available

<sup>38</sup> DoDM 3025.01, 2016.

<sup>39</sup> DoDM 3025, August 2016, p. 50.

<sup>40</sup> DoD, 2010b, p. F-2.

from State, local, and other Federal agencies to respond adequately and that agency or department has initiated response activities) or when the initiating DoD official or a higher authority directs an end to the response.<sup>41</sup>

## USNORTHCOM's Role

As mentioned earlier, USNORTHCOM is the supported commander for DSCA in CONUS, Alaska, the Bahamas, Puerto Rico, and the USVI. USNORTHCOM's mission is:

USNORTHCOM partners to conduct Homeland Defense and Civil Support operations within the assigned area of responsibility to defend, protect, and secure the United States and its interests.<sup>42</sup>

As is the case with other combatant commands, USNORTHCOM conducts deliberate planning, including a North American Aerospace Defense Command (NORAD)—USNORTHCOM theater strategy, a theater campaign plan, and a set of concept plans (CONPLANS), as well as crisis action planning, including standing EXORDs, operational and fragmentary orders (OPORDs and FRAGOs), PSMAAs, warning orders and commander's estimates, and requests for forces (RFFs).<sup>43</sup>

Updated every few years, USNORTHCOM's CONPLAN 3500-14 guided DSCA responses in USNORTHCOM's AOR during the 2017 hurricane season, while USPACOM's CONPLAN 5001-13 served the same function in USPACOM's AOR.<sup>44</sup> These DSCA CONPLANS

provide the framework for DSCA response within their respective areas of responsibility from routine, non-emergency requests for support, such as national special security events, up to rapidly responding to a complex catastrophe, such as natural hazards (hurricanes, tornadoes, floods, etc.), localized or regionalized

---

<sup>41</sup> DoDD 3025.18, 2018, p. 5. We return to the matter of immediate response authority in Chapter 6.

<sup>42</sup> USNORTHCOM, "USNORTHCOM Vision," fact sheet, May 16, 2013b. Beyond its civil support mission, USNORTHCOM has responsibility for defense of the U.S. against land- and sea-based threats and intercontinental ballistic missiles; and NORAD defense in the U.S. and Canada against threats in the air domain. Statement of GEN Lori Robinson, United States Air Force, Commander, United States Northern Command and North American Aerospace Defense Command Before the Senate Armed Services Committee, Washington, D.C., 15 February 2018.

<sup>43</sup> Mike Gergen, "United States Northern Command (USNORTHCOM) Defense Support of Civil Authorities Course," briefing, undated, slide 43.

<sup>44</sup> USNORTHCOM, CONPLAN 3500-14, *Defense Support of Civil Authorities Response*, July 17, 2014, Not available to the general public; U.S. Pacific Command, CONPLAN 5001-13, *Defense Support of Civil Authorities (DSCA)*, December 19, 2013 (U.S. Pacific Command is now known as U.S. Indo-Pacific Command). Neither CONPLAN is available to the public, although a redacted version of CONPLAN 3501-08 is (USNORTHCOM, *CONPLAN 3501-08 Defense Support of Civil Authorities [DSCA]*, May 16, 2008, redacted version posted February 5, 2013a). See also GAO, *Defense Civil Support: DOD Has Made Progress Incorporating the Homeland Response Force into the Chemical, Biological, Radiological, and Nuclear Response Enterprise*, Washington, D.C., GAO-16-599, June 2016, p. 22.

epidemics of infectious diseases, technical and accidental hazards (dam failures, chemical spills or releases), or terrorist attacks.<sup>45</sup>

Figure 3.6 describes the NORAD-USNORTHCOM plans construct, and Figure 3.7 provides an overview of CONPLAN 3500-14, the most recent edition of the USNORTHCOM DSCA CONPLAN at the time of the 2017 hurricane season.

As shown in Figure 3.6, USNORTHCOM CONPLANS for Homeland Defense and DSCA Response, and their associated branch plans, flow from the USNORTHCOM Theater Campaign Plan. In the case of USNORTHCOM CONPLAN 3500-14, a base plan is supplemented by branch plans in nine common annexes; each annex deals with a specific type of event, or circumstance.

Figure 3.7 describes CONPLAN 3500-14's mission and commander's intent. As shown, the commander's intent is to "save lives, minimize human suffering, and stabilize an incident," operating in a supporting role to civil authorities, with six objectives that aim to achieve an end state in which "USNORTHCOM, in support of civil authorities, has addressed the consequences of natural and man-made disasters to the point that further DoD support is no longer required."<sup>46</sup>

Thus, when state emergency management response capabilities are robust, as in the case of hurricanes Harvey and Irma, USNORTHCOM may be asked to provide limited or niche capabilities, such as trucks or search-and-rescue assets, and these may be short-term commitments. When SLTT response capabilities are overwhelmed, however, as was the case for Hurricane Maria, USNORTHCOM may be asked to assume a much larger role and provide C2 of more significant Title 10 forces in support of FEMA-led efforts and may need to operate for a longer time before the desired end state is achieved.<sup>47</sup>

As noted earlier in the description of crisis action planning, when ordered to provide support to a FEMA-led disaster response, USNORTHCOM publishes an EXORD and modifications to that order (FRAGOs).<sup>48</sup> USNORTHCOM can also draw on its own set of PSMAs, which provide FEMA and DoD with a common vocabulary regarding capabilities that might be needed and, it is hoped, can expedite the MA process for frequently requested capabilities.<sup>49</sup>

---

<sup>45</sup> GAO, *Defense Civil Support: DOD Has Made Progress Incorporating the Homeland Response Force into the Chemical, Biological, Radiological, and Nuclear Response Enterprise*, Washington, D.C., GAO-16-599, June 2016, p. 22.

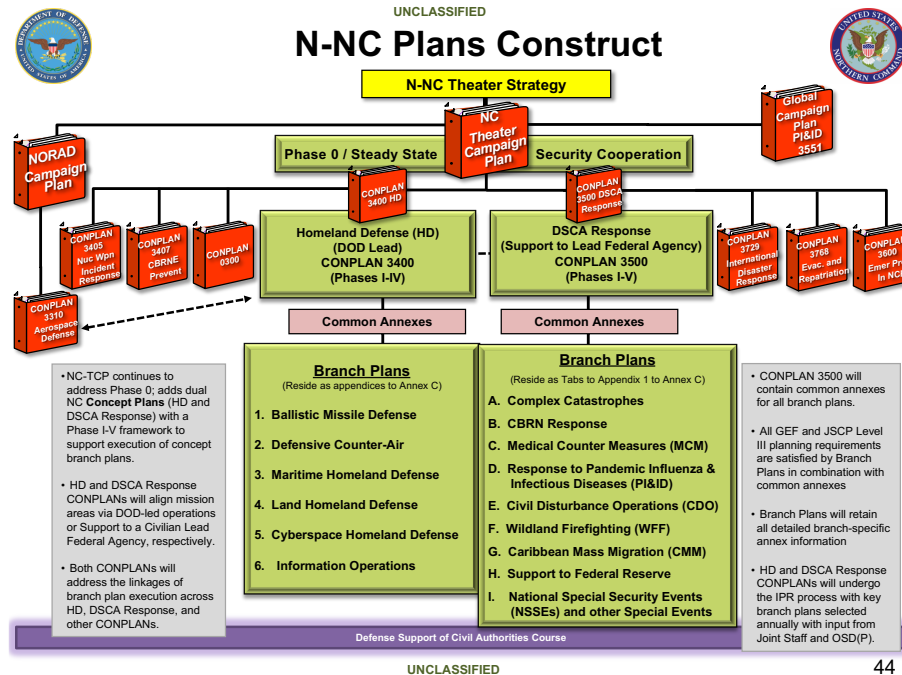
<sup>46</sup> Gergen, undated, slide 45.

<sup>47</sup> Title 10 forces include active, reserve, and guard forces under federal status, and do not include National Guard under SAD or Title 32 status.

<sup>48</sup> Examples of EXORD FRAGOs for hurricanes Katrina and Rita can be found by searching for "exord" on USNORTHCOM's website.

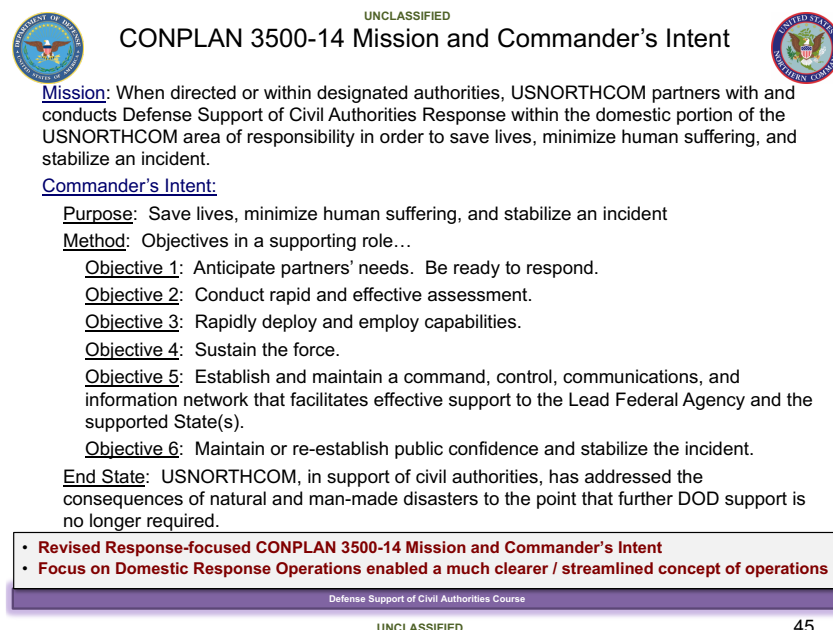
<sup>49</sup> GAO, *Homeland Defense: DoD Can Enhance Efforts to Identify Capabilities to Support Civil Authorities During Disasters*, Washington, D.C., GAO-10-386, March 2010, p. 40.

### Figure 3.6. NORAD-USNORTHCOM Plans Construct



SOURCE: Gergen, undated, slide 44.

### Figure 3.7. CONPLAN 3500-14 Mission and Commander's Intent



SOURCE: Gergen, undated, slide 45.

The Secretary of Defense normally designates USNORTHCOM as the supported combatant commander for DSCA operations in CONUS, Alaska, Puerto Rico, and the USVI. When directed, CJCS typically publishes an EXORD explaining support relationships, available forces, end state, purpose, and the approved scope of actions.<sup>50</sup> This standing EXORD is approved annually and published by the Joint Chiefs of Staff. Once designated as the supported combatant commander, CDRUSNORTHCOM is responsible for establishing a joint task force (JTF), which ideally will be colocated with the JFO to ensure a COP and situational understanding of the requirements needed. The JTF can be a standing JTF or one formed for a specific DSCA mission to better C2 all lines of support. Subordinate organizations of USNORTHCOM include

- USARNORTH, which can provide C2 for land operations under a JFLCC, and includes as subordinate organizations JTF–Civil Support (JTF-CS) and JTF–North (JTF-N)<sup>51</sup>
- U.S. Air Forces North, which can provide C2 for air operations under a joint force air component commander (JFACC)
- U.S. Marine Forces North and U.S. Fleet Forces Command, either of which can provide C2 for maritime operations under a joint force maritime component commander (JFMCC).
- Alaskan Command, a subordinate unified command of USNORTHCOM, that, in coordination with other government agencies, deters, detects, prevents, and defeats threats within the Alaska Joint Operations Area (JOA) to protect U.S. territory, citizens, and interests and, as directed, conduct civil support<sup>52</sup>
- Joint Force Headquarters (JFHQ)–National Capital Region (NCR), which is responsible for land-based homeland defense, DSCA, and incident management in the NCR. JFHQ-NCR draws together the existing resources of the Army, Navy, Air Force, Marine Corps, Coast Guard, and NORAD into a single-point headquarters for planning, coordination, and execution of the mission in the NCR; during a regional crisis or complex catastrophe in the NCR, JFHQ-NCR becomes JTF–National Capital Region (JTF-NCR).<sup>53</sup>

## U.S. Army North’s Role

USNORTHCOM has designated USARNORTH as the standing JFLCC for DSCA in the USNORTHCOM AOR. As both the Army service component command and the standing JFLCC, USARNORTH commands and controls federal army forces conducting DSCA, homeland defense, and theater security cooperation.

---

<sup>50</sup> JP 3-28, 2013, p. II-11.

<sup>51</sup> JTF-CS’s primary mission is to provide C2 for DoD CBRN response forces; JTF-N’s primary mission is providing homeland security and counter-transnational organized crime support to the nation’s federal law enforcement agencies within USNORTHCOM’s AOR.

<sup>52</sup> USARNORTH Education Branch, *United States Northern Command (USNORTHCOM)*, 2017, slide 14.

<sup>53</sup> USARNORTH Education Branch, 2017, slide 14.

USARNORTH also exercises operational control (OPCON) over two standing JTFs: JTF-N and JTF-CS.<sup>54</sup> In most DSCA operations, USNORTHCOM will direct USARNORTH as the standing JFLCC to deploy a contingency command post (typically TF 51) or a JTF to provide C2 for federal forces conducting DSCA operations.<sup>55</sup> The USNORTHCOM commander will most likely designate JFLCC as the main supported effort. If a large response requires the simultaneous deployment of separate JTFs, they can be placed under the OPCON of JFLCC. For a catastrophic event, a corps headquarters can become the main supported effort. Under such conditions, JFLCC would remain under the OPCON of CDRUSNORTHCOM and would set the theater and provide theater sustainment.<sup>56</sup>

### *Defense Coordinating Officer and Defense Coordinating Element*

The DCO is the DoD single point of contact at the JFO.<sup>57</sup> The DCO and his or her supporting defense coordinating element (DCE) are USNORTHCOM assets that are subordinate to the USARNORTH commander. USARNORTH has a total of ten DCOs, with one DCO permanently assigned to each of the ten FEMA regions. Two additional DCOs and DCEs (DCO/Es), in Hawaii and Guam, are assigned to USPACOM.

The DCO facilitates civilian-military coordination by serving as the primary conduit through which civilian authorities request DoD support during major disasters and emergencies, and the principal conduit for validating MAs to Title 10 forces. Figure 3.8 shows the DCO/E within the USARNORTH C2 organization, while Figure 3.9 describes the standard DCO/E organization.

C2 of DCOs is directed by the supported combatant commander in an EXORD for DSCA missions, after which the DCOs may report directly to the supported combatant commander or to a JTF.

The DCO is typically an active component (AC) O-6 officer who is supported by a nine-soldier DCE, led by a USAR O-5 officer, that provides administrative and support staff to the DCO and can be augmented with ESF specialists during a major disaster or emergency.<sup>58</sup> The DCO also serves as DoD advisor to the FCO.

---

<sup>54</sup> JTF-N employs military capabilities in the domestic support of federal civilian law enforcement agencies, and JTF-CS provides support in response to domestic CBRN incidents (ADRP 3-28, 2013, pp. 3-4 to 3-5).

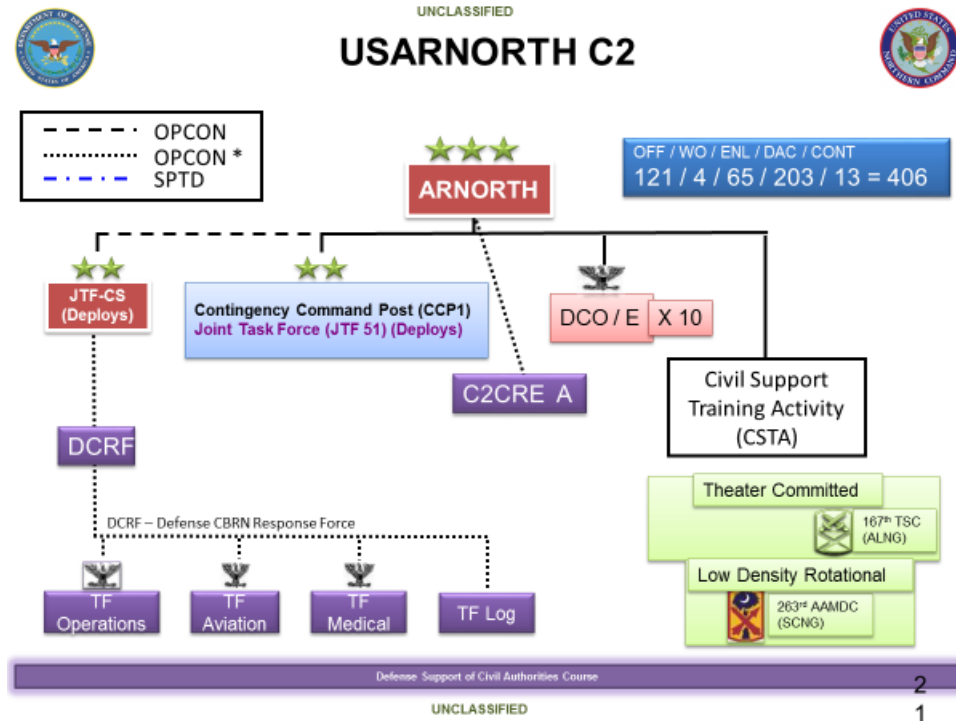
<sup>55</sup> ADRP 3-28, 2013 pp. 3-7, 3-8.

<sup>56</sup> ADRP 3-28, 2013 pp. 3-7, 3-8.

<sup>57</sup> JP 3-28, 2013, p. II-12.

<sup>58</sup> ADRP 3-28, 2013, p. 3-3.

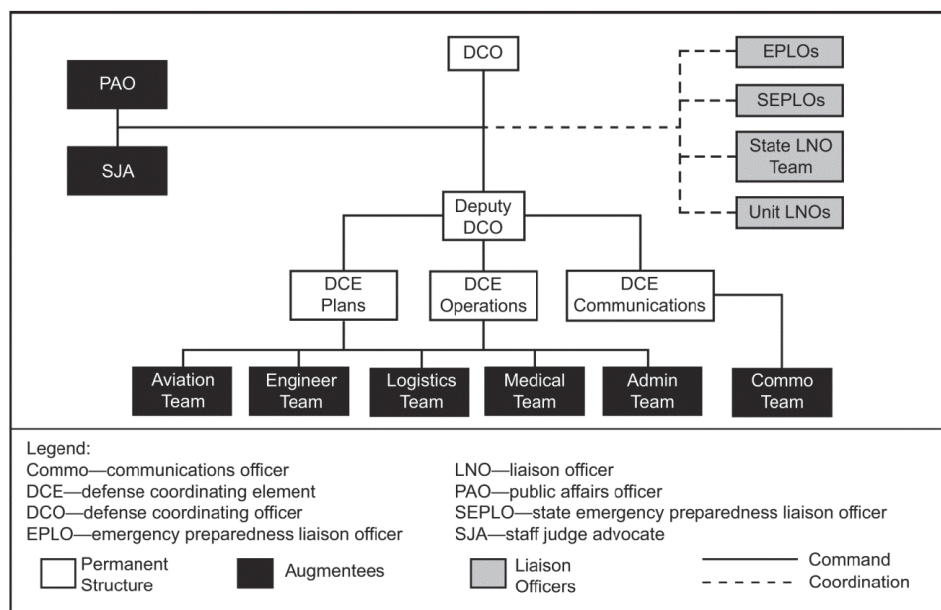
Figure 3.8. USARNORTH Command-and-Control (C2) Including DCO/E



SOURCE: USARNORTH Education Branch, 2017, slide 21.

NOTES: The figure has been modified from the source to reflect information USARNORTH provided us in July 2018. SEPLO = state EPLO; AAMDC = Air and Missile Defense Command.

Figure 3.9. Example of a Defense Coordination Element Organization



SOURCE: ATP 3-28.1, 2015, p. 9.

When not deployed, the DCO/Es are located at a FEMA RRCC, where they help plan and coordinate DSCA operations with state and local partners and have an opportunity to develop habitual relationships with these key DSCA partners.<sup>59</sup> If a major disaster or emergency erupts in the DCO's region, the state EOC is responsible for determining and communicating which ESFs are needed, and the DCO/E becomes the DoD coordination element that supports the activated ESFs.<sup>60</sup>

On activation, the DCO/E is assigned to the JFO, where it validates and coordinates DSCA RFAs and forwards them to the designated DoD entities for approval. Within the JFO, the DCO serves as a member of the unified coordination group (UCG). The DCO/E is responsible for forwarding validated DoD MAs to the appropriate defense organizations for sourcing. For its part,

UCG is the structure that executes unified command and leads incident activities at the field level in order to achieve unity of effort. Its purpose is to establish and achieve shared objectives. The UCG is comprised of senior leaders representing State and Federal interests and in certain circumstances tribal governments, local jurisdictions, or the private sector. The Federal Coordinating Officer (FCO) is responsible for establishing the UCG.<sup>61</sup>

As shown in Figure 3.7, the DCO is typically supported by several teams staffed by augmentees. As needed, Aviation, engineer, logistics, medical, admin, and communications teams can be stood up and placed under the command of the DCO/E. Similarly, the DCO/E is responsible for assigning military liaisons to activated ESFs, and coordinates with emergency preparedness liaison officers (EPLOs), SEPLOs, state liaison officer (LNO) teams, and unit LNOs.<sup>62</sup>

Under normal circumstances, the DCO does not have operational or tactical command authority over deployed DoD forces. However, if the establishment of a DSC-led JTF is not warranted, the DCO may have limited C2 of DoD forces deployed in a JOA for DSCA purposes.<sup>63</sup> For example, when directed by USNORTHCOM, DCOs can be given tactical control (TACON) over attached military detachments of Title 10 forces responding to an affected region, in which case the DCO coordinates with USARNORTH for their sustainment.<sup>64</sup>

---

<sup>59</sup> ADRP 3-28, 2013, p. 3-2.

<sup>60</sup> ADRP 3-28, 2013, p. 3-2.

<sup>61</sup> FEMA, "Glossary," undated a.

<sup>62</sup> ATP 3-18.1, 2015, pp. 8, 10; JP 3-28, *Defense Support of Civil Authorities*, Washington, D.C.: Joint Chiefs of Staff, July 31, 2013, p. II-12.

<sup>63</sup> JP 3-28, 2013, p. II-12.

<sup>64</sup> ADRP 3-28, June 2013, p. 3-2.

## *Emergency Preparedness Liaison Officers*

EPLO positions are authorized in each FEMA region and state from Title 10 reserve forces.<sup>65</sup> In coordination with the services, USNORTHCOM establishes requirements for activating EPLOs in its geographic AOR, including operations and exercise participation. USNORTHCOM also ensures that the regional DCOs provide EPLO operations support in regions and states.<sup>66</sup>

When deployed, permanently attached EPLOs work in coordination with the DCO/E and are under the TACON of the DCO to perform homeland defense and DSCA missions,<sup>67</sup> while service EPLOs report to the services they represent. EPLOs are crucial for DSCA responses.

## Chapter Conclusions

This chapter has provided an overview of the principal authorities that guide federal disaster responses and DoD support to struggling SLTT authorities. The available authorities and guidelines make it clear that the principal burden of responses and incident command resides at the lowest possible level of governance and that, when the President approves requests from civilian authorities for federal assistance, the federal effort is led by FEMA, with other federal departments and agencies, including DoD, providing additional support, as needed. Put another way, DoD is almost always in a supporting role in DSCA disaster relief operations.

---

<sup>65</sup> JP 3-28, 2013, p. II-13. See also DoDI 3025.16, *Defense Emergency Preparedness Liaison Officer (EPLO) Programs*, Washington, D.C.: U.S. Department of Defense, September 8, 2011, change 1, May 8, 2017.

<sup>66</sup> DoDI 3025.16, 2017, p. 6.

<sup>67</sup> JP 3-28, 2013, p. II-13.

## 4. Overview of the Response to Hurricane Maria

---

This chapter provides an overview of the whole-of-government response to Hurricane Maria in Puerto Rico and the USVI, with an emphasis on USARNORTH's role in that response. We begin with an overview of Title 10 (federal) and National Guard military forces, then take a look at the responses to Hurricane Irma and Hurricane Maria.<sup>1</sup> Next, we provide an overview of force levels in Puerto Rico and the USVI from October 11 to November 19, 2017.

### Title 10 and National Guard Peak Forces in Hurricanes Harvey, Irma, and Maria

As described in Chapter Two, hurricanes Harvey, Irma, and Maria came in very quick succession over the August–September 2017 period, necessitating a high level of responsiveness and agility, particularly on the part of federal responders. In hurricanes Harvey and Irma, Texas and Florida had access to a robust number of National Guard personnel, either through indigenous state forces or the EMAC system, which reduced the requirement for federal military forces. Moreover, according to USARNORTH, all the National Guard forces in Harvey, Irma, and Maria, including those from EMAC, were under SAD, and none were under Title 32 because the Secretary of Defense did not authorize Title 32 funds for the National Guard.<sup>2</sup>

According to the National Guard Bureau:

All told, roughly 6,200 Guard members from 38 states supported relief and recovery operations in response to Maria. Additionally, more than 18,300 Guard members from 34 states and close to 21,000 Guard members from 29 states and territories supported Harvey and Irma operations, respectively.<sup>3</sup>

Accordingly, at the peak of each response, the mixes of Title 10 (federal) and National Guard forces were very different for Hurricane Harvey in Texas and Hurricane Irma in Florida from those for Hurricane Maria in Puerto Rico.<sup>4</sup>

---

<sup>1</sup> We relied on the following principal sources to reconstruct the sequence of major events in USARNORTH's response to Hurricane Maria: FEMA Public Affairs, "Overview of Federal Efforts to Prepare for and Respond to Hurricane Maria," October 31, 2017; FEMA, "FEMA Provides Update on Federal Support to Hurricane Irma Response," press release, HQ-17-121, September 16, 2017a; DoD, "DoD Hurricane Relief: Situation Summaries," pop-up page, last update November 3, 2017c; USNORTHCOM, 2017f; USNORTHCOM press releases on the Hurricane Maria response; and USARNORTH, *Hurricanes Harvey, Irma and Maria Response*, August–December 2017, 2018, Not available to the general public; and Chigi and Haus, 2018.

<sup>2</sup> National Guard forces under SAD operate under their governor with state funding; those operating under Title 32 are under the governor's command but with federal funding.

<sup>3</sup> Erich B. Smith, "National Guard Wraps Up Busy Hurricane Season," press release, December 1, 2017.

<sup>4</sup> Sources differ on the timing of the peak response and on the total number of personnel deployed. The numbers presented here are those of USNORTHCOM.

As Table 4.1 shows, the total number of Title 10 forces deployed in response to Hurricane Maria was proportionally significantly larger than were deployed to either hurricane Harvey or Irma. In absolute terms, however, the boots-on-the-ground (BOG) response to Hurricane Maria was far smaller than that in Hurricane Harvey and roughly equivalent to that in Hurricane Irma. At the peak force levels, National Guard forces constituted about 86 percent of the total forces in Harvey in Texas and about 80 percent of total forces or 95 percent of BOG forces in the response to Irma, primarily in Florida. By comparison, in Maria, National Guard forces constituted only about 63 percent of BOG forces and about 43 percent of the total forces in the JOA. Similarly, there was a difference in the involvement of maritime forces, with Harvey being an entirely land-based operation, whereas forces at sea constituted about 16 percent of the overall response in Hurricane Irma (primarily in the vicinity of Puerto Rico and the USVI), and 31.9 percent of the forces in the Hurricane Maria response.

**Table 4.1. Peak Numbers of Title 10 and National Guard Boots on the Ground in the Joint Operational Area for Hurricanes Harvey, Irma, and Maria**

|                     | Total  | BOG    | At Sea |
|---------------------|--------|--------|--------|
| Harvey <sup>a</sup> |        |        |        |
| Title 10            | 3,018  | 3,018  |        |
| National Guard      | 19,345 | 19,345 |        |
| Total               | 22,363 | 22,363 |        |
| Irma <sup>b</sup>   |        |        |        |
| Title 10            | 2,702  | 553    | 2,149  |
| National Guard      | 10,756 | 10,756 | 0      |
| Total               | 13,458 | 11,309 | 2,149  |
| Maria <sup>c</sup>  |        |        |        |
| Title 10            | 7,893  | 3,495  | 4,398  |
| National Guard      | 5,867  | 5,867  | 0      |
| Total               | 13,760 | 9,362  | 4,398  |

SOURCE: USNORTHCOM, 2017f, p. 59.

<sup>a</sup>As of September 4, 2017.

<sup>b</sup>As of September 15, 2017.

<sup>c</sup>As of October 16, 2017.

These gross numbers, however, hide some other significant differences in the composition of the response. According to USNORTHCOM figures, at the peak of the DSCA operation, 56 percent of the federal military response was at sea and under the command of JFMCC, with the bulk of the remaining forces on the ground and commanded and controlled by JFLCC. This bifurcation of Title 10 command stands in contrast to Hurricane Irma, in which the bulk of the

Title 10 response was under a single chain of C2, led by JFMCC.<sup>5</sup> In addition, nearly half of the Title 10 forces deployed in response to Hurricane Maria were USAR personnel stationed on Puerto Rico.<sup>6</sup>

In Texas and Florida, the DSC construct, in which a state guard general officer provides C2 for both National Guard forces and Title 10 (active duty and USAR) land forces in support of FEMA and the state, appears to have been perfectly adequate to the need. In the case of Maria, on the other hand, the hurricane shattered the PRNG and USAR forces and Puerto Rico's emergency management agency, placing a proportionately greater burden on Title 10 forces, National Guard forces from other states operating under EMAC, and FEMA in planning and conducting response operations.<sup>7</sup>

In absolute terms, however, the EMAC support provided to Puerto Rico in response to Hurricane Maria was at a level between that provided to Texas or Florida in the responses to hurricanes Harvey and Irma. As of November 13, 2017, 5,268 SAD personnel had been deployed through EMAC to Texas in response to Hurricane Harvey; 3,910 to Florida in response to Hurricane Irma; and 3,986 to Puerto Rico (which would have included rotational deployments) in response to Hurricane Maria.<sup>8</sup> In addition, at the time of the 2017 hurricanes, Puerto Rico had fewer National Guard personnel to call on than either Texas or Florida. In September 2017, some 20,800 National Guard personnel were stationed in Texas; 11,700 in Florida; and 7,300 in Puerto Rico.<sup>9</sup> Moreover, the transitions of Title 10 forces in Texas and Florida were quite quick: The Title 10 response in Texas lasted only one-and-one-half week, and in Florida it was only one week. By comparison, the Title 10 response to Maria in Puerto Rico lasted six to eight weeks.

---

<sup>5</sup> Many of the Title 10 forces were deployed in the Puerto Rico–USVI region. On September 11, there were 4,610 National Guard and Title 10 personnel in this area (USNORTHCOM, 2017f, p. 29).

<sup>6</sup> In 2017, there were 5,240 USAR soldiers in 61 units stationed on Puerto Rico (U.S. Army Reserve, *America's Army Reserve at a Glance*, 2017, p. 118).

<sup>7</sup> Despite this, the majority of the BOG in Puerto Rico were drawn from reserve forces (both USAR and National Guard) that were permanently stationed in Puerto Rico.

<sup>8</sup> EMAC deployments include both civilian and National Guard personnel. An additional 1,612 EMAC personnel deployed to the USVI in response to Hurricane Irma and 83 in response to Hurricane Maria (National Emergency Management Association, "National Emergency Management Association is requesting Proposals for the Development of an After Action Report: "EMAC Response to the 2017 Hurricane Season," November 14, 2017). Through December 5, 2017, some 4,259 EMAC personnel had deployed to Puerto Rico, including 2,006 civilians; 1,281 law enforcement personnel; and 2,252 National Guard personnel (Michigan State Police, *EMAC Deployments to Puerto Rico*, January 9, 2018, slide 8). Another source gives a total of "more than 4,700" EMAC responders deploying to Puerto Rico; "nearly 5,300" to Texas; and "nearly 4,000" to Florida (Daniel C. Vock, "The Pact Changing How Governments Respond to Disaster," *Governing the States and Localities* website, March 2018).

<sup>9</sup> Defense Manpower Data Center, "Counts of Active Duty and Reserve Service Members and APF Civilians by Location Country, Personnel Category, Service and Component, September 30, 2017.

## The Response to Hurricane Irma

Hurricane Irma passed over Puerto Rico on September 6, 2017. As a result, well before Hurricane Maria, FEMA's NRCC was

fully activated to a Level I with all emergency support functions operational, including Department of Defense (DoD) liaisons in preparation for Hurricane Harvey. Prior to the arrival of Hurricane Maria, federal personnel were already positioned on Puerto Rico and the U.S. Virgin Islands in response to Hurricane Irma. These personnel included federal coordinating officers [FCOs] and Incident Management Assistance Teams . . . on both the U.S. Virgin Islands and Puerto Rico, and staff from FEMA's Caribbean Area Division. Additional resources and personnel were strategically located out of the storm's path, including ships from the Department of Defense. After the hurricane passed, those additional federal resources and personnel recommenced flowing in, as part of a unified federal response.<sup>10</sup>

By September 16, the day Hurricane Maria evolved from a tropical depression into a tropical storm,<sup>11</sup> FEMA would describe the level of federal activity in response to Irma as follows:

Tens of thousands of federal workers are supporting preparedness, response, and recovery to Hurricane Irma, including more than 3,200 FEMA staff, and more than 13,000 National Guard soldiers and airmen from 22 states, in rescue, evacuation, security and support operations.<sup>12</sup>

Although the bulk of the military response and preparation was focused on Florida, important DoD capabilities were deployed to Puerto Rico and the USVI. The capabilities included

- USARNORTH's DCO/E II in USVI and DCO/E V in Puerto Rico
- U.S. Navy and Marine Corps Combined Task Force 189 (CTF-189), which included the USS *Wasp*, USS *Oak Hill*, and USS *Kearsarge*, with helicopters and MV-22B Ospreys from the 26th Marine Expeditionary Unit (MEU)<sup>13</sup>
- a U.S. Army area support medical company and civil authorities information support elements (CAISEs)<sup>14</sup>

---

<sup>10</sup> FEMA Public Affairs, 2017.

<sup>11</sup> Richard J. Pasch, Andrew B. Penny, and Robbie Berg, *Hurricane Maria (AL152017), 16–30 September 2017*, Miami, Fla.: National Hurricane Center, April 10, 2018.

<sup>12</sup> FEMA, 2017a. FEMA also reported that 350 USACE had been assigned 35 MAs during the Irma response to that date.

<sup>13</sup> See Todd Galvin, and Daniel Schadler, "Assistance from the Seas," Defense Visual Information Distribution Service website, October 17, 2017; David Guluzian, and Trey Ryker, "USS Kearsarge (LHD 3) Providing Critical Hurricane Relief," *Navy Supply Corps Newsletter*, February 6, 2018.

<sup>14</sup> See Ron Gallagher, "Bragg Medical-Support Soldiers Heading for St. Thomas Hospital with Irma Aid," *News & Observer*, September 13, 2017; Drew Brooks, "Fort Bragg Troops Aid Puerto Rico Assistance," *Fayetteville Observer*, September 27, 2017.

- strategically placed commanders at key nodes ashore with authorities to employ forces in St. Croix, St. Thomas, and St. John, USVI, and at Roosevelt Roads, San Juan, and Ponce, Puerto Rico.<sup>15</sup>

## The Run-Up to Maria

As Hurricane Maria approached, many of the capabilities that had been deployed for Irma would be temporarily moved out of the path of the storm and redeployed to assist in the Maria response after the storm passed. In addition, various preparations were made during the period between Maria being declared a tropical storm on September 16 and its landfall in Puerto Rico and the USVI.<sup>16</sup> These preparations included moving civilian capabilities into the region. On September 17, FEMA FCOs and incident management assistance teams that were to shelter in place were colocated with the governor of St. Croix, with liaisons on St. John and St. Thomas, and with FEMA's Caribbean Area Division at the FEMA Distribution Center in Puerto Rico. FEMA temporarily repositioned the remainder of the federal employees in the USVI for redeployment following the hurricane. At the same time, the Federal Aviation Administration was working to relocate and protect the mobile air traffic control tower on St. Thomas, and the U.S. Geological Survey (USGS) was prepositioning assets in Puerto Rico. On September 18, emergency disaster declarations were issued for the USVI (EM-3390) and Puerto Rico (EM-3391). Federal personnel were colocated with the USVI governor on St. Croix, and liaisons were deployed in St. John and St. Thomas, as well as with the governor of Puerto Rico. In addition, two Type 1 FEMA urban search-and-rescue teams were deployed to Puerto Rico. On September 19, one Type 4 FEMA urban search-and-rescue team and one canine team arrived in Puerto Rico, and DHS deployed one disaster medical assistance team (DMAT) to Puerto Rico. Finally, on September 20, as predicted several days earlier, Hurricane Maria made landfall, and major disaster declarations were issued for in Puerto Rico (DR-4339) and the USVI (DR-4340), triggering a federal Stafford Act response to the resulting disaster.<sup>17</sup>

During this period, U.S. military personnel were also preparing for Maria's landfall. On September 17, the CAISE, the U.S. Army area support medical company, U.S. Air Force Ground Surgical Team, and USACE personnel who were on the ground in USVI were ordered to shelter and ride out the storm aboard the USS *Kearsarge*, which, along with the USS *Oak Hill*, had been deployed earlier for the Hurricane Irma response. On September 19, USNORTHCOM commanding general (CG) Lori Robinson approved several RFAs and MAs. These requests included MAs to activate and deploy an aerial port operations team, to provide transportation

---

<sup>15</sup> Davidson, 2017, slide 8.

<sup>16</sup> According to NHC, Maria hit Puerto Rico as a "high-end category 4 hurricane" that was "just below the threshold of category 5 intensity" (Pasch, Penny, and Berg, 2019, p. 2. Maria reportedly was a Category 5 hurricane when it hit USVI.

<sup>17</sup> FEMA Public Affairs, 2017.

support to move personnel and/or cargo, to stand up a tailored joint air component coordination element consisting of air and space power subject-matter experts, and to conduct emergency route clearance by the MEU.<sup>18</sup>

## The Response to Hurricane Maria

### *Overview of the Federal Response*

Federal and state capabilities quickly built up in the days following Maria's making landfall on September 20: On September 21, more than 3,500 federal personnel were on the ground in Puerto Rico and USVI;<sup>19</sup> the next day, an estimated 7,000 federal personnel, including 280 FEMA and 1,600 National Guard personnel, were on the ground. By September 25, more than 10,000 federal personnel, including 700 FEMA staff members and 4,300 guardsmen, were on the ground.<sup>20</sup> By September 29, 36 federal departments and agencies were involved in the Puerto Rico–USVI response effort, including 800 FEMA personnel.<sup>21</sup>

In its AAR of the 2017 hurricane season, for example, FEMA described its basic assumptions about disaster responses in support of SLTT entities, its strategic doctrine for adapting and playing a more robust role when states and localities were incapacitated, and some of the specific roles that FEMA and its partners (including DoD) necessarily had to play in the Hurricane Maria response:

FEMA and its partners generally rely on states, tribes, and territories to provide prioritized lists of infrastructure facilities for assessment and restoration based on local needs. (p. 33)

FEMA strategic doctrine calls on the Agency to assume the responsibilities of SLTT governments, the private sector, and NGOs when the effects of a major incident incapacitate those organizations' ability to perform their functions effectively and efficiently until they can resume operations. (p. 28)

To overcome limited situational awareness created by the loss of communications in Puerto Rico, FEMA executed creative solutions to assess the situation and prioritize response activities, including emergency repairs to infrastructure. (p. 33)

FEMA assumed a more active role in coordinating whole community logistics operations for Puerto Rico and the U.S. Virgin Islands due to these territories'

---

<sup>18</sup> USNORTHCOM, 2017f, p. 51.

<sup>19</sup> On September 21, the USS *Kearsarge*, USS *Oak Hill*, and USS *Wasp* began providing support for Hurricane Maria. On September 27, the USNS *Comfort* deployed to Puerto Rico and USVI to provide support (Davidson, 2017, slide 7).

<sup>20</sup> FEMA Public Affairs, 2017.

<sup>21</sup> FEMA Public Affairs, 2017. In addition, the American Red Cross and several other private voluntary organizations contributed to the response. For details, see FEMA, "Voluntary and Non-Governmental Organizations Save Lives, Feed, and Support Survivors in U.S. Virgin Islands and Puerto Rico," press release, Washington, D.C., HQ-17-168, October 8, 2017d.

preparedness challenges, geographic distance, and pre-existing, on-the-ground conditions. (p. viii)

FEMA's logistical support of the movement of commodities differed in Florida and Texas, compared to the Caribbean islands, because of the ability to conduct land-based delivery of resources in Florida and Texas versus air and sea delivery to the islands. In Florida and Texas, FEMA provided a support function to the states whereas in Puerto Rico, FEMA took on an active role of coordinating logistics operations. (p. 25)<sup>22</sup>

GAO elaborated on the challenges FEMA and its partners faced, echoing many of the points made earlier:

GAO found that FEMA faced a number of challenges that slowed and complicated its response efforts to Hurricane Maria, particularly in Puerto Rico. Many of these challenges were also highlighted in FEMA's own 2017 hurricane after action report, including:

- the sequential and overlapping timing of the three hurricanes—with Maria being the last of the three—caused staffing shortages and required FEMA to shift staff to the territories that were already deployed to other disasters;
- logistical challenges complicated efforts to deploy federal resources and personnel quickly given the remote distance of both territories; and
- limited preparedness by the U.S. Virgin Islands and Puerto Rico for a Category 5 hurricane and incapacitation of local response functions due to widespread devastation and loss of power and communications led FEMA to assume response functions that territories would usually perform themselves.<sup>23</sup>

### *Overview of the DoD Response*

In describing the DoD response to Hurricane Maria, we divide the response into four phases:

- September 20–25: Search for the Center of Gravity
- September 26–30: Transition to a Land-Based Response
- October 1–16: Developing the JFLCC Plan
- October 17–November 16: Culmination, Transition, and Redeployment.

#### *September 20 to 25: Search for the Center of Gravity*

In the days immediately following Maria's landfall, DoD and commonwealth military DSCA efforts were conducted primarily by personnel already deployed to the region. DoD personnel were deployed in support of FEMA's strategic priorities:

Conduct immediate life-saving operations, Conduct debris clearance operations, Reopen air and seaports, Re-establish utilities, Conduct outreach, Implement PR commodities distribution plan, Conduct comprehensive and inclusive public

---

<sup>22</sup> FEMA, 2018e; page numbers are cited with each quotation.

<sup>23</sup> GAO, *Hurricanes and Wildfires: Initial Observations on the Federal Response and Key Recovery Challenges*, Washington, D.C., GAO-18-472, September 2018, p. iii.

messaging, Develop a concept for reentry operations, and Obtain visibility of private industry to reestablish normal commerce.<sup>24</sup>

This list remained unchanged for the duration of the operation. These efforts continued to include daily conferences between FEMA, DoD leadership, and other departments, agencies, and relief operations in both Puerto Rico and the USVI.<sup>25</sup>

The initial DoD response to Hurricane Maria was executed using USACE personnel who had been deployed to the region in advance of landfall and personnel from the USS *Kearsarge* Amphibious Ready Group (ARG) and the 26th MEU, which had been deployed to the region on September 8 to conduct DSCA operations related to Hurricane Irma. At this time, C2 for the DoD response to Hurricane Maria was provided by a JFMCC built around the *Kearsarge* ARG. The *Kearsarge* ARG began conducting search and rescue, damage assessment, and patient evacuation on September 21 with its organic aircraft (six MH-60s and three MV-22s). The ARG's aerial damage assessment efforts were supplemented by P-8 patrol aircraft operating out of Florida.<sup>26</sup> On September 24, U.S. marines and sailors were deployed on the ground in Puerto Rico to conduct route reconnaissance, road clearance, and airfield clearance operations.<sup>27</sup> These ground operations would continue under JFMCC command through the end of October. On September 30, the *Kearsarge* ARG was reinforced by the USS *Wasp*, which would contribute an additional 13 helicopters (nine MH-60s and four CH-53s).<sup>28</sup>

National Guard units on both Puerto Rico and the USVI were among the first military responders. When the storm hit, 430 USVI National Guardsmen were on duty and being supported by an additional 390 guardsmen from other states. Personnel were ordered to shelter in place until the storm passed. In addition, some 200 additional guardsmen had been called up in other states to provide support to the USVI relief efforts once airlift became available. On Puerto Rico, around 500 guardsmen had reported for duty in expectation of potential disaster relief operations.<sup>29</sup> By September 22, 1,600 guardsmen were conducting relief operations on Puerto Rico and the USVI, a number that rose to over 4,300 on September 25.<sup>30</sup> These forces, in conjunction with personnel from the 26th MEU, engaged in route clearance, evacuation, first-

---

<sup>24</sup> USNORTHCOM, 2017f, p. 37.

<sup>25</sup> FEMA, 2018e; USNORTHCOM, 2017f; and USARNORTH, 2018b, all provide chronological details on the response.

<sup>26</sup> USNORTHCOM, "NORTHCOM Providing Disaster Relief Following Hurricane Maria," press release, September 21, 2017b.

<sup>27</sup> Terri Moon Cronk, "DoD Continues Round-the Clock Support Following Hurricanes in Caribbean," press release, September 25, 2017; DoD, "DoD Officials Provide Update on Hurricane Relief Efforts," press release, September 27, 2017a.

<sup>28</sup> USNORTHCOM, 2017f, p. 36.

<sup>29</sup> This included six UH-60 MEDEVAC helicopters that had been evacuated from the Virgin Islands to shelter on Puerto Rico (Philip and Barnett, 2017).

<sup>30</sup> FEMA Public Affairs. Roughly 2,750 of these National Guard personnel were from the PRNG (Lamothe, 2017).

responder movement, communications improvement, commodities and fuel distribution, and airlift support operations.<sup>31</sup>

Active-duty U.S. Army tactical units began to reengage in relief operations on September 24, when the 602nd Area Support Medical Company, which had been riding out the hurricane onboard the USS *Kearsarge*, returned to St. Thomas to provide medical support. This company was accompanied by a CAISE.<sup>32</sup> These units were joined a few days later, on the 27th, by a 30-soldier logistics support element drawn from the 247th Composite Supply Company.<sup>33</sup> In addition, on September 27, six HH-60 MEDEVAC helicopters and over 70 personnel from the 101st Airborne Division Combat Aviation Brigade (CAB) arrived in Puerto Rico to provide MEDEVAC, personnel movement, and commodity distribution support.<sup>34</sup> During this initial phase, USARNORTH was monitoring the situation in the region and deploying additional personnel to help coordinate the Army's role in responding to Hurricane Maria. On September 21, USARNORTH's TF-51 was tasked with deploying a nine-soldier liaison cell to Puerto Rico to support the Region V DCO and coordinate with JFMCC.<sup>35</sup>

A major impediment to speedy progress related to the difficulties associated with developing situational awareness and a COP of the situation after landfall. These difficulties arose from several sources, including lack of understanding of predisaster conditions; disruption of local emergency management institutions with local knowledge; and the overall level of destruction, especially communication and ground mobility limitations.<sup>36</sup>

By September 23, the magnitude of Hurricane Maria's impact on the population of Puerto Rico became known when the mayors and representatives of more than 50 of the 78 Puerto Rican municipalities met with government officials for the first time at the EOC in San Juan. The destruction of Puerto Rico's communication network had previously prevented officials from conveying the extent of the damage to their communities.<sup>37</sup> On September 25, the governor of Puerto Rico declared that the island was on the brink of a "humanitarian crisis"; noted that Puerto Rico deserved the same treatment as the hurricane ravaged states on the mainland; and

---

<sup>31</sup> Cronk, 2017; DoD, 2017a.

<sup>32</sup> FEMA Public Affairs, 2017.

<sup>33</sup> USNORTHCOM, "Update: U.S. Northern Command Continues Humanitarian Aid to Puerto Rico and the U.S. Virgin Islands," press release, No. 17-023, September 27, 2017d.

<sup>34</sup> "101st Airborne Gets to Work in Puerto Rico, Transports Med Teams," *Leaf-Chronicle*, September 29, 2018

<sup>35</sup> USARNORTH, "FRAGO 16 to USARNORTH OPORD (AN-OPORD-17-009-16) for DSCA Operations in Response to Hurricane Irma/Maria," September 21, 2017b; interviews with USARNORTH personnel, November 2017.

<sup>36</sup> U.S. Fleet Forces Command also found that the engagement of key local leaders is a critical component of gaining and maintaining situational awareness and understanding civil authorities' priorities for support (Davidson, 2017, slide 8).

<sup>37</sup> The following day, the *Washington Post* published a story quoting the mayor of San Juan as saying "if anyone can hear us . . . help. . . . Do not forget us and do not let us feel alone" (Samantha Smith and Daniel Cassidy, "Puerto Rico's Horrors Start to Come into Focus," *Washington Post*, September 24, 2017, p. A1); see also Jose de Cordoba, "Puerto Rico Tallies Up Devastation from Hurricane Maria," *Wall Street Journal*, September 24, 2017.

urged the federal government to quickly provide more money, supplies, and relief workers. Puerto Rico's allies in Congress echoed this call, pushing for quick adoption of a new relief bill. At the same time, the White House pushed back against the growing criticism of the lack of support for Puerto Rico by arguing that the federal response had not been slow; that there was an "unprecedented push" to get funding for federal assistance; and that efforts to provide food, water, and medical assistance were "doing well."<sup>38</sup> By September 25, FEMA had stopped searching for a commonwealth-led solution and took over the response operation, and JFMCC and USNORTHCOM had determined that JFMCC did not have the capacity to perform joint reception, staging, onward movement, and integration (JRSOI) of the forces that would be required for the response operations.<sup>39</sup>

### September 26 to 30: Transition to a Land-Based Response

On September 26, CDRUSNORTHCOM made the decision to transition DoD's C2 for the response to Maria from JFMCC to a JFLCC built around USARNORTH.<sup>40</sup> As a result, on September 27, BG Richard Kim was deployed to Puerto Rico to assess the situation on the ground prior to the deployment of a JFLCC. He brought with him the rest of TF-51's personnel (about 70 soldiers) to establish JFLCC (Forward).<sup>41</sup> On September 27, USNORTHCOM began to gain an understanding of the "sheer magnitude" of the challenges on Puerto Rico and determined that it was necessary to transition from a JFMCC-oriented "short-term sea-based response" to a "predominately land-based response designed to provide robust, longer-term support to FEMA" and Puerto Rico. That day, FEMA requested that DoD "go big" and deploy some 2,000 additional personnel to conduct DSCA operations.<sup>42</sup> Also on September 27, USNORTHCOM provided guidance regarding execution of the planned transition of C2 for DoD response efforts in the Irma-Maria JOA from JFMCC to JFLCC.<sup>43</sup>

Responding to FEMA's request, USNORTHCOM issued orders on September 29 for the deployment of headquarters, logistics, aviation, medical, and engineer units to support JFLCC in its execution of DSCA operations.<sup>44</sup> These forces were to deploy in five force packages, including focused JFLCC C2, logistical units and associated C2, helicopters, aviation C2

---

<sup>38</sup> Frances Robles, Lizette Alvarez, and Nichols Fandos, "In Battered Puerto Rico, Governor Warns of a Humanitarian Crisis," *New York Times*, September 26, 2017, p. A14; Rebecca Ballhaus and Siobhan Hughes, "Trump Is Set to Visit Puerto Rico to Survey Hurricane Damage," *Wall Street Journal*, September 26, 2017.

<sup>39</sup> Interviews with USARNORTH officials, San Juan, Puerto Rico, November 9–12, 2017, and Fort Sam Houston, December 12–13, 2017.

<sup>40</sup> U.S. Fleet Forces Command's lessons-learned briefing indicated that ESG staff were not manned or equipped to manage a complex, joint, interagency operation the scope of the one that followed Hurricane Maria (Davidson, 2017, slide 11).

<sup>41</sup> Interviews with USARNORTH personnel, November 2017.

<sup>42</sup> USNORTHCOM, 2017f, pp. 34–55.

<sup>43</sup> USNORTHCOM FRAGO 007-024, dated 272204ZSEP17, cited in USNORTHCOM, 2017f, p. 57.

<sup>44</sup> USNORTHCOM FRAGO 007-025, dated 272204ZSEP17, cited in USNORTHCOM, 2017f, p. 57.

elements and medical units, and more-robust medical capabilities and capacity.<sup>45</sup> Table 4.2 provides USNORTHCOM's detailed breakout of these force packages.

### Table 4.2. JFLCC Force Packages

| Force Package Number | Description              | Consisting of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Personnel                                                          |
|----------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|
| 1                    | JFLCC C2                 | LTG Jeffrey S. Buchannan (JFLCC CG)<br>General Rich Kim (JFLCC deputy CG [DCG]) <ul style="list-style-type: none"> <li>• TF-51 main body</li> <li>• JFLCC (Main)</li> <li>• Emergency response vehicle</li> <li>• public affairs officer (PAO)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                    |
| 2                    | Logistics C2 sustainment | 4th Sustainment Brigade Headquarters (–) (Advance Echelon) (PR)<br><br>510 Human Resources Platoon (PR)<br>68th Combat Sustainment Support Battalion (CSSB) Headquarters with two 63rd SIPR NIPR Access Point (PR)<br>3rd Expeditionary Sustainment Command (ESC) Tactical Command Post with 63rd Combat Post Node (PR)<br>247th Composite Supply Company (Main Body) (PR)<br>Water Quartermaster Company (PR) MA Support<br>CAB Headquarters (–) (Advance Echelon) (PR)<br>573 Movement Control Team (MCT) (PR)<br>Joint Public Affairs Support Element (PR)<br>Joint Enabling Capabilities Command (Forward Augmentation)<br>Contract Support Brigade Team (PR) | 45<br><br><br>12<br>35<br>53<br>411<br><br>50<br>191<br>4<br><br>4 |
| 3                    | Sustainment aviation     | 4th Sustainment Brigade Headquarters (Main Body) (PR)<br><br>CAB Headquarters Tactical Command Post (Main Body) (PR)<br>Inland Cargo Transfer Company Platoon (PR)<br>575 Area Support Medical Company (PR)<br>2 Forward Distribution Teams from Medical Logistics Company (PR)<br>2-501 General Support Aviation Battalion (GSAB) Headquarters (PR)<br>2-501 A Company (eight UH 60s) (PR)<br>2-501 Forward Support Company (Fuel, FARP, Maint) (PR)<br>2-501 B Company (six CH 47s) (PR)                                                                                                                                                                        | 164<br>78                                                          |
| 5                    | Aviation medical         | 14 Combat Support Hospital RFF with Combat Post Node 63 Expeditionary Signal Battalion (PR)<br>Expeditionary Medical Support System (PR)<br>Patient Movement Detachment (PR)<br>Veterinary Detachment (PR)<br>161 Engineer Company (Light) (PR) (prepare to deploy order [PTDO] only)                                                                                                                                                                                                                                                                                                                                                                             | 12<br>5                                                            |

<sup>45</sup> DoD, “DoD Accelerates Hurricane Relief, Response Efforts in Puerto Rico,” press release, September 30, 2016b7.

| Force Package Number | Description | Consisting of                 | Personnel |
|----------------------|-------------|-------------------------------|-----------|
|                      |             | Prime Power (VI) (D/249 USAR) |           |
| 6                    | Medical     | USNS <i>Comfort</i>           |           |
| 7                    | Enablers    |                               |           |

SOURCE: Adapted from USNORTHCOM, 2017f, p. 38.

NOTE: Table was modified from the original source to include the JFLCC CG and JFLCC (Main) and to define abbreviations.

Initial USAR DSCA operations on Puerto Rico, however, had started on September 22, although it was a challenge locating USAR personnel in the immediate aftermath of Hurricane Maria. BG Dustin Schultz had put a call out over the local radio stations requesting that USAR soldiers report to the nearest Army Reserve Center for accountability. Initially, only about 3 percent of USAR soldiers could be located. Although this improved over time, the 1st MSC, at least initially, had to rely on ad hoc units that were created with personnel and equipment from several different units.<sup>46</sup>

In addition to the decision to deploy active-duty forces to support JFLCC, the decision was made to mobilize Puerto Rico-based USAR units and personnel to provide additional capability to JFLCC to execute its MAs. The USAR's 1st MSC (–) Headquarters was placed in OPCON to JFLCC on September 30 to execute MA 4339DR-PR-DOD 37 C2 Element for 1st MSC.

Table 4.3 lists the MAs the 1st MSC was to execute. At that time, the 1st MSC was to take OPCON of the following mobilized USAR units: the 166th Regional Support Group (RSG), the 210th RSG, the 246th Quartermaster Company (Mortuary Affairs), the 448th Engineer Battalion, the 407th Medical Company (Ground Ambulance), the 273rd Movement Control Team, and the 597th Quartermaster Company (Field Service). The 448th Engineer Brigade was mobilized to conduct route clearance operations, and the 407th Medical Company was mobilized to provide medical support to the population of Puerto Rico.<sup>47</sup>

<sup>46</sup> The challenges USAR soldiers encountered in the immediate aftermath of the storm were significant; many were still “hacking” a way out of their homes. Soldiers speak of hearing of the call-up from family members while waiting in line for fuel or driving on partially open roads with only enough gas to make it to Fort Buchanan (Ruth Castro, “LTG Luckey Recognizes Hurricane Maria Recovery Efforts,” U.S. Army Reserve website, October 26, 2017; Rigo Cisneros, “Recovery Continues in Puerto Rico,” Army Reserve News Articles website, January 30, 2018; Ruth Castro, “1st MSC Soldiers Receive Satisfaction by Helping Others,” U.S. Army Reserve website, October 9, 2017; interview with 1st MSC personnel, November 2017).

<sup>47</sup> USARNORTH, 2017d.

**Table 4.3. 1st MSC Mission Assignments, as of September 30, 2017**

| <b>MA</b>        | <b>Description</b>                                                        |
|------------------|---------------------------------------------------------------------------|
| 4339DR-PR-DOD-01 | Two communications packages                                               |
| 4339DR-PR-DOD-03 | Mortuary Affairs                                                          |
| 4339DR-PR-DOD-08 | Three communications support Broadband Global Area Network with operators |
| 4339DR-PR-DOD-13 | Ground transportation                                                     |
| 4339DR-PR-DOD-16 | Medical support to triage, treat, stabilize, hold, and transport patients |

SOURCE: USARNORTH, "FRAGO 24 to USARNORTH OPOD (AN-OPORD-17-009-24) for DSCA Operations in Response to Hurricane Irma/Maria," September 30, 2017d.

During this period, several states announced that they would send National Guard personnel to Puerto Rico under the EMAC system; all these National Guard personnel were operating under SAD.<sup>48</sup> On September 27, New York announced that it would send an aviation TF with four UH-60s, two military police companies, an engineer company, 100 state police, and 30 personnel from the state Department of Transportation.<sup>49</sup> On September 28, Louisiana announced that it would send an engineer and one military police company (roughly 320 personnel).<sup>50</sup> On September 29, North Carolina announced that it would deploy 200 personnel from an engineer battalion that would provide the nucleus of a multistate 618-soldier engineer TF.<sup>51</sup> On the same day, New Jersey announced the deployment of 600 law enforcement and emergency responders and 500 national guard personnel, and Maryland said it would deploy two tactical water purification systems.<sup>52</sup>

The Commander USARNORTH (CDRUSARNORTH), General Buchanan, arrived in Puerto Rico on September 28 to assume command of JFLCC, which assumed responsibility from JFMCC for Maria response operations on the following day.<sup>53</sup> He brought with him additional

<sup>48</sup> The EMAC envisions that assisting states may deploy National Guard personnel for humanitarian purposes either under SAD or under Title 32. Under SAD status, the government of the assisting state is responsible for paying its National Guard forces, although the assisting state usually is reimbursed by the receiving state. When activated under Title 32, National Guard forces are paid for by DoD. In the case of hurricanes Harvey, Irma, and Maria, the Secretary of Defense did not authorize Title 32 funding for National Guard forces.

<sup>49</sup> Governor's Press Office (New York), "Governor Cuomo Announces National Guard, State Police and First Shipment of Supplies from the Empire State Relief and Recovery Effort Being Sent to Puerto Rico," press release, September 27, 2017.

<sup>50</sup> Office of the Governor (Louisiana), "Louisiana Emergency Teams Assisting Puerto Rico and U.S. Virgin Islands," press release, September 28, 2017; Louisiana National Guard Public Affairs Office, "La. Guardsmen Deploy to Puerto Rico to Assist in Maria Efforts," press release, September 2017.

<sup>51</sup> The task force would include engineers deployed from New York and Louisiana ("NC Sends Troops, Guard Engineers to Puerto Rico to Help with Recovery Efforts," WTVD-TV website, September 29, 2017).

<sup>52</sup> It is unclear whether New Jersey ultimately deployed 500 National Guard personnel (Phil Gregory, "New Jersey Sending 1,100 Emergency Responders to Help Puerto Rico," WHYY webpage, September 29, 2017; Maryland Emergency Management Agency, "Governor Larry Hogan Directs National Guard to Assist Puerto Rico Following Hurricane Maria," press release, September 29, 2017).

<sup>53</sup> USNORTHCOM, 2017f, pp. 35–36; U.S. Fleet Forces Command, *DSCA*, December 2017, slide 4.

USARNORTH personnel to fully establish JFLCC (Main) in Puerto Rico.<sup>54</sup> On September 30, General Buchanan gave his first press conference as JFLCC commander in the Hurricane Maria response, explaining the transition to a primarily land-based operation as follows:

Since the start of this response, the US Navy has served as the command and control element for the federal military forces responding to the Hurricane Irma damage in Puerto Rico. They oversaw Army, Navy, Air Force, and Marine Corps forces working with civil authorities to help open sea and air ports, clear the major routes around the perimeter of the island, and deliver critical commodities like food, water, and fuel. As we begin a more robust ground operation, we are also transitioning to a land-based headquarters to coordinate further federal military support.<sup>55</sup>

#### October 1 to 16: Developing the JFLCC Plan

Although C2 elements of JFLCC had begun to flow into Puerto Rico in late September, the flow of tactical Title 10 units into Puerto Rico to conduct DSCA operations began in earnest in early October.<sup>56</sup> These additional forces began deploying to Puerto Rico on October 1. The bulk of the required capabilities had arrived by October 10, and JFLCC had achieved what CDRUSNORTHCOM called its “consistent footprint.” This footprint, which remained relatively stable throughout October, consisted of over 13,000 Title 10 and National Guard operating under SAD or Title 32 personnel, more than 4,000 of whom were afloat.<sup>57</sup>

The additional units would continue to flow in over the following weeks, with the medical units being among the last to arrive. On October 12, elements of the 127th Quartermaster Company (Water) arrived, along with additional CH-47 helicopters.<sup>58</sup> The 14th Combat Support Hospital, which began deploying on October 8, became fully operational on the 15th, while the 633rd Expeditionary Medical Support (EMEDS) deployed between October 15 and October 17.<sup>59</sup>

In the first half of October, the main elements of the response, including JFLCC (Main) and its subordinate commands, the USAR 1st MSC, the 3rd ESC, and TF Iron Eagle (1st Armored Division [1st AD] CAB), were in place, and JTF-PR had been designated the Puerto Rico

---

<sup>54</sup> Interviews with USARNORTH personnel, November 2017.

<sup>55</sup> “Prepared Opening Statement for General Buchanan’s Initial Press Conference,” September 29, 2017, quoted in USARNORTH, *Building Trust During Crisis: The Federal Military’s Response to Hurricane Maria*, 2018a, p. 45.

<sup>56</sup> Personnel from the headquarters of the 3rd Expeditionary Sustainment Command and personnel and satellite communications equipment from the 63rd Signal Battalion began to arrive on September 26 (USNORTHCOM, “Update: U.S. Northern Command Continues Humanitarian Aid to Puerto Rico and the U.S. Virgin Islands,” press release, No. 17-022, September 26, 2017c).

<sup>57</sup> USNORTHCOM, 2017f, pp. 42–43.

<sup>58</sup> USNORTHCOM, “U.S. Northern Command Continues Puerto Rican Relief Efforts,” press release, No. 17-040, October 12, 2017e.

<sup>59</sup> Tristan Biese, AF Medics Deploy to Puerto Rico, Aid Hurricane Relief Efforts,” Air Combat Command website, October 18, 2017; DoD, 2017c.

tactical-level supported command, with all other commands (and EMAC) taking a supporting role.<sup>60</sup>

Additional USAR forces were called up in early October. On October 4, 393rd Combat Sustainment Support Battalion, the 430th Quartermaster Company (Field Service), and the 276th Ordnance Company (Support Maintenance) were put under the operational control of the 3rd Expeditionary Support Command to provide direct support.<sup>61</sup> On October 6, the 390th Transportation Company (Seaport Operations), the 432nd Transportation Company (Medium Truck), the 402nd Civil Affairs Battalion, the 941st Quartermaster Company (Petroleum Support), and the 35th Expeditionary Signal Battalion were put under the operational control of the 1st MSC. Also on October 6, the 1st MSC was also assigned to execute two additional MAs: Emergency Clearance (4339DR-PR-DOD-12) and C2 Elements to Conduct DSCA (433339DR-PR-DOD-39).<sup>62</sup> 402nd Civil Affairs Battalion personnel were tasked with engaging with key civilian leaders and the local populace to collect community metrics and information on needs and concerns. To support these efforts, 402nd personnel were colocated with the 1st AD CAB, and every aircraft (T10 and JTF-PR) making commodity deliveries was to provide space for up to two civil affairs personnel and plan time at each commodity drop point to allow for the civil affairs personnel to engage with key leaders.<sup>63</sup>

General Buchanan—serving as senior DoD representative and spokesperson for Title 10 forces—was responsible for ensuring the coordinated and integrated effort among all DoD federal forces, while General Shultz was responsible for working with JFLCC as a DCG for USAR forces.<sup>64</sup> On October 2, PRNG BG José Juan Reyes was appointed DSC for Puerto Rico.<sup>65</sup> At sea, JFMCC, centered around Expeditionary Strike Group Two (ESG-2),<sup>66</sup> continued to support the DSCA operations on Puerto Rico. Figure 4.1 illustrates the structure of the military response to Hurricane Maria as it stood in the middle of October 2017.

As of October 15, 2017, JFLCC was supporting the following MAs listed in Table 4.4.

---

<sup>60</sup> FRAGO AN-OPORD-17-009-36, cited in USARNORTH, 2018b, p. 153.

<sup>61</sup> On October 4, the previously mobilized 273rd MCT was attached OPCON to the 3rd ESC to provide direct support (USARNORTH, “FRAGO 28 to USARNORTH OPORD (AN-OPORD-17-009-28) for DSCA Operations in Response to Hurricane Irma/Maria,” October 4, 2017e).

<sup>62</sup> USARNORTH, “FRAGO 30 to USARNORTH OPORD (AN-OPORD-17-009-30) for DSCA Operations in Response to Hurricane Irma/Maria,” October 6, 2017f.

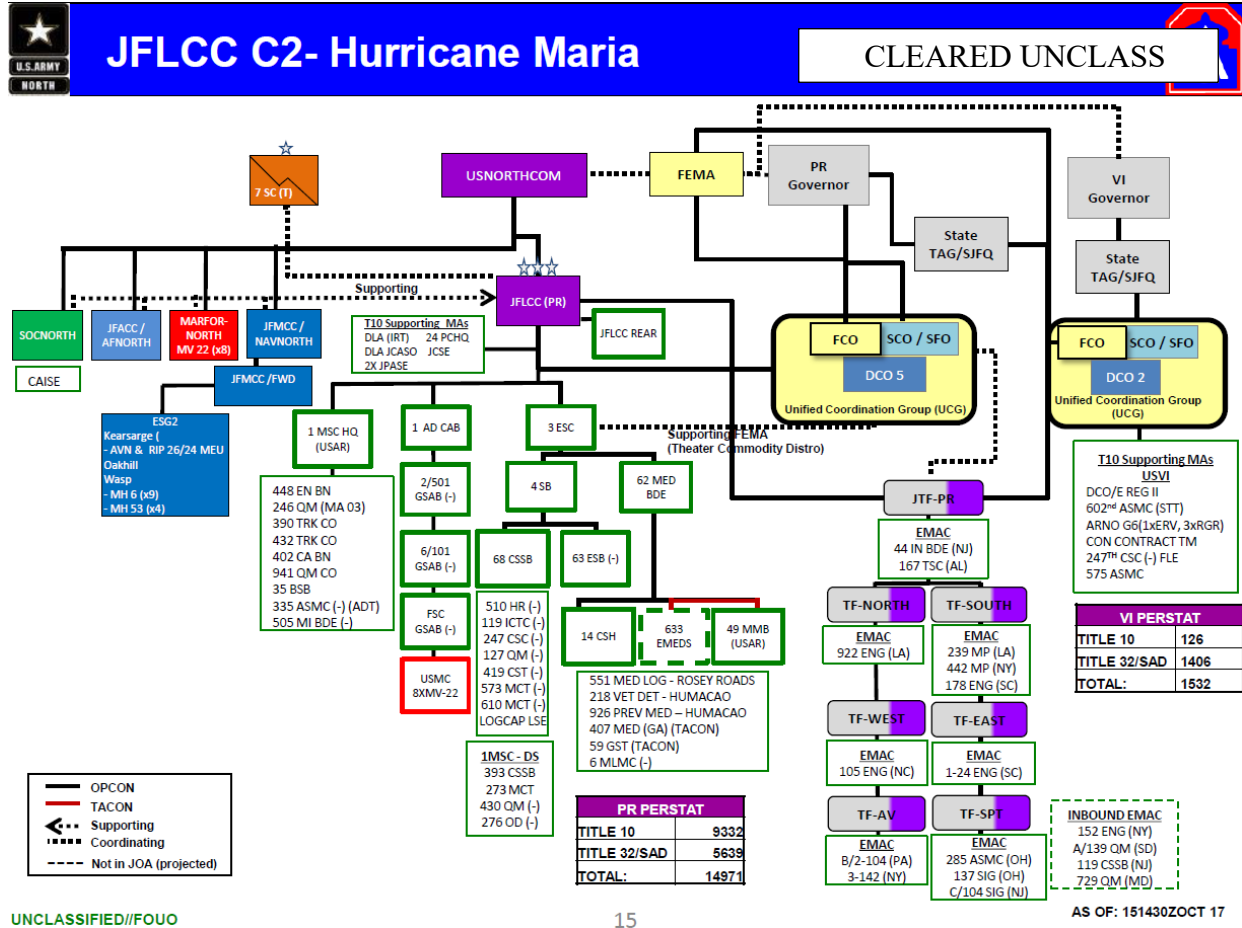
<sup>63</sup> USARNORTH, “FRAGO 31 to USARNORTH OPORD (AN-OPORD-17-009-31) for DSCA Operations in Response to Hurricane Irma/Maria,” October 6, 2017g.

<sup>64</sup> USARNORTH, 2018b, p. 155.

<sup>65</sup> USARNORTH, 2018b, p. 155.

<sup>66</sup> U.S. Fleet Forces Command’s response for Hurricane Maria included ESG-2, consisting of the USS *Kearsarge*, USS *Oak Hill*, USS *Wasp*, USNS *Comfort*, the 24th and 26th MEUs, and a Naval Expeditionary Combat Command Maritime Command Element. ESG-2 was dual-hatted under service (CTF-89) and joint (CTF-189) authorities to enable effective coordination between the *Kearsarge* ARG and *Wasp* for DSCA in the USVI and Puerto Rico (Davidson, 2017, slide 4).

Figure 4.1. The Military Response to Hurricane Maria (as of 15 October 2017)



SOURCE: USARNORTH CUB, October 15, 2017, slide 14.

Table 4.4. JFLCC Supported Mission Assignments

| MA Number        | Task                                                                                   | Performing Organizations                                                               |
|------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| 4339DR-PR-DOD-01 | Communications support to FEMA 100 users in Aguadilla and Ceiba                        | 35th Expeditionary Signal Battalion AND 63rd Expeditionary Signal Battalion—2X JNN TMS |
| 4339DR-PR-DOD-02 | Aerial port opening                                                                    | USTRANSCOM Joint Task Force—Port Opening, CRG and JAT                                  |
| 4339DR-PR-DOD-03 | Mortuary affairs assistance                                                            | 246 Quartermaster Company (Mortuary Affairs)                                           |
| 4339DR-PR-DOD-05 | Strategic airlift                                                                      | USTRANSCOM                                                                             |
| 4339DR-PR-DOD-08 | Communications support to first responders on Vieques and Culebra islands and in Ponce | X3 (TC Joint Enabling Capabilities Command-JCSE X3 IEPS                                |
| 4339DR-PR-DOD-10 | National Disaster Medical System—aeromedical evacuation                                | USTRANSCOM                                                                             |
| 4339DR-PR-DOD-11 | Joint air component coordination element                                               | U.S. Air Forces North                                                                  |

| MA Number        | Task                                                                                                                                | Performing Organizations                                               |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 4339DR-PR-DOD-12 | Emergency route clearing                                                                                                            | ESG-2'S "26 MEU" AND 448 Engineer Company—PTDO 161 Engineer Company CO |
| 4339DR-PR-DOD-13 | Ground transportation                                                                                                               | 166TH RSG, 210TH RSG, 390 TRK CO, 432 TRK CO, 573RD MCT                |
| 4339DR-PR-DOD-14 | Rotary-wing aircraft for lift of personnel and commodities and for medevac and search and rescue                                    | CTF 189/6-101 GSAB/3-501 ASLT/2-501 GSAB                               |
| 4339DR-PR-DOD-16 | Medical support to triage, treat, stabilize, hold, and transport patients                                                           |                                                                        |
| 4339DR-PR-DOD-17 | Maritime medical treatment facility                                                                                                 |                                                                        |
| 4339DR-PR-DOD-19 | CAISE support in Puerto Rico                                                                                                        | Special Operations Command North                                       |
| 4339DR-PR-DOD-21 | National Disaster Medical System—alert the DoD functional component command (FCC) in Columbia                                       |                                                                        |
| 4339DR-PR-DOD-24 | DMAT-like MED teams                                                                                                                 |                                                                        |
| 4339DR-PR-DOD-26 | Extension of Regions V and II October 31, 2017<br>(replaces MA VI-DOD-03 and MA PR-DOD-02)                                          |                                                                        |
| 4339DR-PR-DOD-27 | Water purification, storage, distribution                                                                                           |                                                                        |
| 4339DR-PR-DOD-29 | Incident support base at Naval Air Station Jacksonville and Blount Island, Florida                                                  |                                                                        |
| 4339DR-PR-DOD-31 | Planners to FEMA                                                                                                                    |                                                                        |
| 4339DR-PR-DOD-37 | C2 element for 1st MSC                                                                                                              |                                                                        |
| 4339DR-PR-DOD-38 | Assist with managing the theater distribution network and throughput of commodities                                                 | Logistics support for ESF-7                                            |
| 4339DR-PR-DOD-39 | Public affairs support                                                                                                              |                                                                        |
| 4339DR-PR-DOD-45 | Weather radars with operators                                                                                                       | U.S. Marine Corps (USMC)—WS Cherry Point—RFF                           |
| 4339DR-PR-DOD-49 | Logistics Civil Augmentation Program; reached full operational capability at Aguadilla October 13 and at Roosevelt Roads October 19 |                                                                        |
| 4339DR-PR-DOD-50 | Power lineman in support of the electrical grid                                                                                     | D/249th Engineer Company ordered to deploy                             |
| 4339DR-PR-DOD-51 | Fort Bragg and North Auxiliary Airfield as FEMA incident support bases                                                              |                                                                        |
| 4339DR-PR-DOD-53 | Fort Buchanan as a FEMA forward staging area                                                                                        |                                                                        |
| 4339DR-PR-DOD-54 | Laundry and bath<br>(replaces 4336DR-PR-DOD-05)                                                                                     |                                                                        |
| 4339DR-PR-DOD-55 | Joint Base Charleston as a FEMA incident support base or base/basic support installation                                            |                                                                        |
| 4339DR-PR-DOD-56 | Maritime freight support                                                                                                            | DoD                                                                    |

SOURCE: Adapted from USARNORTH, "FRAGO 40 to USARNORTH OPORD (AN-OPORD-17-009-40) for DSCA Operations in Response to Hurricane Irma/Maria," October 15, 2017j.

By mid-October, discussions began regarding the conditions that needed to be achieved to ensure a smooth transition from support from Title 10 forces to support from local, commonwealth, federal civilian, and National Guard.<sup>67</sup> On October 16, JFLCC's work on metrics and transition conditions had advanced enough that General Buchanan was able to brief Governor Ricardo Rosselló and FEMA FCO Michael Byrne on potential transition criteria for a step-down of Title 10 forces.<sup>68</sup>

#### October 17 to November 16: Culmination, Transition, and Redeployment

On October 20, General Buchanan reviewed capability usage with the FCO and agreed on the metrics that would be used to make informed decisions about releasing Title 10 military capabilities.<sup>69</sup> By October 24, a press statement for the release of the USS *Wasp* and USS *Oak Hill* was in final coordination.<sup>70</sup> The next day, on October 25, General Buchanan received a transition analysis briefing from JFLCC staff.<sup>71</sup>

On November 1, General Buchanan presented the results of an assessment of mission completion to the FCO,<sup>72</sup> and four days later, General Buchanan reengaged with Byrne to discuss the off-ramping of aviation assets.<sup>73</sup> On November 9, the FCO agreed to General Buchanan's recommendations for mission completion for sustainment and medical capabilities in the coming days.<sup>74</sup> Finally, on November 10, a press conference with the governor of Puerto Rico, the FCO, and General Buchanan announced that the conditions for the transition of Title 10 forces back to CONUS had been met, and that these forces would be withdrawn.<sup>75</sup>

U.S. Naval forces were among the first to be redeployed, as the military support for relief efforts on Puerto Rico wound down. On October 26, the USS *Wasp* and the USS *Oak Hill* were released from supporting DSCA operations. This was followed on November 3 by the release of the Kearsarge and the 24th MEU.<sup>76</sup> Finally, on November 17, the USNS *Comfort* ended its medical mission to Puerto Rico and was released from the DSCA mission in Puerto Rico.<sup>77</sup>

---

<sup>67</sup> For example, following an October 14 JFLCC staff briefing to General Buchanan on transition planning, the CG briefed Governor Rosello and FCO Michael Byrne on potential transition issues on October 16. By November 1, the CG was discussing the assessment of mission completion with the FCO (USARNORTH, 2018a, pp. 57–59).

<sup>68</sup> "General Buchanan Interview Log," in USARNORTH, 2018a, pp. 55–57.

<sup>69</sup> "General Buchanan Interview Log," in USARNORTH, 2018a, pp. 55–57.

<sup>70</sup> "General Buchanan Interview Log," in USARNORTH, 2018a, pp. 57–59.

<sup>71</sup> "General Buchanan Interview Log," in USARNORTH, 2018a, pp. 57–59.

<sup>72</sup> "General Buchanan Interview Log," in USARNORTH, 2018a, pp. 57–59.

<sup>73</sup> "General Buchanan Interview Log," in USARNORTH, 2018a, pp. 57–59.

<sup>74</sup> "General Buchanan Interview Log," in USARNORTH, 2018a, pp. 57–59.

<sup>75</sup> "General Buchanan Interview Log," in USARNORTH, 2018a, pp. 57–59.

<sup>76</sup> The 24th MEU had replaced the 26th MEU on October 18 (Davidson, 2017, slide 7; USNORTHCOM, 2017f, p. 43).

<sup>77</sup> Davidson, 2017, slide 7.

The redeployment of active-duty Army component forces began on November 9 when the following forces were ordered to redeploy:

- 3rd ESC
- 4th Infantry Division Sustainment Brigade
- 633rd Expeditionary Medical Support System
- 14th Combat Support Hospital
- 68th CSSB
- 247th Composite Supply Company
- 119th Inland Cargo Transfer Company
- 419th Civil Support Team
- 273rd MCT
- 127th Quartermaster Company
- 2-501st Forward Support Company
- 2-501st GSAB.<sup>78</sup>

The bulk of the personnel in these units redeployed by air between November 11 and 16, with their equipment being moved by sea. On November 13, General Buchanan and many staff departed Puerto Rico and returned to USARNORTH Headquarters at Fort Sam Houston.<sup>79</sup> This departure started a “step down” of Title 10 C2 forces, and MG Brian Harris took command of JTF (Forward). It was planned that a step down to the DCO would be synchronized with the departure of the USNS *Comfort* and that 1st MSC would assume 3rd ESC’s role in logistics and sustainment.<sup>80</sup> It also was envisioned, at the time, that the DSC position would be dissolved by December 15, but that ultimately was a decision for Governor Rosselló to make.<sup>81</sup> Nearly all Title 10 forces were redeployed by the end of the year.

## Overview of Force Levels, October 11 to November 19, 2017

Figures 4.2 and 4.3 present data on the number of Title 10 and National Guard in Puerto Rico and USVI from October 11 to November 19, 2017, based on data in JFLCC CUBs. As shown, total military forces had reached about 14,000 personnel by October 11 and rose gradually over the following two weeks, before declining.<sup>82</sup>

---

<sup>78</sup> USMC’s VMM-264 was also ordered to redeploy at this time (USARNORTH, “FRAGO 66 to USARNORTH OPORD [AN-OPORD-17-009] for DSCA Operations in Response to Hurricane Irma/Maria,” November 10, 2017p).

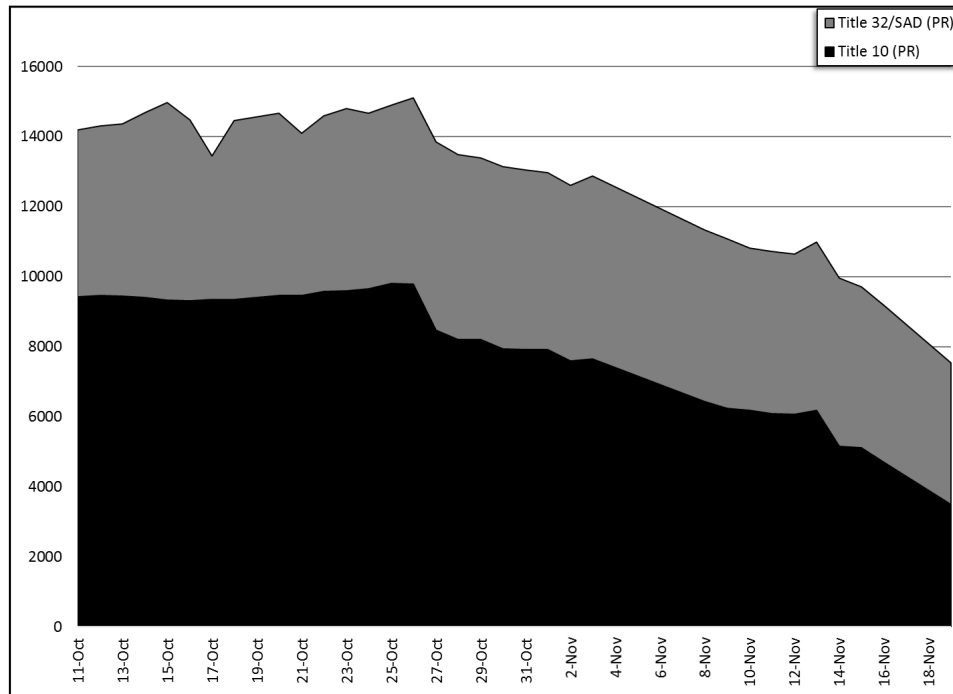
<sup>79</sup> “General Buchanan Interview Log,” in USARNORTH, 2018a, pp. 55–57.

<sup>80</sup> Interview with FEMA official, San Juan, Puerto Rico, November 10, 2017.

<sup>81</sup> Interview with 1st MSC official, San Juan, Puerto Rico, November 10, 2017.

<sup>82</sup> The numbers of personnel for November 4–5 and November 18–19 were interpolated from the available data.

**Figure 4.2. Title 10 and National Guard Personnel: Puerto Rico**



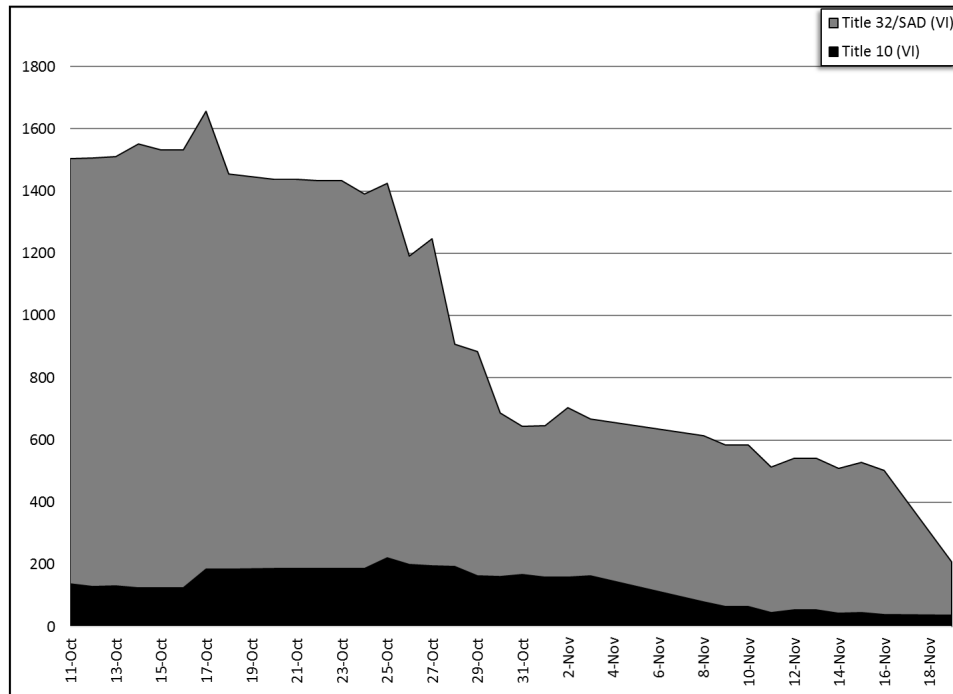
SOURCE: USARNORTH, "Commander's Update Brief," October 11–November 19, 2017i.

## Chapter Conclusions

This chapter has provided an overview of the military response to Hurricane Maria in Puerto Rico and the USVI. The Hurricane Maria response operation differed from the earlier responses in the 2017 hurricane season in that the level of damage and the shattering of emergency management capabilities in Puerto Rico required a larger response from Title 10 forces; the operation was conducted nearly 1,000 miles from CONUS; and the duration of Title 10 involvement in the operation greatly exceeded that in the earlier hurricanes.

The chronology suggests that it took approximately five days after Maria made landfall on September 20 to come to the following conclusions: (1) the commonwealth's emergency management system would be unable to provide the sort of direction envisioned in the Stafford Act; (2) a larger-than-usual federal military response was required and that it needed to be primarily land based; and (3) as a result, a transition of authority from JFMCC to JFLCC lead was indicated. That decision was made on September 25, and the transition of authority took another four days to accomplish, with additional Title 10 capabilities began to be brought in on September 29. In the interim, however, personnel belonging to the USAR, the National Guard, and CTF-89 were actively assessing the damage, clearing roads, and distributing relief supplies, even as EMAC National Guard forces began deploying.

**Figure 4.3. Title 10 and National Guard Personnel: U.S. Virgin Islands**



SOURCE: USARNORTH, 2017i.

As active-duty Army component personnel deployed from CONUS during the first two weeks of October, JFLCC and FEMA planners wrestled with the challenges associated with developing situational awareness and a COP, as well as developing an operational design that could effectively prioritize and synchronize efforts to achieve desired outcomes. By the second half of October, transition criteria had begun to emerge, but it was not until the second week of November that senior civilian and military leaders were assured that Title 10 operations and forces had achieved the transition criteria necessary for their withdrawal and that the remaining operations could be executed by the commonwealth, FEMA, and PRNG. With this decision, the bulk of the Title 10 forces were redeployed from Puerto Rico to their home stations by November 16.

## 5. DSCA Command-and-Control Arrangements: Doctrine and Practice During Hurricane Maria

---

This chapter addresses a number of more detailed questions related to command-and-control arrangements in the Hurricane Maria response, including the following:

- How did the DoD response in Puerto Rico and the USVI match or deviate from the NRF; the FIOPs; the NIMS; and other guidelines, doctrine, authorities, and organizational templates? What actually happened and why?
- How did the DCO and DSC roles in the Maria effort differ from their doctrinal roles, and why? Are there systemic problems that need to be addressed? How do we build role flexibility? What changes, if any, should be made to the DCO/DCE program and structure? What changes, if any, should be made to the DSC program and structure?
- What are the key factors that should inform the choice between a JFLCC and a JTF for disaster responses?

### Command and Control in Doctrine and as Observed

#### *DSCA Operational C2 Arrangements in Doctrine*

Current joint and Army doctrine provides CDRUSNORTHCOM with a flexible array of C2 options for DSCA operations. This doctrine identifies two preferred operational C2 arrangements for DSCA operations: the JTF and the FCC.

#### Joint Task Force

A JTF consists of capabilities from two or more military departments operating under a single joint force commander (JFC). These are generally temporary organizations established when the scope and complexity of an operation require the capabilities of more than one service. The JTF commander has the authority to assign missions, redirect efforts, and require coordination among subordinate commands. The JTF commander is also normally provided with OPCON over assigned and attached units. A JTF can be organized for a geographic area or on a functional basis.<sup>1</sup>

#### Functional Component Command

An FCC is established by a JTF commander to control military operations and generally consists of forces from two or more military departments that operate in the same mission area or

---

<sup>1</sup> JP 1, *Doctrine of the Armed Forces of the United States*, Washington, D.C.: Joint Chiefs of Staff, March 2013, pp. IV-10 to IV-11; JP 3-33, *Joint Task Force Headquarters*, Washington, D.C.: Joint Chiefs of Staff, January 31, 2018, pp. I-1 to I-3, II-6.

physical domain. They are often established to integrate domain planning; reduce the JFC's span of control; and improve operational efficiency, information flow, unity of effort, component interaction, and control over the scheme of maneuver. Normally, the FCC commander is the service component commander with the preponderance of forces assigned to the FCC.<sup>2</sup>

FCCs in USNORTHCOM include JFLCC (USARNORTH lead), JFMCC (Fleet Forces Command lead), and JFACC (U.S. Air Forces North lead).

JFLCC does not normally have JFC authority and normally exercises OPCON over its own service forces and TACON over other forces made available for tasking.<sup>3</sup> In addition, functional components do not plan campaigns; rather, they plan and conduct supporting operations in support of a JFC's campaign plan.<sup>4</sup> DSCA operations are generally ground centric and thus are executed by USNORTHCOM's joint force land component, USARNORTH.

USNORTHCOM is DoD's principal organization for planning DSCA in CONUS and, because of the enduring nature of this mission, the USARNORTH commander has been designated as USNORTHCOM's standing JFLCC, tasked with providing C2 to federal military forces conducting DSCA operations.<sup>5</sup> Current Army doctrine thus focuses on JFLCC as the supported commander during DSCA operations and primary means of providing C2 for "federal military forces and JTFs operating in small- and medium-scale DSCA efforts."<sup>6</sup> Under such circumstances, USARNORTH would normally deploy its contingency command post (TF-51) or a JTF to provide C2.<sup>7</sup> Although U.S. Army doctrine advises that TF-51 should deploy near the JFO in a disaster response,<sup>8</sup> USARNORTH's standard operating procedures in 2017 called for TF-51 to deploy, depending on the nature of the response, either near the location of the DSC or to a base support installation.<sup>9</sup>

For large contingencies, USNORTHCOM could deploy multiple JTFs under USARNORTH/JFLCC control; for catastrophic events, a corps headquarters could become the supported headquarters, with JFLCC remaining under the combatant command of

---

<sup>2</sup> JP 1, 2017, pp. IV-4, IV-17 to IV-18; JP 3-33, 2018, pp. III-3 to III-4.

<sup>3</sup> JP 1, 2017, pp. IV-17, IV-18.

<sup>4</sup> JP 1, 2017, p. I-20.

<sup>5</sup> JP 3-28, 2107, p. II-7; JP 3-33, 201, p. E-4; JP 3-31, *Command and Control for Joint Land Operations*, Washington, D.C.: Joint Chiefs of Staff, February 201, p. I-9; Army Techniques Publication [ATP] 3-93, *Theater Army Operations*, Washington, D.C.: Headquarters Department of the Army, November 2014, 2014, p. A-2.

<sup>6</sup> ADRP 3-28, 2013, p. 3-5.

<sup>7</sup> USARNORTH's contingency command post is designed for rapid air and land deployment within the USNORTHCOM AOR and has communications equipment compatible with potential joint and interagency partners. In addition, it can serve as a JTF if augmented (ATP 3-93, 2014, p. A-2).

<sup>8</sup> ATP 3-93, 2014, p. A-2.

<sup>9</sup> Interviews with USARNORTH staff, October 2017. The doctrinal practice was not initially followed in the response to Hurricane Maria. TF-51 first colocated with the DSC at Fort Buchanan. However, the TF-51 element quickly recognized that FEMA was the center of gravity and moved to the convention center in San Juan. RAND conversations with USARNORTH personnel, November 2017.

USNORTHCOM, setting the theater, and providing theater sustainment.<sup>10</sup> Finally, for small events, in which few federal forces are expected to be required, USARNORTH could deploy one of its DCOs to provide C2 for the federal military response.<sup>11</sup> Existing doctrine thus provides the combatant commander a broad range of operational C2 arrangements for supporting DSCA operations.

From an organizational standpoint, the practical differences between a JTF and an FCC are often relatively minor in DSCA operations, in large measure because there is so much flexibility within each model. Under crisis conditions, each service component headquarters is expected to be prepared to serve, with little or no notice, as a JTF headquarters.<sup>12</sup> Under one of the simplest JTF organizations, subordinate service components operate under the JFC and are delegated operational control over assigned and attached service forces.<sup>13</sup> In DSCA operations, USNORTHCOM's Army service component command or theater army (commander, Army Forces, i.e., USARNORTH), or a subordinate corps or division headquarters would most often be expected to serve as JFC. The JTF also can be organized around a combination of functional *and* service components, which may enhance integration of key functional activities,<sup>14</sup> and other permutations also are possible.

Similarly, in a typical DSCA response based on componency, the core of a JFLCC will most often be an existing Army C2 organization, such as an Army service component command or theater army, corps, or division headquarters.<sup>15</sup> In this case, JFLCC will usually be the supported commander, with other FCC commanders supporting and with functional component forces remaining under the TACON of their respective functional components. As indicated earlier and as will be discussed further in this chapter, either a JTF or functional component-based response is perfectly suitable for DSCA, and there is significant flexibility in tailoring the C2 organization within each structure to best meet the requirements of a DSCA response.

---

<sup>10</sup> ADRP 3-28, 2013, pp. 3-7 to 3-8; ATP 3-93, 2014, p. A-4. Personnel at USARNORTH observed that, according to the USNORTHCOM DSCA C3 estimate (USNORTHCOM, *Commanders' Estimate—Command, Control, and Coordination Options for the Range of DSCA Operations*, May 31, 2017a), USARNORTH would normally form the core of a JTF headquarters for large and catastrophic events, although the combatant commander can elect to keep it as a JFLCC in lieu of a JTF to spare the expense of additional joint augmentation. Doctrinally, a JFLCC would not normally have C2 of subordinate JTFs because this should require a JTF or sub-unified command as higher headquarters over smaller JTFs. However, USNORTHCOM routinely disregards this doctrinal concept to manage the combatant commander's span of control. Interviews with USARNORTH staff, October 2017.

<sup>11</sup> JP 3-28, 2013, p. II-12.; ADRP 3-28, 2013, p. 3-2.

<sup>12</sup> JP 3-33, 2017, pp. II-2, II-4.

<sup>13</sup> Service components include Commander, Army Forces; Commander, Air Forces; Commander, Naval Forces; and Commander, Marine Forces.

<sup>14</sup> This model includes both service components and functional components, including the JFLCC; the JFACC; the JFMCC; and the joint force special operations component commander.

<sup>15</sup> JP 3-31, 2014, p. II-7.

In addition, doctrine suggests that the staff of a JTF or an FCC should be representative of the force composition of its components.<sup>16</sup> Because most DSCA operations that USARNORTH will be called on to conduct will be primarily ground force operations, the practical differences in staff composition between a DSCA-oriented JTF or JFLCC would be slight. In both cases, they are likely to be Army and land force heavy and supported by a suitable staff that can provide C2 to nonorganic assets, such as fixed-wing air and maritime capabilities. This unity of effort can be achieved between JFLCC and the other components through the use of liaisons and other coordination elements.<sup>17</sup> The primary difference between these two C2 structures is that, while a JTF commander has the authority to establish subordinate JTFs or FCCs, an FCC commander does not.<sup>18</sup> Doctrinally, the FCCs are subordinate components of a joint force and do not constitute a joint force with a JFC's authorities and responsibilities.<sup>19</sup>

As will be discussed later, during DoD's response to Hurricane Maria, USARNORTH deployed as a JFLCC. This was both doctrinally appropriate and congruent with the DoD forces deployed. The vast bulk of Title 10 military forces conducting DSCA operations on Puerto Rico belonged to the U.S. Army, although they were supplemented by U.S. Air Force medical units and small numbers of USMC engineers and aviators.

One important C2 arrangement decision regards the TACON of the Title 10 forces executing DSCA MAs. Two basic TACON options are available in doctrine, either appointment of a DSC with command authority over the operational forces of both the National Guard and the deployed federal military forces or establishment of a parallel command structure with separate chains of command for Title 10 and National Guard forces.<sup>20</sup> Although not legally mandated, the use of the DSC structure for DSCA missions employing Title 10 and National Guard forces is identified by statute as the "usual and customary C2 arrangement, including for missions involving a major disaster or emergency."<sup>21</sup> The authority to establish and activate a DSC resides with the governor and the President or the Secretary of Defense. They, with the advice of their military commanders, decide whether to use a parallel or DSC tactical C2 structure.<sup>22</sup> The decision to attach Title 10 forces to the DSC, however, generally resides with the Title 10 operational commander. Figure 5.1 offers examples of these two command structures. Under the parallel

---

<sup>16</sup> JP 3-33, 2017, pp. II-4, III-4; JP 3-0, *Joint Operations*, Washington, D.C.: Joint Chiefs of Staff, January 17, 2017, change 1, October 22, 2018, p. IV-7.

<sup>17</sup> It should be noted that USNORTHCOM's response to Hurricane Maria included a significant maritime component organized under a U.S. Navy-led JFMCC. Roughly one-half of the Title 10 response consisted of personnel attached to CTF 189

<sup>18</sup> JP 3-33, 2017, p. I-1.

<sup>19</sup> JP 3-0, 2018, p. IV-7.

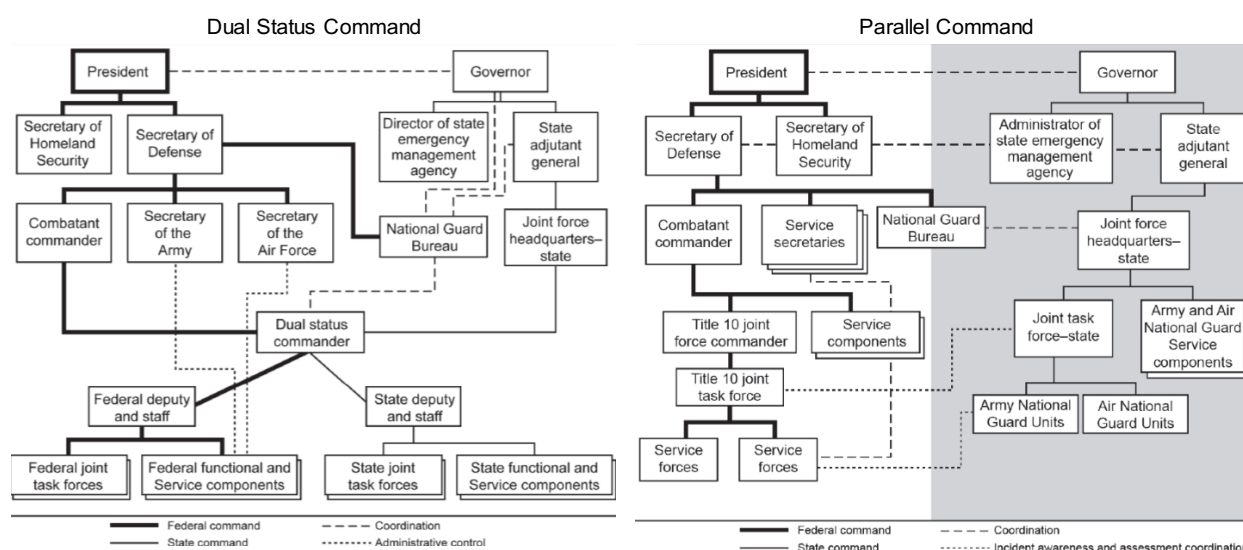
<sup>20</sup> A third potential option is to federalize the deployed Army National Guard (ARNG) forces and maintain a single Title 10 chain of command.

<sup>21</sup> Pub. L. 112-81, National Defense Authorization Act for Fiscal Year 2012, December 31, 2011.

<sup>22</sup> It is normally the governor who nominates a DSC for federal approval (JP 3-28, 2013, pp. II-3, C-1, C-8; ADRP 3-28, 2013, p. v, 3-9 to 3-10; ATP 3-28.1, 2015, p. 10).

command C2 structure, there is no single tactical-level force commander, and the Title 10 and National Guard forces have completely separate chains of command. Effectively using forces under this structure requires a close working relationship between the Title 10 and National Guard commanders and continuous coordination between the two command structures.<sup>23</sup> Under the DSC C2 structure, there is a single tactical-level force commander who receives orders from both the federal and state chains of command executing DSCA operations. This structure integrates federal and National Guard tactical forces, helps reduce duplication of effort, and helps ensure unity of effort.<sup>24</sup>

**Figure 5.1. Dual-Status and Parallel Command Structures**



SOURCE: ADRP 3-28, 2013, pp. 3-9 and 3-10.

### *DSCA C2 Arrangements in the USNORTHCOM Commander's Estimate*

USNORTHCOM supplemented and refined its discussion of DSCA C2 arrangements with the publication of *Commanders' Estimate—Command Control, and Coordination Options for the Range of DSCA Operations* in May 2017.<sup>25</sup> The purpose of the commander's estimate was to identify the preferred command, control and communications (C3) options for a range of DSCA operations.<sup>26</sup> It reiterates that, when Title 10 and National Guard forces are deployed simultaneously, the “usual and customary” C2 construct is the DSC and that the preferred C3

<sup>23</sup> ADRP 3-28, 2013, p. 3-8.

<sup>24</sup> Although dual-status command enhances mission command, it does not create unity of command because the missions for the federal and state National Guard forces originate separately and must be conducted by their respective forces (ADRP 3-28, 2013, p. 3-8, 3-10).

<sup>25</sup> USNORTHCOM, 2017a. USNORTHCOM also developed a flexible menu of C2 options in its contingency planning.

<sup>26</sup> USNORTHCOM, 2017a, p. 1.

arrangement for a Title 10 response to a complex catastrophe on a multistate level is the JTF.<sup>27</sup> It also identifies operational and strategic risks associated with DSCA C3 options. Among these identified risks are the following:

- Building a JTF from a component headquarters may affect the component's theater and/or service missions.
- Prioritizing componency as a solution sacrifices the quicker response time of a standing JTF structure.<sup>28</sup>
- More intermediate levels of command may increase lag time in reporting and decisionmaking.
- Intermediate levels of command may give the impression that CDRUSNORTHCOM is disengaged from DSCA response operations.
- Component-level solutions increase the political risk of overranking relative to state adjutants general.<sup>29</sup>

The basic philosophy underlying C3 for DSCA events is that, for smaller incidents, USNORTHCOM will determine supported and supporting relationships from among its components that enable the components to provide operational-level all-domain DSCA responses. For larger events, USNORTHCOM will designate a JTF headquarters for operational C3 that leverages, when possible, existing service and functional component headquarters, including Alaskan Command and JFHQ-NCR.<sup>30</sup> The commander's estimate provides preferred C3 solutions for five categories of events:

- **Preplanned events**—CDRUSNORTHCOM will determine the supporting and supported relationships between components and subordinates. For single-service DSCA responses, the C3 will normally be exercised through the respective component command. For events in Alaska and the NCR, the preferred supported commands are, respectively, Alaskan Command and JFHQ-NCR. The supported command for land-based events is normally USARNORTH, although U.S. Marine Forces North has been used for national special security events in the past. U.S. Naval Forces North is the preferred supported command for preplanned maritime-based efforts.
- **Small-scale, limited scope events (small)**—For C3 purposes, the preferred solution for small events is the same as for preplanned events.
- **Regional crisis (medium)**—For medium events, the preferred C3 solution for a land-centric DSCA is a JTF sourced from USARNORTH. The preferred solution for a maritime-centric DSCA is a JTF sourced from U.S. Naval Forces North. Alaskan

---

<sup>27</sup> USNORTHCOM, 2017a, pp. 2, 3. DoD defines a *complex catastrophe* as any

natural or man-made incident, including cyberspace attack, power grid failure, and terrorism, which results in cascading failures of multiple, interdependent, critical, life-sustaining infrastructure sectors and caused extraordinary levels of mass casualties, damage, or disruption severely affecting the population, environment, economy, public health, national morale, response efforts, and/or government functions. (JP 1-02, 2019, p. 47)

<sup>28</sup> If a standing JTF is not available, it can be faster to deploy an existing JFLCC than to create a new JTF.

<sup>29</sup> USNORTHCOM, 2017a, p. 4.

<sup>30</sup> USNORTHCOM, 2017a, p. 7.

Command and JFHQ-NCR would be used to source JTFs in their respective areas of responsibility.

- **Complex catastrophe (large)**—For C3 purposes, the preferred solution for a complex catastrophe is the same as for a regional crisis.
- **Theater in crisis**—An event of this scale would exceed the capacity of USNORTHCOM and would require C3 headquarters beyond what it is currently assigned or allocated.<sup>31</sup>

The response to Hurricane Maria appears to have straddled the division between a small-scale and a regional crisis, which USNORTHCOM's commander's estimate defined as follows:

*Small Scale/Limited Scope (Small):* Short- or no-notice events that are unlikely to expand into a larger emergency; small T10 DoD resource request; possibly single domain, single requirement; limited geographic impact.

*Regional Crisis (Medium):* Wide geographic area; significant loss of life or property; potentially multi-state/region, multiple domains, potential critical infrastructure impact, potential to expand, significant T10 DoD requirement.<sup>32</sup>

As a result, according to guidance in the commander's estimate, either component or a JTF would have been appropriate for the Hurricane Maria response, as was the initial handling of the response as a maritime-centric DSCA response. The commander's estimate notes that incidents affecting the Virgin Islands and Puerto Rico are conducive to a maritime-based DSCA response. It also describes conditions under which a transition from a maritime to land component might occur, similar to the transition from JFMCC to JFLCC that took place in late September 2017; notes that the conditions for a maritime-based DSCA response are likely to be short lived; and states that, if these conditions no longer pertain, a U.S. Naval Forces North-sourced JTF may transfer authority to a land component-led JTF.<sup>33</sup> Thus, much of the logic and criteria for USNORTHCOM's response to Hurricane Maria can be found in the May 2017 USNORTHCOM commander's estimate.

Figure 5.2 illustrates the ideal C3 arrangement for a USARNORTH-sourced JTF in response to a regional crisis or complex catastrophe. It envisions a JTF built around USARNORTH's contingency command post (TF-51) and the use of Title 10 forces under the TACON of the DSC to execute MAs.<sup>34</sup>

---

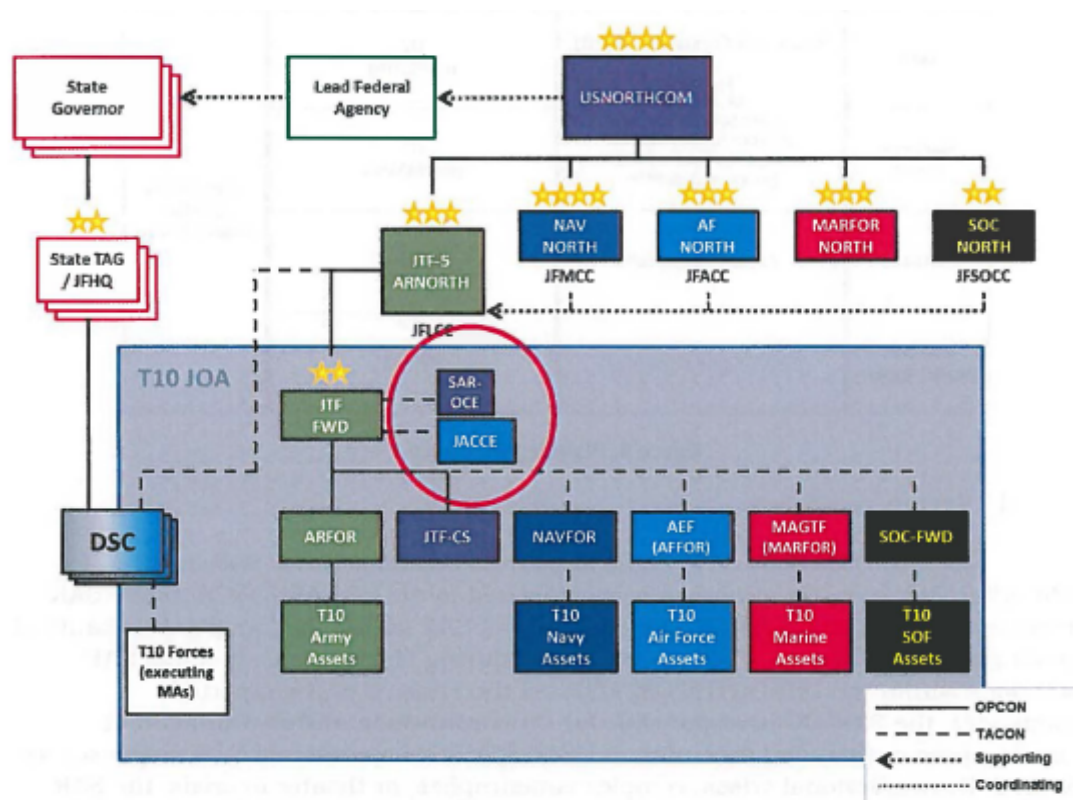
<sup>31</sup> USNORTHCOM, 2017a, pp. 10–11.

<sup>32</sup> USNORTHCOM, 2017a, p. 10.

<sup>33</sup> USNORTHCOM, 2017a, pp. 9, 14, 16.

<sup>34</sup> This is in line with the Commander, USARNORTH's June 2015 prepared remarks to the National Commission on the Future of the Army. The remarks noted that, for medium-scale events, the likely mission command headquarters would be USARNORTH's contingency command post, a joint headquarters, or an FCC and that it would likely be commanded by a major general (USARNORTH, "Commander, U.S. Army North Prepared Remarks for the 10 June 2105 Closed Session to the National Commission on the Future of the Army," 2015).

**Figure 5.2. Command, Control, and Communications Template for a USARNORTH Sourced Joint Task Force**



SOURCE: USNORTHCOM, 2017a, p. 12.

NOTE: The commander's estimate emphasizes that this figure is a template for illustrative purposes only and that the JTF-Commander has the prerogative to determine the C2 and supporting relationships within his or her command. TAG = state adjutant general.

In summary, the commander's estimate provides planning guidance for selecting C3 options based on the scale of and complexity of an incident and on its generic location (land, sea, Alaska, or the NCR).<sup>35</sup> This guidance is not meant to be prescriptive; rather, it is intended to help focus USNORTHCOM's and its components' planning efforts by identifying preferred C3 arrangements.

### *USARNORTH C2 Arrangements During Hurricanes Harvey, Irma, and Maria*

Early in USNORTHCOM's response to the hurricanes of 2017, there was reportedly a debate over potential C2 arrangements. This debate was over whether to establish a JTF or deploy CDRUSARNORTH as a JFLCC to provide C2 to DoD's DSCA efforts. Ultimately, CDRUSNORTHCOM decided to allow CDRUSARNORTH to operate as a JFLCC rather than

<sup>35</sup> USNORTHCOM, 2017a.

to establish an independent JTF.<sup>36</sup> Although various important factors could have influenced this decision, either C2 option could have been justified using existing joint or Army doctrine and both were congruent with USNORTHCOM's existing thinking about C2, and with the May 2017 commander's estimate.<sup>37</sup>

During the 2017 hurricane season USARNORTH used C2 options that were built around USARNORTH's contingency command post, TF-51.<sup>38</sup> During Hurricane Harvey, USARNORTH deployed an 80-soldier JFLCC (Forward) to support Texas authorities (Option 1-2); during Hurricane Irma, it deployed a ten-soldier JFLCC liaison element to Florida (Option 1-1).<sup>39</sup> In all three of the major 2017 hurricane responses—Harvey, Irma, and Maria—a DSC was activated to provide C2 to both federal and state tactical forces.

### *USARNORTH C2 Arrangements During Hurricane Maria*

At the tactical level, doctrine and policy provide operational commanders with a great deal of flexibility for how to organize the forces assigned to them. During the response to Hurricane Maria, however, there were several tactical-level variations from doctrine and standard DSCA organizational practices.

Normally, when a DSC has been activated, most Title 10 forces executing MAs would be attached to it to help ensure unity of effort. During the response to Hurricane Maria, however, a hybrid C2 structure was used in which parallel chains of command for Title 10 and National Guard were maintained after the DSC had been activated.

In addition, although the standard tactical organizational model (as embodied in JTF-CS) uses operational TFs focused on executing MAs, the 3rd ESC was used as an intermediate headquarters between the JFLCC and the medical TF and logistics TF. Furthermore, the 3rd ESC had the dual function of executing both MA operations *and* providing theater logistics support and commodity distribution. Finally, JFLCC had a USAR MSC attached to it. This situation was unique because USAR capabilities are rarely used in large numbers for DSCA operations, and it may have been the first use of a USAR headquarters as a subordinate command to a DSCA operational headquarters.

---

<sup>36</sup> USNORTHCOM, 2017f, p. 14.

<sup>37</sup> USNORTHCOM, 2017a.

<sup>38</sup> A *contingency command post* is a deployable command post drawn from a theater army that provides a limited capability to control small-scale operations. TF-51 is designed to be an all-hazards task force. It is commanded by an ARNG Title 10 major general. Its approximately 35 permanent active, guard, and civilian staff personnel can be augmented up to 200 personnel when deployed (ATP 3-93, 2014, pp. 2-1, 7-1, A-4; USARNORTH Education Branch, *United States Northern Command (USNORTHCOM)*, 2017, slide 27).

<sup>39</sup> Discussions with USARNORTH personnel, November 2017; Jim Garamone, "Military Seeks to Learn Lessons of 2017 Hurricane Season," *DoD News*, December 11, 2017b.

In the Hurricane Maria response, USARNORTH deployed its JFLCC (Main) to Puerto Rico (Option 1-2).<sup>40</sup> It appears that while there was an activated DSC, General Reyes, the majority of federal forces remained under the OPCON of JFLCC.<sup>41</sup> As a result, although the Hurricane Maria C2 arrangements were broadly comparable to standing USNORTHCOM C2 planning, they were a hybrid at the tactical level, i.e., a parallel command structure with a DSC to control National Guard forces.

Although the incapacitation of PRNG explains the rationale, the decision not to assign Title 10 forces to an activated DSC deviated from standing DSCA doctrine and its expectation that such employment of a DSC is not only usual and customary but also preferred, as well as from deviated from standing USNORTHCOM C2 planning. It also deviated from C2 arrangements outlined in the commander's estimate by not fully utilizing the DSC to provide C2 to Title 10 forces executing MAs and by deploying a three-star headquarters to lead DoD's land-based response.<sup>42</sup> As a result, JTF-PR's role as a DSC was largely moot because no Title 10 operational units were attached. The C2 structure used during Hurricane Maria is shown in Figure 5.3.

The U.S. military response to Hurricane Maria on Puerto Rico peaked at around 14,500 personnel in mid-October 2017.<sup>43</sup> Throughout the operation, the military response had three primary components: JFMCC, JFLCC, and JTF-PR. The organizational structure of the U.S. military conducting DSCA missions on Puerto Rico in response to Hurricane Maria illustrated in Figure 5.3 shows that JFMCC was built around ESG-2 and CTF 189, which consisted of three U.S. Navy amphibious ships (the USS *Kearsarge*, the USS *Oak Hill*, and the USS *Wasp*) and USMC's 24th MEU. On October 15, ESG-2 consisted of 4,394 sailors and marines, of whom 482 were ashore.<sup>44</sup> JFMCC had a supporting C2 relationship with JFLCC and accounted for some 47 percent of the Title 10 forces deployed in and around Puerto Rico on October 15, although the vast majority of these personnel remained at sea.

---

<sup>40</sup> Discussions with USARNORTH personnel, November 2017; Jim Garamone, "Military in Puerto Rico Will Stay Until 'All Needs Are Met,' DoD Liaison Says," *DoD News*, September 29, 2017a.

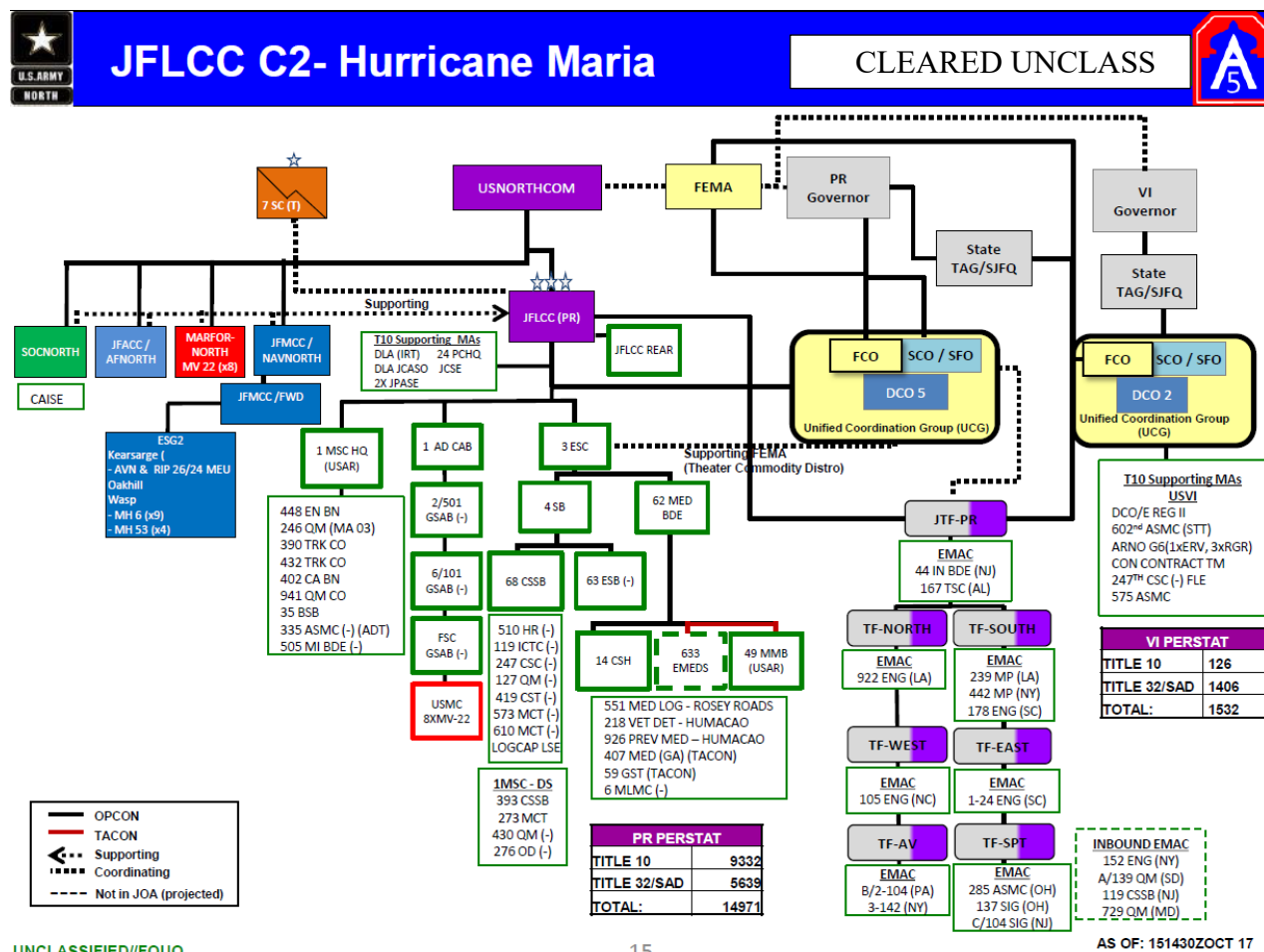
<sup>41</sup> General Reyes was appointed the DSC on October 2, 2017 (USARNORTH, 2017q, p. 155).

<sup>42</sup> The White House and the Secretary of Defense made the decision to deploy a three-star headquarters to lead the land-based DSCA efforts (discussions with USARNORTH personnel, November 2017).

<sup>43</sup> There are some discrepancies among different sources for both the date and level of the peak personnel strength. The USNORTHCOM history gives a peak strength in the Maria JOA of 13,760 (7,893 Title 10 personnel and 5,867 National Guard personnel), of whom 9,362 were on the ground in Puerto Rico on October 16, 2017. USARNORTH CUB's and FRAGOs, however, identify the peak strength as occurring on October 26, 2017, and place the personnel strength at 15,099. On October 16, USARNORTH's CUB showed 14,474 personnel in and around Puerto Rico. In addition, according to USARNORTH's CUBs, Title 10 strength peaked at 9,802 personnel on October 25 (USNORTHCOM, 2017f, p. 59; USARNORTH CUB, October 26, 2017; USARNORTH, "FRAGO 43 to USARNORTH OPORD (AN-OPORD-17-009-40) for DSCA Operations in Response to Hurricane Irma/Maria," October 18, 2017k).

<sup>44</sup> ESG-2 consisted of 3,905 sailors, 488 marines, and one member of the Coast Guard. It also had 25 rotary- and tilt-wing aircraft (USARNORTH, 2017j, slide 33).

Figure 5.3. JFLCC Command-and-Control Organization for Hurricane Maria on October 15, 2017



SOURCE: USARNORTH, 2017j, slide 14.

A second major element of the military response on Puerto Rico to Hurricane Maria was JTF-PR. Personnel for the DSC's functional staff were drawn from the 44th Infantry Brigade Combat Team (IBCT) Headquarters (138 soldiers) and began arriving around October 4, 2017, to serve as the staff for the DSC.<sup>45</sup> In mid-October, these personnel were supplemented by 54 soldiers from the 119th CSSB who were tasked with serving as the DSC's logistics planning cell.<sup>46</sup> The DSC's staff was also augmented by a ten-person Title 10 joint enabling capability (JEC).<sup>47</sup> As noted earlier, JTF-PR's role as a DSC was largely moot because no Title 10 operational units were attached. JTF-PR provided roughly 51 percent of the BOG in Puerto Rico. JTF-PR consisted of some 5,626 National Guard personnel. An estimated, 4,449 of these

<sup>45</sup> The 44th IBCT was deployed between October 1 and November 27, 2017 (USNORTHCOM, 2017f, p. 40; Department of Military and Veterans' Affairs, "Discussion Points: Military Affairs," working paper, 2019).

<sup>46</sup> The 119th CSSB was deployed between October 15 and November 27, 2017 (Department of Military and Veterans' Affairs, 2019).

<sup>47</sup> USARNORTH, 2017j, slide 29.

guardsmen were from PRNG, with the remaining 1,177 guardsmen deploying from 22 states under the EMAC system.<sup>48</sup> JTF-PR was organized into four regional TFs (TF West, TF North, TF South, and TF East), an Aviation TF, and a Support TF.<sup>49</sup>

The final element of the military response to Hurricane Maria was composed of some 5,000 personnel under the OPCON or TACON of JFLCC. JFLCC had OPCON over three primary headquarters: USAR's 1st MSC, the 1st AD CAB (TF Iron Eagle), and the 3rd ESC. The 1st MSC was the largest of these elements, consisting of some 2,548 soldiers, contractors, and civilians. Of these, some 1,577 were reservists living on Puerto Rico who were mobilized to conduct DSCA MAs. The 3rd ESC had TACON over some 606 of these reservists (primarily from logistics and medical units), while the remaining 976 reservists were divided among two TFs built around the 1st MSC's two regional support groups.<sup>50</sup> The 1st MSC TF personnel were focused on tactical mobility and commodity distribution.<sup>51</sup>

The second major element under OPCON of JFLCC was an aviation TF (TF Iron Eagles) with some 319 soldiers that was built around a GSAB. This TF's headquarters element was provided by the 1st AD CAB. TF Iron Eagles operated 22 U.S. Army helicopters, and in addition, had TACON of a USMC MV-22 squadron with eight aircraft, and a USMC weather radar element. TF Iron Eagles conducted medical evacuation and patient movement, passenger movement, supply delivery, and site survey operations.<sup>52</sup>

The final major Title 10 command OPCON to JFLCC was the 3rd ESC, which had OPCON of two brigade headquarters: the 4th Infantry Division Support Brigade and the 62nd Medical Brigade. The 3rd ESC and the 4th Infantry Division Support Brigade focused on commodity distribution throughout Puerto Rico and established various logistics support sites throughout the island. The 62nd Medical Brigade exercised mission command over all Title 10 medical units deployed to the JOA, including TACON of a USAR medical battalion and a U.S. Air Force EMEDS.<sup>53</sup>

Figure 5.4 presents data on the composition of the military response on various dates in October 2017, by primary component.

---

<sup>48</sup> The Puerto Rico ARNG consisted of some 6,000 soldiers. Of these, about 1,100 were first responders, and another 600 were new recruits undergoing training on the mainland. Puerto Rico ARNG personnel were also deployed overseas (RAND conversation with National Guard personnel, November 2017; Margaret Ziffer, "Puerto Rican Engineers Depart Theater Early to Support Families Following Hurricane," U.S. Army website, October 18, 2017).

<sup>49</sup> USARNORTH, "2017j, slide 29. It should be noted that the number of guardsmen recorded in the CUBs fluctuated, sometimes widely, on a daily basis.

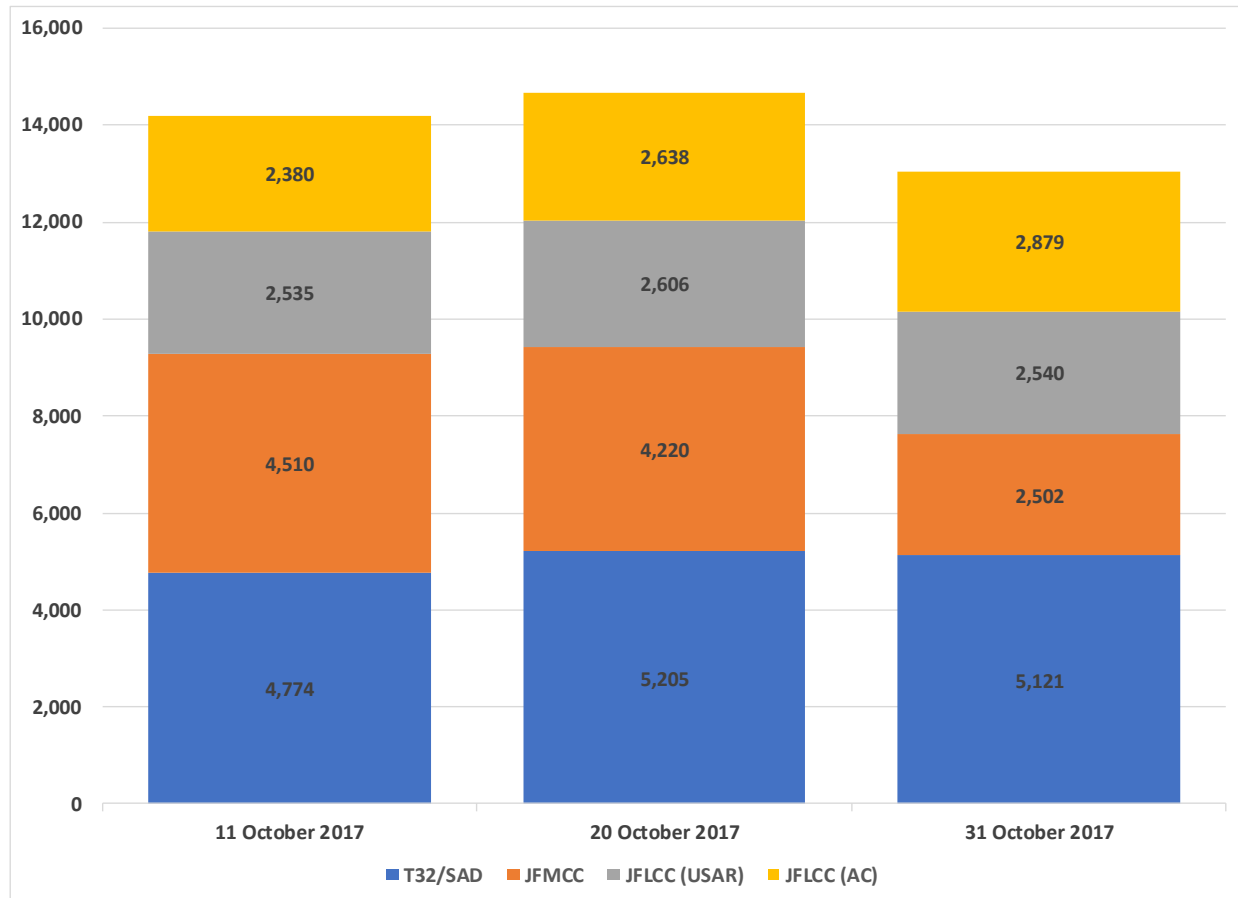
<sup>50</sup> Included in this group are personnel from the 49th Medical Battalion, which was under the TACON of the 62nd Medical Brigade.

<sup>51</sup> USARNORTH, 2017j, slide 28.

<sup>52</sup> USARNORTH, 2017j, slide 32.

<sup>53</sup> USARNORTH, 2017k; USARNORTH, 2017j, slides 29, 30.

**Figure 5.4. Composition of Military Forces Executing DSCA Operations in Puerto Rico, October 2017**



SOURCE: Derived from USARNORTH CUBs, October 11, 20, and 31, 2017.

NOTE: The JFLCC AC personnel are estimated. The CUBs provide details on the number of JFMCC, USAR, and ARNG personnel deployed, but not on the total number of JFLCC AC personnel. These JFLCC AC personnel numbers were estimated by subtracting the number of USAR and JFMCC personnel from the CUB's total number of deployed Title 10 personnel.

Operational command of Title 10 ground forces deployed to Puerto Rico was exercised through a JFLCC that was built around USARNORTH's TF-51, i.e., the C2 form was a JFLCC (Forward) deployed into the affected area. Although USARNORTH had several naming conventions and internal configurations for its forward deployed C2 element throughout the operation, all were consistent with USNORTHCOM options. CDRNORTHCOM made the decision to transition Hurricane Maria response C2 from JFMCC to JFLCC on September 26. Prior to this decision, USARNORTH had begun deploying JFLCC (Forward) personnel to Puerto Rico to serve as the nucleus of JFLCC (Main).<sup>54</sup> USARNORTH established JFLCC (Main) in Puerto Rico on September 30. This was a large headquarters consisting of some 174

<sup>54</sup> USNORTHCOM, 2017f, p. 35; USARNORTH, 2017q, pp. 148, 149, 153.

personnel that was commanded by USARNORTH's CG, General Buchanan.<sup>55</sup> As the Title 10 mission on Puerto Rico drew down in November, JFLCC (Main) transitioned back to JFLCC (Forward) on November 13. This headquarters consisted of some 42 to 62 personnel under the command of General Harris. This was a transitional C2 structure that departed the island between November 18 and November 27, as the Commonwealth of Puerto Rico and FEMA assumed greater control of response and recovery efforts.<sup>56</sup>

## Defense Coordinating Officer and Element in Doctrine and as Observed

### *The DCO/E in Doctrine*

Each FEMA Region has a DCO who serves as FEMA's single point of contact for DoD support and who is supported by a DCE.<sup>57</sup>

Doctrinally, it is expected that the DCO/E will be supplemented during a crisis response by specialty staff augmentees, additional personnel from the services, and additional EPLOs to serve as liaisons.<sup>58</sup> These augmentees could include additional personnel to form aviation, engineer, logistics, medical, and administrative teams and to support DCO/E public affairs, legal, and communications capabilities.<sup>59</sup> During a DSCA event, the DCO will normally have TACON of activated EPLOs, Reserve EPLOs, and SEPLOs. EPLOs normally support DoD interactions with FEMA, while SEPLOs usually support DoD interactions with the state, the state-level JFHQ for National Guard, or the DSC.<sup>60</sup> Figure 5.5. illustrates a notional augmented DCE.

The augmentation required for large-sale incidents can be substantial. The Region VI DCO, for instance, uses a 61-person DCO/E force package as an illustrative DCO/E deployment template. This package included 30 augmentees from USARNORTH or USNORTHCOM and 22 EPLOs (see Figure 5.6).

Some of the augmentees included in these examples were identified in the 2017 hurricane season AARs as lacking sufficient capabilities to fulfill their roles and responsibilities.<sup>61</sup> Although the operational context for this example of an augmented DCO/E is not defined, it is some 33 percent larger than the DCO/E deployed to Puerto Rico.

---

<sup>55</sup> USARNORTH, 2017q, pp. 131, 153.

<sup>56</sup> USARNORTH, 2017q, pp. 133, 181.

<sup>57</sup> FEMA, "Region II: Defense Coordinating Officer," webpage, April 24, 2019.

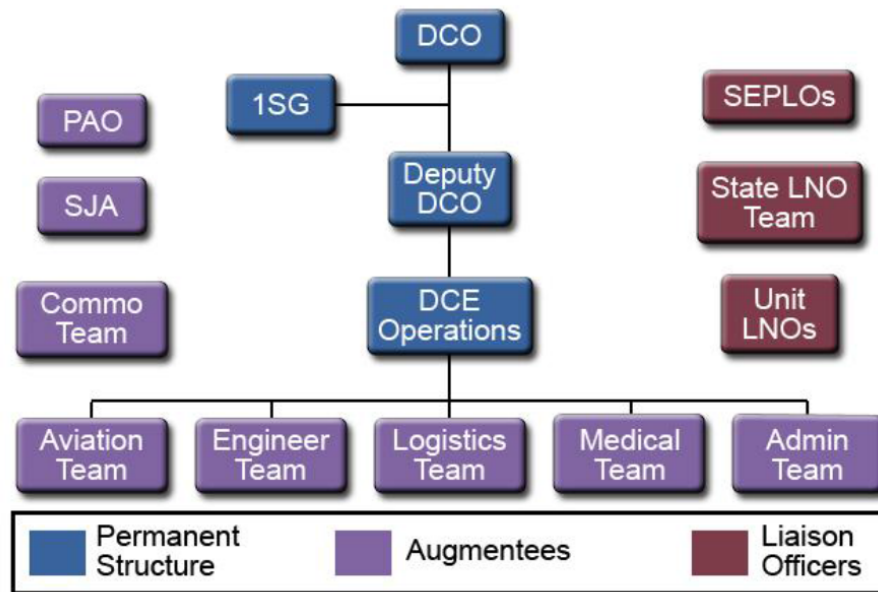
<sup>58</sup> JP 3-28, 2013, II-12.

<sup>59</sup> ATP 3-28.1, 2015, p. 9.

<sup>60</sup> JJP 3-28, 2013, pp. II-13 to II-14.

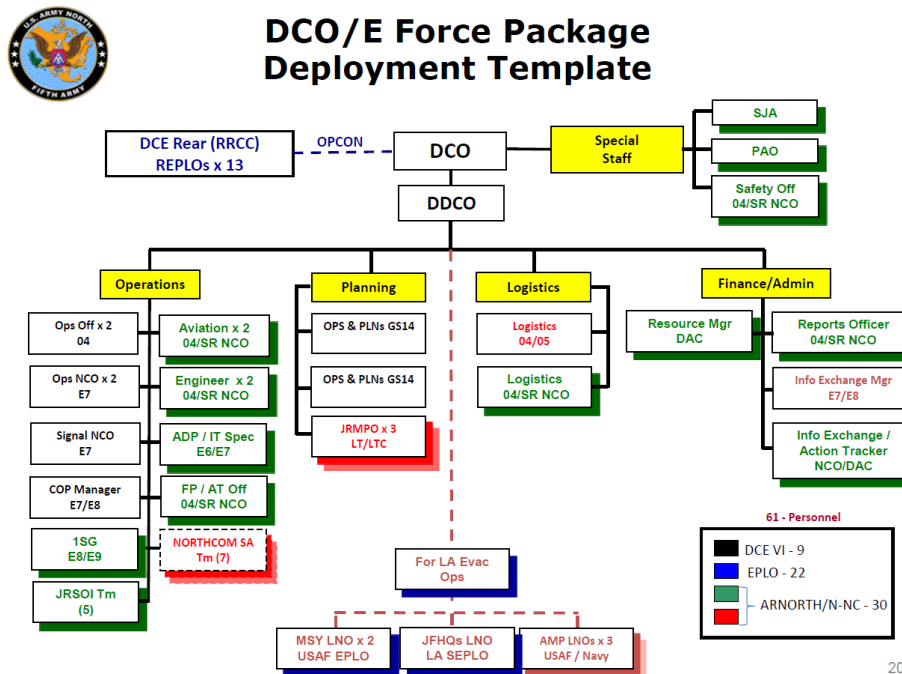
<sup>61</sup> It was noted for instance, that the DCE should have at least one full-time logistician and that the MA section needed to be enlarged during large operations (USARNORTH, 2017q, pp. 97–98, 216).

Figure 5.5. Illustrative Augmented DCE Structure



SOURCE: DoD, 2010b, p. 3-14.

Figure 5.6. DCO/E Force Package Deployment Template



SOURCE: USARNORTH, *Defense Coordinating Element (DCE) Battlebook 2014*, November 2013, p. 20.  
 NOTES: ADP = Army Doctrine Publication; N-NC= USNORTHCOM; SR NCO = senior NCO; Tm = team; USAF = U.S. Air Force.

The DCO/E for Region V deployed to Puerto Rico on September 5, 2017, in anticipation of Hurricane Irma's landfall and was later augmented by JFMCC personnel. Following Maria, on the order to transition from a maritime- to a land-based response, USARNORTH initially deployed a JFLCC liaison cell to the DCO/E on September 25 and began deploying DCO requested staff augmentation packages on September 29. As early as September 28, the DCO/E in Puerto Rico was integrating LNOs into the FEMA TFs to identify immediate and emerging requirements and to produce MATOs for troop movements. This augmentation of the DCO/E by EPLOs and SEPLOs increased it to a strength of 40 personnel by October 10, 2017.<sup>62</sup>

### *The DCO/E Observed*

One significant departure from NIMS doctrine set the overall context for DoD DSCA operations on Puerto Rico and had important ramifications for the entire DoD response. The NIMS system is predicated on the ability of local and state emergency managers to plan, lead, and conduct relief operations and to articulate and validate RFAs that FEMA can translate into MAs. This structure was lacking in Puerto Rico, where PREMA, at least initially, was largely incapable of generating RFAs or responding to the needs of the affected population. As a result, FEMA personnel had to take on roles that they were not trained for, generating RFAs and taking the lead in planning the execution of relief operations rather than responding to commonwealth RFAs.<sup>63</sup> One consequence of this was the need for USARNORTH to embed a large number of liaisons within the UCG to help plan the relief operations.

This requirement also appears to have put unexpected stress on the DCO/Es deployed to support the UCG because the DCO/Es were not organized and staffed to support the increased liaison and support requirements. As discussed later, in Chapter 6, the failure of the state-level emergency management system may also have contributed to the top-down MA process that saw the NRCC generating MAs, not all of which had been fully coordinated with the DCOs. This process was said to have resulted in a great deal of confusion because it resulted in the deployment of some capabilities that had not been coordinated with the DCO, FEMA, or Puerto Rico and may not have been necessary.<sup>64</sup>

When reviewing DoD's response to Hurricane Maria, USARNORTH personnel observed that the DCO/E organizational construct, while necessary, might be dated and insufficient in a catastrophic event.<sup>65</sup> This observation may be the result of the significant need for LNOs during the deployment, a demand that stressed both USARNORTH and the DCO/E. The additional stress would almost certainly be greater in a catastrophic event.

---

<sup>62</sup> FRAGO 16 issued on 21 September directed the USARNORTH Staff to be prepared to deploy DCO/E augmentation packages if requested by the DCOs (USARNORTH, 2017q, pp. 148, 151, 152–153, 235).

<sup>63</sup> Interview with USARNORTH MA Manager, San Antonio, April 11, 2017.

<sup>64</sup> One DCO went so far as to say that "every top down MA was wrong. A number of them made no sense" (USARNORTH, 2017q, pp. 51, 229, 238, 235–236).

<sup>65</sup> Interview with General Kim, October 11, 2017.

During the Hurricane Maria response, the FEMA staff and the ESFs were, at one point, divided among 18 TFs, working groups designed to solve specific problems. Each of these TFs, which met three times daily, required some degree of DoD representation to help with MA generation. The DCO/E in San Juan lacked the staff to integrate with all of these FEMA and ESF TFs. Although the DCO could provide some coverage with its core staff, augmentees, and CTF-189 liaisons, the office required additional planners and liaisons from JFLCC to support FEMA. JFLCC itself had only three liaisons, so the additional personnel had to “come out of hide.”<sup>66</sup> Furthermore, the LNOs had to be “high-quality officers” who could operate at the FEMA level, and their departure from JFLCC reportedly decreased its effectiveness.<sup>67</sup> This issue resulted from the fact that the existing DCE augmentation plan could not support more than one DCO/E at a time, and multiple DCO/Es had been activated to deal with overlapping disaster responses.<sup>68</sup>

Another issue that arose in regard to the liaisons was that many JFLCC personnel used to augment the DCO/E or serve as liaisons had a poor understanding of the MA process, and this caused friction between the command and coordination nodes. Suggestions to address this issue included providing key JFLCC personnel with more in-depth MA training and creating a battle roster of liaisons to be better able to identify personnel that need additional training.<sup>69</sup>

Another weakness identified in the DCO/E structure was its inability to provide, when necessary, adequate C2 to the relatively small deployment of Title 10 forces in the USVI, as is called for in doctrine. This issue arose because, during Hurricane Maria, no JFLCC C2 element was deployed to the USVI AOR to provide C2 to the three Title 10 units deployed there, so the Region II DCO was designated as a TF commander and given OPLAN/TACON of the three Title 10 units. This required the DCO/E to act as a tactical battle-tracking and C2 headquarters, something it was not staffed to do.<sup>70</sup> Given this experience, USARNORTH’s 2018 summary of its operations during the 2017 hurricane season concluded that the DCO/E is not staffed to provide C2 to small numbers of Title 10 ground units, as envisioned in doctrine.<sup>71</sup>

## The Dual-Status Commander in Doctrine and as Observed

### *The DSC in Doctrine*

As described earlier, the DSC is a statutorily authorized C2 construct that allows an officer, with both presidential and gubernatorial consent, to command both state and federal forces.

---

<sup>66</sup> USARNORTH, 2017q, p. 3, document provided to RAND by USARNORTH (USARNORTH, 2017r, p. 43).

<sup>67</sup> The CG noted that “[w]e’ll continue [deploying an adequate number of appropriate LNOs] but know it will cost us” (USARNORTH, 2018b, p. 3).

<sup>68</sup> USARNORTH, 2017q, p. 200.

<sup>69</sup> USARNORTH, 2017q, pp. 51–52; USARNORTH, 2018b, p. 3.

<sup>70</sup> USARNORTH, 2017q, pp. 40–41.

<sup>71</sup> USARNORTH, 2017q.

32 U.S.C. § 325(a)(2) allows an officer of the National Guard to retain National Guard duty status when serving on active duty if authorized by the President to do so with the consent of the relevant governor.<sup>72</sup> Similarly, 32 U.S.C. § 315(a) allows the secretaries of the Army and Air Force to detail commissioned officers to duty with state National Guard forces who, with the permission of the President, may accept a commission in the state National Guard without vacating their federal position.<sup>73</sup>

The DSC status was initially authorized for use during National Special Security Events (NSSEs) in 32 CFR 183.6, in which it was stated that the DSC was the “usual and customary command and control arrangement” for NSSEs.<sup>74</sup> The first employment of the DSC for NSSEs was the G-8 Summit in 2004.<sup>75</sup> Subsequently, the December 2011 National Defense Authorization Act included language intended to facilitate the use of the DSC to provide unity of effort during disaster response operations.<sup>76</sup>

When the Armed Forces and the National Guard are employed simultaneously in support of civil authorities in the United States, appointment of a commissioned officer as a dual-status commander serving on active duty and duty in, or with, the National Guard of a State under sections 315 or 325 of title 32, United States Code, as commander of Federal forces by Federal authorities and as commander of State National Guard forces by State authorities, should be the usual and customary command and control arrangement, including for missions involving a major disaster or emergency as those terms are defined in section 102 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5122). The chain of command for the Armed Forces shall remain in accordance with sections 162(b) and 164(c) of title 10, United States Code.<sup>77</sup>

Doctrine also prefers the use of the DSC structure.<sup>78</sup> The DSC is an intermediate link between two distinct and separate chains of command: the federal chain of command for Title 10 forces and the state chain of command for SAD and Title 32 National Guard forces. Although the DSC is enabled to exercise command on behalf of both the state and federal governments, the authorities these chains of command provide are mutually exclusive. The DSC can only issue orders that originate from the federal chain of command to Title 10 forces and can only issue

---

<sup>72</sup> See U.S.C., Title 32, National Guard, Chapter 3, Personnel, Section 325, Relief from National Guard Duty when Ordered to Active Duty, Subsection (a), Relief Required.

<sup>73</sup> See U.S.C., Title 32, National Guard, Chapter 3, Personnel, Section 315, Detail of Regular Members of Army and Air Force to Duty with National Guard. These changes were made to federal statute in 2004 (John T. Gereski and Christopher R. Brown, “Two Hats Are Better Than One: The Dual-Status Commander in Domestic Operations,” *Army Lawyer*, June 2010, pp. 72–75).

<sup>74</sup> CFR, Title 32, National Defense, Section 183.6, Defense Support of Special Events: Procedures.

<sup>75</sup> Gereski and Brown, 2010, p. 73.

<sup>76</sup> National Guard Bureau, “Dual Status Commander (DSC),” flyer, December 2017.

<sup>77</sup> Pub. L. 112-81, 2011. This language is also included in the notes to 32 U.S.C. 317.

<sup>78</sup> JP 3-33 notes that it is important for commanders to have a clear understanding of the various command arrangements available for use during DSCA operations and states that the “DSC is the preferred C2 method for forces during a federal and state response” (JP 3-33, 2018, p. E-1).

orders that originate from the state chain of command to SAD and Title 32 National Guard forces. Doctrine prefers but does not mandate attaching Title 10 personnel to the DSC. The President, as Commander-in-Chief, retains the authority to place appropriate Title 10 forces under the OPCON or TACON of the DSC on a case-by-case basis.<sup>79</sup>

In addition, the DSC structure does not apply to civil disturbance operations, homeland defense operations, federal military authorities using immediate response authority to provide DSCA support, mutual or automatic aid agreements between local communities and military installations, or federal military forces supporting the Department of Justice in emergency response operations related to weapons of mass destruction.<sup>80</sup>

The primacy of the DSC is also recognized in Section 515 of the 2012 National Defense Authorization Act,<sup>81</sup> which indicates that a DSC should be the “usual and customary” C2 arrangement when Title 10 and National Guard forces are employed simultaneously in support of civil authorities in the United States. As noted earlier, USNORTHCOM does not mandate any particular C2 structure for DSCA operations and has developed numerous C2 options to ensure that the C2 structures used in DSCA operations depend on the mission and the nature and size of the incidents.

The DSC requires a staff capable of planning and directing the execution of DSCA operations. The National Guard or SAD staff will usually consist of the existing state National Guard command, which provides the nucleus of the C2 element for JTF-State.<sup>82</sup> The size and capability of this staff will thus often depend on the structure of the National Guard forces located in the state. To ensure unity of effort between Title 10 and National Guard forces under the control of the DSC, the DSC’s staff must include both Title 10 and National Guard personnel. To support this effort, USNORTHCOM has preidentified Title 10 deputy commanders, usually O-6s, to lead a DSC-JEC that can integrate with state-level DSC staff personnel. The baseline DSC-JEC consists of 16 personnel drawn primarily from USNORTHCOM and its components’ staffs. The DSC-JEC is tailored for the specific situation, so mission analysis may result in the deployment of a DSC-JEC that is larger than the doctrinal baseline.<sup>83</sup> Figure 5.7 provides an example of an integrated Title 10–National Guard DSC staff.

In theory, any adverse impacts on unity of command associated with the DSC’s dual role should be mitigated to some extent by the fact that the Title 10 forces are executing missions requested by the same civil authorities that have command of the National Guard forces.

---

<sup>79</sup> JP 3-33, 2018, p. IV-14.

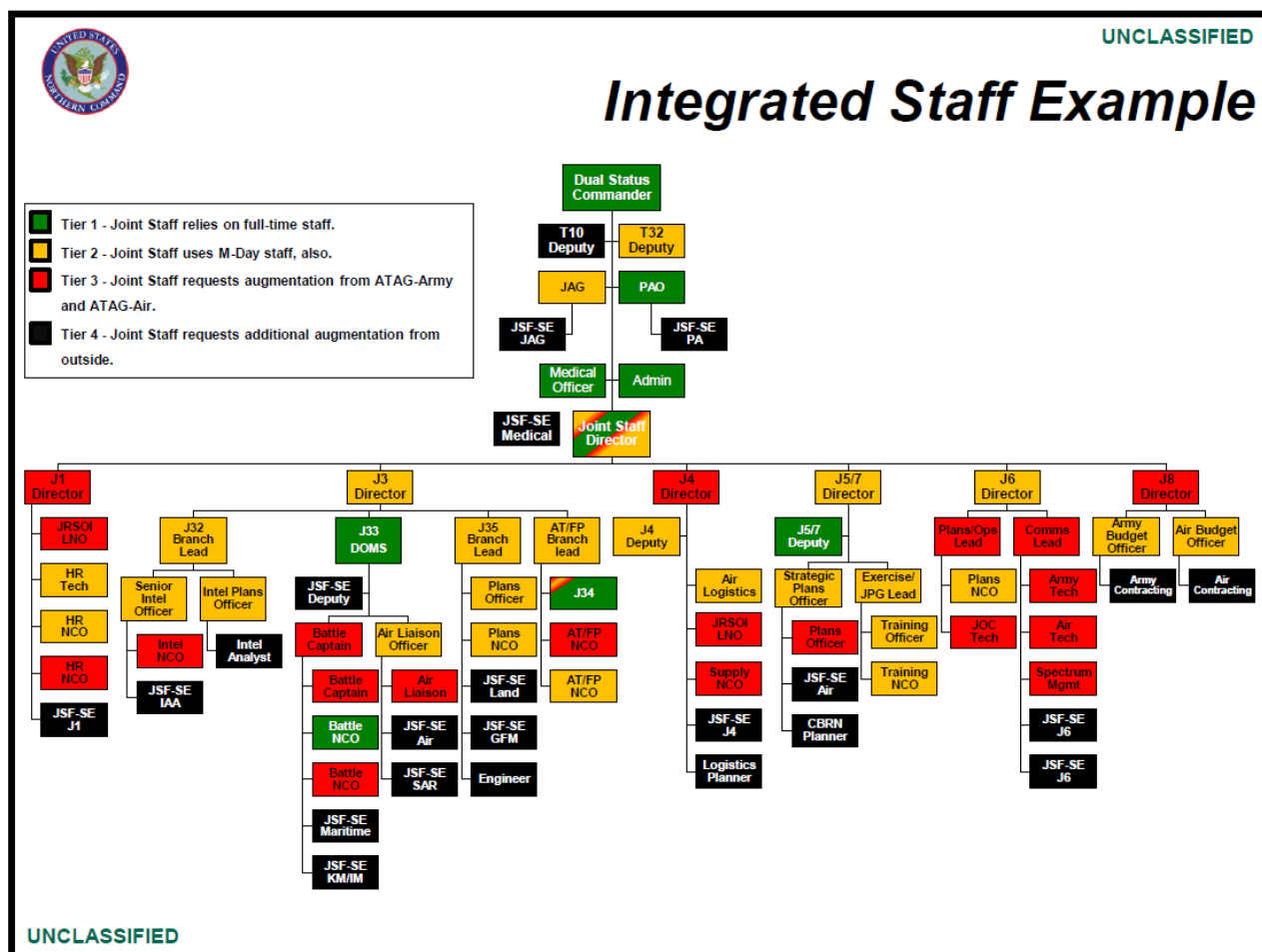
<sup>80</sup> JP 3-28, 2013, p. C-1; ADRP 3-28, pp. 3-8, 3-10.

<sup>81</sup> Pub. L. 112-81, 2011.

<sup>82</sup> JP 3-33, 2018, p. E-1.

<sup>83</sup> USNORTHCOM Publication 3-20, 2012, pp. xix, 2-16, 4-1.

Figure 5.7. Integrated DSC Staff



SOURCE: USNORTHCOM Publication 3-20, *Title 10 Support to Dual Status Commander Led Joint Task Force Standard Operating Procedures*, January 21, 2010, p. 4-6.

NOTES: Tier 1 consists of full-time DCS staff; tier 2 consists of augmentees available on mobilization of the DSC; tier 3 consists of augmentees from the state National Guard; and tier 4 consists of additional augmentees, including the DSC-JEC.

### The DSC as Observed

Although the DSC has been a permissible C2 option for no-notice events since 2004, it has rarely been fully activated. Twenty-five DSCs had been activated for consequence management events prior to the 2017 hurricane season. Only three of these DSCs, however, ultimately employed Title 10 forces.<sup>84</sup> The DoD DSCA operations on Puerto Rico in response to Hurricane

<sup>84</sup> The first activation of DSCs for a no-notice event occurred in 2011 in anticipation of the need for a federal response to Hurricane Irene. Ultimately, Title 10 forces were not required for this event. Similarly, most DSCs for no-notice events were activated in anticipation that the event might be significant enough to require federal forces. Ultimately, only Hurricane Sandy (2012) and the Colorado floods of 2013 required such a response (United States Army North Education Branch, 2017, slide 42; Ryan Burke and Sue McNeil, *Toward a Unified Military Response: Hurricane Sandy and the Dual Status Commander*, Carlisle, Pa.: U.S. Army War College Press, April 2015, pp. 14, 16).

Maria were thus the first real opportunity to activate a DSC to employ a large number of Title 10 forces. As a result, neither Title 10 nor National Guard–SAD forces operating in Puerto Rico had much practical experience with using the DSC structure to respond to major natural disasters.

Governor Rosselló established a DSC for Puerto Rico on September 7, 2017, after Hurricane Irma made landfall.<sup>85</sup> Following Hurricane Maria, the FEMA Region 2 director noted on September 29 that a DSC structure was in place to ease the C2 of National Guard/SAD and Title 10 forces. At that time, according to General Buchanan, it was possible to “put both federal and state forces together under the command and direction of one officer.”<sup>86</sup> This unity of effort, however, did not occur until late October, and then only in a cursory fashion, as the DoD effort in Puerto Rico was winding down.

According to USARNORTH’s concept of operations, the DSC and JTF-PR together were to be the tactical-level supported command once they had achieved full operational capability.<sup>87</sup> Indeed, on October 14, JFLCC staff began developing criteria for when JTF-PR could accept TACON of Title 10 forces.<sup>88</sup> It was not until October 28, however, that a small number of Title 10 forces were provided to the DSC, when elements of the USAR 448th Engineer Battalion and the 597th Quartermaster Company were transferred to JTF-PR from the 1st MSC.<sup>89</sup> This transfer consisted of some 240 USAR soldiers.<sup>90</sup>

In any event, on October 2, General Reyes was appointed as DSC PR, and on October 4, 44th IBCT Headquarters began arriving to provide the DSC with National Guard staff personnel.<sup>91</sup> Thus, by early October, the DSC should have had the personnel required for a functional staff. In addition, the Title 10 USNORTHCOM-provided JEC was also in place to provide the DSC with a Title 10 Deputy Commander and Title 10 staff augmentation. This staff element numbered between 8 and 13 personnel during October 2017.<sup>92</sup> The failure to hand off TACON of Title 10 forces to a functioning DSC appears to be a departure from current doctrine. Among the reasons for this decision was the JFLCC commander’s belief that JTF-PR lacked the span of control to absorb Title 10 forces, that the 44th IBCT’s staff lacked the appropriate experience and expertise to provide C2 for the quantity and types of Title 10 forces being deployed, and that JFLCC headquarters could effectively provide C2 to the Title 10 forces, while JTF-PR focused on

---

<sup>85</sup> USNORTHCOM, 2017f, p. 26.

<sup>86</sup> Garamone, 2017a.

<sup>87</sup> USARNORTH, 2017k.

<sup>88</sup> USARNORTH CUB, October 16, 2017, slide 6.

<sup>89</sup> USARNORTH, “FRAGO 53 to USARNORTH OPORD (AN-OPORD-17-009) for DSCA Operations in Response to Hurricane Irma/Maria,” October 20, 2017m; USARNORTH CUB October 28, 2017, slides 9, 10, 11.

<sup>90</sup> USARNORTH CUB, October 30, 2017, slide 27.

<sup>91</sup> USARNORTH, *Hurricanes Harvey, Irma, and Maria Response, August–December 2017: Summary Report*, 2018b, p. 155; USNORTHCOM, 2017f, p. 40.

<sup>92</sup> JEC size drawn from USARNORTH October CUBs (October 11–October 31, 2017).

reconstituting the PRNG and receiving EMAC forces.<sup>93</sup> It also took time to establish a functioning DSC. Initial attempts to use the DSC structure appear to have been of limited effectiveness because it lacked the staff to effectively C2 the guardsmen present on Puerto Rico. Only after the arrival of General Reyes and the headquarters of the 44th IBCT did the DSC structure begin to be effective.<sup>94</sup>

The decision to maintain parallel chains of command raised the possibility of some loss of unity of effort in executing some MAs. There was a difference of opinion on this issue among the personnel that we talked to in the course of our research for this report. USARNORTH believes that the commanders were coordinating effectively and that unity of effort was not lost.<sup>95</sup> Some JTF-PR personnel, however, felt that full use of the DSC could have led to improvements in the area of unity of effort.<sup>96</sup> In addition, the multiple chains of command had the potential to result in duplication of effort and different assessments of the operational environment. For instance, on October 15, all three primary headquarters (JTF-PR, JFLCC, and CTF-189) were engaged in road-clearance operations. Similarly, logistics units from both the USAR and the ARNG were engaged in providing food and water to affected communities throughout Puerto Rico. By mid-October, the bulk of these operations was being conducted by JTF-PR, which, in conjunction with FEMA, had established and was operating ten regional support areas (RSAs) and 78 points of distribution (PODs).<sup>97</sup>

## Decision Logic for Choosing a JFLCC or JTF for Operational C2

One final question we were asked to examine was about the factors could influence the choice of a C2 organization.

Both doctrinal and other guidance provide a flexible menu of C2 options for DSCA operations. As noted earlier, these options primarily focus on the use of a JTF or land component command to provide C2. This section will discuss some of the factors to be considered when choosing an operational C2 arrangement for federal forces deployed on a DSCA operation. There

---

<sup>93</sup> Additional reasons included that the DSC organization was viewed as lacking the necessary robustness to C2 Title 10 forces, that the Title 10 commanders were unfamiliar with the DSC structure, that Title 10 commanders preferred retaining control of their tactical units, and that undertaking a transition of Title 10 forces to the DSC could have disrupted ongoing Title 10 planning, synchronization, and operations (interviews with USARNORTH personnel, November 2017).

<sup>94</sup> Interviews with USARNORTH personnel, November 2017; USNORTHCOM, 2017q, p. 40.

<sup>95</sup> RAND correspondence with USARNORTH personnel, July 2018.

<sup>96</sup> One ARNG interviewee noted that, on deployment to Puerto Rico, he had expected most Title 10 forces to be under the DSC because this would improve unity of effort and the COP. He noted that overlaying the Title 10 and National Guard COPs made it apparent that there were weaknesses in the unity of effort (interview with ARNG personnel, November 11, 2017). Similarly, USARNORTH personnel noted that there was competition for commodities between the Title 10 and National Guard forces (interview with USARNORTH personnel, November 2017).

<sup>97</sup> There was one POD in each of Puerto Rico's 78 municipalities (USARNORTH, 2018b, pp. 166, 168).

is one key point to keep in mind, however, regarding providing operational C2 to federal forces engaged in DSCA operations: In nearly all cases, CDRUSNORTHCOM and CDRUSARNORTH will be supporting a primary or lead civilian agency. Unlike most military operations, it is the civilian authorities who are in charge, and the military forces are supporting them. Rather than planning the overall operation, then, military commanders will generally be executing RFAs from the supported civil authorities that originate with the civilian incident commander and that are transmitted to tactical units through the military chain of command.<sup>98</sup> Only in the rarest cases, under limited circumstances—such as those that prevailed in the response to Hurricane Maria—will the military need to perform roles and functions that are normally the province of local, state, or commonwealth emergency managers.

The C2 arrangement for federal military forces deployed during a DSCA operation will be primarily influenced by the mission, the nature and scale of the disaster, and the location of the incident. Additional factors that can influence this decision include the number of affected areas (singular or multiple) and the relative scope of the incident (small, large, or large and complex). These factors influence the span of control that a headquarters requires to provide adequate C2 to the tactical units under its control.<sup>99</sup>

The local and state capacity to handle an incident directly influences the size of the required Title 10 resources that need to be deployed, and this in turn influences the required C2 arrangements. A small federal military response requires relatively limited C2 capacity, while a large response could require a large and highly capable headquarters.

CDRUSNORTHCOM also must decide whether they want to retain direct control of the operation or appoint a subordinate commander to provide operational control of DoD support within the affected area. If CDRUSNORTHCOM opts to establish an operational headquarters, they must then decide the basic form of this headquarters. Other potential factors, including the timeliness with which the headquarters can be deployed, CDRUSNORTHCOM's desire for unity of command and effort in the affected area, and the optics of the proposed C2 arrangement, can also shape the choice of C2 organization. Box 5.1 lists these factors, presenting them in the chronological order in which they are typically encountered. Although the logic tree (Figure 5.8) depicts a smooth flow, it seems likely that, in practice, many of these factors may be iterative, simultaneous, and mutually interactive.

As used in the box,

- *Small* refers to a small-scale or limited-scope incident. Such incidents are short- or no-notice events that are unlikely to expand into a larger emergency, require only a small amount of Title 10 resources, possibly involve only a single requirement in a single domain, and have limited geographic impact.

---

<sup>98</sup> ADRP 3-28, 2013, pp. v, 2-5 to 2-6, 4-3, 4-5.

<sup>99</sup> See JP 1, 2017, p. V-18.

### Box 5.1. Potential C2 Decision Factors

- Number of incidents (span of control)
  - Single incident
  - Multiple overlapping Incidents
- Scale and scope of incident(s)
  - Small
  - Medium
  - Complex catastrophe (large)
- Local/state capacity (Title 10 resources potentially required)
- CDRUSNORTHCOM control of tactical Title 10 forces
  - Maintains control, FCC/JTF in supporting role
  - Delegates control to the DoD operational commander Title 10 DSCA C2 headquarters
- Timeliness of deployment
- CDRUSNORTHCOM's desired level of unit of command or effort
- Optics of C2 option choice

- *Medium* refers to a regional crisis. Such incidents may cover a wide geographic area, result in significant loss of life or property, involve multiple states or regions and multiple domains, affect critical infrastructure, expand, or require significant Title 10 resources.<sup>100</sup>
- *Complex catastrophe (large)* refers to an incident involving cascading failures of multiple, interdependent, critical, life-sustaining infrastructure sectors and extraordinary levels of mass casualties, damage, or disruption that severely affect the population, environment, economy, public health, national morale, response efforts, and/or government functions.

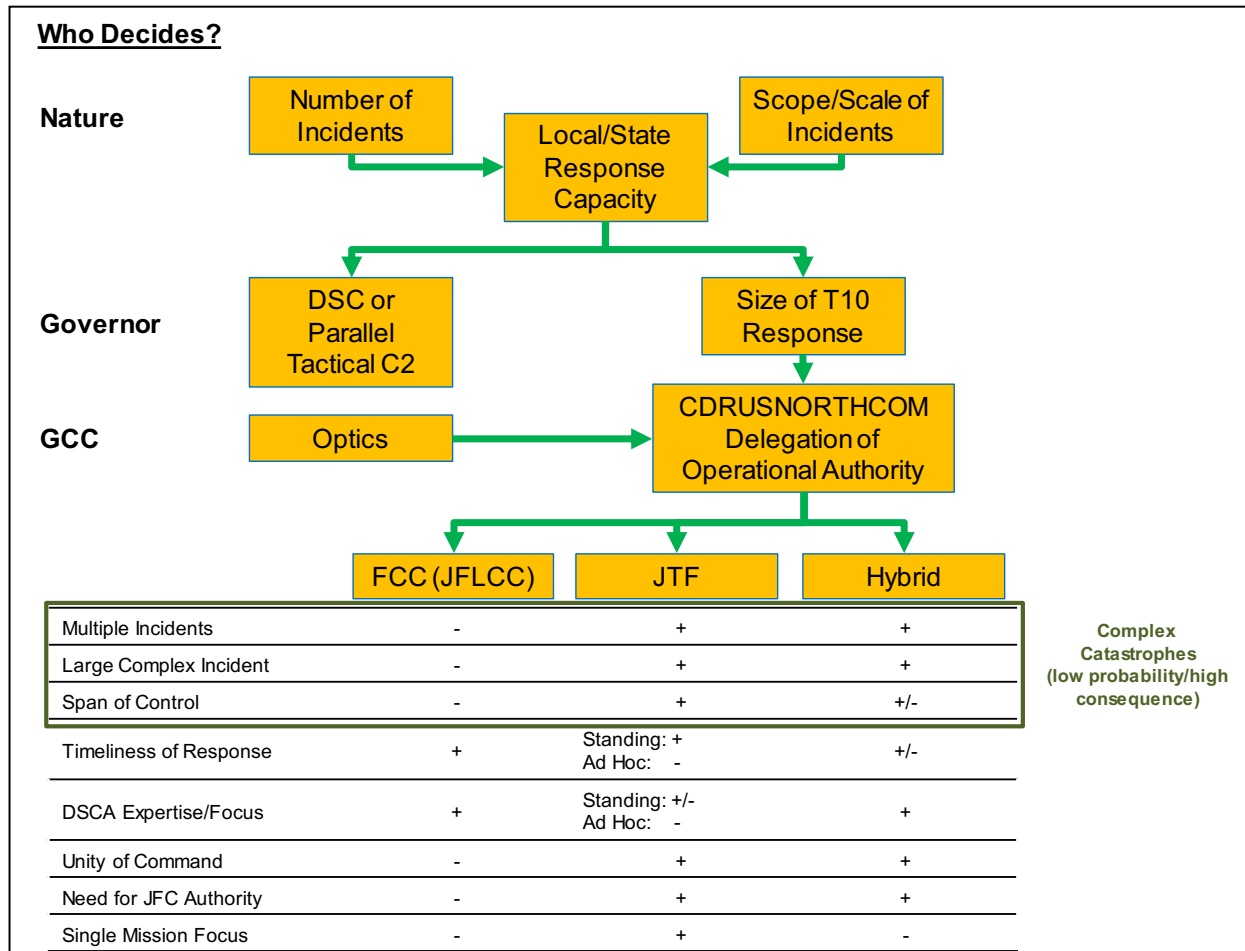
Figure 5.8 portrays the principal decisionmakers (nature, the governor, and geographic combatant command [GCC]) at upper left. The bottom half of the figure lists some of the considerations that can influence the choice of C2 options.

In many disasters, nature determines the timing and severity of the events that befall a state or locality. In turn, the scope and scale of these events, in combination with local and state emergency capabilities and capacity, determine whether local and/or state response capacity is adequate. The governor is responsible for requesting Title 10 support from the federal government and also decides whether to request activation of a DSC or to accept parallel tactical C2 chains of command. Depending on the size of this force request, CDRUSNORTHCOM will choose either to retain operational control of the tactical Title 10 DSCA response or to assign it to one of three basic forms of an intermediate operational headquarters (FCC, JTF, or hybrid FCC). The potential public optics of this choice will influence the decision.

---

<sup>100</sup> USNORTHCOM, 2017a, p. 10.

**Figure 5.8. Operational C2 Decision Logic Tree**



Various additional factors can further influence the choice between the FCC, JTF, and hybrid C2 options. It should be noted that these three basic forms of C2 represent ideals and that, in practice, the CDRUSNORTHCOM has the ability to craft flexible C2 solutions that blend the characteristic of these ideal forms.

For most routine DSCA operations, JFLCC, as a standing entity, has the advantage of timeliness of response, existing DSCA expertise, and focus. JFLCC, however, because it is a single-domain command, will normally not provide unity of command across domains because it does not have authority over operational forces attached to other FCCs that may be operating in the affected area. This issue can be mitigated to some extent through the TACON of forces from the other military departments and with appropriate staff augmentation. In addition, because it is also USNORTHCOM's JFLCC and service component command, it retains other important responsibilities that will require staff and the commander's attention. Because they generally involve multiple overlapping incidents and/or locations, complex catastrophes are large, complex incidents and can require a large span of control that may generally best be handled by a JTF built around a large operational headquarters. The hybrid option, because it endows JFLCC with

JFC authorities, is also suitable for such incidents because it increases the commander's ability to organize subordinate forces.

Because JTFs need to be staffed and reoriented on the DSCA mission prior to deployment, their responses are generally less timely. In addition, JTFs generally lack personnel versed in DSCA operations. Both liabilities can be mitigated by creating standing JTFs, such as JTF-CS. JTFs do, however, have the advantage of unity of command; a single mission focus; and, if necessary, JFC authority. The hybrid option, based on JFLCC, can mitigate some of the disadvantages of the pure JFLCC through its ability to exercise JFC authority. Its timeliness, however, will depend to some extent on the nature of the response: If the hybrid option needs to be augmented with air or naval component personnel, it will take longer to be ready for deployment.

It should be reiterated that the choice between assigning operational C2 to a JFLCC or a JTF commander remains contingent on the nature of the incident and the preferences of CDRUSNORTHCOM. In the USNORTHCOM AOR, timelines will not usually be a factor in this choice because USNORTHCOM has both a standing JFLCC (USARNORTH) with a DSCA-oriented contingency command post (TF-51) and a standing JTF (JTF-CS), both of which are trained to support DSCA operations and are designed, in part or in whole, to be deployed rapidly.<sup>101</sup>

Furthermore, the practical differences between an FCC and a JTF appear to be quite small in the context of most DSCA operations, particularly if the FCC is given JFC authority. In addition, because DSCA events are largely ground-oriented, there is generally no need to integrate large maritime and fixed-winged air staff capabilities directly into the Title 10 DSCA C2 headquarters because air and maritime liaison elements within JFLCC can be used to enhance coordination and allow unity of effort.

For larger and more complex events, a JTF would likely be more appropriate for C2 because it generally has larger staff and a larger tactical span of control than USARNORTH. JTF-CS, for instance, consists of approximately 175 staff personnel and was designed to provide C2 to four brigade headquarters. Although USARNORTH is larger, with some 406 personnel, it also serves as USNORTHCOM's Army service component command and has additional responsibilities associated with that role.<sup>102</sup> For large and complex operations, CDRUSNORTHCOM could also employ a corps or division headquarters; these have deployable staffs in excess of 600 personnel and are designed to serve as the nucleus of a JTF or JFLCC in large and complex operations.

---

<sup>101</sup> JTF-CS is designed to be deployed rapidly to support complex CRBN consequence management operations and TF-51, the contingency command post for USARNORTH, is designed to be rapidly deployed to support all DSCA operations. TF-51's permanent staff is relatively small but can be augmented, if necessary.

<sup>102</sup> United States Army North Education Branch, 2017, slide 21.

## Chapter Conclusions

During the 2017 hurricane season, CDRUSNORTHCOM preferred to use JFLCC as the C2 element for its disaster-related DSCA responses. Although there appears to have been a brief debate over whether to use a JTF or JFLCC, doctrine and CDRUSNORTHCOM could have supported either choice.

In addition, although the DSC is the doctrinally and statutorily preferred C2 arrangement during DSCA disaster-response operations, during Hurricane Maria, JFLCC commander opted for a hybrid C2 structure that used a parallel command structure in the presence of an activated DSC. The principal deviation from the doctrinal norm was JFLCC's retaining OPCON of Title 10 forces assigned to it during Hurricane Maria rather than attaching them to the DSC-led JTF-PR. Again, doctrinal and statutory preferences notwithstanding, such an arrangement was entirely permissible.

It needs to be emphasized that this deviation from doctrinal norms occurred in the broader context of the breakdown of the NIMS structure on Puerto Rico. The commonwealth and local incident response systems broke down in the wake of Hurricane Maria and were at least initially unable to plan and oversee disaster response activities. The commonwealth was also unable to generate RFAs in a timely fashion. In addition, USAR and National Guard forces and personnel in the region were deeply affected by the disaster and were unavailable for duty in the immediate aftermath of the disaster. Many members of the Reserve Component on Puerto Rico were first responders and were thus responding to the disaster in their civilian role.<sup>103</sup>

This resulted in several important deviations from the standard NIMS procedures, notably including the need for FEMA personnel to act in the unaccustomed roles of planners and synchronizers rather than as facilitators and generators of MAs in response to commonwealth and local RFAs. This, in turn, led to JFLCC and DCO/E personnel becoming more deeply involved in supporting the JFO's planning and execution processes than might normally be the case. One result of this was a demand for liaisons that exceeded the deployed capacity of the DCO/E and JFLCC, a force provision issue. In the future, because it may again be necessary to deploy more liaisons than is typical for DSCA responses, efforts should be made to expand the pool of potential liaisons and to train appropriately qualified personnel, whether from USARNORTH, USNORTHCOM, or the services.

During the response to Hurricane Maria, JFLCC did not attach Title 10 operational units to the DSC because of a belief that JTF-PR would be unable to provide adequate C2 to such forces. This decision was made while a new DSC with National Guard staff deployed from New Jersey was being established at roughly the same time as JFLCC. The DSC was also augmented by

---

<sup>103</sup> Some 1,100 of the 6,000 personnel in the PRNG were first responders. In addition, about 600 were new recruits training in the United States and thus not available for response operations. Some elements of the PRNG were also deployed to Kuwait (conversation with National Guard personnel, November 2017; Ziffer, 2017).

Title 10 staff personnel, although by a smaller contingent than is doctrinally recommended. This suggests several potential issues:

- First, small states (or states with small ARNG structures) may lack the requisite headquarters organizations to fully staff a DSC during a large, complex, or catastrophic disaster. As a result, it may be necessary to develop procedures to preidentify personnel or units that can rapidly supplement the DSC's staff and to ensure that they are organized and trained to integrate into a JTF and perform staff functions.
- Second, USNORTHCOM's capacity to provide the required JEC to the DSC and to USARNORTH's ability to support this effort by providing any required augmentees may need more attention. Providing the necessary JEC personnel to a DSC staff comes at an organizational cost to the organizations from which they come in USARNORTH and USNORTHCOM. To minimize the effects of supplying augmentees on these headquarters when larger-than-expected JEC elements are required, these organizations could build some personnel slack into their structures, develop procedures for rapidly augmenting the headquarters, or develop procedures for acquiring JEC personnel from elsewhere. To support these efforts, it might be necessary to conduct a detailed requirements study of JEC personnel that could be required in a large complex disaster (potentially involving multiple DSCs) or when a state has a limited C2 capability. That being said, while the use of the DSC is the C2 arrangement doctrine and policy prefer, there are conditions under which maintaining parallel chains of command will be appropriate.
- Third, given the potential importance of DSC during a crisis, understanding the capability and capacity of a state's or territory's DSC prior to a disaster would be helpful for planning response efforts.<sup>104</sup> USNORTHCOM, in conjunction with other relevant organizations, should consider developing metrics for evaluating DSC capabilities, then establishing procedures for routinely gathering and updating this information to guide crisis response planning and programmatic efforts to improve DSC capabilities.

---

<sup>104</sup> U.S. Fleet Forces Command's review of lessons learned in their DSCA responses during the 2017 hurricane season noted that the duration and complexity of crises themselves create additional challenges for understanding local conditions, capacity and capability, and the ability to define operational requirements (Davidson, 2017).

## 6. Mission Assignments

---

This chapter addresses the following research question:

- What changes to the MA process are required, and how should DoD mitigate challenges in future incidents?

As described in Chapter 2, during federal responses to DSCA events, FEMA, as the lead federal agency, processes RFAs from SLTT authorities. Once the requests have been validated, FEMA can task other federal agencies, including DoD, with specific response operations to address the requests. This interagency tasking is accomplished through the MA process.

MA tasking of Title 10 forces occurs when local, state, and civilian federal resources cannot meet the life-saving, life-sustaining, and other requirements during the response phase of DSCA operations (see Chapter 3). Although these taskings are generally limited in scope, scale, and duration, as seen during hurricanes Harvey and Irma, the significant challenges encountered during Hurricane Maria merited a much larger requirement for Title 10 support. As a result, in the immediate aftermath of Hurricane Maria, a large number of MAs emerged to address many different requirements.

In this chapter, we review available data on MAs that were assigned to DoD during the response to Hurricane Maria. We first describe the MA process using FEMA guidance and provide an overview of the MAs issued for the response in the USVI and PR. We will then describe the issues and challenges that occurred in creating and executing these MAs and provide recommendations to mitigate the prospects for encountering similar issues and challenges.

The analysis draws from a large number of sources, including MA data from FEMA and DoD (through the DoD Defense Support of Civil Authorities Automated Support System [DDASS]),<sup>1</sup> FEMA courses on the MA process, USNORTHCOM and USARNORTH summary reports on the Hurricane Maria response, and interviews with personnel involved in the response.

### Overview of the Mission Assignment Process

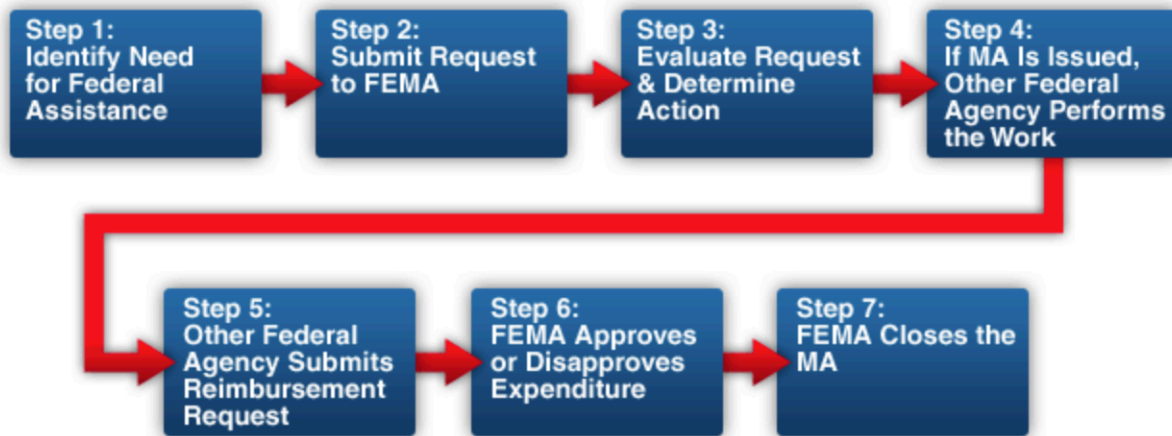
As was briefly described in Chapter 3, FEMA employs the MA process to task and reimburse other federal agencies, including DoD, to provide disaster assistance (see Figure 6.1).<sup>2</sup>

---

<sup>1</sup> DDASS is an unclassified web-enabled application that provides the ability to track, collaborate, coordinate, and prioritize FEMA MAs assigned to the DoD in real-time (U.S. Department of Defense, Defense Support of Civil Authorities Automated Support System, database, undated a).

<sup>2</sup> FEMA, undated b.

**Figure 6.1. The Mission Assignment Process**



SOURCE: FEMA, "IS 293: Mission Assignment Overview," webpage, undated b.

An MA is essentially a work order issued through FEMA, either before or after presidential declaration of an emergency or major disaster, for a federal department or agency to complete a specific life-saving or life-sustaining task using its own resources.

The authorities and guidance to generate MAs are codified in the Stafford Act, Title 44 of the CFR,<sup>3</sup> the NIMS, and the NRF. The Stafford Act provides the authority to FEMA to task other federal agencies to utilize resources in support of state and local assistance, while 44 CFR contains the pertinent regulations for implementation of MAs under the Stafford Act. For their part, the NIMS and the NRF provide the structure and template to execute and define the specific capabilities requested under an MA.<sup>4</sup>

The defined tasks in MAs being considered for issuance must fall into the scope of emergency work, not of permanent restorative work or studies. In general, this applies to such activities as debris clearance; provision of emergency power, food, and water deliveries; and emergency medical transport and care.

In a disaster response, the MA process begins with identification of a need for federal assistance and proceeds through several steps until FEMA makes a final payment to the responding federal agency.<sup>5</sup> The MA process begins when SLTT authorities determine that within-state or interstate (through EMAC) resources are inadequate to address emerging requirements, and a formal RFA is submitted using a Resource Request Form.<sup>6</sup> After receiving

<sup>3</sup> CFR, Title 44, Emergency Management and Assistance, Chapter I, Federal Emergency Management Agency, Department of Homeland Security.

<sup>4</sup> FEMA, undated b.

<sup>5</sup> FEMA, undated b.

<sup>6</sup> FEMA course IS-293 still refers to this requesting document as an Action Request Form; however, Resource Request Form is now the current term (interview with A staff, November 2017).

the form, the FEMA Operations Section Chief determines how to respond to the request. This often involves coordinating with FEMA's project manager; the Office of Federal Assistance action officer; and, when DoD involvement is required, the DCO. These planners meet to determine how the task will be accomplished and prepare the SOW, which defines the period of performance and provides an estimate of cost obligations.

The initialization of an MA is intended to be a bottom-up process, in which state or other local authorities identify the need to contact FEMA, and planners within the JFO define the SOW. However, as will be discussed later, many MAs are initiated at a higher federal level, in a more top-down process. And as described in Chapter 3, because of the need for rapid response in DSCA events, FEMA and other federal departments and agencies have prepared PSMA language that can be used to expedite completion of required forms.

Once the Resource Request Form has been approved, the information is entered into FEMA's Enterprise Coordination and Approval Processing System to generate the MA. MAs that lead to DoD tasking are also tracked using a separate system, DDASS. The transfer of information between the FEMA and DoD systems is entirely manual and is conducted regularly throughout the response.<sup>7</sup> In addition to MAs, additional requests made that fall within existing SOWs of an active MA may result in the development of an MATO. MATOs are typically employed to provide more specific taskings under a broader SOW (e.g., route clearance on a specific roadway may constitute an MATO under a more-general route clearance MA). During execution of an MA, it is often necessary to amend the original MA to reflect more-specific estimates of funding, time requirements, the project manager responsible for oversight, or state cost-sharing estimates.

Our analysis of typical amendments in the Hurricane Maria response shows that these were most often used to extend the expected end date of the MA or to increase funding.<sup>8</sup> Although amendments are common, an MA cannot be amended to change the SOW, and any new SOWs ultimately require a new MA.

Once the assigned federal agency completes the work outlined in the MA, the Office of Federal Assistance action officer typically arranges a thorough review of the work with the requestor, FEMA project manager, and operations section chief to provide final agreement that the tasks have been addressed adequately. In some future DSCA events, it also may be necessary for DoD and FEMA planning integration to begin as early as possible, to develop termination and transfer criteria and a transition plan.<sup>9</sup> The review process for final reimbursement can often take many months to complete, typically only after the DSCA response has been completed.<sup>10</sup>

---

<sup>7</sup> The use of DDASS to track MAs was explored in our semistructured interviews in Puerto Rico, November 2017. We observed the manual information transfer.

<sup>8</sup> This is based on observations of amendments through DDASS regarding the Hurricane Maria response.

<sup>9</sup> According to ATP 3-28.1, 2015, and USARNORTH, *Military End-States in DSCA: Transition Planning for Disaster Response*, draft, 2018c.

<sup>10</sup> According to semistructured interviews conducted in Puerto Rico, November 2017.

In any event, once it has been agreed that the work has been completed, staff are released from the assignment, and the formal reimbursement review process for the MA can begin. In the response to Hurricane Maria, the incapacitation of the commonwealth’s capabilities for generating formal RFAs and judging when the need for Title 10 forces had ended meant that federal responders had to develop transition conditions and metrics, assess progress toward mission accomplishment, and coordinate these with the commonwealth.

Although this process applies to all MAs, there are three distinct types of MAs (see Table 6.1).

**Table 6.1. Mission Assignment Types**

| <b>Type of MA</b>          | <b>Details</b>                                                                                                                                                                                                                                                                                                 |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Federal operations support | <ul style="list-style-type: none"> <li>• For any type of support to federal operations</li> <li>• Requested by the federal government</li> <li>• 100-percent federally funded</li> <li>• Eligible before or after a declaration</li> </ul>                                                                     |
| Technical assistance       | <ul style="list-style-type: none"> <li>• For expert advice to the state</li> <li>• Requested by the state</li> <li>• 100-percent federally funded</li> <li>• Eligible after declaration</li> </ul>                                                                                                             |
| Direct federal assistance  | <ul style="list-style-type: none"> <li>• For resources beyond the state’s capability to provide or contract for</li> <li>• Requested by the state</li> <li>• Subject to cost-share provisions—normally 75-percent federally funded, 25-percent state funded</li> <li>• Eligible after a declaration</li> </ul> |

SOURCE: 44 CFR, Ch. 1.

As shown in the table,

- The first type of MA is for federal operations support, which is requested by a federal agency to support federal operations.
- A technical assistance MA is requested when expertise is provided directly to the state and local jurisdictions when they have resources but lack the knowledge or skills to perform the task.
- Finally, direct federal assistance provides resources to affected state and local jurisdictions when they are unable to provide disaster assistance.<sup>11</sup>

<sup>11</sup> FEMA, undated b.

## Overview of Mission Assignments in the USVI and Puerto Rico

We now turn to the MAs generated during the response to hurricanes Irma and Maria in the USVI and PR.

Overall, DoD accounted for 42 percent of FEMA MAs in the Puerto Rico and USVI AOR: USNORTHCOM executed a total of 62 MAs for Hurricane Irma and 35 MAs for Hurricane Maria.<sup>12</sup> These MAs were generated primarily between September 2017 and early January 2018. The following subsection provides an overview of the MAs generated for DoD, including their timing, scope, and type.<sup>13</sup> In general, most of the MAs defined in the responses to Puerto Rico and the USVI were classified as federal operations support, although there were also many direct federal assistance MAs.

A federal approving official approves MAs, although technical assistance and direct federal assistance MAs also require the approval of a state approving official. Individuals with federal approving official authority include the NRCC manager, the RRCC director, the FCO, and the operations section chiefs at each location in an active response.

Although the FCO and operations section chief were both located within the JFO for the Puerto Rico response, some of our interviewees reported that many MAs were generated through the NRCC, which is FEMA's primary operations center for national incident response.<sup>14</sup> Many of our interviewees viewed the generation of MAs through the NRCC as a top-down rather than bottom-up MA definition process and considered many of these MAs to be somewhat generic and somewhat disconnected from the situation on the ground.

Conversely, many of the activities destined to become MAs in Puerto Rico and the USVI were identified and nominated by DoD units on the ground, creating an even more bottom-up approach to this process, in which units operated under immediate response authority until they were covered by MAs/MATOs.<sup>15</sup> These issues highlight some of the confusion surrounding the grey areas between acting under immediate response authority and under MAs that have been approved through the formal MA process.

---

<sup>12</sup> According to USNORTHCOM, 2017e, pp. 47–58. This AAR provides an excellent picture of the contributions of various DoD elements to the hurricane responses.

<sup>13</sup> USNORTHCOM, 2017e, provides a more detailed accounting of the MAs pertinent to Puerto Rico and the USVI, addressing USNORTHCOM MAs for Hurricanes Harvey, Irma, and Maria.

<sup>14</sup> Interview with USARNORTH MA staff, November 2017.

<sup>15</sup> It should also be noted that there were challenges associated with mobilization of Reserve forces under 10 USC § 12304(a), because of the perception that Reserve Component units must first be linked to an MA before attempting to map unit structure to requested personnel numbers (USARNORTH, 2018b; U.S. Code, Title 10, Armed Forces, Subtitle E, Reserve Components, Part II Personnel Generally, Chapter 1209, Active Duty, Section 12304 Selected Reserve and Certain Individual Ready Reserve members; Order to Active Duty Other Than During War or National Emergency, Subsection [a], Authority).

### *DoD Mission Assignments for Hurricanes Irma and Maria*

DoD received 13 MAs for its response in Puerto Rico and the USVI in the immediate aftermath of Hurricane Irma's landfall on September 5, 2017:<sup>16</sup>

- DCO/E R-V Activation–PR/RRCC
- Field Service Unit
- Provide Joint Base Maguire-Dix-Lakehurst as a regional incident support base
- Activate DCO/E Region II
- Provide Maritime Platforms
- Provide CAISE
- Strategic Airlift
- Civil Air Patrol aerial imagery USVI
- Temp Medical Facility
- Surgical Intervention Service
- FEMA Forward Staging Area at Ft Buchanan
- Airfield Assess/Opening
- Full-Time Support Force at Dobbins Air Force Base.<sup>17</sup>

After Hurricane Maria made landfall in Puerto Rico on September 20, DoD received an additional 11 MAs:<sup>18</sup>

- Joint Air Component Coordination Element Support to Joint Air Operations Center
- Ground Transportation
- Imagery via Civil Air Patrol
- CAISE
- Emergency Route Clearance
- Aerial Port Operations
- Strategic Airlift
- Communications Package
- Airfield Assess/Opening
- Request GSAB
- Communications support package; Broadband Global Area Network with operators.<sup>19</sup>

### *Number, Scope, and Types of MAs for Puerto Rico and the USVI*

Figures 6.2 and 6.3 show the cumulative numbers of MAs generated as a result of Hurricane Maria as a function of their start dates for within Puerto Rico and the USVI, respectively, from September 19 to December 31, 2017. In the figures, the black area indicates the number of DoD-assigned MAs, and the gray area indicates number assigned to other departments and agencies.

---

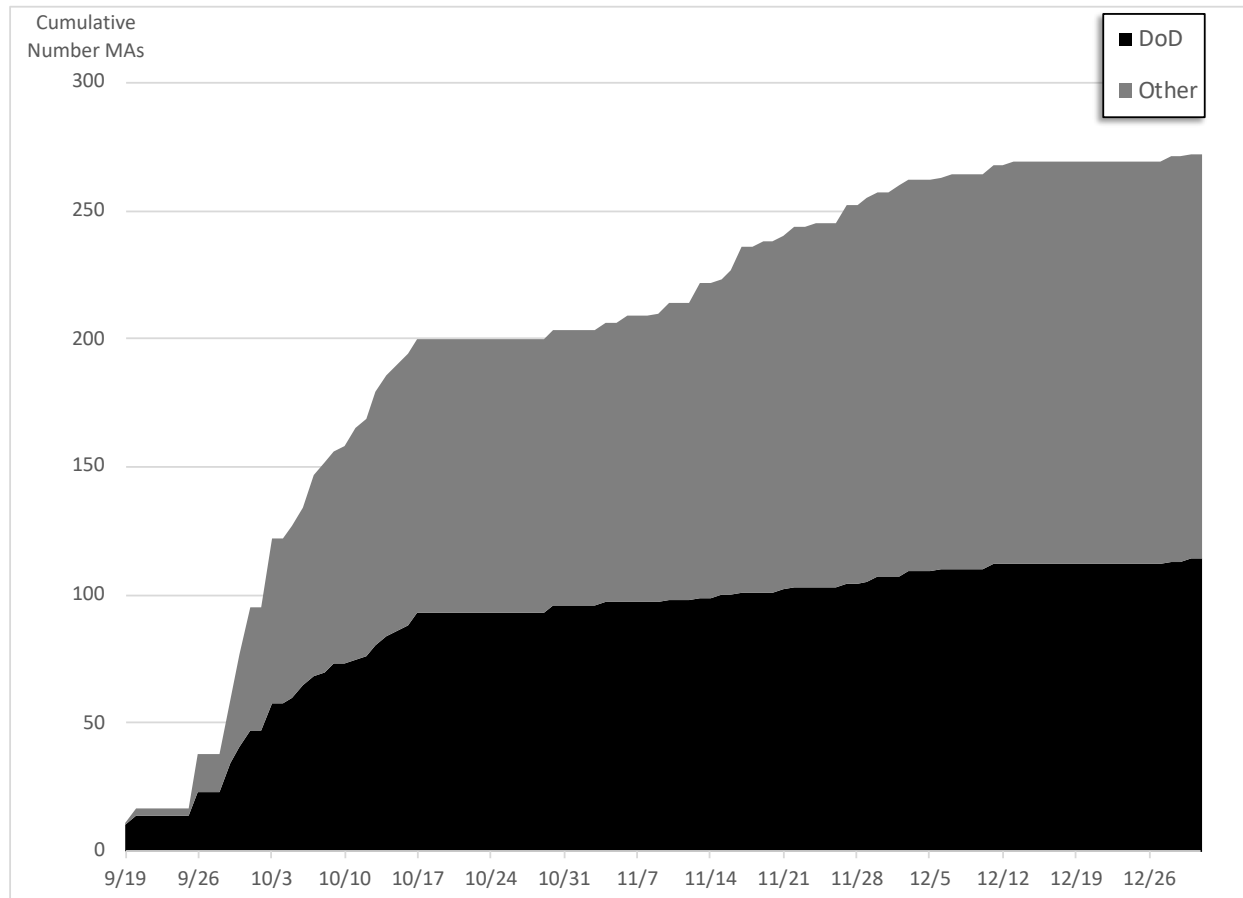
<sup>16</sup> USARNORTH, 2018b.

<sup>17</sup> USARNORTH, 2018b.

<sup>18</sup> USARNORTH, 2018b.

<sup>19</sup> USARNORTH, 2018b.

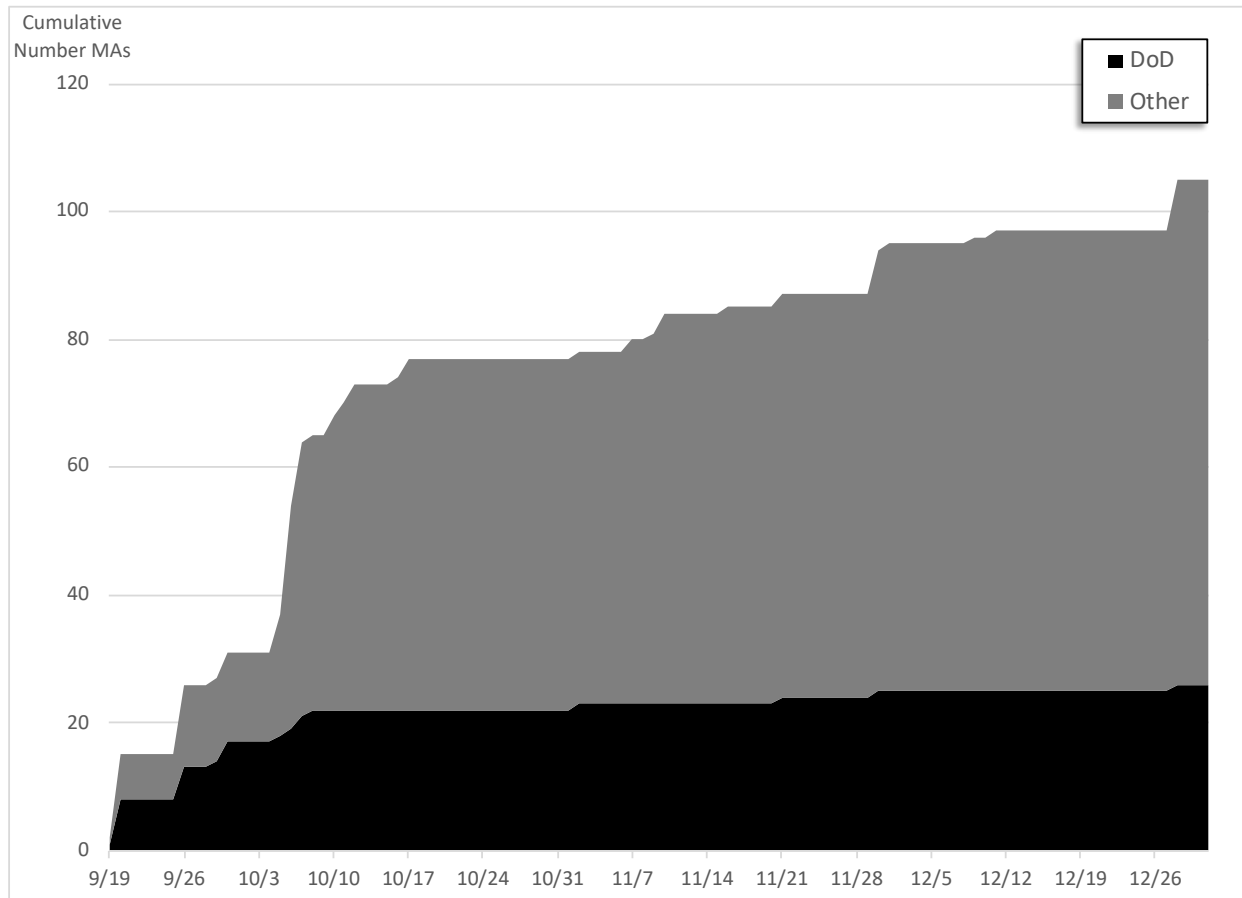
**Figure 6.2. Cumulative Mission Assignments Initiated in Puerto Rico, September 19 to December 31, 2017**



SOURCE: FEMA, 2018f.

The majority of MAs for Hurricane Maria responses in Puerto Rico and the USVI were initiated between the middle of September 2017 and the middle of October 2017. In general, the MAs associated with DoD are most prevalent earlier in the response, when critical life-saving and life-sustaining missions were also most prevalent. For both DoD and other agencies, there is a prominent spike in MA generation in the last week of September, immediately following Hurricane Maria's landfall. For DoD, very few additional MAs were generated after about October 17; however, other agencies continued to see an increasing number of new MAs through the middle of December. Within the USVI, the bulk of DoD MAs were generated by early October, with very few additional MAs defined after that point. However, beginning in early October, other agencies saw a drastic spike in new MAs.

**Figure 6.3. Cumulative Mission Assignments Initiated in USVI, September 19 to December 31, 2017**



SOURCE: FEMA, 2018f.

MATOs are an important consideration for understanding the scope and duration of the work conducted under MAs. MATOs are implemented to direct specific activities that fall within the SOWs for approved MAs and provide detailed direction within the SOW for an approved MA. Therefore, the number of MATOs defined within each MA can be used as a general indication of the scope of the MA and of the extent to which the MA engenders a sequence of discrete tasks over time. Accordingly, we tabulated the number of MATOs for each MA based on the DDASS data for PR and the USVI.

Table 6.2 aggregates the numbers of DoD MAs that had certain numbers of associated MATOs for Puerto Rico. In total, there were 196 DoD MATOs across all DoD MAs in Puerto Rico. As can be seen, the bulk of the MAs had a very small number of associated MATOs, with approximately 60 percent of the MAs having no associated MATOs. This suggests that the bulk of the MAs had a more narrowly defined SOW, or one which did not require redefinition through subsequent MATOs. However, a small number of MAs had a relatively large number of

MATOs, indicating that a few MAs had very broad SOWs with many simultaneous or sequential activities requiring more-detailed definition in MATOs.

**Table 6.2. DoD MAs with Numbers of MATOs, Puerto Rico**

| <b>Number of MATOs</b> | <b>Number of MAs with That Range of MTOs</b> |
|------------------------|----------------------------------------------|
| 0–4                    | 62                                           |
| 5–9                    | 5                                            |
| 10–14                  | 6                                            |
| 15–20                  | 1                                            |
| >20                    | 1                                            |

SOURCE: DDASS.

To provide a better understanding of the types of work where MATOs were prevalently used, the MAs with the greatest number of MATOs can be analyzed separately. Table 6.3 lists the top MAs containing approximately 80 percent of the total MATOs defined for Puerto Rico. As can be seen from this breakout, the broader areas of work within Puerto Rico included strategic airlift, emergency route clearance, medical support, public affairs, commodity distribution, communications, and providing LNO support to FEMA.

**Table 6.3. Top DoD MAs, by MATO Count, Puerto Rico**

| <b>MA Number</b> | <b>Description</b>                                                      | <b>Number of MATOs</b> |
|------------------|-------------------------------------------------------------------------|------------------------|
| 4339DR-PR-DOD-05 | Strategic Airlift in Support of Maria                                   | 48                     |
| 4339DR-PR-DOD-12 | Emergency Route Clearance                                               | 15                     |
| 4339DR-PR-DOD-14 | Request Rotary Wing Lift (GSAB)                                         | 14                     |
| 4339DR-PR-DOD-03 | Mortuary Affairs                                                        | 12                     |
| 4339DR-PR-DOD-16 | Medical Support: Facility, Rotary Wing, Ambulance, Fixed-Wing Transport | 11                     |
| 4339DR-PR-DOD-39 | Public Affairs Support                                                  | 11                     |
| 4339DR-PR-DOD-27 | Water Purification and Storage                                          | 10                     |
| 4339DR-PR-DOD-37 | C2 Elements                                                             | 10                     |
| 4339DR-PR-DOD-38 | Theater Distribution Network                                            | 8                      |
| 4339DR-PR-DOD-01 | Two Communications Packages                                             | 7                      |
| 4339DR-PR-DOD-31 | Planners to FEMA                                                        | 6                      |
| 4339DR-PR-DOD-24 | Level II Medical Teams—DMAT-Like                                        | 5                      |
| 4339DR-PR-DOD-49 | Logistics Civil Augmentation Program Mission                            | 5                      |

SOURCE: DDASS.

A similar view of MATOs can be taken for USVI. Provided in Table 6.4 are the aggregated number of MAs with varying numbers of associated MATOs for the USVI, where a total of 59 MATOs were defined across all MAs. For the USVI 37 of the 43 MAs had no defined MATOs, and only two MAs had more than four MATOs defined. These two MAs with a significant number of MATOs included the MA for strategic air lift and the MA to provide maritime platforms for the response.

**Table 6.4. MAs with Numbers of MATOs, U.S. Virgin Islands**

| <b>Number of MATOs</b> | <b>Number of MAs with That Range of MTOs</b> |
|------------------------|----------------------------------------------|
| 0–4                    | 41                                           |
| 5–9                    | 0                                            |
| 10–14                  | 0                                            |
| 15–20                  | 1                                            |
| >20                    | 1                                            |

SOURCE: DDASS.

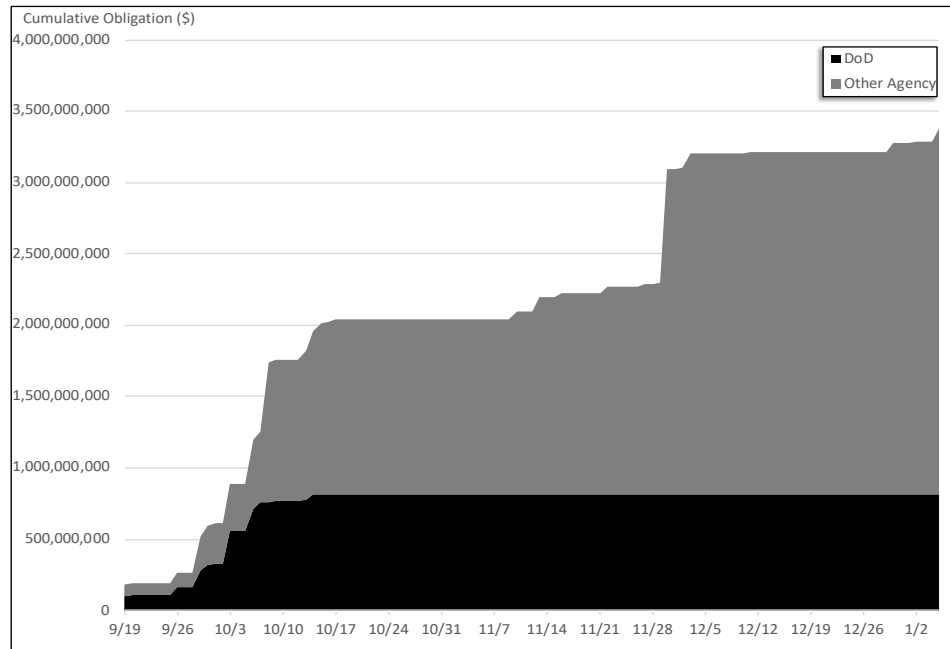
### *Cumulative Obligations for DoD and Other Departments and Agencies*

An additional indication of the relative extent of DoD involvement in the larger response can be found in the estimated obligations provided under DoD-specific MAs, compared to the amounts provided to other agencies. Figures 6.4 and 6.5 summarize these data for Puerto Rico and the USVI, respectively.

Figure 6.4 describes the cumulative estimated financial obligation for the Hurricane Maria response in Puerto Rico. During the initial phases of the response, the bulk of the financial obligations FEMA authorized were for DoD entities; amounts grew rapidly from mid-September until the second week of October. As that initial phase of the response ended, more of the obligated dollars were directed to other federal agencies, and additional taskings for DoD largely halted. In the end, although the DoD involvement is obviously much more pronounced in the early phases of the response, the total obligations to other federal agencies ultimately greatly outweighed those for DoD.

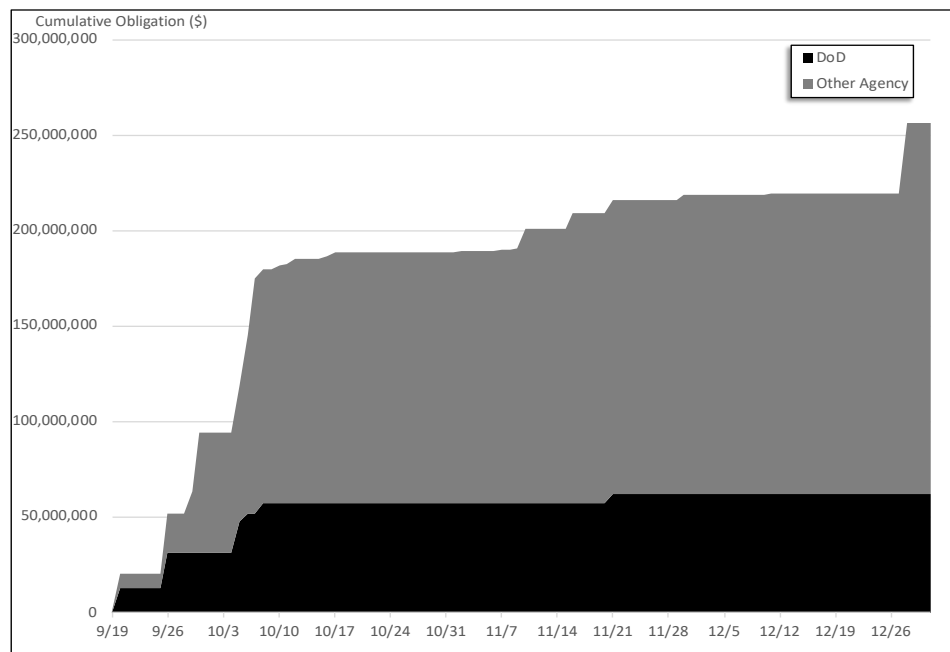
As seen Figure 6.5, the trend for the response to Hurricane Maria in the USVI is similar. Again, the financial obligations authorized for DSCA responses in USVI tended to favor DoD more heavily during the initial phases of the response, when emergency life-saving and life-sustaining activities were most prevalent. However, as the response proceeded, costs for other federal agencies increasingly exceeded those for DoD.

**Figure 6.4. Cumulative Estimated Financial Obligations  
for Puerto Rico Response**



SOURCE: FEMA, 2018f.

**Figure 6.5. Cumulative Estimated Financial Obligations  
for USVI Response**



SOURCE: FEMA, 2018f.

### *DoD Mission Assignments Active Through the Response*

In addition to aiding understanding of the extent to which FEMA tasked DoD with conducting response operations, DDASS provides additional details regarding the end dates of the MAs. This information can be used to determine the total number of active MAs throughout the response operations in Puerto Rico and the USVI.

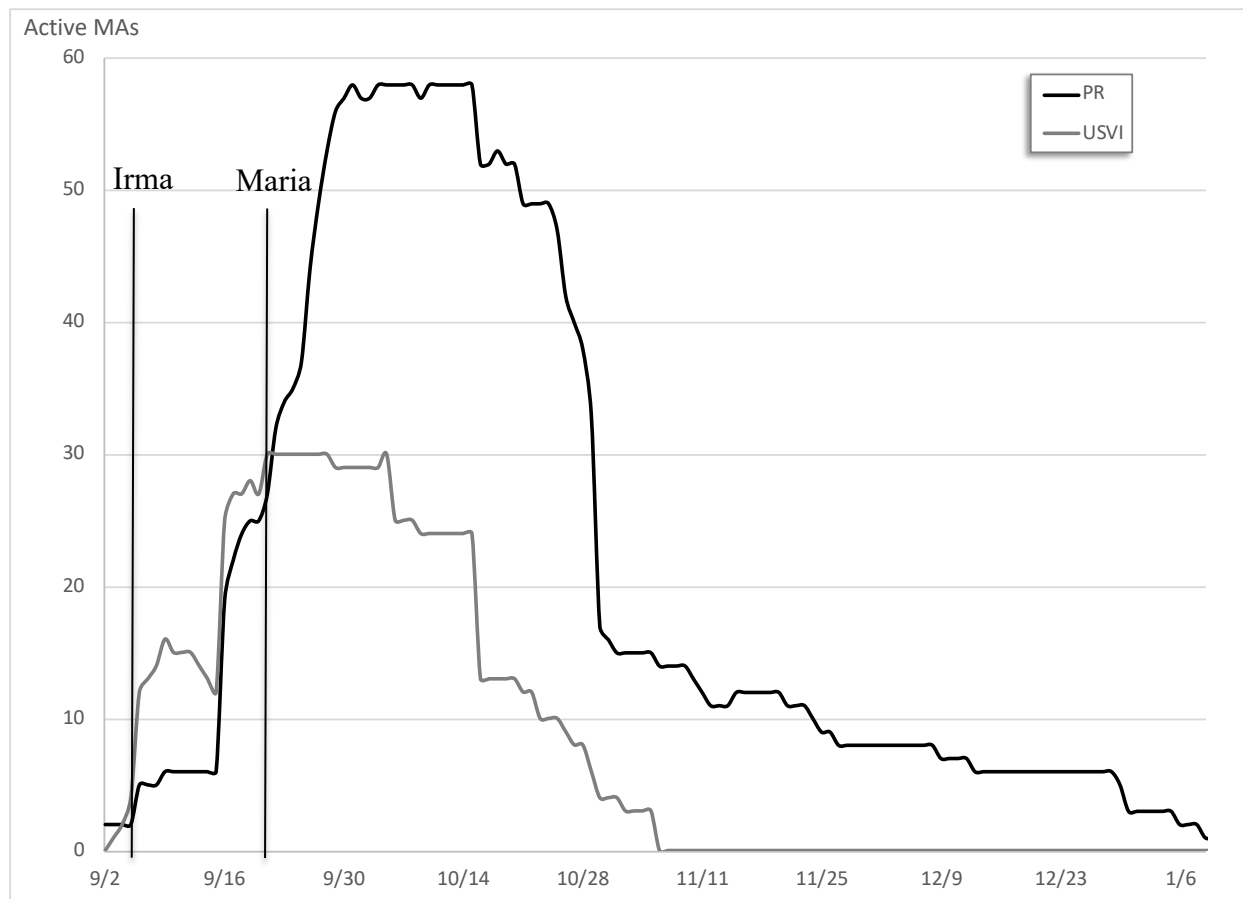
Figure 6.6 presents the total number of active MAs throughout response operations for both Puerto Rico and the USVI. This figure also indicates the landfall dates for both hurricanes Irma and Maria. Immediately following landfall of Hurricane Irma in the USVI, on or about September 6, the number of active MAs for the USVI increased significantly. A much smaller number of MAs became active in Puerto Rico, where the impact of Hurricane Irma was significantly less. After Irma, several of the MAs initiated in the USVI were closed until shortly before Hurricane Maria made landfall in the region. About four to five days before Hurricane Maria made landfall, the numbers of active MAs for both Puerto Rico and the USVI began to increase rapidly, likely in preparation for the impacts of the second hurricane. For the USVI, the number of active MAs plateaued shortly after Hurricane Maria struck the region; however, in Puerto Rico, the number of active MAs continued to climb through early October. By the end of the first week of October, the total number of active MAs in Puerto Rico peaked and ultimately plateaued until the latter half of October. At this point, the transition plan that was developed in early October began to show the initial signs of a DoD drawdown in Puerto Rico. The most dramatic drop in completion of MAs in Puerto Rico occurred in the first week of November, when many redeployments were occurring. After this period, a number of active MAs were slowly closed out, but a few remained in place until well after the beginning of 2018. Within the USVI, the completion and closeout of MAs began occurring about the middle of October; by early November, there were no further active DoD MAs.

### *DoD Mission Assignment Priorities*

DDASS also provides information on the priorities assigned to MAs DoD executed, classifying them as either *lifesaving*, *life sustaining*, *high*, or *medium*. Figures 6.7 and 6.8 present the associated cumulative number of MAs, by mission priority, over the course of the disaster response for Puerto Rico and the USVI, respectively. As can be seen, lifesaving and life-sustaining missions are more heavily concentrated early in the response, when vital emergency operations were being conducted. Toward the later stages of the response, the MAs include larger numbers of lower-priority missions. In Puerto Rico, MA generation for life-sustaining MAs spiked significantly immediately preceding the landfall of Hurricane Maria. Furthermore, most lifesaving MAs for Puerto Rico were initiated around landfall and ultimately plateaued by the end of September. For the USVI, MA initiation spiked twice, the first just as Hurricane Irma made landfall, and most of these were either lifesaving or high-priority MAs. The second spike

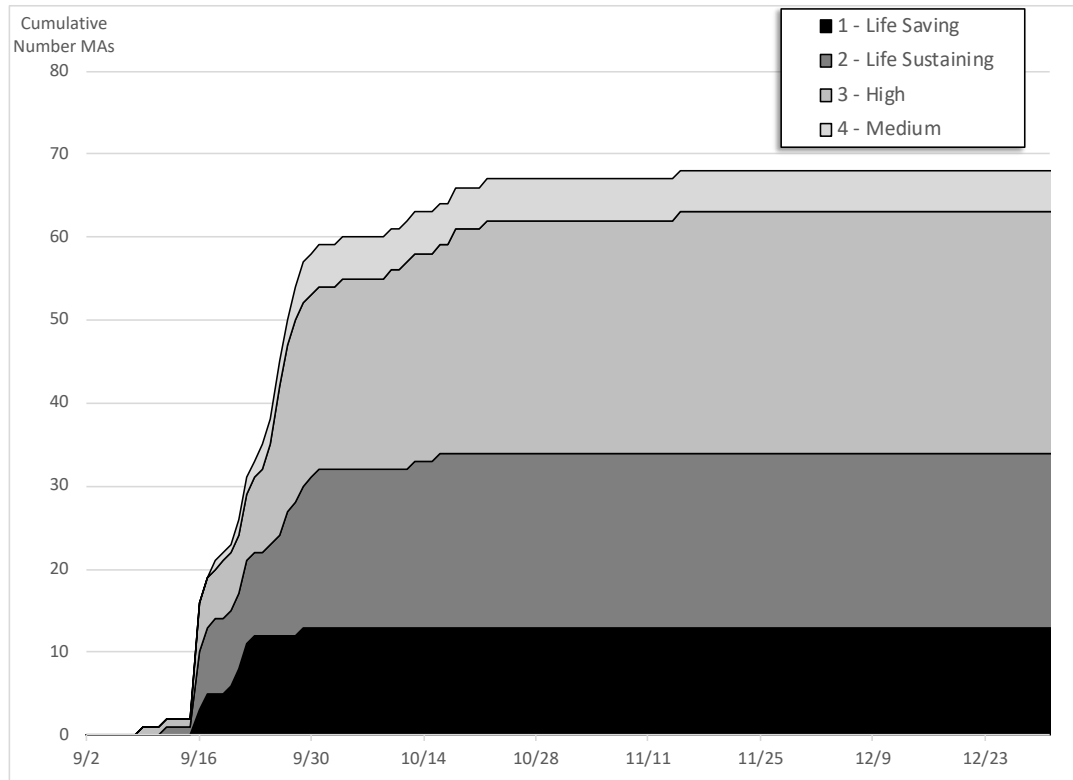
in MA generation immediately preceded the landfall of Hurricane Maria. However, in this case lifesaving, life-sustaining, and high-priority MAs all had large spikes in activity.

**Figure 6.6. Active DoD-Assigned Mission Assignments in Puerto Rico and the USVI**



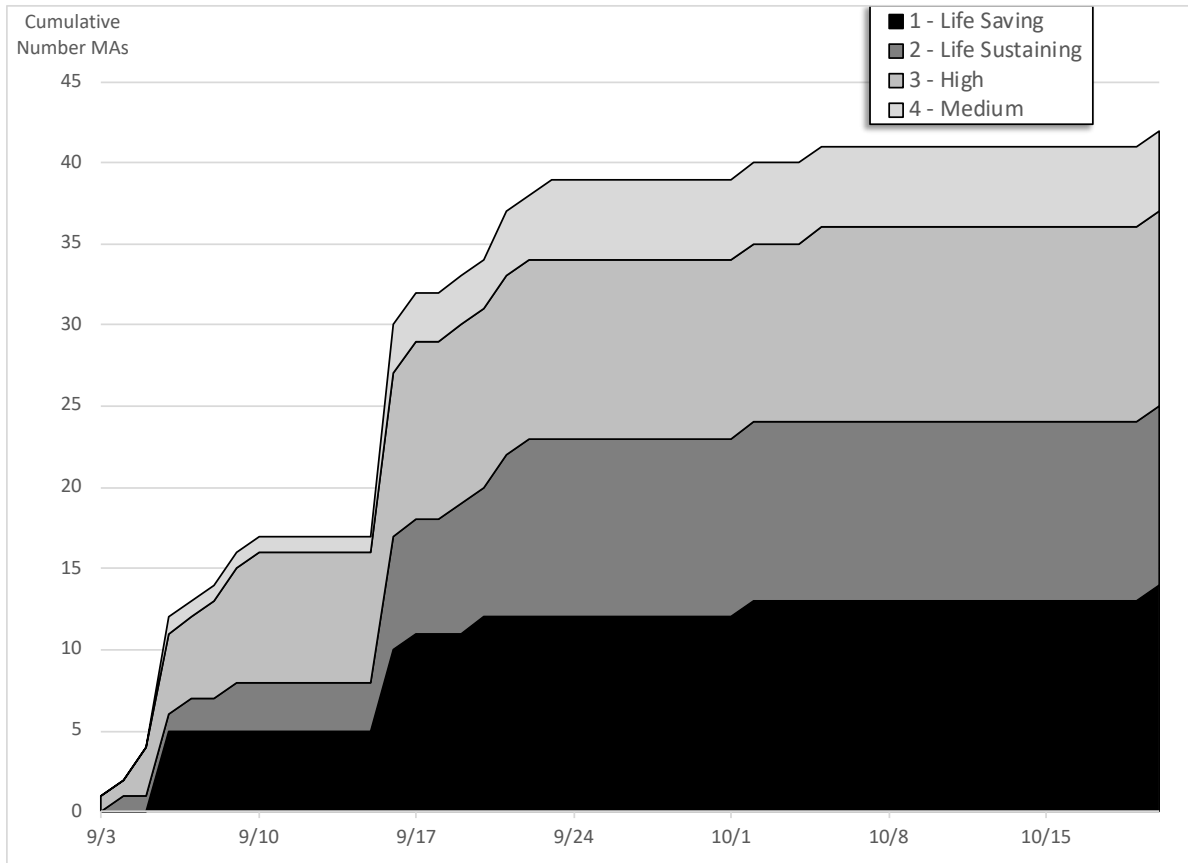
SOURCE: DDASS.

**Figure 6.7. Cumulative Number of DoD Mission Assignments, by Priority, Puerto Rico**



SOURCE: DDASS.

**Figure 6.8. Cumulative Number of DoD Mission Assignments, by Priority, USVI**



SOURCE: DDASS.

## Challenges Associated with Mission Assignments

During the Hurricane Maria response, issues related to transitioning from immediate response authority to tasks under an MA and associated MATOs, a lack of understanding of the MA process, misalignment of FEMA-generated MAs with expectations of the DoD units responsible for providing the response, and difficulty relating MAs to subsequently defined transition conditions all presented challenges. Although these challenges did not prevent the success of the overall DSCA mission, each should be addressed to help identify potential solutions for future DSCA events.

Addressing such challenges is all the more important because a catastrophic event, incident, or complex catastrophe could, under some circumstances, result in the same sort of incapacitation of SLTT government and emergency management structures that occurred in Puerto Rico after Hurricane Maria that led to these challenges.

## *Transitioning from Immediate Response Authority to Mission Assignment*

During the Hurricane Maria response, there appears to have been some confusion or disagreement about the appropriate use of immediate response authority, and the transition from immediate response authority to tasking under the formal MA process. These issues were particularly evident in the interviews we conducted in Puerto Rico in November 2017, when one unit specifically mentioned that immediate response authority was only applicable for a 72-hour period, after which an MA must be used to direct further work.<sup>20</sup> Although work under immediate response authority did not actually stop at that 72-hour threshold, the perception remained that such extensions were exceptions to DoD guidance.

Military commanders in DSCA operations generally can act under immediate response authority to save lives, prevent human suffering, and prevent greater property damage. DoDD 3025.18, *Defense Support of Civil Authorities*, authorizes immediate response authority for providing DSCA, when requested:

Federal military commanders, Heads of DoD Components, and/or responsible DoD civilian officials (hereafter referred to collectively as “DoD officials”) have IMMEDIATE RESPONSE AUTHORITY as described in this Directive. In response to a request for assistance from a civil authority, under imminently serious conditions and if time does not permit approval from higher authority, DoD officials may provide an immediate response by temporarily employing the resources under their control, subject to any supplemental direction provided by higher headquarters, to save lives, prevent human suffering, or mitigate great property damage within the United States. Immediate response authority does not permit actions that would subject civilians to the use of military power that is regulatory, prescriptive, proscriptive, or compulsory . . . .

An immediate response shall end when the necessity giving rise to the response is no longer present (e.g., when there are sufficient resources available from State, local, and other Federal agencies to respond adequately and that agency or department has initiated response activities) or when the initiating DoD official or a higher authority directs an end to the response. The DoD official directing a response under immediate response authority shall reassess whether there remains a necessity for the Department of Defense to respond under this authority as soon as practicable but, if immediate response activities have not yet ended, not later than 72 hours after the request for assistance was received.<sup>21</sup>

DoD guidance on the application of immediate response authority indicates that “DoD officials may provide an immediate response by temporarily employing the resources under their control, subject to any supplemental direction provided by higher headquarters.”<sup>22</sup> Ultimately, the DoD official directing an immediate response authority response can continue to provide any life-saving or life-sustaining assistance until either (1) the “necessity giving rise to the response

---

<sup>20</sup> Combined interview notes.

<sup>21</sup> DoDD 3025.18, 2018, pp. 4, 5.

<sup>22</sup> DoDD 3025.18, 2018, p. 5.

is no longer present,” or (2) the “initiating DoD official or higher authority directs an end to the response.”<sup>23</sup> It should be noted, however, that the DoD official directing a response under immediate response authority is required to reassess the necessity of continued response “as soon as practicable” but no later than 72 hours after the RFA is received.<sup>24</sup>

As described above, there is ample authority for a DoD official directing immediate response authority to continue those activities until one of the two conditions to end the response have been met, assuming a reevaluation of the necessity for the response is done within 72 hours. For instance, in the case of the 1st MSC, a reserve unit initially operating using immediate response authority under the direction General Shulz, several confounding factors led to the need for continued operation under immediate response authority beyond the 72-hour window. As the DoD official directing the response, General Shulz had the authority to continue operations under immediate response authority until the need for the operations no longer existed or until a higher authority directed her to stop the operations. The higher authority on the ground in Puerto Rico, General Buchanan, did not direct units to stop what they were doing under immediate response authority at 72 hours. Therefore, as long as General Shulz was reassessing the need for continued immediate response authority every 72 hours, there was no reason for her to direct her unit to stop its activities.

Despite the fact that DoD guidance supported the use of immediate response authority in the Hurricane Maria response, clearer direction and a more formal covering authority via MAs/MATOs would have been desirable. Structuring response activities under the MA process can achieve better rationalization and synchronization across response activities and ensure reimbursement of all costs. As a result, reimbursement for response activities under immediate response authority may be somewhat less certain than under a formal MA. Although immediate response authority costs should also be reimbursable, the activities conducted are never to be “delayed or denied based on the inability or unwillingness of the requester to make a commitment to reimburse the Department of Defense.”<sup>25</sup>

### *Perceived Lack of Understanding of MA Process*

Interviews and review of AARs revealed that Title 10 forces involved in the Hurricane Maria response lacked understanding of the MA process. Although all USARNORTH personnel are required to take the initial Phase 1 DSCA training course, which details the MA process, there was still a wide gap in knowledge of the MA process, especially among units acting as augmentees.<sup>26</sup> We treat this issue in greater detail in Chapter 7, but MA-related education and the

---

<sup>23</sup> DoDD 3025.18 4.i(5), 2018, p. 5.

<sup>24</sup> DoDD 3025.18 4.i(5), 2018, p. 5.

<sup>25</sup> DoDD 3025.18 4.i(6), 2018, p. 5.

<sup>26</sup> Interview with USARNORTH training staff in San Antonio, March 6, 2018.

training of officers playing central roles in planning or serving as liaisons with FEMA are particularly important.

### *MA Generation Misaligned with DoD Operations*

Although the precise extent to which MAs were initiated through the NRCC (as opposed to the RRCC) during the Hurricane Maria response is unknown, some of our interviewees appear to have believed that NRCC-generated MAs were misaligned with the expectations of the DoD units responsible for providing the response.<sup>27</sup>

In general, DoD directs activities based on requirements and attempts to pull the minimum number of resources required to successfully address the requirements. However, there is a perception that the NRCC is in the “push business” with regard to addressing response operations in affected areas, meaning the NRCC tends to construct MAs in such a way that material is pushed to the AOR without specific definition of the requirement being fulfilled. As an example, the NRCC is more likely to define an MA providing a specific number of aircraft for search-and-rescue missions, as opposed to providing DoD with a specific requirement that needs to be met without dictating, e.g., the number and scale of search-and-rescue missions to perform each day. The misalignment of the NRCC-defined MAs with the expectations of responding DoD units may be exacerbated in these types of responses because there is no DCO working directly with the NRCC to help translate response needs to DoD capabilities. As a result, FCOs within the NRCC can generate MAs without direct interaction with DoD liaisons.<sup>28</sup> It should be noted that while USNORTHCOM has a permanent liaison to FEMA, there was still a perception among our interviewees of ill-structured MAs being generated through the NRCC. To help mitigate some of the issues associated with these problematic MAs, in future DSCA operations, DoD might embed more DoD LNOs or a MAST in the NRCC to better tailor MAs to missions being conducted by DoD.<sup>29</sup>

Relatedly, there were indications in our interviews that, at the outset of the response to Hurricane Maria, the relationship between FEMA and the U.S. Army was not well structured and that it was unclear how the lead federal agency intended to use U.S. Army resources.<sup>30</sup> This ultimately created issues with synchronization between DoD and FEMA, which might have been remedied through the more rapid use of formal MAs to direct response activities.

---

<sup>27</sup> This impression comes from multiple sources, including interviews conducted with USARNORTH staff involved in the MA process and staff from the MA strike team (MAST).

<sup>28</sup> Interview with MAST staff, November 2017.

<sup>29</sup> Interview with MAST staff, November 2017.

<sup>30</sup> According to interviews with personnel from responding military (Active, USAR, and USNG) and federal organizations (FEMA), November 2017.

## *Relating MAs to Transition Conditions*

In the early period of the Hurricane Maria response, both Title 10 and FEMA planners had difficulty relating desired end states and transition conditions to existing MAs.<sup>31</sup> An understanding of the desired end state is essential for measuring progress on the ground and determining when Title 10 forces can be redeployed home.

MAs do not typically describe the conditions necessary for the successful completion of tasks: As drafted, MAs are generally limited by a specified end date or funding cap, which can always be amended if there is more work to be done. To address this deficiency within the defined MAs, JFLCC planning staff, in collaboration with their FEMA ESF counterparts, developed the conditions and metrics for off-ramp decisions for Title 10 forces separately from the MA definition process.<sup>32</sup> This was accomplished by conducting weekly updates on progress toward desired outcomes within the areas of aviation, route clearing, commodities distribution, bulk water production and distribution, communications, medical, and public affairs and by comparing indicators of progress with evolving transition criteria.<sup>33</sup> Planners also assessed trends in operational tempos to see if there was excess capacity suggesting that the tempo of operations could be reduced or paused without adverse impacts.<sup>34</sup> Initially, only informal coordination between the JFLCC and FEMA planners took place because the JFLCC staff was not confident enough in the process initially to include interagency partners in the early stage of planning. This approach may have been shortsighted because it failed to adequately account for the views of the ESFs and interagency teams that would assume control as military forces redeployed.<sup>35</sup> In future DSCA incidents requiring extensive Title 10 involvement, transition planning activities should enjoy interagency-wide visibility from the start.

As an example of the transition planning USARNORTH conducted, the following illustrations provide information regarding aviation and route clearance MAs that were active on October 21, 2017, as described in the weekly update that day.<sup>36</sup> Table 6.5 presents an overview of

---

<sup>31</sup> In addition to recognition of the difficulty USARNORTH staff reported in relating transition conditions to MAs (interviews, November 2017), this point is also reflected in Davidson, 2017, slide 10.

<sup>32</sup> USARNORTH, 2018b.

<sup>33</sup> U.S. Fleet Forces Command's lessons-learned review also identified difficulties associated with assessing transition criteria in Puerto Rico and identified early identification of common elements of information, assessment criteria, and transition points as areas for potential improvement for future DSCA responses (Davidson, 2017, slide 10). The review also reported that: "JFMCC staff (as lead Component) [was] not prepared to support joint reception, staging, onward movement and integration (JRSOI) and common user logistics for all Title 10 land forces," and that this should be another area for improvement (Davidson, 2017, slide 11). It will be important to monitor future improvements in naval capabilities in these sorts of areas to ascertain if and when JFMCC organizations might have all the capabilities necessary to command and control future Hurricane Maria-like responses.

<sup>34</sup> USARNORTH, 2018b. COL Tim Kreuttner, U.S. Army North G-5, and David Kang of FEMA's Office of Response and Recovery, provided us information about and insights on the metrics development process in the Hurricane Maria response.

<sup>35</sup> According to USARNORTH, 2018c.

<sup>36</sup> JFLCC J5, *JFLCC MA Analysis*, Vers. 7, October 17, 2017.

the active MAs/MATOs for aviation, while Box 6.1 lists the associated transition conditions for aviation at that time.

**Table 6.5. Example of Aviation MAs Tracked Through JFLCC Analysis Scrub, October 21, 2017**

| MA/MATO          | Description                                                                        | Unit Start | Date       | Duration | Status (%)  |
|------------------|------------------------------------------------------------------------------------|------------|------------|----------|-------------|
| 4339DR-PR-DOD-14 | Request rotary-wing lift (GSAB)                                                    |            | 9/17/2017  | 43       | In progress |
| 14.002           | Hospital assessment teams                                                          | 6-101 GSAB | 9/30/2017  | 35       | 54          |
| 14.003           | JFLCC tilt- or rotary-wing support for emergency actions                           | 1 AD CAB   | 9/30/2017  | 24       | 79          |
| 14.004           | Heavy or medium rotary wing in PR                                                  | 1 AD CAB   | 10/2/2017  | 27       | 63          |
| 14.005           | Medevac rotary-wing support                                                        | 6-101 GSAB | 10/1/2017  | 28       | 64          |
| 14.006           | Rotary wing for Climbers/Equip.                                                    | 1 AD CAB   | 10/17/2017 | 31       | 0           |
| 14.008           | 1st CAB delivers PR Air National Guard water blivets to interior, remote locations | 1 AD CAB   | 10/6/2017  | 20       | 65          |
| 14.009           | Rotary wing aerial survey                                                          | 1 AD CAB   | 10/2/2017  | 27       | 63          |
| 14.011           | CTF-189 tilt or rotary wing support                                                | CTF-189    | 10/18/2017 | 2        | 50          |

SOURCE: JFLCC, *Mission Assignment Transition Criteria Analysis*, October 21, 2017.

#### **Box 6.1. Example of Aviation Transition Conditions, October 21, 2017**

##### **Conditions for Transition**

The transition of aviation assets will occur in multiple stages as MATO requirements decrease:

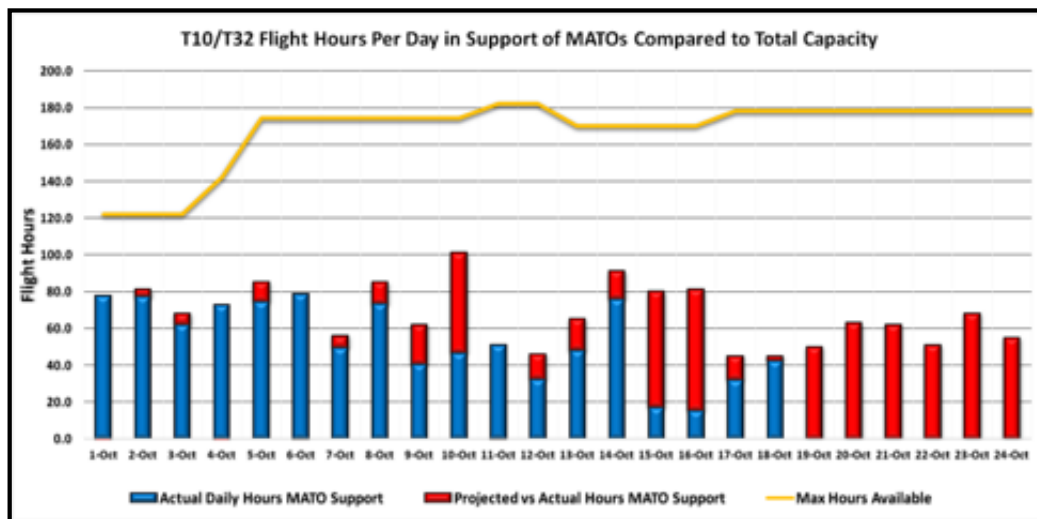
1. USS *Wasp*, *Oakhill* aviation—sufficient resources remaining
2. USS *Kearsarge* aviation—sufficient resources remaining
3. USNS *Comfort* aviation—sufficient resources remaining
4. TF Iron Eagle (1CAB) aviation—reduced demand/ARNG in place
5. Army National Guard aviation—PRNG able to assume mission

SOURCE: JFLCC, 2017.

As a part of its analysis, JFLCC also developed utilization-based metrics to assess excess capacity that might indicate when capabilities could be stepped down; JFLCC continuously tracked and compared the projected and actual daily hours flown, as well as comparing these metrics against the maximum available hours for aviation assets on the ground. As shown in Box 6.1 and Figures 6.9, there was substantial excess aviation capacity over the entire period,

and as the actual flying hours declined significantly by mid-October, JFLCC planners saw an opportunity to begin returning aviation assets to their home stations.

**Figure 6.9. Example of Aviation Operations Progress**



SOURCE: JFLCC, 2017.

For route clearance activities, JFLCC tracked the active MAs and MATOs (Table 6.6) and the transition conditions (Box 6.2) in the same format as for aviation.

**Table 6.6. Example of Route Clearance MAs Tracked Through JFLCC Analysis Scrub**

| MA/MATO         | Description                                           | Unit Start                   | Start Date | End Date   | Status      |
|-----------------|-------------------------------------------------------|------------------------------|------------|------------|-------------|
| 4339DR-PRDOD-12 | Emergency route clearance                             |                              | 9/17/2017  | 10/31/2017 | In progress |
| 12.009          | Emplace Jersey barriers and sandbags at Guajataca Dam | 1 MSC 448 Engineer Battalion | 9/30/2017  | 10/25/2017 | In progress |
| 12.010          | Emergency route clearance and establishment of QRF    | 1MSC 448 Engineer Battalion  | 9/30/2017  | 10/25/2017 | In progress |
| 12.011          | JFLCC clears routes in PR                             | 1 MSC 448 Engineer Battalion | 9/30/2017  | 10/31/2017 | In progress |

SOURCE: JFLCC, 2017.

### Box 6.2. Example of Route Clearance Transition Conditions

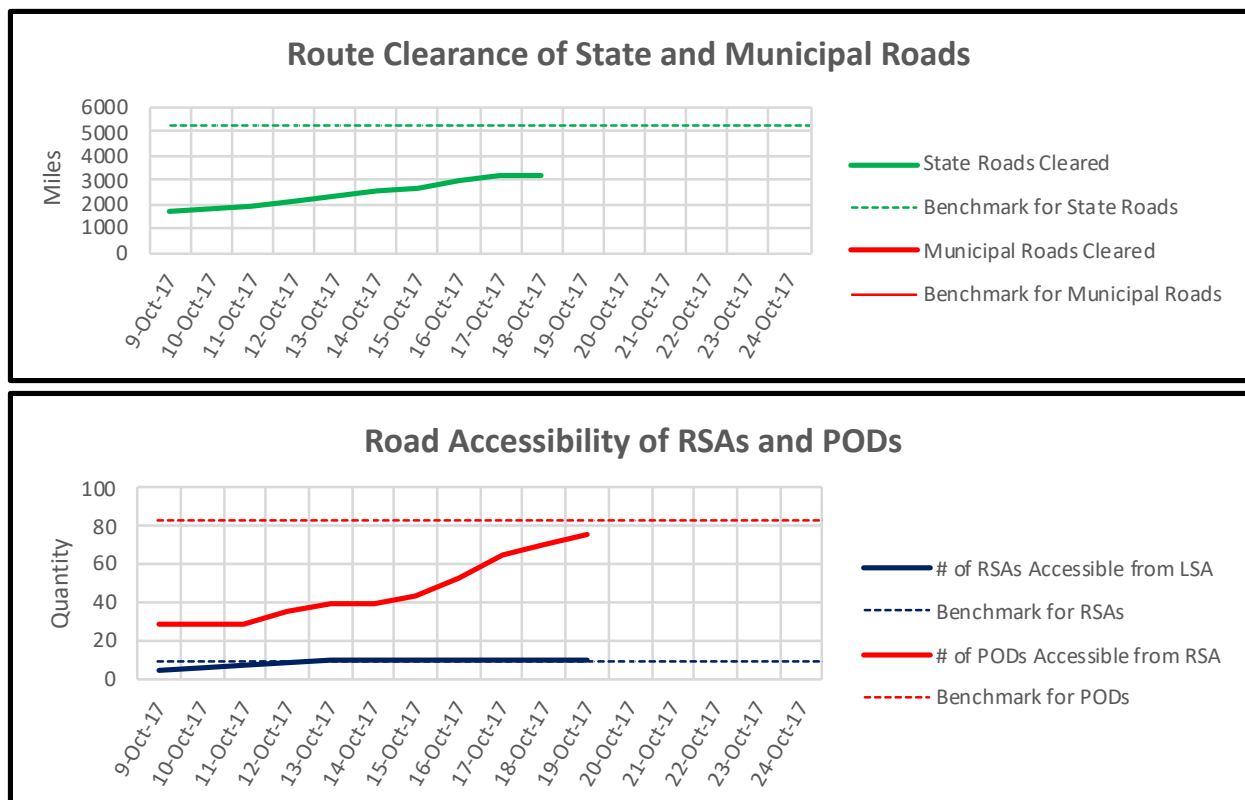
#### Conditions for Transition

- State roads have been cleared and are open, except those with structural deficiencies.
- Emergent tasked municipal roads have been cleared and are open
  - USACE debris removal
  - Bus routes.
- Title 32 forces or civilian contracts are in place for emergency route clearance.

SOURCE: JFLCC, 2017.

Figure 6.10 shows the metrics used to track progress in route clearance activities related to the miles of state and municipal roads cleared and the number of accessible roads leading to RSAs and PODs. For these metrics, the benchmarks for success are clearly indicated by the horizontal lines, and progress to date is evident from the rising lines on number of miles cleared.

Figure 6.10. Example Route Clearance Operations Progress



SOURCE: JFLCC, 2017.

In implementing the collaborative and transparent planning approach highlighted through the examples above, USARNORTH and its FEMA counterparts were able to establish a transition

plan. USARNORTH is currently formalizing this process to specify the approach to transition planning.<sup>37</sup> The process begins with the staff developing conditions for transition that describe what must be true before military units on the ground can finish or hand over operations to another agency. Following this, metrics can be developed to aid in measuring progress and recognizing conditions to trigger decisions to shift or redeploy assets. Staff and leadership must work together to refine these conditions, analyze their status, and further agree on a transition plan as the response unfolds. Staff will present these conditions and assessments in a joint brief to the UCG, which includes representatives from the state. Finally, when the CG, DSC, DCO, and FCO judge that a resource is no longer required they are to consult with the SCO and/or state emergency manager. To ensure consensus, all the key stakeholders are brought into decisions to transition Title 10 forces home.

By establishing the conditions for transition and discussing progress against these conditions jointly with the FCO and ESF counterparts, JFLCC was able to promote joint situational understanding.<sup>38</sup> This understanding provided the basis for dialogue that was necessary to make off-ramp decisions on specific MAs and determine the appropriate time for redeployment of Title 10 forces.

## Options and Recommendations

Several options are available to address the challenges associated with MAs in future DSCA events. The following discussion provides some potential options to mitigate challenges related to transitioning from immediate response authority to MA, the misalignment of MA definition with DoD operations, and understanding transition conditions for MAs.<sup>39</sup>

### *Transitioning from Immediate Response Authority to MA*

Although the use of immediate response authority in the Hurricane Maria response past 72 hours was allowable under the applicable DoD guidance, moving units onto MAs more quickly in future operations may alleviate some synchronization issues and better ensure cost reimbursement for activities conducted under immediate response authority.

One potential option for expediting the definition of MAs in common areas of DSCA operations, and subsequently increasing the speed of response, is to develop additional PSMAAs to cover the sorts of operations that were conducted for extended periods under immediate response authority during Hurricane Maria, and also could be required in other hurricane

---

<sup>37</sup> USARNORTH, 2018c, provides a draft of a more formal process for transition planning and establishing mission end-states in DSCA events. This proposed process for transition planning is a modification of the end state and exit strategy tactics, techniques, and procedures found in Appendix A of Center for Army Lessons Learned, *Catastrophic Disaster Response Staff Officer's Handbook: Techniques and Procedures*, Combined Arms Center, Fort Leavenworth, Kan., No. 06-08, May 2006.

<sup>38</sup> USARNORTH, 2018b.

<sup>39</sup> Chapter 7 addresses the challenges associated with a lack of understanding of the MA process.

responses. Currently, several PSMAAs exist within both the FEMA and DoD MA trackers and are generally directed at activating key personnel for DSCA missions, such as the DCO/E and FCO. Some of our interviewees expressed concern about relying more heavily on PSMAAs because these MAs are generally copied verbatim without modifications that would make them directly relevant to the specific response. Although using a PSMA may provide for quick approval of the MA, PSMAAs were sometimes perceived as lacking specificity and failing to relate to specific conditions for transition or end states for the MA.

However, these issues associated with PSMAAs may be mitigated by ensuring that common mission sets, such as aviation, route clearing, commodities distribution, bulk water production and distribution, communications, medical, and public affairs are designed in advance to relate to a planning framework that includes metrics (measures of outcome, effectiveness, and performance) and notional desired end states and transition criteria. However this might be accomplished, it would be critical for those developing MAs to coordinate with planners to clarify MA end-state or transition conditions during the approval process to integrate them more naturally into planners' assessment frameworks. We believe that this could be a fruitful topic for discussion between FEMA and DoD.

As a starting point, the hurricane planning guidelines in the multiservice tactics, techniques, and procedures for DSCA events identify the areas in which MAs will likely be needed, which include the following:<sup>40</sup>

- debris clearance
- transportation of first responders, evacuees, and the injured
- health care providers
- air assets for search-and-rescue
- logistical support
- temporary shelter and basing
- USACE assessment of key infrastructure
- heavy equipment and operations
- shoring and structural reinforcement
- fatality search and recovery teams supporting mortuary response teams
- security and law enforcement.

As shown earlier, in many of these mission areas (e.g., debris clearance, transportation of people and assets, medical support, logistic support, and mortuary affairs), MAs are supplemented with MATOs defined throughout operations. Therefore, more-generic MAs may be pre-scripted, and the use of MATOs can provide additional details as situational awareness and the COP become fully established. To provide the initial estimates of the scope and scale of the work covered under these PSMAAs; the available handbooks similar to the country studies that the Library of Congress and others published for many years; and initial analysis, such as from

---

<sup>40</sup> ATP 3-28.1, 2015.

USACE's disaster impact models, may be used.<sup>41</sup> In addition to these resources, the FEMA RRCC Situational Awareness Section informs its leadership of conditions that affect response operations, which may also be used to inform DoD activities. Furthermore, NHC provides a wealth of products and information on hurricane impacts that may be helpful prior to landfall.<sup>42</sup> This option would require coordinated effort between FEMA and DoD, and should likely include representatives from the DCOs, FCOs, and possibly even the MAST.

### *Misalignment of MA Generation and DoD Requirements*

FEMA and DoD have distinctly different ways of thinking about requirements. For example, FEMA may simply state that it requires five trucks to deliver commodities. DoD, instead, wants to know about the desired effect (e.g., the volume of commodities that need to be moved, how quickly items need to reach their destinations) to be able to identify the most effective (or cost-effective) mix of capabilities to meet the performance goals. Some sort of mechanism to translate and/or realign these different perspectives is needed. Our interviews revealed a fair amount of anecdotal evidence that many top-down DoD MAs that came from the NRCC were either not tailored to circumstances on the ground or needed to be translated into terms that DoD could use. The potential options for addressing this include the following:

- PSMA and MATOs with built-in metrics could be developed, with the metrics also embedded in planning and assessment schemes to provide a framework for assessing progress and establishing transition conditions. For example, PSMA for emergency route opening might include such metrics as the number of miles or percentage of total miles of major and/or secondary roads that are free of debris, and standing plans could posit alternative levels (e.g., 50, 75, or 90 percent of roads free of debris) that could serve as a trigger for transitioning the mission to others.
- DoD and FEMA can collaborate on a revision to the MA/MATO generation process to ensure that the process is redesigned to automatically generate MAs that define requirements in a form that both FEMA and DoD can use. In addition to a process change, such an approach might require organizational adjustments that facilitate closer collaboration between FEMA and DoD in MA/MATO development.
- DoD and FEMA might pursue an agreement to push for MA/MATO generation at the lowest possible level to ensure that MAs/MATOs reflect desired effects that DoD can translate into capability requirements. With this sort of bottom-up MA/MATO generation, the DCO would enjoy a more active role in MA generation and be better able

---

<sup>41</sup> Some example resources are Bureau of the Census, "Puerto Rico and the Outlying Areas," *Geographic Areas Reference Manual*, Washington, D.C.: U.S. Department of Commerce, November 1994, pp. 7-1 to 7-42; Caitlin Chase, Gregory Gonzalez, Daphne Gorman, and Sydney Higginbottom, *Assessing Critical Infrastructure in Puerto Rico's Coastal Zone*, Worcester, Mass.: Worcester Polytechnic Institute, May 4, 2011; Helen Chapin Metz, ed., *Dominican Republic and Haiti Country Studies*, Washington, D.C.: Federal Research Division, Library of Congress, December 1999; and Gary L. Miller, and Ariel E. Lugo, *Guide to the Ecological Systems of Puerto Rico*, Washington, D.C.: U.S. Department of Agriculture, June 2009.

<sup>42</sup> According to FEMA, *FEMA Region II Hurricane Annex for Puerto Rico & US Virgin Islands*, Washington, D.C., October 20, 2014b.

to help frame MA language in the context of requirements and DoD capabilities to meet them.

- When a more top-down approach to MA/MATO definition is embraced, DoD can enlist additional DCOs or a MAST to embed within the NRCC to assist in scoping and framing DoD MAs.

Although other—possibly even better—ideas may present themselves, a mutually satisfactory arrangement that can address the challenges that were encountered in the Hurricane Maria response seems likely to require collaboration between FEMA and DoD and, possibly, changes to the MA process and other guidance.

### *Relating MAs to Transition Conditions*

Given the importance of understanding conditions for transition in making off-ramp decisions for Title 10 forces during a DSCA event, additional efforts should be made to define measurable end states early in the execution of MAs.

DoD can continue to engage in metric and transition condition planning through direct collaboration with FEMA counterparts during the incident response, as was occurred in the response to Hurricane Maria and as USARNORTH is currently formalizing. This would likely require some education of DSCA responders regarding metric identification, which would need to be incorporated into existing DSCA training. Although this does not require action on the part of FEMA regarding MA generation, it would likely create an additional burden on both DoD and FEMA during an incident response.

## Chapter Conclusions

The research question for this chapter asked about changes to the MA process and ways to mitigate the challenges DoD has faced in future incidents. The following are among the key MA-related challenges encountered during the response to Hurricane Maria and possible responses:

- Additional education and training on the MA process and immediate response authority can address the general lack of understanding of the MA process and the limits of actions under immediate response authority in DSCA operations.
- Working with FEMA to clarify and/or develop additional guidelines and procedures for the future can mitigate the lack of clear guidelines or procedures for transitioning from immediate response authority- to MA-based activities.
- Ensuring that MAs are generated at the lowest level possible (JFO, RRCC, or NRCC) and better ensuring the essential involvement of the DCO in the MA development, validation, and assignment process and better align MAs with DoD operations.
- Linking measures of outcome to measures of performance and linking MAs to the same measures of performance, rather than mapping previously approved MAs into a subsequently developed plan and assessment framework, would provide a more robust basis for establishing end states and transition conditions and monitoring progress toward these goals.

## 7. DSCA Training for Effective Command and Control

---

In this chapter, we address the following research questions:

What headquarters training is required for an effective DSCA response, and what baseline preparations would another organization need to effectively command and control a large disaster response?

To inform our discussion of this question, we conducted interviews in Puerto Rico and Fort Sam Houston, reviewed DSCA training curricula, and examined the USARNORTH lessons-learned summary report.

This chapter begins by identifying requirements for effective DoD C2 in DSCA responses. We then review the types of DSCA training currently being conducted, identify the organizations and personnel receiving this training, and identify potential gaps in DSCA training that could be detrimental to effective C2 in major disaster responses. We close with options and recommendations for closing these training gaps.

### Requirements for Effective C2 in a DSCA Response

For joint operations, C2 “encompasses the exercise of authority, responsibility, and direction by a commander over assigned and attached forces to accomplish the mission.”<sup>1</sup> However, as described in earlier chapters, a key objective in DSCA operations is achieving unity of effort across civilian and military responders, with the objective of unity of command—implying a C2 relationship—reserved for the military forces assigned or attached to a military commander.

In the context of a DSCA response, then, effective C2 must also be geared toward building unity of effort in an environment where the military is not in charge (and does not want to be in charge): Where the state and local government have primary authority, FEMA leads the federal response, and DoD Title 10 forces operate in a strictly support role.

#### *Key Sources of DSCA Knowledge*

Effective C2 requires a detailed understanding of DSCA doctrine and processes. As described in Chapter 3, the guidance documents that are arguably of greatest relevance to DoD include the NRF, NIMS, JP 3-28,<sup>2</sup> and MA process guidelines. These publications detail roles and responsibilities and the structure of the response and provide a template for incident management. In addition to understanding the doctrine and processes associated with DSCA

---

<sup>1</sup> JP 1, 2017.

<sup>2</sup> DHS, 2016a; FEMA, 2017c; and JP 3-28, 2013.

responses, the ability to tailor C2 to remain agile is also critical, given the unique nature of each event.

### *Command and Control Agility: Tailoring Command and Control*

Because every disaster is unique, every disaster response will also be unique. To address the innumerable variations that might be encountered and to respond to unanticipated challenges during a response, C2 must be tailorable to the specific features of the response effort.

During the 2017 hurricane season, the responses to hurricanes Harvey, Irma, and Maria ultimately required and received three different C2 solutions:

- During Hurricane Harvey, JFLCC Forward supported the state of Texas.
- In Hurricane Irma, the JFLCC Liaison Element supported the state of Florida.
- In Hurricane Maria, following the determination that a land-based Title 10 element was required, C2 shifted from JFMCC to JFLCC Main staff.<sup>3</sup>

Despite these variations, a common feature of these responses was the use of componency, with JFLCC as the C2 element for land-based operations. As a result, JFLCC acquired significant experience in remaining agile under changing conditions and responses, and demonstrated the capacity to respond to complex, large-scale operations that require brigade-level functional C2 for optimal performance.<sup>4</sup>

A particularly telling example of this agility was the extensive application of LNOs and other augmentees across FEMA's ESFs and TFs to achieve unity of effort in the response to Hurricane Maria. Maria's incapacitation of local and commonwealth emergency management capabilities meant that higher levels of interaction and synchronization among multiple departments and agencies would be required, and this, in turn, would dictate the augmentation of liaison efforts.<sup>5</sup> Although this adaptation proved successful, it was accomplished without previous training and exercises encompassing such strategies. Hurricanes similar to Katrina and Maria may be somewhat rare, but increasing concern about the challenges of catastrophic incidents suggests that, when they do occur, they will likely benefit from careful consideration of the unique strategies that were employed to achieve unity of effort during the response to Hurricane Maria.

## DSCA Training Conducted

We now turn to a review of DSCA training and exercises. It should be noted that DoD currently has a CONUS-based DSCA training model that USARNORTH and USNORTHCOM manage and conduct.<sup>6</sup> This training model includes courses designed to provide familiarity with

---

<sup>3</sup> USARNORTH, 2018b.

<sup>4</sup> USARNORTH, 2018b.

<sup>5</sup> USARNORTH, 2018b.

<sup>6</sup> Interview with USARNORTH training staff, March 2018.

DSCA operations and applicable doctrinal and other guidelines and exercises that provide experiential learning. In the following subsections, we review the curricula and exercises and examine how well current DSCA training aligns with the requirements we described earlier.

### *Curricula for DSCA Training*

USARNORTH and USNORTHCOM manage DSCA training in the USNORTHCOM AOR. There are three main courses:

- Phase 1—All USARNORTH must complete this initial DSCA training, which presents the core concepts and doctrinal guidance for national preparedness, NIMS, the NRF, and DSCA doctrine. This online mission doctrine course typically takes approximately six hours to complete.<sup>7</sup>
- Phase 2—This course extends the core concepts to real-world examples through problem-based learning. This one-week course is geared toward decisionmakers. FEMA personnel also participate because this course is part of the FCO credentialing program. The first day and a half is a review of academic material, and the rest of the week consists of interactive problem-based learning. Classes for approximately 60 students take place up to 15 times a year through USARNORTH in San Antonio, Texas, and four times a year through USNORTHCOM.
- Phase 3—This is a continuing-education program, rather than an actual course. There is no formal time requirement. DSCA-trained personnel receive a biweekly newsletter that gives updates on DSCA and interagency doctrine, policies, and procedures; shares emergency preparedness news; relates lessons learned during real-world events and exercises; and presents tactics, techniques, and procedures.<sup>8</sup>

USNORTHCOM, in partnership with the National Guard Bureau, is responsible for managing a fourth course, which all appointed DSCs attend after completing the Phase 1 and Phase 2 training.<sup>9</sup>

Because all USARNORTH personnel are required to complete Phase 1 DSCA training, at minimum, this course material arguably serves as the base level of knowledge that should be provided across all DoD DSCA responders. We therefore next examine that course in more detail.

### *A Deeper Look into the DSCA Phase 1 Course*

The goals of the DSCA Phase 1 course include (1) an understanding of the vision of the National Preparedness Goal and how the National Planning Scenarios are applied to all types of

---

<sup>7</sup> Interview with USARNORTH training staff, March 2018; Joint Knowledge Online, “Storyboard Design Document for Defense Support of Civil Authorities (DSCA) Phase 1 Course,” JKO Course ID: J3ST-US010, February 2016.

<sup>8</sup> Interview with USARNORTH training staff, March 2018.

<sup>9</sup> Interview with USARNORTH training staff, March 2018.

threats and hazards;<sup>10</sup> (2) application of information in the NIMS and NRF; and (3) DoD's role in DSCA.<sup>11</sup> These goals are achieved through learning activities, such as knowledge-based questions within each lesson, scenario-based quizzes, and a final exam that must be passed with a score of at least 80 percent. The course is broken into three modules that track with the overarching goals for the course.<sup>12</sup>

- Module 1 covers the primary preparedness concepts for DSCA events. This module introduces students to the National Preparedness Goal and explains the National Preparedness System and National Planning Scenarios.<sup>13</sup> When introducing the scenarios, the course provides a crosswalk between the DSCA training scenarios and the National Planning Scenarios. Finally, Presidential Policy Directive 8 is also discussed as it is the primary policy establishing the requirements for national preparedness.<sup>14</sup>
- Module 2 introduces the concept of incident management based on a review of national-level guidance and doctrine. This module familiarizes students with how various agencies and jurisdictions are organized and managed during a DSCA event, under the assumption that greater understanding of response partners will help to promote unity of effort. The first lesson reviews the purpose and intent of NIMS, discusses the key principles and components, and tests the students' understanding of NIMS. The next lesson reviews the incident command system to help students understand unified command principles and the management characteristics and functional areas of the incident command system. The final lesson introduces the NRF; the key elements, roles, and responsibilities; the phases of an effective response; and organizational structures.
- Module 3 introduces the core concepts of DSCA and reviews DoD's responsibilities for civil support as outlined in the NRF, DoD Directive 3025.18,<sup>15</sup> and JP 3-28.<sup>16</sup> Students are asked to categorize the activities described in the Strategy for Homeland Defense and DSCA;<sup>17</sup> identify DoD's key objectives in DSCA; describe the roles and responsibilities of DoD elements in DSCA; describe the operational phases that USNORTHCOM and

---

<sup>10</sup> DHS, *National Preparedness Guidance*, Washington, D.C., September 2008a, p. 31. According to FEMA, The fifteen all-hazards National Planning Scenarios are an integral component of DHS's capabilities-based approach to implementing Homeland Security Presidential Directive 8: National Preparedness (HSPD-8). The scenarios serve as the foundation for the development of homeland security tasks, target capabilities, and standards and performance metrics against which capabilities and tasks will ultimately be measured. The scenario-derived capabilities and standards serve as a basis for assessing national preparedness; help guide Federal preparedness assistance to State, local, and tribal governments; and assist in development of national exercises and training programs. (FEMA, "National Planning Scenarios," fact sheet, Washington, D.C., undated c)

<sup>11</sup> Joint Knowledge Online, 2016.

<sup>12</sup> Joint Knowledge Online, 2016.

<sup>13</sup> See DHS, 2015, for the National Preparedness Goal; DHS, 2011, for the National Preparedness System; and the National Planning Scenarios.

<sup>14</sup> Presidential Policy Directive 8, 2011.

<sup>15</sup> DoDD 3025.18, 2018.

<sup>16</sup> JP 3-28, 2013.

<sup>17</sup> DoD, *Strategy for Homeland Defense and Defense Support of Civil Authorities*, Washington, D.C., February 2013.

USPACOM follow when providing civil support; and explain and evaluate the procedures for requesting, validating, and processing RFAs and MAs.

Overall, the Phase 1 DSCA course provides a detailed introduction to the national guidance and doctrinal principles for conducting DSCA operations. The primary policy directives defining authorities, principles, and processes are introduced, and the students' understanding of the concepts is tested through multiple choice quizzes.

### *Collective Training Events*

USNORTHCOM also engages in collective training exercises, including Ardent Sentry, Vigilant Shield, Vibrant Response, and Vigilant Guard. It should be noted that the role of USNORTHCOM and USARNORTH varies across these exercises because some are intended for training of state and lower headquarters entities.

#### *Ardent Sentry*

Ardent Sentry is an annual NORAD-USNORTHCOM exercise that is part of FEMA's multiagency national-level exercise and is generally run as a rolled-up CBRN/DSCA or other catastrophic event.<sup>18</sup> The April 2018 national-level exercise, titled Atlantic Fury, introduced a catastrophic hurricane scenario affecting Region III. In this scenario, the hurricane made landfall in the vicinity of Hampton Roads and moved northward, up the Chesapeake Bay, ultimately affecting Baltimore. The response involved multiple regions with independent play to demonstrate increasingly complex interoperability.<sup>19</sup> Although not explicitly stated in any reference materials, it seems likely that the lessons learned from the 2017 hurricane season played an influential role in this exercise.

#### *Vigilant Shield*

Vigilant Shield is an annual NORAD-USNORTHCOM homeland defense exercise under the direction of General Robinson. This exercise centers on the ability to secure critical infrastructure during a simulated attack.<sup>20</sup> Although the focus is quite different from that of Ardent Sentry and most DSCA events, this exercise considers both homeland defense and DSCA.<sup>21</sup> Thus, Vigilant Shield provides another national-level activity in which to apply DSCA doctrine to real-world scenarios.

---

<sup>18</sup> Interview with USARNORTH training staff, March 2018.

<sup>19</sup> U.S. National Response Team, "Atlantic Fury 2018," briefing, April 25, 2018.

<sup>20</sup> John Hamilton, "Vigilant Shield Takes Fight to New Mexico Mountains," U.S. Department of Defense, November 3, 2017.

<sup>21</sup> Interview with USARNORTH training staff, March 2018.

## Vibrant Response

Vibrant Response is a CDRUSNORTHCOM-directed, JFLCC-executed exercise that features the CBRN Response Enterprise (CRE), with a particular focus on the DSCA mission set.<sup>22</sup> Vibrant Response 18 was conducted April 6–26, 2018, and the exercise assessed the ability of the CRE components, the Defense CBRN Response Force (DCRF), C2 CRE Alpha (C2CRE A), and C2CRE Bravo (C2CRE B) to conduct operations in support of civil authorities. The scenario was based on National Planning Scenario 1 (involving a 10-kiloton improvised nuclear device) and called for all three TFs to support civil authorities responding to the detonation of such a device in a major U.S. city. Vibrant Response 18 was conducted in coordination with Guardian Response 18, a U.S. Army Forces Command–directed external evaluation and culminating training event for USNORTHCOM CRE entities. This multicomponent collective training exercise focuses on the DSCA mission set. The training audience included the DCRF, C2CRE A, and C2CRE B and their subsidiary units; state and federal agencies; local emergency response forces; and other CRE elements. The primary capabilities executed during this mission include urban search and rescue, patient decontamination, casualty ground and air evacuation, and general logistical support. Many of these activities are common across all DSCA events, and this exercise is therefore a valuable training opportunity.

## Vigilant Guard

Vigilant Guard is a state-level USNORTHCOM-sponsored exercise in conjunction with the National Guard Bureau. The exercise emphasizes National Guard capabilities but typically includes at least a small Title 10 component.<sup>23</sup> The most recent exercise, Vigilant Guard 18, took place in March 2018 and centered on a massive earthquake occurring in Yellowstone National Park, leading to disastrous flooding throughout populated areas of Montana. This exercise involved many organizations throughout the state and included DoD elements from Malmstrom Air Force Base.<sup>24</sup> Although this exercise is typically smaller in scope and impact than those previously mentioned, it provides another opportunity to explore the lessons learned and the unique adaptations that may be required during DSCA events. However, because Vigilant Guard is intended for training of state and lower headquarters elements, USARNORTH and TF51 are secondary training audiences, and overemphasizing USARNORTH in these state-level exercises may distract from the primary training objectives.

---

<sup>22</sup> Information regarding Vibrant Response has been provided through feedback on this report by USARNORTH staff.

<sup>23</sup> Interview with USARNORTH training staff, March 2018.

<sup>24</sup> Allyson Cummings, “Vigilant Guard 18 in Its Final Days,” ABC Fox Montana website, March 8, 2018.

## USARNORTH Participation

Although these collective training events provide valuable opportunities to exercise the DSCA mission set, USARNORTH does not need to participate in all cases. USARNORTH must consider that some risk acceptance is necessary to maintain the balance between training and the ability to surge when required. USARNORTH currently balances a diverse mission portfolio with the requirement to sustain DSCA expertise, and annual participation in Ardent Sentry may be sufficient for this purpose.<sup>25</sup>

## *Additional Training Materials*

USARNORTH also manages some additional training materials that are worth noting, including quick tactical courses and a smartphone-enabled DSCA refresher application. The tactical courses consist of short (20-minute) YouTube videos covering the key concepts of operations for DSCA events.

Recently, USARNORTH has tested, although not yet fielded, a prototype DSCA refresher course application from Sandia National Labs, a pilot project with the Joint Staff J-7 called the Pervasive Learning System (PERLS).<sup>26</sup> This application provides mobile access via smartphones to the Phase 1 training materials discussed earlier. With the potential to access this material on personal phones, participants can address individual gaps in DSCA familiarity prior to deployment. Although the tool's potential value is obvious, the full application has reportedly not yet been disseminated because of funding issues.<sup>27</sup>

Finally, additional DSCA reference materials provide guidance to DSCA responders, including the *DSCA Handbook: Tactical Level Commander and Staff Toolkit*, and *DSCA Handbook: Liaison Officer Toolkit*.<sup>28</sup> These materials can also be used as quick reference guides for tactical-level responders and may help responders identify information critical to the success of DSCA missions.<sup>29</sup>

---

<sup>25</sup> This perspective is based on feedback from the USARNORTH staff.

<sup>26</sup> Interview with USARNORTH training staff, March 2018. One of our USARNORTH interviewees described an emerging option for quick review and training of DSCA materials that makes use of PERLS, "a mobile learning system that guides and mentors learners through learning and training recommendations from a self-regulated micro-learning model." According to this source, USARNORTH has partnered to create DSCA-related content that could be reviewed by personnel deploying to a disaster. PERLS is described at Advanced Distributed Learning Initiative, "Pervasive Learning System (PERLS)," webpage, undated.

<sup>27</sup> USARNORTH training staff, March 2018.

<sup>28</sup> DoD, 2010b; DoD, *Defense Support of Civil Authorities Handbook: Liaison Officer Toolkit*, Washington, D.C.: Government Printing Office, GTA 90-01-021, 2010a.

<sup>29</sup> DoD, 2010a.

## Organizations and Personnel Receiving DSCA Training

Although the classroom training and other exercises cover the key requirements for effective C2 in a DSCA response, the extent to which this training is disseminated across the DoD community is also of interest. In this section, we discuss the personnel receiving DSCA training, as well as those without DSCA training who may be deployed to a DSCA event. It is important to note that DSCA training is not currently aligned with mission essential task lists (METLs), primarily because no DSCA-specific METLs exist across active, Reserve, or National Guard units.<sup>30</sup> DSCA-specific METLs have existed in the past, however.

Ultimately, the center of mass for DSCA training is in providing the necessary information to everyone involved in the DCE,<sup>31</sup> although this represents just a small fraction of the personnel receiving some form of training. As noted earlier, all USARNORTH personnel are required to complete the Phase 1 DSCA online course, and as a result, USARNORTH processes approximately 15,000 DSCA students per year. In addition to this training, USARNORTH also requires key leaders, primarily at the O-6 level, to take the Phase 2 course.<sup>32</sup> From this standpoint, the vast majority of soldiers within USARNORTH should be familiar with the essential DSCA doctrinal guidance and have enough familiarity to engage in a DSCA response. Additionally, TF 51 is USARNORTH's contingency command post and has participated, in various capacities, in every DSCA-related operation or exercise for the past ten years.

A limited number of other units are sufficiently trained to act as C2 headquarters elements in a DSCA response. Currently, both JTF-CS and JTF-N are under the OPCON of USARNORTH, although only personnel in JTF-CS have received all the DSCA training that would enable it to act as a division-level C2 element. JTF-N's primary mission is defense support of civilian law enforcement agencies, a subset of DSCA, and TF staff receive no formal training for C2 of DSCA response operations.<sup>33</sup>

Additionally, the C2 elements for the DoD CRE have the requisite training to effectively conduct C2 in DSCA responses. C2CRE A primarily consists of USAR units led by the 76th Operational Response Command from Utah and is augmented by the 209th RSG from Missouri.

---

<sup>30</sup> Interview with USARNORTH training staff, March 2018.

<sup>31</sup> Interview with USARNORTH training staff, March 2018.

<sup>32</sup> Interview with USARNORTH training staff, March 2018.

<sup>33</sup> Interview with USARNORTH training staff, March 2018. DoDI 3025.21

[e]stablishes DoD policy, assigns responsibilities, and provides procedures for DoD support to Federal, State, tribal, and local civilian law enforcement agencies, including responses to civil disturbances within the United States, including the District of Columbia, the Commonwealth of Puerto Rico, the USVI, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and any territory or possession of the United States or any other political subdivision thereof in accordance with DoDD 3025.18. (DoDI 3025.21, *Defense Support of Civilian Law Enforcement Agencies*, Washington, D.C.: U.S. Department of Defense, February 27, 2013)

The National Guard ultimately comprises 66 percent of the entire CRE. C2CRE B, with TF 46 from Michigan acting as headquarters, is another option for DSCA C2.<sup>34</sup>

Other units have DSCA experience, the necessary capability, and the requisite training to act as a C2 headquarters element in a DSCA response. These include both the 3rd ESC, which provided essential support to JFLCC in Puerto Rico, and the 4th ESC, which had just completed training as of this writing. The 4th ESC is preparing to assume the role of the 3rd ESC in support of USARNORTH.<sup>35</sup> One potential issue with the utilization of the 4th ESC in these types of events is that it is a Reserve unit, and mobilization may be slower to materialize than necessary.<sup>36</sup>

The National Guard also provides division headquarters to Domestic All-Hazards Response Teams, which conduct contingency planning; coordinate with existing EMAC partners; and, on request from supported states, mobilize and deploy to affected areas to provide additional C2 support to JFHQ.<sup>37</sup> These teams provide the ten essential ARNG capabilities: aviation, C2, CBRN response, engineering, medical, communications, transportation, security, logistics, and maintenance.<sup>38</sup> The Domestic All-Hazards Response Team comprises three division headquarters at any given time from the eight ARNG divisions within CONUS—one from the west, one from the east, and one reinforcing.<sup>39</sup> These division headquarters rotate on an approximate two-year cycle.<sup>40</sup>

Finally, USNORTHCOM has combatant command of Alaskan Command, which is a sub-unified command that participated in Ardent Sentry 18, which exercised the DSCA mission set. USNORTHCOM also has combatant command of JFHQ-NCR, which can become JTF-NCR on order. JTF-NCR participated in Ardent Sentry 18, as well as multiple Special Event Assessment Rating events and NSSEs in the NCR.<sup>41</sup> These organizations have participated in exercises that would make them well suited to future DSCA events.

Several DoD entities are deployed without previous DSCA training or experience. In general, most augmentees and units responsible for acting on MATOs, such as the 1st AD CAB in Puerto Rico, are unlikely to have DSCA training.<sup>42</sup> Interestingly, the 1st AD CAB was initially notified in August 2016 that it would be a part of the Army's DCRF, with a mission assumption date in summer 2017. However, based on the timing of the exercises, some personnel were unable to

---

<sup>34</sup> Army National Guard, *Army National Guard Annual Financial Report, FY 2015*, 2015.

<sup>35</sup> According to feedback from USARNORTH staff.

<sup>36</sup> Interview with USARNORTH training staff, March 2018.

<sup>37</sup> U.S. Army, "Domestic All-Hazards Response Team," *STAND-TO!*, October 19, 2009.

<sup>38</sup> National Guard Regulation 500-1, *National Guard Domestic Operations*, National Guard Bureau, June 2008.

<sup>39</sup> Steven Blum, "Army National Guard Division and Brigade Combat Team Designations," Washington, D.C.: National Guard Bureau, November 7, 2005; Cory Angell and Doug Roles, "Division Commanders Discuss DART, Other Issues," press release, February 16, 2010; U.S. Army, 2009.

<sup>40</sup> Angell and Roles, 2010.

<sup>41</sup> DHS, "What Are Special Event Assessment Rating (SEAR) Events?" fact sheet, Washington, D.C., undated b.

<sup>42</sup> Interview with USARNORTH training staff, March 2018.

attend any form of DSCA training before the hurricane season. As a result, many individuals were deployed to Puerto Rico without DSCA training, and the need for a quick reference guide on DSCA operations became clear.<sup>43</sup>

## Potential Gaps in DSCA Training

Although most USARNORTH personnel likely to respond to DSCA events receive some form of training covering the key national doctrine and guidance, many areas remain in which training can further enhance DSCA preparedness across the rest of the force. To ensure a basic level of understanding during DSCA responses, issues surrounding a lack of knowledge or erosion of knowledge must be addressed. Furthermore, to prepare DoD responders to meet the unique challenges associated with each DSCA event, exercises must also be provided. Finally, aligning training curricula and events to METLs may also help ensure all soldiers within DoD are fully prepared to respond in a DSCA event, which would require defining DSCA specific METLs. Each of these areas will be discussed here.

One of the greatest challenges to ensuring that all DoD personnel are prepared to respond to a DSCA event is in maintaining familiarity with all relevant DSCA doctrinal principles and guidance. In the response to Hurricane Maria, for example, several sources suggested that there was an initial lack of knowledge in some of the deployed forces regarding the DSCA process and terminology, as well as the MA process.<sup>44</sup> Although this gap in knowledge across a small slice of the force did not prevent Title 10 forces from successfully executing the mission, it did cause some friction between units and required concurrent learning of the DSCA doctrine. In general, the units without DSCA familiarity tended to be augmentees or support units, especially at the operational and tactical levels,<sup>45</sup> such as the USTRANSCOM Joint Enabling Capabilities Command.<sup>46</sup>

In addition to general familiarity with DSCA principles and terminology, having an understanding of the MA process, which directs and funds most response activities, is critical to providing continuity of the response. In the Puerto Rico response, it was noted that several DoD forces—including JFMCC, JFLCC, subordinate commands, USNORTHCOM staff sections, and augmented DCE personnel—had different understandings of the MA process.<sup>47</sup> Given that the majority of these personnel should have received some basic level of DSCA training, the lack of a common level of understanding of the MA process is somewhat surprising. This ultimately led to unnecessary delays throughout the response, and all means of mitigating these delays should be pursued through further training.

---

<sup>43</sup> USARNORTH, 2018b.

<sup>44</sup> USARNORTH, 2018b.

<sup>45</sup> Davidson, 2017, slide 12.

<sup>46</sup> USARNORTH, 2018b.

<sup>47</sup> USARNORTH, 2018b.

Finally, while there were some obvious gaps in providing the right information to individuals involved in a DSCA event, there were also indications that sustaining a shared understanding of force flow procedures during the response to Hurricane Maria was a challenge.<sup>48</sup> This knowledge erosion can present a significant issue when leadership assumes a base level of knowledge across the responding force and may need to be addressed through refresher courses or other exercises that will help with long-term retention of DSCA fundamentals.

In addition to the gaps in the basic level of DSCA understanding, several instances during the Hurricane Maria response indicate issues associated with a lack of experience in exercises. For instance, it was noted in an interview with USARNORTH leadership that one of the biggest issues prior to mission execution was the lack of the full involvement of USARNORTH staff in such exercises as Vigilant Guard because USARNORTH viewed these exercises as primarily limited to TF-51 training.<sup>49</sup> The real benefit of these training exercises is that they provide DSCA trainees with unique situations on which to base responses. This application of doctrinal guidance helps provide training for adaptation and agility during actual responses, which the Phase 1 training course certainly does not cover.

Despite this, USARNORTH does update its DSCA Phase 2 training courses after lessons learned are published from actual responses. In the recent past, Hurricane Sandy was the primary case study, and that is now being changed to Hurricane Harvey.<sup>50</sup> Although Hurricane Maria did present additional challenges over hurricanes Harvey and Irma, it is viewed as nonstandard and is not currently planned as a case study. This is not to say these more-challenging cases will be ignored; students participating in the Phase 2 course frequently bring up nonstandard case studies. Ultimately, these exercises really need to provide students with experiences requiring adaptation and agility, which was critically important to the successes in the Hurricane Maria response. It was noted through several interviews within USARNORTH that most individuals did not realize they would have to stretch DSCA doctrine as far as they did.<sup>51</sup> Incorporating examples of these adaptations into exercises can help potential DSCA responders develop a level of experience beyond the basic familiarity with doctrine that is currently standard.

Overall, the primary gaps between DSCA training and preparedness are in providing and sustaining an understanding of DSCA doctrine and guidance and in giving students some experience with DSCA responses.

## Recommendations

The identified gaps relate to both providing and retaining information regarding DSCA guidance and principles, as well as providing sufficient experience in DSCA events. Several

---

<sup>48</sup> USARNORTH, 2018b.

<sup>49</sup> USARNORTH, 2018b.

<sup>50</sup> Interview with USARNORTH training staff, March 2018.

<sup>51</sup> USARNORTH, 2018b.

recommendations are aligned with these issues. The following discussion highlights the previously identified issues and presents possible recommendations to address these issues.

### *Recommendations to Provide and Sustain Knowledge of DSCA Principles*

Although most responders to Hurricane Maria had some form of DSCA training, there were indications that there was an initial lack of knowledge on the part of some units involved regarding the DSCA process, terminology, and the MA process. This initial lack of knowledge did not prevent mission success; however, leadership believes that less friction would have arisen given a better appreciation for DSCA doctrinal foundations and processes.

#### **Recommendation 1**

To ensure a basic level of understanding of DSCA principles, including the MA process, the audience for Phase 1 DSCA training should be expanded. This may be accomplished by first defining DSCA-specific METLs and linking these METLs with a DSCA training requirement across all active-duty forces. Additionally, the audience for installation briefs should be expanded to include executive officers or operations officers to provide a better understanding of DSCA operations at the unit level. Executing this would require modifications to current METLs and would place an additional training burden on units that are not currently receiving DSCA training. This additional training burden will ultimately need to be weighed against other training requirements and against the likelihood of employment in a DSCA response to prevent an excessive training burden across units.

One specific area of the DSCA response in which misunderstandings arose across several units concerns the MA process. It was noted that DoD forces supporting the Hurricane Maria response—including JFMCC, JFLCC, subordinate commands, USNORTHCOM staff sections, and augmented DCE personnel—had different understandings of MAs and the MA process.<sup>52</sup> To effectively achieve synchronization across units and to ensure unity of effort, there must be some common level of understanding of MAs and the MA process.

#### **Recommendation 2**

USNORTHCOM and USARNORTH should consider developing an additional course for DSCA based on FEMA L0348: Orientation to Mission Assignments for FEMA Staff and Interagency Partners.<sup>53</sup> One way to accomplish this would be to tailor the current FEMA training materials, then making them available for training online as with the current Phase 1 training materials. This course would provide additional details on the use of MAs and on the MA process beyond what the current Phase 1 and Phase 2 courses provide. The audience for this training should include all personnel required to take the Phase 2 DSCA training, such as all

---

<sup>52</sup> USARNORTH, 2018b.

<sup>53</sup> USARNORTH, 2018b.

potential DCE staff, as well as potential JFLCC and JFMCC staff members. Executing this would require developing a new curriculum, although the availability of FEMA training materials would somewhat reduce the effort required. Requiring additional training from select staff could also increase the training burden, which must be weighed against other training requirements.

Supplemental reference materials are also needed for DSCA responses. The inability to sustain a shared understanding of DSCA doctrine and guidance has caused difficulties in past responses, and any unit may become involved DSCA, regardless of whether that unit has received DSCA training. Because it may be infeasible to require all units to engage in preincident DSCA training or to undertake refresher training at regular intervals, USNORTHCOM and USARNORTH may want to consider providing support materials for quick training and reference to all units tasked for DSCA during the JRSOI process.

### Recommendation 3

To address the need for supplemental quick reference material in a DSCA event, USNORTHCOM and USARNORTH should consider beginning dissemination of PERLS to all USNORTHCOM/USARNORTH staff. The system could be provided via individual soldiers' smartphones in the event that they are deployed to a DSCA event. This would allow all staff ready access to refresher material based on the Phase 1 DSCA curriculum. This would allow all staff ready access to refresher material based on the Phase 1 DSCA curriculum, without further burdening them with additional training on DSCA principles. However, there would be some cost associated with finalizing and disseminating this application across the force. The costs associated with final development and sustainment should be examined more formally, given the potential benefits to responding units.

### *Recommendations to Provide Experience in DSCA Events*

Providing DSCA experience is an important consideration for overall preparedness because the factors encountered in an event will differ from past events and the curricula of classroom training.

For instance, during USARNORTH's execution of the DSCA mission in Puerto Rico, multiple departments and agencies that were not accustomed to interoperating had to collaborate extensively.<sup>54</sup> This was especially significant because of the many different augmentation means, such as the LNO exchanges across FEMA ESFs and TFs.

Additionally, current C3 constructs in USNORTHCOM DSCA joint doctrine, such as the employment of a JTF, were not used in Puerto Rico, and there was some indication that DSCA training and education may need to further clarify the JTF option.

---

<sup>54</sup> Interviews in San Juan, November 2017.

Finally, there is a need to continue multistate DSCA exercises to sustain experience dealing with situations requiring high levels of collaboration.

#### Recommendation 4

To provide soldiers who may respond to DSCA events with more comprehensive experience, USNORTHCOM and USARNORTH should continue efforts toward greater multiagency involvement in existing exercises, such as Ardent Sentry, Vigilant Shield, Vibrant Response, and Vigilant Guard. The advantage of this recommendation is that staff could refresh their understanding of DSCA principles, doctrine, and guidance in short order, without being burdened with additional training requirements. These exercises should address multistate events and include personnel from all supporting agencies, such as the National Guard, DSCs, JFMCC, JFLCC, and FEMA. Importantly, these training events should consider exercising the JTF C3 option, paying particular attention to the DSC role. These expanded or new events should be geared toward establishing a new standard of collaboration and should inform an enduring training program. However, participation in exercises must be approached from a balanced perspective. All units participating in DSCA events will have other primary missions, and some level of risk acceptance is necessary. Providing the right level of participation in training exercises will involve carefully considering other training and mission requirements and participation in other DSCA training events.

Agility and the ability to sustain an operation beyond typical DSCA planning horizons is necessary for success in some DSCA events. This was seen in the response to Hurricane Maria, in which DSCA doctrine was perceived to be stretched; planning horizons beyond 24 hours were rare; and operations extended well beyond the typical two weeks encountered in other hurricane responses. As a result, staff were required to remain agile on a day-to-day basis and were tasked with additional sustainment burdens not typically encountered during DSCA responses.

#### Recommendation 5

To address the unique circumstances and adaptations encountered during the Hurricane Maria response, it is recommended that the lessons learned in Puerto Rico be incorporated into future scenarios for DSCA events. This should include the potential need for increased LNO presence across FEMA ESFs and TFs.<sup>55</sup> In addition, the advent of very short planning horizons (of less than 24 hours) should be used to train against. Finally, extended DSCA events may require additional preparations, such as phased maintenance while deployed, and this capability should be used in training exercises. Any event would greatly benefit from the collective involvement of FEMA, as well as Title 10 and National Guard/SAD forces.

---

<sup>55</sup> U.S. Fleet Forces Command's lessons-learned review echoed the point that LNO exchanges were vital for staff-staff coordination (Davidson, 2017, slide 9).

## Chapter Conclusions

For DSCA events, effective C2 must be geared toward building unity of effort. Although USARNORTH had extensive training prior to the hurricane season, USNORTHCOM might need to call on another organization to provide C2 during simultaneous incidents or a rapid succession of them. We sought to address the types of headquarters training that would be required for an effective DSCA response and to suggest baseline preparations that would allow other organizations to conduct effective C2 of a large disaster response.

This chapter identified the requirements for effective DoD C2 in DSCA responses; reviewed the types of DSCA training currently being conducted; detailed the organizations and personnel receiving this training; recognized potential gaps in DSCA training that could diminish the effectiveness C2 in major disaster responses; and finally, provided options and recommendations for closing these training gaps.

The training gaps that must be addressed relate to providing and promoting retention of information on DSCA guidance and principles and to giving potential DSCA responders adequate experience during training exercises. Potential recommendations to address these training gaps have been proposed, which are geared toward both the academic curricula and the training exercises to better prepare DSCA responders to tailor C2 to meet the specific features of any given response.

## 8. Public Affairs and Strategic Communication

---

Q: Who is in charge of the response?

A: The governor is in charge. FEMA is supporting the governor, and the DoD/JFLCC is supporting FEMA.<sup>1</sup>

“The message is, we’re in support of FEMA, and FEMA is in support of the Commonwealth Government.”

—LTG Jeffrey S. Buchanan<sup>2</sup>

In this chapter, we address the following question:

What was the significance of public affairs at the different levels: Puerto Rican, national, and internal military audiences?

We interpreted this question as requiring a factual accounting of public affairs and strategic communication messaging and related activities over the course of the response, broken out by the intended audience, i.e., Puerto Ricans, national audiences, and military personnel. We also looked for evidence of effectiveness, but the limited availability of relevant data impeded our efforts to assess this.

To answer this question, we needed first to understand the principles underlying USARNORTH’s public affairs and communication strategy. In designing and executing a public affairs and communication strategy to guide its response to Hurricane Maria, USARNORTH leaders sought to build trust and confidence in the disaster response and in the credibility of USARNORTH’s communications. This involved responding to the specific challenges of Hurricane Maria and addressing challenges and criticisms that had arisen during previous responses.

Lessons from the 2005 Hurricane Katrina response and other civil disaster response efforts were critical in shaping USARNORTH’s public affairs and communication strategy for Hurricane Maria. For example, in the aftermath of Hurricane Katrina, many state leaders across the country were concerned about the perception that the Army—in filling a leadership void on the ground—had overstepped its authority by appearing to take charge of a state during the response. To address these issues, USARNORTH worked over the next several years to build trust among state governors and alleviate their concerns about state sovereignty.

Awareness of the debate about the military’s role in disaster response was also reflected in USARNORTH’s public affairs strategy for Hurricane Maria, which was designed to avoid creating the impression that the military was in charge, an emphasis reflected in the passages

---

<sup>1</sup> “JFLCC PAO Messaging: Hurricane Maria Response in Puerto Rico as of 8 November 2017,” reproduced in USARNORTH, 2018a, p. 68.

<sup>2</sup> Interview with USARNORTH officials, December 12, 2017.

quoted at the beginning of this chapter. In addition, awareness of the importance of communication in building trust and confidence among partners led USARNORTH to work in close coordination with FEMA and local authorities throughout the response and to seek a division of labor in public affairs and strategic communication activities—with USARNORTH in a supporting role.

Another lesson shaping USARNORTH's public affairs strategy concerned the importance of engagement with local media, leaders, and members of the public. Public affairs personnel who had participated in USARNORTH's Hurricane Katrina response recalled that the earlier team's nearly exclusive focus on national media created negative perceptions among local media, which were reflected in local news stories and subsequently picked up by national media, thus requiring even more effort to correct. This concern led USARNORTH, in its Hurricane Maria response, to emphasize the importance of maintaining awareness at the local level and engaging with local audiences.

A third lesson from past disaster responses involved the importance of building trust and relationships with other agencies and individuals involved in the response. In early 2017, USARNORTH had conducted an analysis of the operational environment as found in civil support missions. This analysis had found that institutional motivations or political agendas have more influence on the success or failure of a civil defense mission than do the structural factors associated with the response, such as the number of roads that need to be unblocked or the quantity of supplies that need to be moved. These lessons pointed to the importance of taking an evenhanded approach to engagements with local political actors to avoid any appearance of favoritism in Puerto Rico's polarized political climate.

Our main finding in assessing USARNORTH's public affairs efforts in response to Hurricane Maria is that JFLCC planned and devoted considerable efforts to engagements with local Puerto Rican audiences, without notably sacrificing attention to national or military audiences. However, although efforts to engage local audiences appear to have garnered goodwill from Puerto Ricans, available public opinion data suggest that these actions were unable to overcome the prevailing view of national audiences that the initial response to Hurricane Maria took far too long and that the U.S. government was not doing nearly enough to restore Puerto Rico to its predisaster conditions. We report our findings in greater detail in this chapter, focusing on the significance of public affairs at the local, national, and internal military audiences at three levels: planning and guidance, execution, and effectiveness.

The analysis relied on interviews and a variety of documentary and data sources, including the following:

- USARNORTH public affairs guidance, which argued for according local leaders and media a level of importance comparable to that given national audiences
- FEMA news releases, which were used to analyze key public affairs and strategic communication themes

- JFLCC’s interview log for General Buchanan and other senior leaders, which detailed the extent to which JFLCC leaders engaged with local leaders and local and other media
- data on JFLCC called *disaster area circulation (DAC)*—the circulation of senior military and civilian leaders throughout the disaster area<sup>3</sup>—which describes the importance USARNORTH attached to direct engagements with local leaders and press and visits to military units<sup>4</sup>
- a sample of 21 daily analyses of local print media reporting, the existence and contents of which testify to the importance USARNORTH accorded local audiences and provide insights into the changing tone of local print reporting
- USARNORTH public affairs estimates and several daily analyses of media reporting from the U.S. Army Office of the Chief of Public Affairs, which assessed public affairs atmospherics
- Google Trends data on Puerto Ricans’ search patterns in the aftermath of Hurricane Maria
- sentiment analyses of Twitter data and news reporting from the U.S. Military Academy.

## Public Affairs Organization, Planning, and Guidance

The principles discussed in the introduction to this chapter, especially the objectives that USARNORTH was *supporting*—not leading—FEMA and other responders and that public affairs communications should involve the coordination of efforts across response organizations, were very much in evidence in the planning and organization of USARNORTH’s public affairs strategy.

### *USARNORTH Public Affairs Concept of Operation*

According to our interviews with USARNORTH officials, public affairs elements within each agency or organization divided their labors; FEMA, the supported agency, took the lead. Substantial continuous efforts were made to ensure that messaging was synchronized up and down the chain of command and across JFLCC’s interagency partners.

---

<sup>3</sup> The term *disaster area circulation* does not exist in doctrine but appears to be an adaptation to disaster environments of another nondoctrinal term, *battlefield circulation*, in which a commander circulates throughout the disaster area to appraise the situation on the ground and to engage with local commanders and others. For an example of the use of *battlefield circulation*, see Army Staff Sgt. Artur Taradejna, “California Guard Supports Battlefield Circulation,” press release, June 14, 2011

<sup>4</sup> In addition to these efforts, DoD CAISE and combat camera teams also contributed to efforts to engage Puerto Ricans and Virgin Islanders. On September 17, 2018, a CAISE was assisting with communication and outreach support to communities in the USVI. After riding out Hurricane Maria on the USS *Kearsarge*, the CAISE was reinserted into the USVI on September 24, 2017. And by September 27, 2018, the CAISE was reported to be operating in Puerto Rico “supporting territorial government and FEMA Joint Field Office efforts to engage the mayors of the 78 municipalities and ascertain needs.” We were unable to develop a more detailed picture of the precise contributions of the CAISEs and, therefore, simply acknowledge their involvement and contribution to the overall effort in Puerto Rico and the USVI. See FEMA Public Affairs, 2017, and FEMA, “FEMA Briefing,” September 28, 2017b.

This synchronization involved extensive communication between USARNORTH and the other agencies and individuals involved in the response. Prominent among these efforts were daily coordination teleconferences with the White House, FEMA, and other interagency partners using the National Incident Communication Coordination Line;<sup>5</sup> daily news conferences involving Governor Rosselló, the FCO (Michael Byrne), the DSC (General Reyes), and the JFLCC (General Buchanan); and daily conference calls with USNORTHCOM to synchronize messaging up and down the military chain of command. These high-level planning efforts were supplemented by routine interactions up and down the public affairs chain and across interagency actors to ensure consistency in public affairs activities and messaging in the face of new developments.<sup>6</sup>

The division of labor in public affairs and strategic communication activities also meant that the approving authority for release of information was delegated to the lowest level possible at all levels of the operation, provided that release was made through a PAO.<sup>7</sup> Allowing release of information at the lower echelons, coupled with the aforementioned synchronization methods, enabled PAOs to disseminate coordinated information more proactively to the public and provide more rapid responses to media queries.

Other actions were also taken to facilitate coordination and synchronization with partners. As described in an October 9 USARNORTH public affairs estimate, JFLCC public affairs operations were integrated into FEMA's Joint Information Center (JIC) operations, with some additional division of labor between JFLCC Forward, the DCO/DCE, and JFLCC Rear:

- JFLCC PAO was to support the FEMA ESF-15 (External Communications) JIC and advise the commander on public affairs operations, conduct planning, and synchronize public information assets in the JOA.
- The DCO/DCE Region V PAO was to advise and provide liaison with FEMA ESF-15 and JFLCC PAO.
- The JFLCC Rear PAO was to amplify reporting of Title 10 operations in support of FEMA in social media and local and national outlets; advise the commander on public affairs operations, conduct planning, and provide reachback support to JFLCC; and facilitate media operations.<sup>8</sup>

This structure and organization were designed to support a unified effort between USARNORTH and its partners.

---

<sup>5</sup> USARNORTH, 2018a, p. 31. The National Incident Communications Coordination Line is a public affairs and strategic communication conferencing system that enables the White House and federal departments to develop and coordinate federal communications efforts collaboratively and provide additional messaging guidance specific to the hurricane response.

<sup>6</sup> USARNORTH, 2018a, p. 31. In addition, a panel of the U.S. Army War College conference on DSCA doctrine provided a significant amount of detail on the close coordination between the various messaging efforts.

<sup>7</sup> USNORTHCOM, "Approved Public Affairs Guidance for U.S. Northern Command (USNORTHCOM) 2017 Hurricane Season," reproduced in USARNORTH, 2018a, p. 31.

<sup>8</sup> USARNORTH, "Public Affairs Estimate (Puerto Rico JOA)," October 9, 2017h.

## *Public Affairs Guidance*

In line with the coordinated effort just described, USARNORTH's public affairs and strategic communication messaging efforts to Puerto Ricans and national and military audiences were developed with broad direction from FEMA and USNORTHCOM and adapted to address USARNORTH-specific efforts in support of the broader whole-of-government response.

### USNORTHCOM

Working from various existing authorities, guidelines, and plans,<sup>9</sup> USNORTHCOM issued public affairs guidance in spring 2017 for the upcoming June 1, 2017, to November 30, 2017, hurricane season that stressed the military's role in supporting FEMA and local, state, and other federal agencies:

Upon the decision to deploy forces, USNORTHCOM will maintain an active public affairs posture with decentralized public affairs operations. All major events and activities must be conducted in coordination with the primary agency, which [is] normally Department of Homeland Security (DHS) and FEMA.

Military public affairs professionals must balance aggressiveness with appropriate sensitivities to ensure the media understands the support role and mission of DoD while also having the opportunity to witness first-hand DoD operations. Ensure messages and activities are seen as supportive to the local, state and other federal agencies.<sup>10</sup>

USNORTHCOM's guidance also included several standing messaging themes that could be adapted and employed during the hurricane season. Many of these messages specifically addressed the needs of local audiences (USARNORTH 2018a, p. 31):

Our thoughts and prayers are with the families and communities in (LOCATION) who have been affected by this hurricane.

We understand some people will be anxious to return home following the storm, but we ask everyone to be patient and to wait for directions from their tribal and local officials. There may be hazards that prevent you from being able to return home such as downed power lines, road closures, roads or bridges that are impassable, and traffic lights not working.

For those who are unable to return home, states, tribes, localities, and the Red Cross continue to operate emergency shelters. To find a shelter, download the Red Cross Hurricane app, visit the Red Cross web site, call 1-800-RED CROSS (1-800-733-2767), or check local media outlets.

Other USNORTHCOM messages focused on organization of the federal response itself and the Army's role within this response:

---

<sup>9</sup> These included the NRF; the 2008 release of the NIMS; DoD JP 3-61, *Public Affairs*; USNORTHCOM CONPLAN 3500-14; the ESF-15 (External Affairs) Standard Operating Procedure; and the Standing DSCA EXORD.

<sup>10</sup> USARNORTH, 2018a p. 31, Sections 3.1 and 6.1.

U.S. Northern Command is poised to provide Department of Defense support to FEMA, tribal, state and local response efforts due to the hurricane.

U.S. Northern Command plays an important role in disaster response; however, all our efforts are in support of a lead federal agency working closely with state and local officials.

U.S. Northern Command leans forward with state governors and the National Guard to advance understanding, trust and teamwork in direct support and dual-status command arrangements.

U.S. Northern Command partners to conduct homeland defense, civil support and security cooperation to defend and secure the United States and its interests.<sup>11</sup>

## JFLCC Public Affairs

The first of USARNORTH's public affairs estimates (described later in more detail), which describe the evolving public affairs information environment, similarly stressed that the USARNORTH public affairs mission was in support of FEMA:

[In support of] FEMA, JFLCC public affairs assets inform local, regional, and national audience on U.S. Army and DoD efforts [in support of] local, territorial, and federal support to Hurricane Maria affected areas. Additionally, support key leaders in media engagements.<sup>12</sup>

USARNORTH public affairs guidance for hurricanes Irma and Maria was that USARNORTH public affairs and strategic communication activities and messaging themes would follow USNORTHCOM and FEMA public affairs guidance:

### 4.G. (U) PUBLIC AFFAIRS GUIDANCE.

4.G.1. (U) Public affairs posture for hurricane is active when conducted in compliance with primary agency guidance. USARNORTH will follow US Northern Command and FEMA public affairs guidance and will develop command themes and messages in concert with that guidance. Upon deployment, USARNORTH public affairs will coordinate public affairs activities with the joint information center (JIC), if established. Assigned forces will coordinate public affairs activities with USARNORTH PAO. Upon receipt of PTDO or planning orders, units may acknowledge their preparatory actions and make plans for extended media opportunities [in coordination with] USARNORTH PAO. During execution, commanders will make every effort to support media access, including placing media on aviation assets, to ensure they are able to provide an accurate and complete reporting of response operations to hurricane. Commanders and deployed personnel are encouraged to talk about what they are doing to assist with the hurricane within their own knowledge, experience, and staying within their operational scope. Questions concerning overall military support to hurricane will be directed to US Northern Command Public Affairs.

---

<sup>11</sup> USNORTHCOM, "Approved Public Affairs Guidance for U.S. Northern Command (USNORTHCOM) 2017 Hurricane Season," reproduced in USARNORTH, 2018a, Tab 3, pp. 30–33.

<sup>12</sup> USARNORTH, "Public Affairs Estimate (Puerto Rico JOA)," September 29, 2017c.

Questions regarding the overall federal response operation will be directed to the FEMA or JIC.

4.G.2. (U) Units are encouraged to deploy with organic public affairs personnel. Units deploying without organic PAOs are required to appoint a unit public affairs representative (UPAR). Each PAO or UPAR, upon arrival at deployment site, will contact USARNORTH public affairs for guidance, talking points, themes, and messages and additional instructions. All deployed personnel will also provide their contact information to USARNORTH to build a public affairs contact roster. All media responses should be limited to specific answers about the unit's mission as it pertains to responses efforts for hurricane. Report all media queries to USARNORTH PAO.<sup>13</sup>

Given the overall public affairs objective of promoting trust and confidence in the response, public affairs guidance focused on the importance of providing an accurate and complete accounting of response activities and ensuring that unit personnel and other resources were devoted to public affairs activities. In addition, guidance emphasized the importance of engaging with media, indicating that units could acknowledge their “preparatory actions and make plans for extended media opportunities” and would make “every effort to support media access,” and “are encouraged to talk about what they are doing to assist with the hurricane.”<sup>14</sup>

USARNORTH's guidance also focused on the importance of providing media access, especially at the local level. As described in USARNORTH's review of public affairs and strategic communications in Hurricane Maria:

One operational commander [involved in the Katrina response] stressed the importance of media access for complete and accurate reporting. One [Katrina] public affairs officer told us that favoring national journalists over locals enabled negative perceptions to emerge from lower levels and be amplified by national outlets. Understanding this media dynamic—and the importance of local outlets for reaching people in need—led Army North to focus more than half of its media engagement efforts on local media outlets.<sup>15</sup>

USARNORTH's guidance further emphasized the important of taking an even-handed approach on local political matters:<sup>16</sup>

We sought to avoid the appearance of favoring one party or group over another as we began working with partners to stabilize the situation on the ground. Civil

---

<sup>13</sup> USARNORTH Operations Order 17-009 for DSCA Operations in Response to Hurricanes Irma/Maria, reproduced in USARNORTH, 2018a, p. 40.

<sup>14</sup> USARNORTH 2018a, p. 40.

<sup>15</sup> USARNORTH, 2018a, p. 1.

<sup>16</sup> The political fault lines in Puerto Rico were perhaps most in evidence in the political rivalry between Puerto Rico Governor Rosselló, who was also president of the pro-statehood Partido Nuevo Progresista, and San Juan mayor Carmen Yulín Cruz, who was one of the vice presidents of the Partido Popular Democrático. See Puerto Rico Data Lab, “Ricardo Rosselló vs. Carmen Yulín Cruz: Who Has Earned the Most Attention Following Hurricane Maria?” blog post, November 1, 2017.

affairs Soldiers and local experts were invaluable for helping us understand the island's political landscape.<sup>17</sup>

A September 25 JFLCC FRAGO added messaging themes to help explain the mission and role of JFLCC-led land forces in Puerto Rico and USVI. These messages emphasized that, while the Army would be providing a large volume of personnel and equipment to support the response effort, the Army would be working in support of FEMA and in coordination with partners:

ADD 3.C.23.J.8. (U) TOP LINE MESSAGING: DOD Title-10

ADD 3.C.23.J.8.A. (U) A land-based operation increases the volume of personnel and equipment throughout the islands ISO [in support of] FEMA in its response.

ADD 3.C.23.J.8.B. (U) Top-priority of federal government is protecting lives and safety of those affected by Hurricane Maria

ADD 3.C.23.J.8.C. (U) DOD and our Canadian military partner continue to deliver food and water, communications equipment, route clearance units and commodity distribution

ADD 3.C.23.J.8.D. (U) Total army response for Hurricane Maria is more than 4,000 Soldiers and Army Corps of Engineer civilians

ADD 3.C.23.J.8.E. (U) Army has committed 15 aircraft and more than 500 trucks committed to relief efforts<sup>18</sup>

Guidance also stressed the importance of communications surrounding the transition from response to recovery. Messages concerning the transition were designed to emphasize the long-term nature of the commitment to the Hurricane Maria effort. As was described in the overview of the response in Chapter Three, a statement also was released at the time of JFMCC transition to JFLCC Forward for the Hurricane Maria Response, explaining to various audiences that the transition was important “for ensuring the most efficient command construct for a longer-term, land-based recovery operation in Puerto Rico.”<sup>19</sup>

Guidance regarding recovery messages emphasized the role of partner organizations and, over time, a growing role for Puerto Rican military personnel. An 18 October JFLCC FRAGO updated public affairs themes to highlight the role of Puerto Rican citizens, leaders, and military personnel and to encourage hope among victims of the hurricanes that Puerto Rican response capabilities were recovering. At the same time, these messages continued to emphasize that the recovery was likely to be a long one:

---

<sup>17</sup> USARNORTH, 2018a, p. 1.

<sup>18</sup> FRAGO 22 to USARNORTH OPORD (AN-OPORD-17-009-22) for DSCA Operations in Response to Hurricane Irma/Maria, reproduced in USARNORTH, 2018a, p. 41.

<sup>19</sup> “NORAD and USNORTHCOM Public Affairs PAG/Quick Response; Subject: JFMCC Transitions to JFLCC FWD for Hurricane Maria Response,” n.d., reproduced in in USARNORTH, 2018a, p. 35.

CHANGE 3.C.23.J.11. (U) THEMES

CHANGE 3.C.23.J.11.A. (U) In partnership with FEMA, Governor, NGOs and National Guard

CHANGE 3.C.23.J.11.B. (U) ENDURING OPERATIONS—ENDURING EFFORT

CHANGE 3.C.23.J.11.C. (U) Many of our military members supporting this effort and their families also live and work in Puerto Rico

CHANGE 3.C.23.J.12. (U) MESSAGES. (NOTABLE QUOTES)

CHANGE 3.C.23.J.12.A. (U) Citizens are showing great resolve, the Governor of PR is leading recovery effort with the entire Federal Government supporting them.

CHANGE 3.C.23.J.12.B. (U) The DOD is providing a unified response to support FEMA and local authorities in PR, to provide life-saving and life-sustaining support.

CHANGE 3.C.23.J.12.C. (U) Progress is being made, recovery will be long.

CHANGE 3.C.23.J.12.D. (U) The DOD's primary focus to support FEMA and PR in distributing commodities and providing medical support.

CHANGE 3.C.23.J.12.E. (U) The safety and wellbeing of the Puerto Rican people is our top priority.<sup>20</sup>

In sum, public affairs guidance covered messaging directed both to local audiences, especially families and communities affected by the hurricanes, and to broader audiences, including national media. Much guidance focused on explaining the military's role in supporting the Government of Puerto Rico, FEMA, and other federal agencies in carrying out the response. This guidance focused both on the initial involvement of the military in the response and on the transition of military forces out of Puerto Rico—in both cases, emphasizing that the unified, whole-of-government response would continue.

## Analysis of Execution

### *Evolution of Public Affairs Themes and Messages*

We now turn to a discussion of how well the public affairs strategy was executed, looking first at the evolution of public affairs messaging over the course of the response and, in the next subsection, looking at patterns of engagement with key audiences. In terms of messaging, we found that there was significant continuity in public affairs and strategic communication themes and messages over the course of the response, for example, on the supporting role played by military forces. However, USARNORTH faced an additional challenge: communicating the

---

<sup>20</sup> USARNORTH, 2017k.

military's transition out of Puerto Rico in a way that would not lead to Puerto Rican concerns of abandonment.

Late September 2017

Public affairs activities during the early execution phase of the response focused on providing information to a wide range of audiences concerning the movement of military forces in Puerto Rico, and integrating and coordinating military public affairs personnel, equipment, and activities with those of FEMA, the governor, and other response partners.

At the time of the transition from JFMCC to JFLCC in late September 2017, USNORTHCOM prepared "top line" and "C2 transition" messages to be used to explain the transition to a land-based, longer-duration operation. These messages emphasized the many efforts that were being made but also acknowledged the extent of the recovery challenge:

- The top priority of the DoD, working together to support FEMA and local authorities in Puerto Rico is providing life-saving and life-sustaining support to those in the affected areas.
- While significant progress in being made in the response to Hurricane Maria, recovery for Puerto Rico will be long and frustrating and will require the help of the whole community. As access to ports, airfields, and roads continue[s] to open, more resources will flow into hard hit areas.
- U.S. Northern Command continues to conduct 24-hour operations bringing additional essential commodities to the islands, and restoring power at hospitals, ports, airports and other critical facilities
- DoD understands how important it is to have the right capabilities at the right place at the right time to support the needs of our citizens.
- The situation in Puerto Rico remains challenging. The level of destruction and the fact that it is an island makes this response effort more challenging than others we've faced this season. However, enhanced communications and completed assessments are providing a clearer picture of the extent of damage, allowing the federal response to better focus its efforts.
- We were well-prepared, more prepared than we were for Irma in regard to forces in place. Despite that preparation, significant effort was required to reopen airfields and seaports to be able to begin flowing supplies and capabilities.<sup>21</sup>

During the transition to a land-based effort, USNORTHCOM messaging stressed the long-term support capability provided and also provided a view into the response and recovery process, emphasizing the military's supporting role and the whole-of-government effort to help the citizens of Puerto Rico. The following are examples of C2 transition messages:

- At this phase of the response operations, USNORTHCOM is adjusting our focus in Puerto Rico from a short term, sea-based response to a

---

<sup>21</sup> "NORAD and USNORTHCOM Public Affairs PAG/Quick Response; Subject: JFMCC Transitions to JFLCC FWD for Hurricane Maria Response," n.d., reproduced in in USARNORTH, 2018a, pp. 35–36.

predominantly land-based effort designed to provide robust, long term support capability.

- The change in military command and control from a maritime based to a land based construct enhances USNORTHCOM's ability to provide civil support to FEMA at this phase of the response operations.
- This change in military command and control is a deliberate process, with time built in to ensure an orderly and successful transition, therefore enhancing military capability to support FEMA and further help the citizens of Puerto Rico.
- During this phase of the response operations, the land-based military headquarters will enhance the whole of government response in support of FEMA to help the citizens of Puerto Rico.<sup>22</sup>

As we will discuss later (see "Patterns of Engagement with Key Audiences," later in this chapter), General Buchanan was, in many respects, the face of the Title 10 response to the hurricanes. In his initial press conference on September 30 following his assumption of C2 of the Title 10 response, General Buchanan struck several key themes that would be emphasized over the course of the response, including empathy for the victims of Hurricane Maria, the need to do more to assist in the response and recovery, the role of Title 10 forces in working with FEMA to support the governor and the commonwealth, and the likelihood of a long recovery. As General Buchanan stated at the time,

[o]ur hearts go out to the people of Puerto Rico who have suffered through this tremendous devastation. This will be a long recovery for many people. We look forward to working with FEMA to provide the support the governor is requesting

....

... This will be a long response, but we are grateful for the opportunity to serve as a part of the team, working with FEMA on behalf of the Commonwealth to help get the people of Puerto Rico back on their feet.<sup>23</sup>

#### Mid-October 2017

USARNORTH's messaging in October 2017 continued to emphasize five messages that focused on the military's supporting role and the unified response effort:

1. Citizens are showing great resolve, the [Puerto Rico] Gov. is leading recovery effort with the entire federal government supporting them.
2. The DoD is providing a unified response to support FEMA and local authorities in [Puerto Rico], to provide life-saving and life-sustaining support
3. Progress is being made, recovery will be long.
4. The DoD's primary focus to support FEMA and [Puerto Rico] in distributing commodities and providing medical support.

---

<sup>22</sup> "NORAD and USNORTHCOM Public Affairs PAG/Quick Response; Subject: JFMCC Transitions to JFLCC FWD for Hurricane Maria Response," n.d., reproduced in USARNORTH, 2018a, pp. 35–36.

<sup>23</sup> "Prepared Opening Statement for General Buchanan's Initial Press Conference," September 29, 2017, quoted in USARNORTH, 2018a, p. 45.

5. The safety and wellbeing of the Puerto Rican people is our top priority.<sup>24</sup>

USARNORTH's CUBs usually included briefing slides on USARNORTH Public Affairs activities, and an analysis of the slides in the October 11–19 CUBs shows that USARNORTH focused on four themes that appear to have been directed at both local Puerto Rican and external audiences over that period. The four themes emphasized partnership and long-term recovery, as well as the importance of tactical efforts and the role of military members who live and work in Puerto Rico:

1. Focus coverage at the junior/tactical level
2. Partnership with FEMA, governor, NGOs and National Guard
3. Enduring operations—enduring effort
4. Many of our military members supporting this effort and their families also live and work in Puerto Rico.<sup>25</sup>

A NORAD and USNORTHCOM Public Affairs leadership talker from October 19, 2017 detailed the following FEMA themes, evidently seeking to balance a discussion of the challenges for recovery with assurances that progress was being made to restore needed services:

1. The full force of the federal government continues to make progress toward recovery, working hand-in-hand with U.S. Virgin Islands and Puerto Rico officials, municipalities, businesses and voluntary agencies on the islands.
2. We are pushing every day to restore essential services, and doing everything we can. Our goal is to help Puerto Rico and the U.S. Virgin Islands restore water, electricity, and communications, which will enable citizens to begin to return to their routines.
3. Assistance from FEMA is available to help individuals and families affected by Hurricanes Irma and Maria take care of necessary expenses and serious needs that are not covered by insurance or other forms of assistance.
4. The recovery efforts in Puerto Rico and the USVI will last for months, if not years. With such severe damage to critical infrastructure, rebuilding will take time, even with the level of personnel and materials that are surging onto the islands. This Administration, and the more than 20,000 federal personnel deployed to the impacted area, will not be satisfied until every resident on Puerto Rico and the U.S. Virgin Islands is able to return home and continue life as normal.<sup>26</sup>

## November 2017

By November 8, just before Title 10 units began transitioning remaining response missions to civilian and National Guard organizations, FEMA, DoD, and JFLCC had developed a set of

---

<sup>24</sup> “Public Affairs” slides in USARNORTH, “Commander’s Update Brief,” October 11–19, 2017i.

<sup>25</sup> “Public Affairs” slides in USARNORTH, 2017i. The first theme was dropped after October 14, 2017.

<sup>26</sup> “NORAD and USNORTHCOM Public Affairs Leadership Talker,” October 19, 2017, reproduced in USARNORTH, 2018a, p. 51. The talker also detailed “DoD Top Line Messages and Key Facts” for that day.

complementary top-line messages. These messages were aligned with each other and with public affairs guidance emphasizing such themes as the unified, whole-of-government response; DoD's role in supporting the Government of Puerto Rico and FEMA; the progress being made and the prospects for long-term recovery; and the determination to ensure a smooth transition before Title 10 forces returned to their home stations:

#### FEMA TOPLINE MESSAGES

The full force of the federal response is working diligently to meet the mission critical priorities of the Governor of Puerto Rico that include power, water restoration, distribution of food and water and medical operations.

One of the longest sustained disaster air operation missions in U.S. disaster relief history with 1151 air drops to provide commodities to isolated communities.<sup>27</sup>

It will be a long road, in some cases years, before communities will fully rebuild, however, progress is being made to help resources and services become available for residents in order to establish a new normal.

#### DOD TOPLINE MESSAGES

The DoD has a long tradition of supporting civil authorities while maintaining its primary mission of fighting and winning the Nation's wars. We stand ready to assist our fellow Americans in this time of need.

The DoD has four primary focus areas: providing medical capabilities, distributing commodities by air and ground, clearing roads, and establishing forward sustainment areas to support FEMA points of distribution.

#### JFLCC TOPLINE MESSAGES

The JFLCC is responsible for the federal military response in support of FEMA and the Commonwealth of Puerto Rico to help the people in the aftermath of hurricanes Irma and Maria.

We are providing medical, logistical, aviation, and communications support as part of an emergency response effort.

We will continue to provide requested capabilities as long as civil authorities require our assistance.<sup>28</sup>

As just described, FEMA, DoD, and JFLCC messages all emphasized support of the commonwealth's civil authorities and the sorts of assistance being provided. In addition, JFLCC sought to allay concerns that federal military forces might be withdrawn before its Puerto Rican and FEMA response partners were capable of assuming responsibility for providing needed assistance:

---

<sup>27</sup> Although FEMA messaging used the term *air drops*, the military did not drop supplies from the air via parachute. The military aircraft landed in the isolated municipalities to off-load their cargo.

<sup>28</sup> "JFLCC PAO Messaging: Hurricane Maria Response in Puerto Rico as of 8 November 2017," reproduced in USARNORTH, 2018a, pp. 67–68.

## TRANSITION OF FEDERAL MILITARY FORCES

Some areas of Puerto Rico are well into recovery while other areas still need the military's help.

The military still has significant medical, aviation, and logistics capabilities on the island even as we transition some units whose missions are complete.

These transitions from military to civilian capabilities [occur] through deliberate and systematic planning. We work side by side with FEMA as they build civilian capacity, and we only taper off federal military support when National Guard and civilian workers are able to meet the commonwealth's needs.<sup>29</sup>

Although USARNORTH sought to emphasize that the military was in Puerto Rico to support and not to lead the response effort, USARNORTH's public affairs effort also had to address concerns, particularly on the part of local audiences, that military assets were being taken away from Puerto Rico too soon, before the recovery effort was over, and that Puerto Rico might be "abandoned." USARNORTH's public affairs messaging sought to address such concerns. For example, the following question-and-answer was provided as part of the JFLCC PAO messaging guidance:

Q: Why are federal assets redeploying when there is still so much work to do?

A: Federal military assets will redeploy when their missions are complete. As the Commonwealth of Puerto Rico continues to recover from Hurricane Maria, the role of the U.S. military will decrease. The initial capabilities and capacities provided by military forces will continue on a smaller scale with the U.S. Army Reserve, National Guard and U.S. Government agencies, such as FEMA, Health and Human Services, and the Environmental Protection Agency remaining longer. The bulk of U.S. military forces will not depart Puerto Rico until response missions have either been completed or can be transitioned to local or other federal agencies.<sup>30</sup>

This guidance emphasized the continuing role of local and federal agencies, even while the role of the military decreased after the initial response effort.

To add to our understanding of public affairs messaging, we also looked at FEMA press releases, national and local media reports, and Twitter posts. Each of these analyses is discussed next.

### FEMA Press Releases

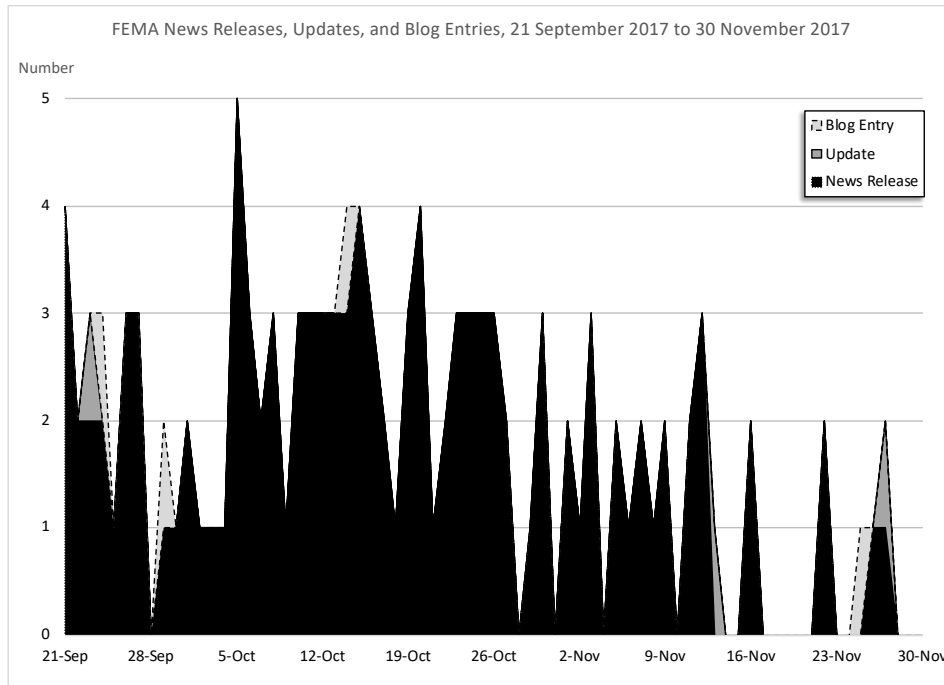
Figure 8.1 presents data on the number of FEMA news releases, updates, and blog entries from the major disaster declaration for Hurricane Maria on September 21 through November. Figure 8.2 presents similar data for FEMA news releases, updates, and blog entries on Hurricane Maria in the USVI.

---

<sup>29</sup> "JFLCC PAO Messaging: Hurricane Maria Response in Puerto Rico as of 8 November 2017," reproduced in USARNORTH, 2018a, pp. 67–68.

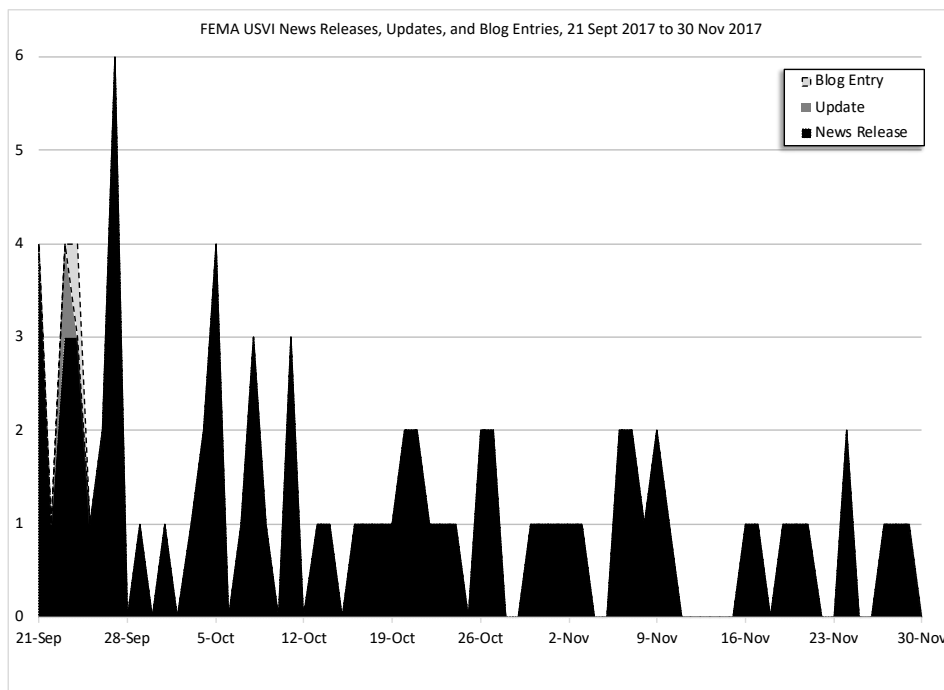
<sup>30</sup> "JFLCC PAO Messaging: Hurricane Maria Response in Puerto Rico as of 8 November 2017," reproduced in USARNORTH, 2018a, p. 69.

**Figure 8.1. FEMA Press Releases on Hurricane Maria in Puerto Rico, September–November 2017**



SOURCE: FEMA, “Updates and Articles, Blogs, and News Releases,” webpage, undated d (Puerto Rico page).

**Figure 8.2. FEMA Press Releases on Hurricane Maria in USVI, September–November 2017**



SOURCE: FEMA, “Updates and Articles, Blogs, and News Releases,” webpage, undated e (USVI page).

As shown in the two figures, FEMA generally produced more press releases for Puerto Rico than the USVI, but in both cases, the number of daily releases declined after the initial flurry of releases in late September and early October; we attribute this to the typical pattern for news reporting on high-profile events, in which there is an initial flurry of press reporting that dies off as the newness and salience of the event fades. As the figures show, national news reporting and several other measures show similar declines in reporting on the aftermath of Hurricane Maria.

### *Patterns of Engagement with Key Audiences*

As noted earlier, General Buchanan was, in many important respects, the primary face of the Title 10 response to Hurricane Maria for both local and national audiences. Understanding his role in engaging with different audiences is therefore critical to understanding USARNORTH's overall public affairs efforts. According to USARNORTH officials, General Buchanan "committed about half his day to engaging with partners, Congressional delegations, administrative officials, and the news media."<sup>31</sup> In addition, other JFLCC senior leaders also engaged in outreach to local Puerto Rican leaders and media.

We next present the results of our analysis of two rich sources of information on the patterns of engagements in Puerto Rico and the USVI: a log of General Buchanan's interviews and other engagements and a chronology of JFLCC senior leaders' DAC, i.e., travel around Puerto Rico and USVI joint operational area. These sources show that, consistent with the aim of devoting significant attention to Puerto Rican audiences, General Buchanan and other JFLCC leaders made extensive efforts to engage with various local audiences (especially leaders and media), as well as personnel in units in Puerto Rico. Consistent with the decision that Puerto Rico would be the main effort, the data also show a heavy emphasis on Puerto Rico.

#### *Analysis of General Buchanan's Interview Log*

The JFLCC PAO maintained a log of interviews and other public events involving General Buchanan and other senior leaders during the Hurricane Maria response.<sup>32</sup> The interview log had daily entries for each of the 45 days between September 29 and November 13, 2017, and provided a synopsis of media and other public events undertaken each day. We analyzed and coded the daily entries in the interview log to identify

- the balance of attention to different levels of media and other public events (national, local, international, or military)
- the types of media involved (television, print, radio, or online)
- the event type (e.g., meeting, interview, embedded journalist ride-along)

---

<sup>31</sup> USARNORTH, 2018a, p. 57.

<sup>32</sup> "General Buchanan Interview Log," reproduced in USARNORTH, 2018a, pp. 57–59.

- meeting participants (e.g., municipal mayors, military representatives, U.S. delegations)
- municipality, when one was mentioned.<sup>33</sup>

These data indicate that, in accordance with JFLCC public affairs and strategic communication objectives, local media and audiences received levels of attention that were roughly comparable to that given to national media and audiences and that, by some measures, local audiences received even greater attention:

- About 41 percent of the media events involved local media, while only slightly more (45 percent) involved national media.
- Media engagements were fairly evenly divided between television and print, with nearly 40 percent for each.
- About 60 percent of the events involved municipal leaders; about 56 percent involved at least one meeting or other event with a municipal mayor; and another 4 percent involved other local municipal officials.
- The interview log also reports extensive travel (DAC) by General Buchanan and other senior JFLCC personnel; the log reports a total of 46 visits to Puerto Rico's municipalities, with 21 municipalities seeing one visit, nine seeing two visits, Utuado seeing three visits, and the municipality of Ponce seeing four visits.<sup>34</sup>
- Finally, USARNORTH public affairs officials expressed the view that, in addition to a small number of interviews with military media, General Buchanan's two "Facebook Live" events were primarily intended for, and heavily attended by, internal audiences (military and civilian personnel, as well as the command's existing friends and followers).

As noted earlier, the data substantiate JFLCC's emphasis on the main effort in Puerto Rico, compared to the supporting effort in the USVI.

#### Analysis of Disaster Area Circulation Activities

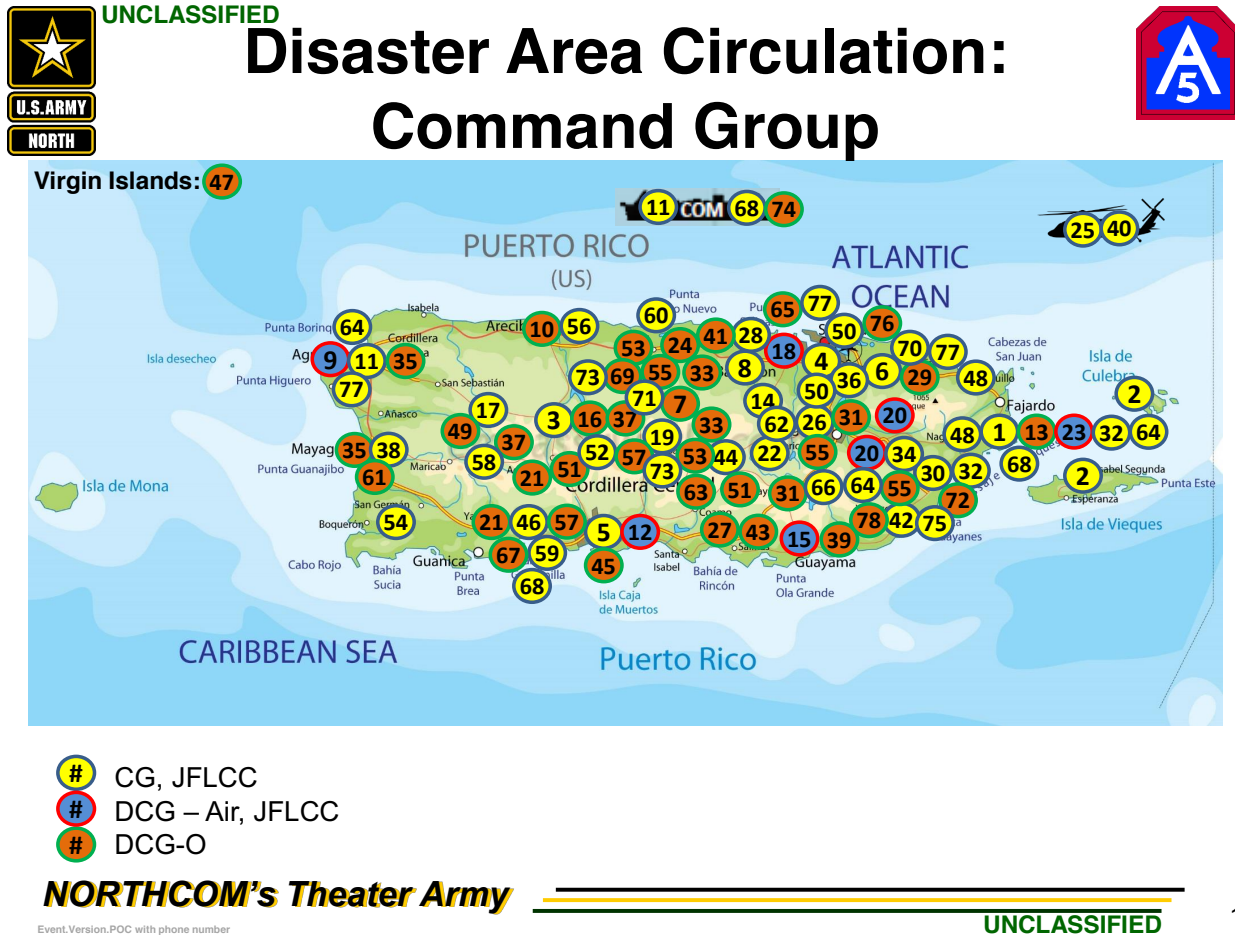
Another aspect of engagement involves USARNORTH's physical presence in different parts of Puerto Rico that were affected by the hurricanes and, to a much lesser extent, the USVI. General Buchanan and other JFLCC senior leaders traveled regularly and extensively around Puerto Rico, most often accompanied by senior FEMA and commonwealth officials—including General Reyes, the DSC, and local and national media (see Figure 8.3).

---

<sup>33</sup> For example, the entry for September 29 read: "29 SEP: Participate in governor's press conference; interview with CNN, US News and World Report, CNBC, NBC, El Nuevo Dia. CBS (BG Kim)," and was coded to reflect that, on that day, a press conference, and interviews with at least one national news organization and at least one local news organizations also took place. See Appendix B for our detailed tabulations.

<sup>34</sup> In addition to recording the travel of JFLCC senior leaders, the interview log noted one visit each by Maj Gen Thomas J. Sharpy of USTRANSCOM and BG Diana Holland of USACE. We expect that each of these two senior leaders traveled more widely but that the log did not capture not all of their travel.

Figure 8.3. JFLCC Command Group Disaster Area Circulation,  
September 30, 2017–November 10, 2017



SOURCE: Provided by USARNORTH, November 2017.

This travel frequently involved visits with municipal mayors, press interviews, and inspections of distribution centers and military units in the field. Thus, it can be fairly concluded that the DAC activities were aimed primarily at local and military audiences, although national press, delegations of national political leaders, and others also were sometimes involved.

Interviews with USARNORTH officials and analysis of available data indicate that this travel had several discrete objectives:

1. to allow senior military and civilian personnel to assess military and civilian elements of the response
2. to enable on-the-spot consultations with and decisions from senior leaders to remedy the most urgent and severe problems

3. to ensure that senior leaders' observations were reported back to their staffs to inform the development of a COP that would facilitate unity of effort and synchronization of civilian and military response efforts.<sup>35</sup>

As Figure 8.3 suggests, USARNORTH identified nearly 80 instances of DAC by senior JFLCC and other personnel between September 30 and November 13, 2017:

- More than 100 locations were mentioned in the text descriptions of these events, with the top locations visited being Ponce (eight mentions); Roosevelt Roads (six); Aguadilla (five); and Caguas, Canovanas, the USNS *Comfort*, and Utuado (4 mentions each).
- A total of about 40 trips mentioned General Buchanan's involvement; a little over 20 mentioned the DCG-Operations (General Kim); and six events involved DCG-Air (General Sharpy of USTRANSCOM).
- More than 50 of these trips included visits to military units, including ships of ESG-2.
- Roughly 30 to 35 trips were in each of the following categories:
  - travel involving the FCO or other senior FEMA personnel
  - travel involving the DSC, PRNG General Reyes, or his designate
  - travel involving municipal mayors
  - travel to logistics nodes, e.g., distribution centers, logistics support areas (LSAs), RSA, and municipal PODs
  - two island overflights and a single visit to the USVI.

In short, our analysis of the evidence related to DAC confirms that General Buchanan and other JFLCC senior leaders paid high levels of attention to the municipalities and other local conditions. However, the data also suggest that significant efforts were made to visit U.S. military units in Puerto Rico to show the flag, communicate guidance, and collect the observations of on-the-ground troops to better understand progress being made, challenges still being faced, and possible solutions to these challenges.

## Analysis of Effects

So far, we have focused on guidance and planning for and execution of USARNORTH's public affairs strategy. These data provide useful information on what USARNORTH did during the response. We now turn to a discussion of evidence related to the effects of the public affairs strategy at the local and national levels. Effects are somewhat more challenging to analyze than guidance and planning, given a lack of data in some areas. At the same time, it is crucial to understand diverse measures of the effects of USARNORTH's strategy, even in a limited way, if we are to consider the significance of public affairs efforts at the different levels.

---

<sup>35</sup> According to USARNORTH, an ancillary objective was to ensure that the JFLCC, FEMA, the commonwealth, and local and national press could develop a common view of the main challenges different locations faced at different times.

In this section, we consider effects by looking at a variety of different sources, including public affairs estimates from USARNORTH, national and local media reporting, Puerto Ricans' web searches, Twitter activity in Puerto Rico and USVI, and national public opinion data.

### *USARNORTH Public Affairs Estimates*

USARNORTH produced several public affairs estimates, which provide insights into the evolving public affairs information environment and the challenges being faced. These estimates provide a high-level view of local and other audience attitudes toward the response efforts. The first of these estimates, on September 29, describes criticism of the federal response to Hurricane Maria:

The information environment remains critical of the US Federal response to the Puerto Rico crisis in the aftermath of Hurricane Maria. JFLCC Public Affairs deployment force flow is complete with support from Army North, a Press Camp Headquarters, a PA [Public Affairs] Detachment, and three Combat Camera teams. Key PRARNG [Puerto Rico ARNG] PA relationships are established but other ARNG PA assets have not yet been requested.<sup>36</sup>

By October 9, additional public affairs capabilities had been deployed, and JFLCC public affairs personnel were able to consider the transition of public affairs responsibilities from Title 10 to National Guard elements. Meanwhile, criticism of the federal response continued, even though U.S. national media attention had begun to wane:

The information environment has stabilized yet remains critical of the US Federal response to the Puerto Rico crisis. U.S. national interest has faded dramatically and JFLCC Public Affairs Media Operations and FEMA requirements can be sourced organically with the PCH [press camp headquarters] and one Combat Camera team. JFLCC CDR [commander] has agreed to reduce the T10 PA footprint. T10 PA forces remain hardy enough to source the FEMA requirements (MA-39) and continue to tell the Army story for duration of the recovery process, but also has developed COAs [courses of action] to off ramp T10 capabilities if the T32 capabilities arrive to serve the PA requirements across the JOA. The ARNG and NGB [National Guard Bureau] have confirmed the resourcing of a MPAD [mobile public affairs detachment] and PAD [public affairs detachment].<sup>37</sup>

By October 24, although media attention occasionally flared in response to new developments, national media attention continued to decline, and JFLCC public affairs personnel assessed that only one MA for public affairs requirement remained open. Accordingly, plans to conclude Title 10 public affairs operations, transition fully to FEMA and National Guard public affairs efforts, and redeploy to home stations appear to have been well advanced:

The information environment is stable with little US national interest; practically no interest with the release of the USS WASP and USS OAK HILL last week.

---

<sup>36</sup> USARNORTH, 2017c.

<sup>37</sup> USARNORTH, "2017h.

Congressional criticism and GOPR [government of Puerto Rico] criticism over the last week of a contract entity to provide electrical power resulted in cancellation of the contract and a call for assistance from NY and FL. The Governor continues to expect greater support from the USACE and stands by his goals for the return of electricity for 95% of the population by December 15. JFLCC Public Affairs Media Operations center almost exclusively on GO [general officer] DAC. RIP/TOA [relief in place/transfer of authority] between 24 PCH (AC) and 65 PCH (MAARNG) complete. JFLCC PAO directs a deliberate CI/VI [command information/visual information] assignment urgency to cover the JOA with another round of stories before units conclude recovery operations and prepare for redeployment. FEMA MA Analysis confirms only one requirement remains for T10 PA forces . . . through 27NOV17.<sup>38</sup>

By November 8, as JFLCC was preparing for the transition of Title 10 forces back to their home stations, there were some reports of Puerto Rican unease about the departure of Title 10 forces and the possible implications of Title 10 redeployment for continued relief and recovery operations. As the JFLCC PAO described at the time:

As media reports continue to focus on these hard-hit areas, the public becomes concerned when they hear that military units are departing. A complicating factor is that most civilians do not understand the difference between the federal military and National Guard. The following talking points are intended to help maintain public confidence in the response while communicating the completion or transition of federal military missions.<sup>39</sup>

As described earlier, additional top-line messages were developed at this time to reassure Puerto Ricans that they were not being abandoned and that response and recovery operations would continue, but with heavier reliance on FEMA and federal civilian and national guard capabilities.

### *National News Reporting*

Although public affairs estimates provide a view of the changing information environment, counts of stories broadcast on television news networks offer insights into the significance of Hurricane Maria to major news organizations, as measured by the evolving level of media interest in the hurricane story and the level of media cueing to the public. To assess the level of national media attention to Hurricane Maria, we counted the daily number of stories broadcast on CNN and Fox News related to the impact of Hurricane Maria in Puerto Rico and the USVI from September 16, 2017 (when Maria was declared a named tropical storm, four days before landfall) through November 30, 2017, when reporting had dropped to nearly zero (see Figure 8.4).<sup>40</sup>

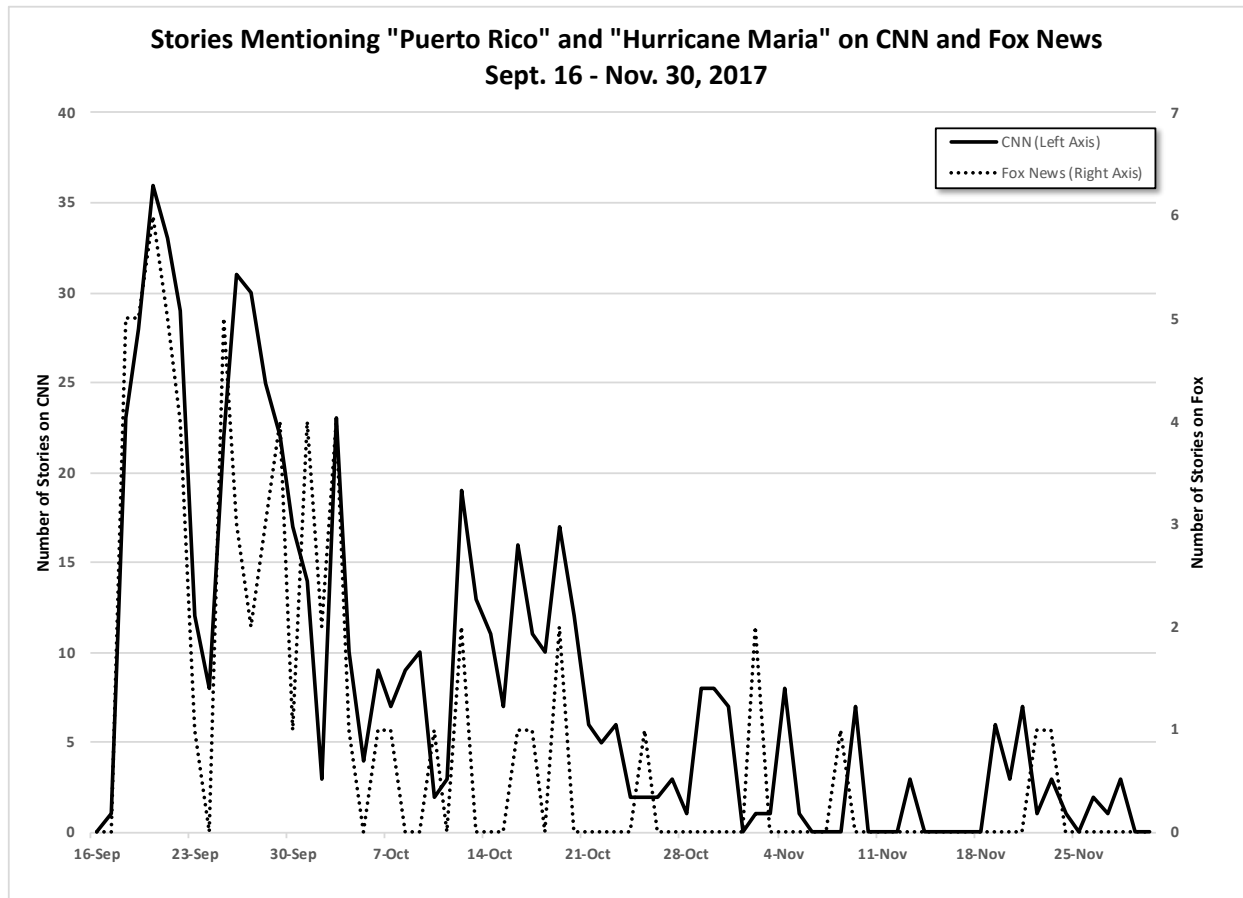
---

<sup>38</sup> USARNORTH, "Public Affairs Estimate (Puerto Rico JOA)," October 24, 2017n.

<sup>39</sup> "JFLCC PAO Messaging: Hurricane Maria Response in Puerto Rico As of 8 November 2017," reproduced in USARNORTH, 2018a, p. 67.

<sup>40</sup> We searched these broadcast news outlets using the LexisNexis Academic database. We selected CNN and Fox News because of their 24-hour news broadcasts. MSNBC was eliminated from the search because LexisNexis does

**Figure 8.4. CNN and Fox News Reporting on Hurricane Maria in Puerto Rico, September–November 2017**



SOURCE: Lexis-Nexis.

In the figure, the left y-axis shows the number of stories on CNN, and the right y-axis shows the number of stories on Fox News. We used two axes because there were seven to 12 times as many reports on Puerto Rico and Hurricane Maria on CNN as on Fox News over the September–November period.

As shown, the highest peaks in media coverage occurred September 18–22, which coincided with the run-up to Hurricane Maria, Maria making landfall, and the two days immediately following. The number of stories then declined slightly before dropping on September 24, followed by another peak over September 25–29 that coincides with commentary on the “slow

---

not include data from all the programs broadcast on MSNBC. We experimented with different combinations of search terms: *Puerto Rico*, *Hurricane Maria*, and *Puerto Rico and Hurricane Maria*. After collecting data on the different search terms for each day in the period, we decided *Puerto Rico and Hurricane Maria* elicited the most accurate data since searching *Puerto Rico* alone sometimes included stories not related to Hurricane Maria, and searching *Hurricane Maria* alone excluded stories that were relevant to our study. We used the same approach—*Virgin Islands and Hurricane Maria*—for reporting on the impact of Hurricane Maria on the USVI.

response” to the disaster, and the September 29 transfer of authority from JFMCC to JFCLCC, and General Buchanan taking command of the Title 10 military response in Puerto Rico.

CNN and Fox News reporting on the USVI was much sparser: CNN and Fox News reports on the Virgin Islands constituted only about one-third the number of the reports on Puerto Rico in September, and about one-tenth the number of reports on Puerto Rico in October.

In sum, the amount of national news reporting on CNN and Fox News was generally consistent both with the early peak and subsequent decline in the number of FEMA daily releases. Although CNN had many more reports than did Fox, the trends in increasing or decreasing interest were generally the same.<sup>41</sup> In addition, the greater media attention devoted to Puerto Rico than to the Virgin Islands was consistent with the relative numbers of FEMA daily releases.

### Sentiment Analysis of Twitter and National Media

Sentiment analysis provides a means of identifying and categorizing opinions expressed in a piece of text to determine whether the writer’s attitude is generally positive, negative, or neutral. Such analyses can be useful in providing a snapshot of audience attitudes about media reports, although the tools used for discerning sentiment in text are, at present, somewhat immature.

The mathematics department of the U.S. Military Academy conducted a series of sentiment analyses of Twitter, Google News, and traditional news reporting on hurricane relief in Puerto Rico to better assess USARNORTH’s success in four key areas: understanding of the media landscape, stakeholder engagement, public confidence, and supporting unity of effort.<sup>42</sup> For these sentiment analyses, a number scale—ranging from  $-1.0$  (indicating negative sentiment) to  $+1.0$  (indicating positive sentiment)—was developed. Each media or Twitter item assessed was assigned a value from this scale. Over 10,000 news articles from various mainstream news sources reported from September–November 2017 were used.<sup>43</sup>

These analyses suggested a significant decline in favorable sentiment on Twitter and Google News in the days immediately after Hurricane Maria made landfall, which was followed within the first week of USARNORTH’s deployment to Puerto Rico by a bottoming-out of the negative trend in social and mainstream media and a recovery to neutral or modestly positive sentiment by early October; in the case of news reporting, there was a slight increasing trend in positive

---

<sup>41</sup> The Pearson product-moment correlations between daily CNN and Fox News reporting levels using identical search terms ranged between 0.79 and 0.84. The high correlation in the volume of reporting for these outlets suggests that they were responding in similar ways to developments on the ground.

<sup>42</sup> These analyses are described in “2.4 Initial Sentiment Analysis,” “5.1 Assessing Our Efforts,” and “5.4 Media and Twitter Sentiment Analysis,” in USARNORTH, 2018a, pp. 26, 80–81, 92–97.

<sup>43</sup> The authors analyzed 10,267 articles from 1,668 news sources from Google News; the top news sources were CNN, National Public Radio, *The New York Times*, *The Washington Post*, and *USA Today* (see “5.4 Media and Twitter Sentiment Analysis,” in USARNORTH, 2018a, pp. 92–97). The authors would like to express their thanks to COL Joseph Lindquist of West Point for information on this analysis.

sentiment thereafter, while sentiment on Twitter essentially remained in neutral territory.<sup>44</sup> Our inference from these results is that there was an increase in positive sentiment in late September that was because of the increased reporting on the ramping up of response operations after about September 25.

### *Local Press Reporting*

We also conducted a detailed analysis of print articles about the military's response in Puerto Rico. The USARNORTH PAO provided us with 21 daily summaries of a total of 111 articles in four leading Puerto Rican newspapers, including Puerto Rico's main newspaper, *El Nuevo Dia* (51 stories, or 46 percent); *El Vocero* (42 stories, or 38 percent); *Primera Hora* (16 stories, or 14 percent); and *Metro* (two stories, or 2 percent).<sup>45</sup> We conducted a content analysis of these summaries, leading to the following key observations:

- Forty-five percent of the individuals mentioned in the articles were Puerto Rican officials of various kinds, including Governor Rosselló (15 percent), other commonwealth representatives (18 percent), and Puerto Rican mayors (10 percent).
- Of the U.S. government personnel mentioned, U.S. military personnel predominated (17 percent), followed by FEMA and other U.S. government officials (9 percent each).
- A total of 57 locations were mentioned in the newspaper reporting, with San Juan (six mentions), Bayamon (five mentions), and Arecibo (four mentions) being the top-mentioned places.

We also analyzed the tone of each article summary, i.e., whether it was positive, neutral, or negative, with the following results:

- A total of 19 reports (17 percent) of the article summaries had a positive tone, while the remaining 80 percent were either negative (46 reports, or 41 percent) or neutral (also 46 reports, or 41 percent).
- Articles we coded as positive concentrated on three main areas: efforts of the U.S. military, recovery funding from the White House, and improvements in energy availability and aid distribution. Several articles discussed visits of governors and mayors from U.S. states that had been hit by other hurricanes to Puerto Rico to meet with the governor or mayors to discuss their shared challenges, marking symbolic partnerships between these individuals and their common struggles.
- The majority of articles we coded as negative touched on the general distress citizens Puerto Rico were experiencing as a result of the ongoing recovery efforts, which were not happening as quickly as citizens had hoped and anticipated. The articles that were most negative were generally directed toward the Puerto Rican government and the Autoridad

---

<sup>44</sup> "5.4 Media and Twitter Sentiment Analysis," in USARNORTH, 2018a, p. 80.

<sup>45</sup> These daily analyses were conducted by MAJ Michael B. Lovell, SGM Dean A. Welch, and Luis A. Deya, all of USARNORTH. A table of the results of our analyses can be found in Appendix B.

de Energía Eléctrica (the Puerto Rico Electric Power Authority) in some fashion; almost all of these were related to the Whitefish scandal.<sup>46</sup>

The simple fact that USARNORTH commissioned or undertook these analyses constitutes additional evidence of the importance it attached to understanding the evolving local media environment, media cues that might be reaching ordinary Puerto Ricans, and media reporting on local attitudes. The modest levels of local reporting on military contributions to the response and their generally positive tone, moreover, suggest the success of a public affairs strategy that sought to direct attention (and credit) to the efforts of the commonwealth and FEMA.<sup>47</sup>

### *Analysis of Puerto Ricans' Web Searches*

One way to ascertain the changing level of public interest in a topic is to collect and analyze data on the use of internet search engines: The number of Google searches connotes a level of interest in a topic that is sufficient to manifest itself in information-seeking behavior. We used Google Trends to better understand Puerto Ricans' information-seeking related to Hurricane Maria, although, as will be described, it is important to interpret these results in light of the fact that Puerto Rican power and telecommunications capabilities were severely disrupted by the hurricane.<sup>48</sup>

As noted earlier, one aspect of JFLCC's public affairs and strategic communication strategy was to avoid conveying the impression that the military was in charge of the response effort and to instead focus attention on the military's support to FEMA and FEMA's support to the governor of Puerto Rico. To test whether JFLCC was able to achieve the relatively low-profile status that it sought, we examined Google Trends search data for insights into Puerto Ricans' interest in FEMA, JFLCC, and the commonwealth. Figure 8.5 presents Google Trends data on daily searches by Puerto Ricans using the search terms *Hurricane Maria*, *FEMA*, *Rossello*, *Buchanan*, and *assistance*.<sup>49</sup>

---

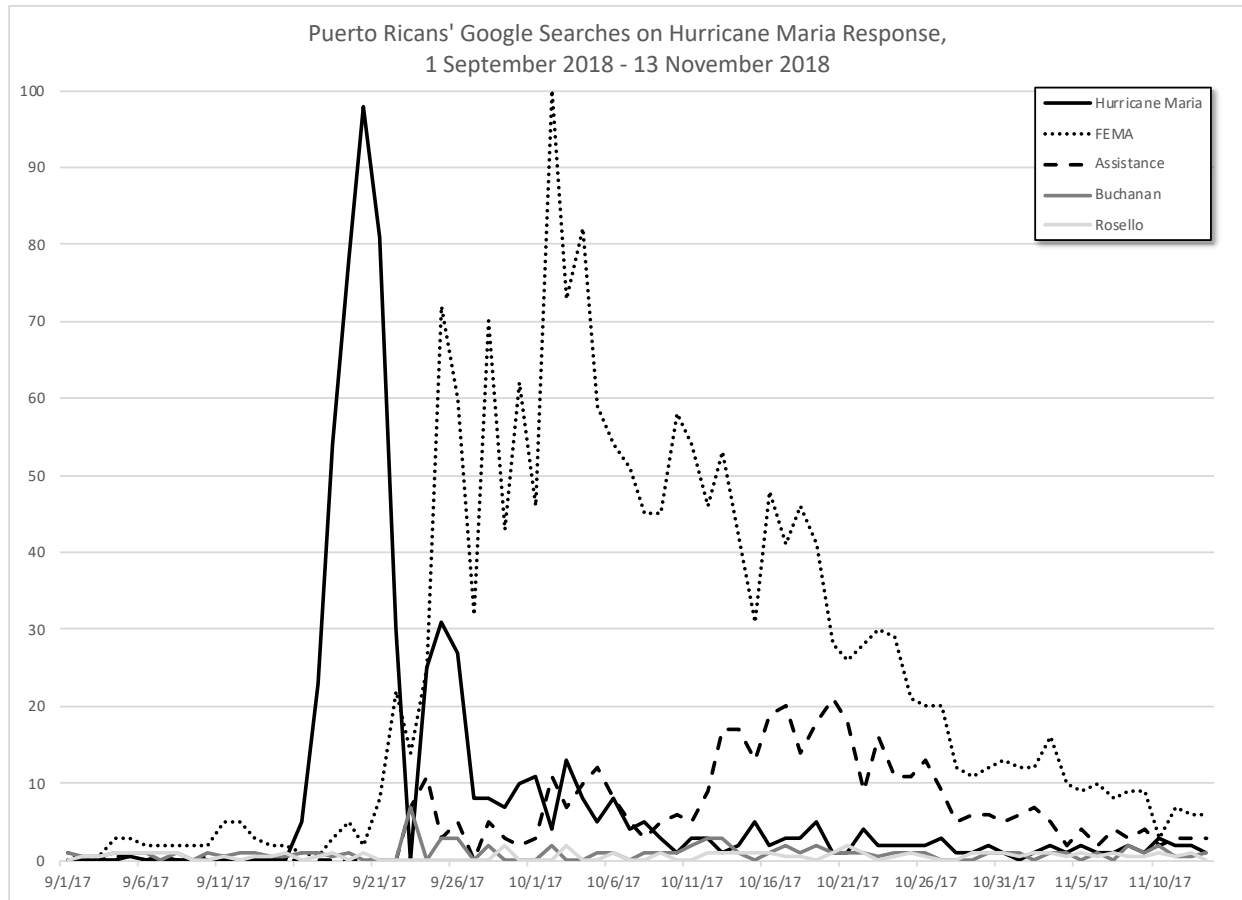
<sup>46</sup> The Whitefish scandal was related to a contract for restoration of Puerto Rican power that was let to a small Montana-based firm that had only a handful of employees and little or no experience in operations of the scale that would be required in Puerto Rico.

<sup>47</sup> These analyses did not consider press reporting in the USVI.

<sup>48</sup> The impact of Hurricane Maria on the availability of power and the initial total collapse of the telecommunications sector likely influenced early search trends, as well as social media participation. Beyond demonstrating the resulting declines in online activity, the data did not allow further analysis of these impacts. In addition, the geolocation of Puerto Rican Twitter users did not provide a reliable basis for distinguishing between Twitter users who were in Puerto Rico and Puerto Ricans who were living elsewhere. Accordingly, the analysis relied on online activity by Puerto Ricans who identified Puerto Rico as their home, which would include the entire Puerto Rican diaspora.

<sup>49</sup> Google Trends results on November 13, 2017, suggested that most of the searches were conducted by Puerto Ricans in the northern and interior portions of Puerto Rico. The search terms we examined were *hurricane maria*, *Fema*, *Buchanan*, and *Rosello*.

**Figure 8.5. Puerto Ricans' Google Searches on Hurricane Maria Response**



NOTE: Google Trends searches of Puerto Rican users using search terms *Hurricane Maria*, *FEMA*, *Assistance*, *Buchanan*, and *Rossello*.

As shown in the figure, searches for *Hurricane Maria* predominated in the early days of the disaster but fell off quickly, with searches for *FEMA* quickly rising and exceeding searches on the hurricane in the first five or so days, and searches regarding *assistance* gaining traction and surpassing searches for *FEMA* in early October 2017.<sup>50</sup> Meanwhile, the frequency of searches for [General] *Buchanan* and [Governor] *Rosselló* remained well below those for these other terms.<sup>51</sup>

### *Analysis of Twitter Activity*

In a similar vein, we also conducted an analysis of activity on the Twitter social media network related to Hurricane Maria in Puerto Rico to ascertain the level of commentary on the hurricane and its results nationally and locally. We used a Twitter feed called Gardenhose, which outputs a random sample of about 10 percent of all public Tweets and is generally considered to

<sup>50</sup> It would seem likely, for example, that Puerto Ricans would have been very interested in the progress of the response and recovery, in FEMA's procedures for applying for disaster assistance, and other topics.

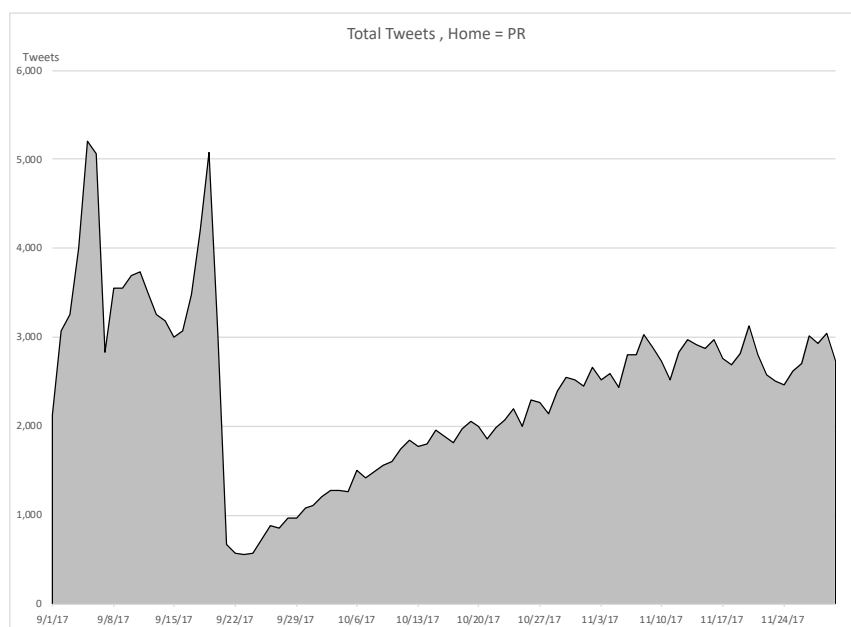
<sup>51</sup> Because of the low levels of activity related to the USVI, we did not analyze web search behavior for its residents.

be reliably representative of overall Twitter activity.<sup>52</sup> We collected data both for all Twitter users worldwide and for those whose profile stated that their home was Puerto Rico.

Figure 8.6 shows that the overall level of Puerto Ricans' Twitter activity fell in the aftermath of Hurricane Irma making landfall in Puerto Rico on September 6, recovered somewhat, and then plummeted after Hurricane Maria made landfall on September 20, likely because of the widespread losses of power, loss of access to the telecommunications grid, and other similar effects of the storm. The figure also shows a long, steady increase in the number of Tweets after September 21, presumably as Puerto Ricans regained broadband access.

Figures 8.7 and 8.8 report the number of Tweets mentioning *Puerto Rico* and *Hurricane Maria* both overall and for Twitter users who identified their home as Puerto Rico.<sup>53</sup> The number of tweets mentioning *Puerto Rico* spiked with both Hurricane Irma and Hurricane Maria, then fell off by early October. The number of tweets mentioning *Hurricane Maria* similarly spiked at the time of Maria, then dropped off. The pattern is similar to both the number of FEMA press releases and the number of CNN and Fox News reports on Hurricane Maria and reinforces the impression that interest in and motivation to comment on the disasters declined in the weeks immediately following landfall.

**Figure 8.6. Twitter Activity in Puerto Rico, September–November 2017**

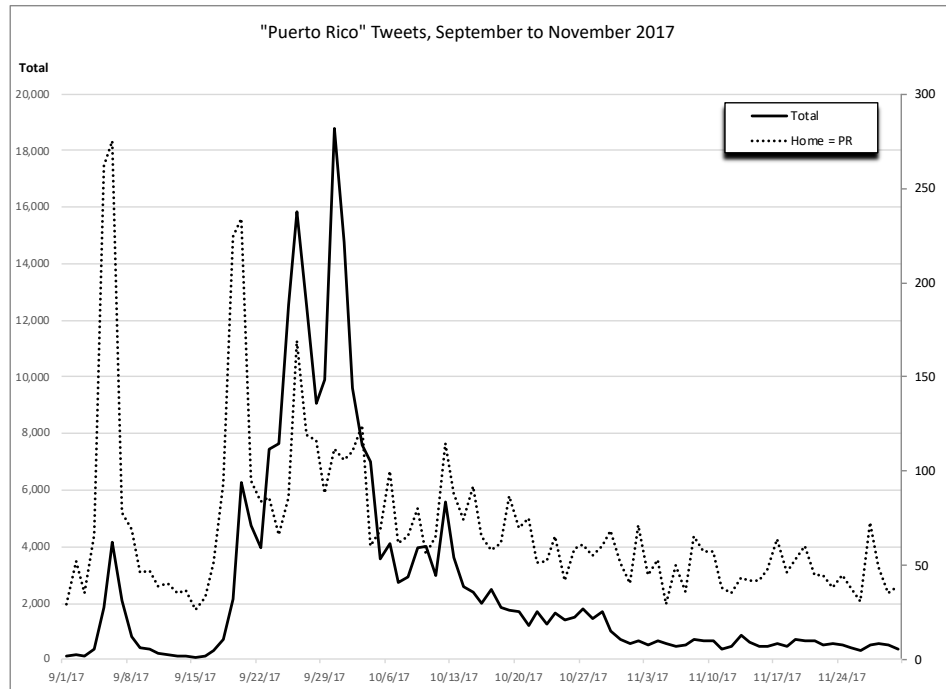


SOURCE: Twitter Gardenhose feed.

<sup>52</sup> Thus, the actual total number of tweets would be expected to be ten times those in the figure.

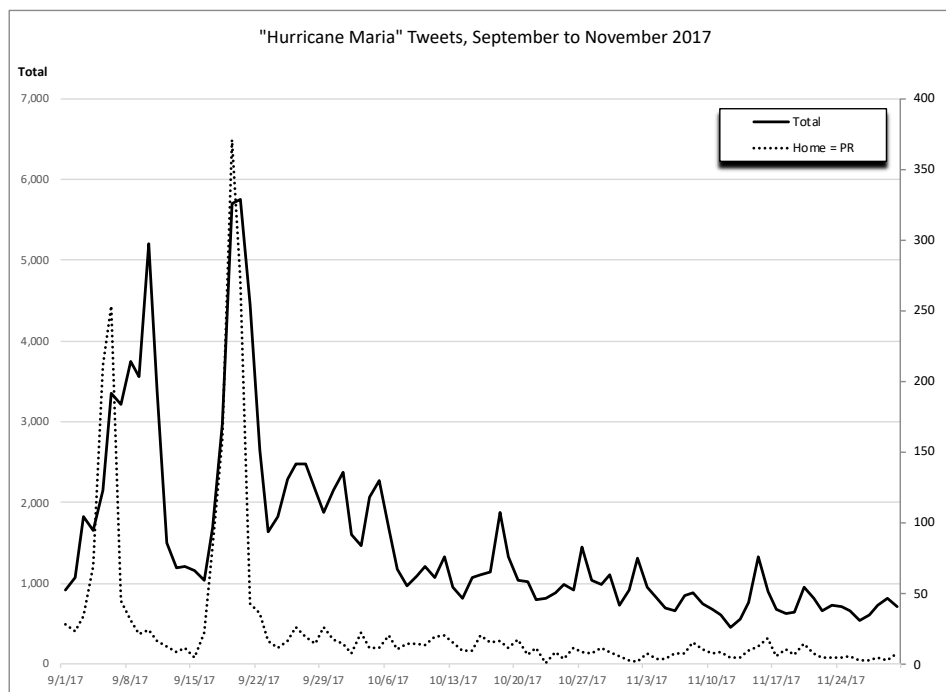
<sup>53</sup> This includes Puerto Ricans who identified Puerto Rico as their home, but were living elsewhere.

**Figure 8.7. Twitter Activity Related to *Puerto Rico*, September–November 2017**



SOURCE: Twitter Gardenhose feed.

**Figure 8.8. Twitter Activity Related to *Hurricane Maria*, September–November 2017**



SOURCE: Twitter Gardenhose feed.

The Twitter activity for residents of the USVI was much lower and did not appear to be particularly noteworthy.<sup>54</sup>

### *Analysis of National Public Opinion Polls*

Public opinion survey data can also provide insights into the effects of public affairs campaigns. We conducted a search for available public opinion survey data related to the response to Hurricane Maria. Although we did not find any surveys of Puerto Rico, we were able to analyze several U.S. national surveys; the following discussion is chronological.<sup>55</sup>

A September 28–October 2, 2017, an Associated Press poll found that 77 percent thought that the U.S. federal government had “a major responsibility” to help in disasters in territories like Puerto Rico, the Virgin Islands, and Guam.<sup>56</sup>

The Henry J. Kaiser Family Foundation conducted two polls over the October–November 2017 period that asked questions about attention to the response effort, and assessments of the response. The first poll, conducted October 4–8, 2017, found that

- 73 percent of those polled had heard “a lot about” the damage Hurricane Maria caused in Puerto Rico.
- 62 percent of those polled said that the people in Puerto Rico were not getting the help they needed.
- 52 percent thought that the government “was not doing enough . . . to restore electricity and access to food and water in Puerto Rico after Hurricane Maria.”
- When asked who should be blamed for the slow restoration of basic services in Puerto Rico, 44 percent pointed to “a slow response by the federal government,” and another 32 percent pointed to “disorganization in the local Puerto Rico government.”<sup>57</sup>

The second Kaiser Family Foundation poll took place over November 8–13, just as JFLCC planners were finalizing plans for the transition back home. The questions were similar to those of the October poll:

- 63 percent of those polled said that they were following news about rebuilding and recovery efforts in Puerto Rico “very closely” (22 percent) or “somewhat closely.”
- 70 percent said, that Puerto Ricans were not getting the help they needed (an increase of 8 percentage points over the October result).

---

<sup>54</sup> For example, on September 20, 2017, when Hurricane Maria made landfall in Puerto Rico and the USVI, there were a total of 3,062 tweets from Twitter users whose profiles indicated their home was Puerto Rico, but only 64 tweets were from USVI Twitter users.

<sup>55</sup> We searched the Roper Center’s iPoll database for questions mentioning “Puerto Rico” between September 1 and December 31, 2017 (Roper Center, Cornell University, Roper iPoll search page, undated).

<sup>56</sup> Associated Press/NORC Energy Policy Survey, September 2017,  $n = 1,150$  (Laurie Kellman and Emily Swanson, “AP-NORC Poll: Low Marks for Trump’s Puerto Rico Response,” Associated Press, October 4, 2017).

<sup>57</sup> Kaiser Family Foundation Poll conducted October 4–October 8, 2017,  $n = 1,008$  (The Henry J. Kaiser Family Foundation, *Puerto Rico after Hurricane Maria: The Public’s Knowledge and Views of Its Impact and the Response*, October 2017).

- 59 percent said that the U.S. government was not doing enough.<sup>58</sup>

Additional polling in mid- to late October suggests that most respondents might have blamed senior government decisionmakers for the slow response:

- Fox News polling conducted over October 22–24, 2017, found that 50 percent of those polled felt that the Trump administration had done a “poor” job, and another 14 percent thought that it had done only a “fair” job in responding to Hurricane Maria.<sup>59</sup>
- NBC News/Wall Street Journal polling conducted over October 23–26, 2017, similarly found that 54 percent of those polled disapproved of President Trump’s handling of the response to Hurricane Maria.<sup>60</sup>

Taken together, this suggests that impressions of a slow response crystallized in the early days of the relief effort and failed to change over the course of the operation. There is, however, little evidence that civilian or military responders were held to blame. The evidence thus suggests not so much that military public affairs “lost the war on Maria,” as much as it was simply all but impossible to shake off the early negative perceptions of the response.

## Chapter Conclusions

The research question that animated research in this chapter asked about the significance of public affairs for Puerto Rican, national, and internal military audiences. We found that JFLCC planned and devoted considerable efforts to engagements with local Puerto Rican audiences, without notably sacrificing attention to national or military audiences:

- Our review of public affairs guidance and other documentation shows that, to avoid public affairs problems encountered during the Hurricane Katrina response in 2005, USARNORTH’s public affairs planning aimed to ensure that local leaders, media, and other Puerto Rican audiences received significant levels of attention in public affairs and strategic communication efforts.
- Consistent with these aims, the execution of USARNORTH public affairs and strategic communication efforts included substantial numbers of interviews, DACs, and other means to reach out to Puerto Rican audiences regularly and directed a roughly comparable level of attention to national news audiences.

---

<sup>58</sup> Kaiser Health Tracking Poll conducted November 8–13, 2017,  $n = 1,201$  (The Henry J. Kaiser Family Foundation, *Kaiser Health Tracking Poll*, November 2017). The question about where the blame for the slow response should be laid was not asked again in the November poll.

<sup>59</sup> Fox News Poll conducted October 22–24, 2017,  $n = 1,005$  (Dana Blanton, “Fox News Poll: Storms Erode Trump’s Ratings,” Fox News, October 25, 2017).

<sup>60</sup> NBC News/Wall Street Journal Poll conducted October 23–26, 2017,  $n = 900$  (Peter Nicholas, “Trump’s Approval Rating Falls to Lowest Level Since Taking Office,” *Wall Street Journal*, October 29, 2017).

- Military audiences were addressed through PAOs at the unit level, standard command information systems, and Facebook Live events that were designed explicitly to reach larger numbers of military personnel and their families.<sup>61</sup>

Our analyses of FEMA news releases, national television news reporting, Google searches, and Twitter posts all suggest peaks at the time Hurricane Maria made landfall, followed by significant drop-offs across each of these measures in early to mid-October.

Although efforts to engage local audiences appear to have garnered goodwill from Puerto Ricans, according to available public opinion data, these efforts were unable to overcome the apparently settled view of a majority of the national public that the initial response to Hurricane Maria took far too long and that the U.S. government was not doing nearly enough to quickly and effectively restore Puerto Rico to its predisaster conditions. This challenge, of course, goes well beyond USARNORTH's public affairs campaign and depends on the extent of the damage and the nature of the overall response itself.

Given the devastation to Puerto Rico, there is little doubt that it was unrealistic for anyone to expect Puerto Rico to see a quick recovery. Nonetheless, a quicker and more effective initial response could possibly have led to more understanding and forgiving views regarding the extended timeline that would be required for a full recovery.

It appears likely that public affairs efforts for the initial response were at something of a disadvantage because of public perceptions of a slow start for the overall response, which became apparent after 3–4 days. Nonetheless, USARNORTH seems to have achieved its objectives with respect to conveying its supporting role and communicating effectively to multiple audiences, especially local audiences. In the end, the military's role seems to have been viewed in a generally positive way, even if overall feelings about the governmental response efforts were somewhat negative.

---

<sup>61</sup> The first Facebook Live event reached an estimated 67,500 people; the second reached 243,500. USARNORTH, 2018a, pp. 90–91.

## 9. Cross-Cutting Questions

---

We have addressed various challenges and mitigation strategies related to the specific research questions in previous chapters. In this chapter, we address four cross-cutting questions that relate to the speed of response, with a particular focus on the unique circumstances encountered during the Hurricane Maria response, and possible future requirements for DoD capabilities:

- What changes to doctrine do the lessons learned from Hurricane Maria suggest are required?
- How could DoD improve the speed of response, including early situational awareness and understanding of the problem in a catastrophic incident?
- How could DoD better prepare to respond to incidents where the state or territory has limited capability and capacity?
- Considering the unique conditions in Puerto Rico and the USVI— islands more than 1,000 miles from the nearest U.S. state— versus potential common challenges in other states and territories, what DoD capabilities might be required?

To address these research questions, this chapter

- reviews the key challenges associated with current doctrine, and suggested changes
- reviews the key challenges that affected the speed and effectiveness of the disaster response and identifies broad options for mitigating these challenges in future events
- summarizes ways DoD might improve future responses
- discusses potential capability challenges in light of the unique conditions in Puerto Rico and the USVI.

### Required Changes to Doctrine

We identified three areas in which changes to doctrine may be desirable: (1) doctrine on DSCA C2, (2) doctrine for DSCA situational awareness, and (3) doctrine related to the DSC and the role of the USAR in DSCA responses.<sup>1</sup>

#### *Doctrine for DSCA C2*

Basic DSCA doctrine remains sound and reflects the supporting role that DoD plays in the NRF, the NIMS, and the FIOPs. Given that current DSCA doctrine was largely written in 2013 and 2014, the joint and Army doctrinal community should consider revising some of this

---

<sup>1</sup> U.S. Fleet Forces Command's lessons-learned review voiced similar concerns regarding operational challenges that were not covered by existing doctrine. Specific areas identified included: airspace control, C2 considerations, communications, and interagency POCs (Davidson, 2017, slide 12).

doctrine to incorporate lessons from the 2017 Hurricane season, and there are a few areas that could be expanded on.<sup>2</sup>

For example, current doctrine tends to use *JTF* and *JFLCC* interchangeably when discussing the C2 for DoD DSCA operations. Doctrine should be clarified to state that both of these C2 organizations are appropriate under certain conditions and to discuss when and at what echelons each of these arrangements would be appropriate. To accomplish this, material on C2 options in USNORTHCOM plans might be added as appendixes to JP 3-28, ADRP 3-28, and ATP 3-28.1.<sup>3</sup> In addition, potential C2 arrangements should be discussed in the DSCA sections of the appropriate Joint and Army C2 doctrinal documents, in particular JP 3-33, JP 3-31, and ATP 3-93 and FM 3-94.<sup>4</sup>

### *Doctrine for DSCA Situational Awareness*

Existing doctrine could expand its discussion of gaining and maintaining situational awareness. This could include a discussion of the concept of DAC, in which the commander constantly circulates throughout the disaster area to get a sense of the affected area and, importantly, to develop a COP with senior FEMA, SLTT, and other personnel. It should also include discussion of the potential use of on-the-ground tactical capabilities, such as civil affairs teams and engineer reconnaissance teams, which are trained in evaluating infrastructure and, in the case of civil affairs teams, civilian requirements and systems.<sup>5</sup> Responsibilities for establishing baseline information on critical state and local infrastructure also could be vested with each state's emergency management, National Guard, or DSC organization.<sup>6</sup> The daily and persistent operation of these capabilities would supplement existing civil capabilities and could contribute to the creation of a more complete picture of the operating environment. Finally, doctrine should describe principles for establishing an integrated whole-of-response reporting and assessment system that includes a single point of contact for validation, deconfliction,

---

<sup>2</sup> The top-level DSCA documents—JP 3-28; ADP 3-28, *Defense Support of Civil Authorities*, July 26, 2012; and ADRP 3-28—were published in 2013. The supporting summary of service-level tactics, techniques, and procedures, ATP 3-28.1, was published more recently, in September 2015. (A further update appeared in February 2019, after our research concluded.)

<sup>3</sup> JP 3-28, 2013; ADRP 3-28, 2013; and ATP 3-28.1, 2015.

<sup>4</sup> JP 3-33, 2018; JP 3-31, 2014; ATP 3-93; and Field Manual 3-94, *Theater Army, Corps, and Division Operations*, Washington, D.C.: Headquarters, Department of the Army, April 2014

<sup>5</sup> These specialized teams could be supplemented, if necessary, by personnel drawn from brigade combat team reconnaissance and scout elements. The 402nd Civil Affairs Battalion (USAR) is stationed on Puerto Rico. During the response to Hurricane Maria, this unit focused on supporting public affairs operations.

<sup>6</sup> For example, in the 2000s, the National Guard had a program called Full Spectrum Integrated Vulnerability Assessment that reviewed and assessed vulnerabilities of defense and defense industrial base facilities and responded to related requirements as part of predeployment preparation, planning, and coordination of National Guard forces to protect critical infrastructure sites. The authors are indebted to Bert Tussing of the U.S. Army War College for bringing this to our attention.

integration, analysis, and reporting of disparate inputs from various stakeholders for development of a COP.

### *Doctrine for DSC in DSCA*

When current doctrine was written, the use of a DSC for disaster response was an emerging and largely untested concept. As described in this report, a DSC was activated in Puerto Rico during the 2017 hurricane season but was not used in this dual status as fully as he might have been if a viable C2 capability had existed earlier. To the extent that this was the result of unfamiliarity with the concept, DSCA doctrine should expand its discussion of the DSC structure and provide more information on the integration of Title 10 staff and tactical units under the DSC. And as suggested earlier, DSC doctrine also might discuss DSC responsibilities for developing baseline information on critical infrastructure to bootstrap earlier situational awareness and a COP. Finally, doctrine should stress the significant advantages a state National Guard DSC has in understanding local stakeholders and conditions.

### *Doctrine for Use of USAR in DSCA*

The DoD response to Hurricane Maria saw an unprecedented use of USAR personnel. Indeed, mobilized USAR personnel stationed on Puerto Rico made up the bulk of JFLCC's tactical forces executing MAs and roughly 50 percent of total JFLCC personnel. This suggests that DSCA doctrine should include an expanded discussion of the use of USAR (and other reserve personnel) in DSCA operations and, in particular, any unique conditions or requirements involved in their mobilization and employment.

### *Choosing the Best Model*

Doctrine might better address the considerations that should go into choosing the best C2 model for a given DSCA operation, given the likely composition of the force, e.g., active; reserve; and National Guard under SAD, Title 32, or federalized under Title 10.

## **Ways DoD Might Improve the Speed of Response**

### *Key Challenges Affecting the Speed of the Hurricane Maria Response*

As discussed previously, the USARNORTH response to Hurricane Maria had four distinct periods:

- September 20–25, 2017: In the immediate aftermath of the storm, the response focused on a search for the center of gravity.
- September 26–30, 2017: The JFMCC to JFLCC transition followed the assessment that a land-based response was needed.
- October 1–16, 2017: Development of the JFLCC response and transition plan took place.

- October 17 to November 16, 2017: The culmination, transition, and redeployment of active duty Army (and other) forces occurred.

Throughout, several key challenges affecting the speed of the response arose and, in many instances, persisted across multiple periods:

- *Lack of understanding of predisaster conditions to provide a baseline for the response:* This challenge created great difficulties in establishing just how much destruction and degradation of performance of key systems had occurred as a result of Maria. This appears to have been most challenging during October 1–16, as FEMA and DoD planners were developing a planning and assessment framework that could be used to guide the transition from a heavy reliance on Title 10 forces.
- *Lagging understanding of the enormity of the challenge and the required response, as well as continued challenges with situational awareness and COP:* This challenge led to delays in establishing operational C2, assessing conditions, and prioritizing response missions and was a pressing challenge until the second half of October.
- *The commonwealth's inability to plan and lead the response and the early need for FEMA and other federal responders to fill the vacuum and take the lead:* This led to delays as federal responders sought to determine Puerto Rico's ability to provide leadership and in bootstrapping a substitute response organization led by FEMA and its partners. This challenge was arguably most acute September 20–30.
- *Limited federal and other capabilities and capacity to substitute for commonwealth leadership in the early phases of the response:* The unexpected requirement to plan and lead the initial response required adapting organization, staffing, and other elements, which further delayed actual progress on the ground. This also was arguably most acute September 20–30.
- *Overcoming the great distance from CONUS and adapting to the insular nature of Puerto Rico and USVI:* Air- and seaports needed to be opened, and roads needed to be cleared of debris to make the movement of personnel, equipment, and materiel possible, and the great distances limited the rate of buildup of capabilities. This also was arguably most acute in late September.
- *Lagging recognition of the need for a land-based, JFLCC-led response and associated capabilities for JRSOI and of the time needed to transition operational-level C2 from JFMCC to JFLCC:* It took about five days to determine that the operation would have a land-centric center of gravity and that a JFLCC was needed to C2 the needed forces and another five days for JFLCC Main to deploy. This issue was largely resolved by September 30.
- *Interagency planning, coordination, cooperation, and synchronization issues that hindered the development of unity of effort:* It took approximately two weeks to develop a planning and assessment framework for the operation and to socialize the framework with the commonwealth, FEMA, and other partners. Most of these issues were resolved by mid-October, when a planning and assessment framework emerged.

Table 9.1 provides an overview of the key challenges that affected DoD's speed of response, and the periods during which these challenges were present and had the most impact. Although the first two periods covered by the table (September 20–25 and September 26–30) were most

relevant to the speed of response, we also include subsequent periods in the table to convey the persistence of some of these challenges.

**Table 9.1. Key Challenges Affecting Speed of Response in Hurricane Maria Response**

| Challenges                                                                                                                                                                                | September 20–25 | September 26–30 | October 1–16 | October 17–November 16 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|--------------|------------------------|
| Lack of understanding of predisaster conditions to provide a baseline for the response                                                                                                    | ✓               | ✓               | ✓✓           | ✓                      |
| Lagging understanding of the enormity of the challenge and the required response and continued challenges with situational awareness and COP                                              | ✓✓              | ✓✓              | ✓✓           | ✓                      |
| The commonwealth’s inability to plan and lead the response and the early need for FEMA and other federal responders to fill the vacuum and take the lead                                  | ✓✓              | ✓✓              | ✓            |                        |
| Limited federal and other capabilities and capacity to substitute for commonwealth leadership in the early phases of the response                                                         | ✓✓              | ✓✓              | ✓            | ✓                      |
| Overcoming the great distance from CONUS and adapting to the insular nature of Puerto Rico and USVI                                                                                       | ✓✓              | ✓✓              | ✓            |                        |
| Lagging recognition of the need for a land-based, JFLCC-led response, and associated capabilities for JRSOI and of the time needed to transition operational-level C2 from JFMCC to JFLCC | ✓✓              | ✓               |              |                        |
| Interagency planning, coordination, cooperation, and synchronization issues that hindered the development of unity of effort                                                              | ✓✓              | ✓✓              | ✓✓           | ✓                      |

NOTES: ✓ indicates the challenge was present during the period; ✓✓ indicates periods in which challenge had greatest impact.

As the table suggests, during the search for the center of gravity (September 20–25, 2017), the primary challenges encountered included apprehending the enormity of the disaster, adapting to commonwealth’s inability to lead the response, marshalling the organizational machinery and personnel to deal with the leadership gap, overcoming the distance of PR and the USVI from CONUS, the lagging recognition that a JFLCC was needed, and establishing unity of effort.

During the JFMCC-to-JFLCC transition period (September 26–30, 2017), FEMA capabilities and capacities to carry out commonwealth roles and functions were enhanced, but DoD required time to transition the operational-level C2 solution from a maritime-based response (JFMCC) to a land-based one (JFLCC). Most of the other challenges continued into this period.

The JFLCC response and transition plan period (October 1–16, 2017) began with JFLCC’s assumption of the role of DoD C2 headquarters. During this period, response-wide situational awareness and a functional COP were achieved, and desired end-states, conditions, and metrics for transition also were developed. These efforts were heavily affected by the lack of

understanding of the preconditions on PR before the hurricane season and by challenges in forging interagency coordination, cooperation, and synchronization to ensure unity of effort.

Through the employment of LNOs and greater cooperation between DoD and FEMA, agreement on a transition plan was ultimately achieved, enabling the culmination, transition, and redeployment of active duty Army component forces from October 17 to November 16, 2017. During this final period of the USARNORTH response, the primary challenges related to closing out operations and active MAs and socializing awareness of progress that had been made and transition criteria across key stakeholders, including FEMA, and various commonwealth stakeholders.

### *Options for Mitigating Key Challenges*

We identified several pre-hurricane season options and recommendations to mitigate the key challenges of the Hurricane Maria response. A large number of these mitigation strategies may be employed well before the start of the hurricane season, and others are expected to be implemented just before or after landfall of a major hurricane. The following discussion highlights the most significant strategies.

#### **Pre-Hurricane Season Options**

Prior to a hurricane season, one of the most important ways to mitigate the challenges in Puerto Rico will be to improve the capabilities of PREMA, PRNG, and USAR in Puerto Rico to respond to future Category 5 hurricanes. This may be accomplished by establishing mission requirements specific to Puerto Rico DSCA operations, increasing training and exercises across these local response authorities, and revising and stress-testing integrated operational plans with other key partners, such as FEMA and DoD. Essential infrastructure, such as power and telecommunications capabilities, should also be hardened.

Additionally, before the hurricane season, DSCA critical capabilities should be identified, with the focus on ensuring that these capabilities can be made immediately available in response to a DSCA event. This may include reviewing likely EMAC forces for sufficient coverage of expected mission sets, establishing Logistics Civil Augmentation Program-like contracts for provision or movement of key capabilities, and improving resilience by hardening Puerto Rican and USVI facilities and capabilities.

Improvements in capabilities to coordinate with interagency partners will also be key to alleviating many challenges. This can be pursued by conducting exercises involving FIOPs, establishing a permanent MAST or DCO-like presence at the NRCC, and revising DSCA CONPLANS and operational plans for Puerto Rico and USVI to address the specific challenges of the Hurricane Maria response.

Ensuring that each state or territory has a DSC capable of providing effective C2 for the likely tactical response forces could speed up the integration of both federal and state EMAC capabilities into the disaster response efforts. If shortfalls in DSC capability are identified,

federal and state or commonwealth authorities should seek programmatic solutions to overcome or mitigate the identified shortfalls. Such solutions could include additional training for DSC staff, identifying an appropriate headquarters to support the DSC, augmenting existing headquarters with trained personnel, or preidentifying EMAC forces capable of rapidly increasing the capability of the DSC in the affected area during a future crisis.

Finally, compiling predisaster country handbooks for Puerto Rico and USVI, similar to the country studies that the Library of Congress and others published for many years, including critical infrastructure, incident support base capabilities, contacts at the state and local levels, geospatial patterns of economic activity, and population information could have significantly improved the ability to quickly generate situational awareness and develop a COP and may also provide a baseline for assessing the impacts of future storms. The resources that might inform such a handbook include the USACE, regional DCO analysis, FEMA assessments, and information collected by state-level emergency management agencies.<sup>7</sup> USARNORTH's July 2017 briefing provides a solid basis for such a handbook and should be kept up to date.<sup>8</sup>

### Prelandfall Options

Immediately preceding landfall, several actions might be taken to better prepare for rapid response operations.

As islands, Puerto Rico and the USVI must rely in the early days of a crisis on the DSCA capabilities resident on the island prior to the disaster.<sup>9</sup> As a result, key disaster response capabilities on the island that are likely to be immediately in demand should be predeployed or otherwise postured so that they can respond rapidly to a catastrophe. To support this rapid response, predeployment of capabilities to shelters can provide the immediate response capabilities in a ready status. Additional forces that may be required can also be mobilized during this time by sending out PTDOs to active-duty Army component forces and key elements of USAR in Puerto Rico. Mobility assets similarly could be put on alert or repostured for potential use. Forces that are mobilized during this period should conduct equipment checks and perform any necessary maintenance on essential equipment before landfall. Finally, this period should be used to allow planners to revise generic Puerto Rico plans, review pre-scripted lists of actions and MAs, and review the country handbook materials to familiarize first responders with the human terrain of Puerto Rico.

---

<sup>7</sup> See for instance the Louisiana DCE Battlebook for 21-4-2015 produced by Patrick Hogan and Christopher Kenny (Patrick R. Hogan and Christopher M. Kenney, *Louisiana Defense Coordinating Element (DCE) 2014–2015*, briefing, undated).

<sup>8</sup> USARNORTH, *Puerto Rico and U.S. Virgin Islands DSCA Response Infrastructure*, briefing, July 2017a.

<sup>9</sup> This insularity is both physical and psychological; Puerto Rico does not appear to have much saliency for the bulk of the U.S. population or governmental structure.

## Postlandfall Options

In the immediate aftermath of a hurricane making landfall, several strategies may enable more-effective and -efficient execution of the response operation. First, enhanced integration of Title 10 capabilities with presumptive Puerto Rico and USVI DSCs should be pursued. To rapidly enable synchronization with interagency partners, DoD should ensure that the DCE is appropriately sized and staffed for the mission, and qualified LNOs from appropriate DoD organizations should be deployed to critical federal touchpoints. Development of a synchronized COP and situational awareness can be enabled by creating a single office of primary responsibility or individual to scrub and integrate multisource COP-related information from interagency partners, and LNOs or procedures may be implemented to ensure various actors' information is habitually incorporated.<sup>10</sup> Although the most efficient way to gain postincident situational awareness is through interaction with a functioning local emergency management system, this may not always be possible. In such cases, it may be necessary to supplement civilian disaster assessment capabilities with the rapid deployment of DoD reconnaissance elements. Additionally, DAC may also be employed to verify situational awareness and the COP. Finally, it may be possible to improve situational awareness and the COP by incorporating crowdsourced information from the population, using social media (e.g., Twitter or Facebook) or special-purpose disaster-reporting smartphone apps, over wireless and other networks, predicated on the restoration of power and telecommunications capabilities.<sup>11</sup>

## How Best to Prepare for Future Responses?

Some U.S. states and territories may have a limited capability or capacity to manage the response to a future catastrophic disaster: Hurricane Maria was an example of this, with PREMA and PRNG being overwhelmed by the magnitude of the disaster and with FEMA and its federal, state, and other partners having to perform many PREMA and PRNG functions. As described earlier, although FEMA's strategic concept included the possibility of playing a more substantial role than usual, FEMA and its partners were neither organized nor trained for this role, and FEMA's capacity had been drawn down as a result of having already committed many resources to the Harvey and Irma responses. One consequence of this was the need to integrate a large number of liaisons and planners from both USNORTHCOM and USARNORTH.

To help prepare for similar situations in the future, FEMA and USNORTHCOM should develop an operational concept for how FEMA would effectively assume the responsibilities of a state-level emergency management organization and how USNORTHCOM would support such

---

<sup>10</sup> We see this as an issue as a topic for discussion with FEMA and could be a new element within the NIMS or other FEMA guidance.

<sup>11</sup> This of course assumes the availability of power and wireless transmission capabilities. As shown in Chapter 8, there was a significant drop-off in Twitter activity after Maria hit Puerto Rico, presumably because so many Twitter users lost cellular or other access.

an effort. This operational concept should lay out how a response would be organized in such a situation and the support that it would require from the U.S. military. It should also describe procedures for data sharing, the development of a COP, and the procedure for developing a common set of metrics for tracking progress and accomplishment of MAs.

USNORTHCOM and USARNORTH were challenged by the need to provide liaisons, planners, and other staff personnel to support the DCE and the JEC supporting the DSC. USNORTHCOM should undertake an assessment of potential future needs for such personnel in a catastrophic event and then develop the required policies and procedures to help ensure that adequate numbers of such personnel are properly trained and rapidly available in future such contingencies.

The response to Hurricane Maria exposed gaps in DoD personnel's understanding of DSCA procedures, particularly regarding MAs. To help overcome this gap, USARNORTH should consider expanding the participation of its staff in DSCA exercises. It should also seek to ensure insight into and understanding of FEMA response plans through close communication with its DCOs when these plans are being developed.

Finally, operations in response to Hurricane Maria exposed problems in the process of developing top-down MAs. Although a permanent USNORTHCOM liaison to FEMA resides in the NRCC, that presence might need to be augmented (e.g., by a MAST or DCO-like capability to the NRCC) in particularly large or complex responses, to deal with the additional workload in the development of MAs.

## What DoD Capabilities Might Be Required?

We now turn to the final cross-cutting question we were asked to address: “Considering the unique conditions in Puerto Rico and the USVI—lands more than 1,000 miles from the nearest U.S. state—versus potential common challenges in other states and territories, what DoD capabilities might be required?”

To recap, among the unique conditions that affected the shape of the response in Puerto Rico were geography, especially Puerto Rico's status as an island at significant distance from CONUS; the commonwealth's economic decline and debt crisis, which have limited improvements to public and private infrastructure; an aged and aging—and poor—population; and the sharing of political authority between the government of the commonwealth and its 78 municipalities. These conditions, in turn, contributed to Puerto Rico's vulnerability to a major hurricane, such as Maria; its challenges in mobilizing capabilities for an effective commonwealth response in the aftermath of the hurricane; and many of the operational requirements and challenges faced during the response.

Two additional considerations are important:

- The potential risks to Puerto Rico and the USVI of future disaster events.
- The extent to which investments are made in Puerto Rico that will reduce its vulnerability and improve its resilience, and/or improve the commonwealth's organic capabilities to respond, in future natural disasters.

### *The Risk of Future Disasters*

Puerto Rico and the USVI will remain at risk not just from future tropical storms and major hurricanes but also from earthquakes, volcanic activity, and tsunamis. Any of these incidents could trigger the sort of catastrophic damage that occurred as a result of Maria.

#### **Tropical Storms, Extreme Weather, and Sea Level Rise**

We are currently in “the ongoing high-activity era for Atlantic hurricanes that began in 1995 . . . [which] has been associated with the warm phase of the Atlantic Multi-Decadal Oscillation.”<sup>12</sup> The Atlantic multidecadal oscillation is a 60- to 80-year period of oscillation between warm and cold phases. Although there are at least some indications that we may be transitioning from a warm phase to a cold phase, if the current warm phase has a 30- to 40-year duration, the current warm phase and the resulting high level of hurricane activity could persist for some years, perhaps to 2025–2035.<sup>13</sup> Moreover, even if an oscillation to a cool phase is underway, evidence suggests that that a cool phase could contribute to a rise in sea levels,<sup>14</sup> which could heighten the effects of extreme weather events.

Indeed, as in 2017, the 2018 Atlantic hurricane season evidenced a high level of hurricane activity that was consistent with the seasonal forecasts. On May 24, 2018, NOAA released its 2018 Atlantic Hurricane Season Outlook.<sup>15</sup> Figure 9.1 summarizes NOAA's forecasts for the 2018 hurricane season, including the Atlantic hurricane season.

---

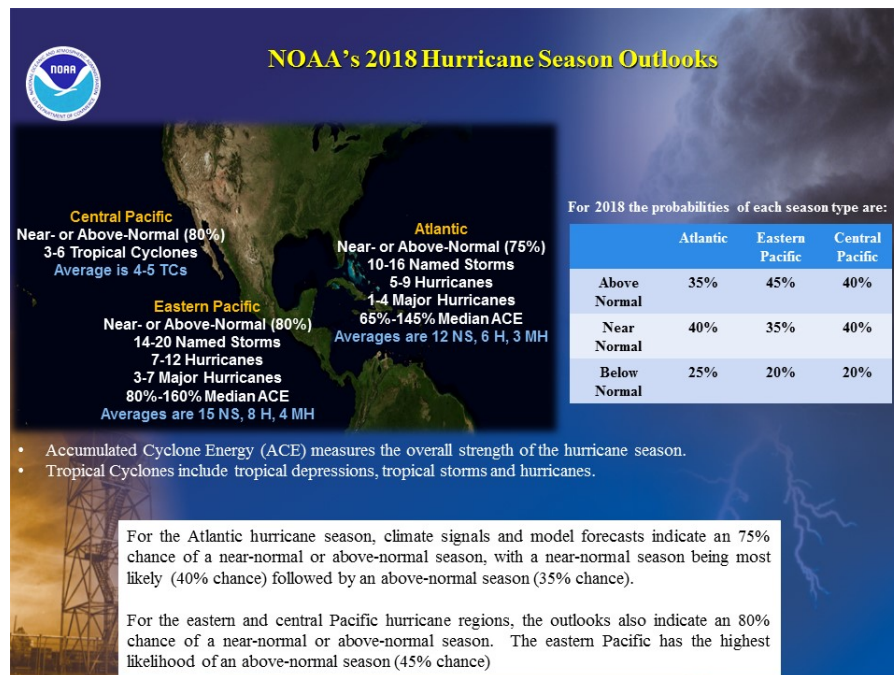
<sup>12</sup> NOAA, “NOAA 2018 Atlantic Hurricane Season Outlook,” press release, Washington, D.C., May 24, 2018f, p. 3.

<sup>13</sup> Previous warm phases were observed between about 1860–1890 and 1930–1970, with cold phases between about 1890–1930 and 1965–1995. See David Enfield et al., “The Atlantic Multidecadal Oscillation: Impacts, Mechanisms & Projections, briefing, 2001; Gerard McCarthy and Ivan Haigh, “The Atlantic is Entering a Cool Phase That Will Change the World's Weather,” *The Conversation* website, May 29, 2015; and Gerard D. McCarthy, Ivan D. Haigh, Joël J.-M. Hirschi, Jeremy P. Grist, and David A. Smeed, “Ocean Impact on Decadal Atlantic Climate Variability Revealed by Sea-Level Observations,” *Nature*, Vol. 521, May 28, 2015.

<sup>14</sup> Cooling in the Atlantic is associated with sea level rise on the northeast coast of the United States; it is not clear from the sources we reviewed what the effects might be on sea levels in the Caribbean (McCarthy and Haigh, 2015; McCarthy et al., 2015).

<sup>15</sup> NOAA, 2018f.

**Figure 9.1. NOAA's 2018 Hurricane Season Outlook**



SOURCE: NOAA, "NOAA's 2018 Hurricane Season Outlook," briefing slide, undated a.

NOAA further summarized the outlook for the 2018 Atlantic hurricane season as having a 75-percent chance of a near- or above-normal season (35-percent probability of an above-normal season, a 40-percent probability of a near normal system) and a 25-percent probability of a below-normal season. The outlook further called for a 70-percent probability for each of the following:

- ten to 16 named storms (average for 1981–2010: 12)
- five to nine hurricanes (average: six)
- one to four major hurricanes (average: three)
- an ACE of 65 to 145 percent of the median (average for a near-normal season: 71.4 to 120 percent).<sup>16</sup>

As predicted, the 2018 Atlantic hurricane season was quite active. Although it generated two major hurricanes that made landfall in the southeastern portion of CONUS, it spared Puerto Rico and the USVI:

<sup>16</sup> NOAA, "Forecasters Predict a Near- or Above-Normal 2018 Atlantic Hurricane Season: New Satellite Data and Model Upgrades to Give Forecasts a Boost," press release, May 24, 2018e. The 70-percent probability for these bands means that there is a residual 30-percent probability that the season could see either higher or lower levels of activity. NOAA's press release states that the

combination of ENSO [El Niño–Southern Oscillation]–neutral conditions and a warmer MDR [Main Development Region] could favor hurricane activity near the upper ends of the predicted ranges, while the combination of El Niño and a cooler MDR could favor activity near the lower ends of the predicted ranges. (NOAA, 2018f)

The 2018 Atlantic hurricane season officially concludes on November 30, and will be remembered most for hurricanes Florence and Michael, which caused significant damage in the southeastern U.S. In total, the season produced 15 named storms, including eight hurricanes of which two were “major” (Category 3, 4 or 5). An average season has 12 named storms, six hurricanes, and three major hurricanes.<sup>17</sup>

Looking ahead, the Intergovernmental Panel on Climate Change (IPCC) has pointed to the strong possibility that climate change may be fueling more extreme weather events in the future.<sup>18</sup>

A changing climate leads to changes in the frequency, intensity, spatial extent, duration and timing of extreme weather and climate events, and can result in unprecedented extreme weather and climate events.<sup>19</sup>

In a similar vein, in preparation for its most recent (January 2017) report on global trends,<sup>20</sup> the National Intelligence Council (NIC) used the IPCC’s assessment of likely changes for weather phenomena as a baseline for assessing the potential impacts of anticipated climate change for U.S. national security.<sup>21</sup>

As shown in the Table 9.2, IPCC judges more-intense tropical cyclones to be “more likely than not” and more-extreme sea levels and heavy-precipitation events as “likely” over the 2016–2035 period, with the likelihood growing thereafter.

---

<sup>17</sup> NOAA, “Destructive 2018 Atlantic Hurricane Season Draws to an End,” press release, November 28, 2018g. Despite its geographical vulnerability to tropical storms, Puerto Rico has generally been spared from major hurricanes:

Despite its location in the heart of hurricane territory, Puerto Rico has endured surprisingly few hurricanes. On average, the island experiences a tropical storm every five years, and hurricanes even less frequently than that.

But the storms that do hit, though they may not be intense hurricanes, tend to cause catastrophic damage on the U.S. territory, whose population is about 3.5 million.

Remarkably, just one Category 5 hurricane has made landfall in Puerto Rico since 1851—the San Felipe Segundo hurricane in 1928. (Angela Fritz, “Puerto Rico Has a Long History with Tropical Storms. None of Them Were Like Hurricane Maria,” *Washington Post*, September 19, 2017.)

The initial forecast for each hurricane season appears in the spring.

<sup>18</sup> These effects of climate change could be muted somewhat by the transition to a cooling cycle in the Atlantic multidecadal oscillation, however.

<sup>19</sup> Christopher B. Field, Vicente Barros, Thomas F. Stocker, Qin Dahe, David Jon Dokken, Gian-Kasper Plattner, Kristie L. Ebi, Simon K. Allen, Michael D. Mastrandrea, Melinda Tignor Katharine J. Mach, and Pauline M. Midgley, eds., *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change*, Cambridge: Cambridge University Press, 2012, p. 7.

<sup>20</sup> NIC, *Global Trends: Paradox of Progress*, Washington, D.C., NIC 2017-01, January 2017.

<sup>21</sup> NIC, *Implications for US National Security of Anticipated Climate Change*, Washington, D.C., NIC WP 2016-01, September 21, 2016. NIC, in turn, drew from IPCC material.

**Table 9.2. Projected Trends in Extreme Weather Events**

| Phenomenon                      | Likelihood of Changes in 2016-2035 | Likelihood of Changes by 2080-2100 |
|---------------------------------|------------------------------------|------------------------------------|
| Warmer days and nights          | Likely                             | Virtually certain (99-100%)        |
| More hot days and nights        | Likely                             | Virtually certain                  |
| More warm spells and heatwaves  | Likely                             | Very likely (90-100%)              |
| More heavy precipitation events | Likely                             | Very likely                        |
| More droughts                   | More likely than not               | Likely (66-100%)                   |
| More intense tropical cyclones  | More likely than not               | More likely than not (33-66%)      |
| More extreme sea levels         | Likely                             | Very likely                        |

SOURCE: NIC, 2016, p. 6. NIC drew this information from IPCC, 2013, p. 7.

Taken together, the forecasts of more-intense tropical cyclones, more-extreme sea levels, and more heavy-precipitation events suggest that the risk of more frequent and violent storms making landfall in Puerto Rico and the USVI could well increase. Thus, the special cases of Puerto Rico and the USVI—insular, distant from CONUS, and with vulnerable infrastructure and populations—may be at heightened risk of additional Maria-like hurricanes in the future.

#### Seismic and Volcanic Events and Resulting Tsunamis

More-extreme weather, tropic storms, and sea-level rise are not the only risks Puerto Rico and the USVI face. They are also at relatively high risk of seismic and volcanic events and of resulting tsunamis:

Many earthquakes and tsunamis have occurred in the northeastern Caribbean, where the movements of the Earth’s surface plates are rapid and complicated. Future such events pose serious hazards to the 3.7 million people who live in Puerto Rico and the U.S. Virgin Islands.

The Caribbean is one of the smaller surface plates of the Earth. The approximately rectangular plate extends from Central American on the west to the Lesser Antilles on the east, and from just south of Cuba on the north to South America on the south. Earthquakes occur all around its periphery, and volcanoes erupt on its eastern and western sides.<sup>22</sup>

Large earthquakes occurred in or near Puerto Rico, the USVI, and the island of Hispanola in 1787 (magnitude 8.1), 1867 (magnitude 7.5), 1918 (magnitude 7.5), 1946 (magnitude 7.5), 1946 (magnitude 8.1), 1953 (magnitude 6.9), and 2010 (magnitude 7.0, Haiti).<sup>23</sup> USGS judges the risk

<sup>22</sup> Jeffrey W. Nelson and William Dillon, *Earthquakes and Tsunamis in Puerto Rico and the U.S. Virgin Islands*, USGS Fact Sheet FS-141-00, April 2001, p. 1.

<sup>23</sup> Nelson and Dillon, 2001, p. 2.

of a large earthquake in Mayaguez, Puerto Rico, as comparable to the probability for Seattle, Washington.<sup>24</sup>

In addition, according to USGS, Puerto Rico and the USVI face the risk of tsunamis related to earthquakes or volcanic activity:

Tsunami waves form when large pieces of the sea floor undergo abrupt vertical movement due to fault rupture, landslides, or volcanism. Immediately after the 1946 earthquake, a tsunami struck northeastern Hispaniola and propagated inland for several kilometers; some reports indicate that nearly 1,800 people drowned. In 1918, a magnitude 7.5 earthquake resulted in a tsunami that killed at least 91 people in northwestern Puerto Rico. Eyewitness reports of an 1867 Virgin Islands tsunami give a maximum wave height of more than 7 meters (23 feet) in Frederiksted, St. Croix, where a large naval vessel was left on top of a pier.

. . . A problem for Puerto Rico and the Virgin Islands is that sites of tsunami generation are likely to be very close to the coast, and so warning time is short, unlike Hawaii, where sites are very distant and warnings can be broadcast hours in advance. Therefore, improved understanding of the geology must be used for public education and planning for safer construction and the proper siting of structures where people congregate.<sup>25</sup>

### *Investments to Improve Resilience and Capability*

As just described, the actual impact of future disasters, whether hurricanes, earthquakes, volcanic eruptions, or tsunamis—and the potential requirements for Title 10 and other CONUS-based military responders—ultimately will depend in no small measure on the success of post-Maria efforts in Puerto Rico and the USVI to harden key infrastructure, improve indigenous preparedness and emergency management capabilities, and complete other post-Maria measures that are currently underway to increase the islands' future resilience.

In its lessons-learned report for the 2017 hurricane season, FEMA recommended several actions to improve future responses. Notable among these are (1) revising the NRF and Response FIOP “to emphasize stabilization of critical lifelines and coordination across critical infrastructure sectors” (2) and “support[ing] states in building a greater capacity to respond to and recover from disasters by maintaining financial support while right-sizing the federal deployment footprint.”<sup>26</sup>

In addition, the Government of Puerto Rico has embarked on an ambitious recovery plan that has, among other aims, been designed to improve Puerto Rico's resilience in the face of future disasters:

To build the new Puerto Rico to meet the current and future needs of the people through sustainable economic development and social transformation;

---

<sup>24</sup> Nelson and Dillon, 2001, p. 2; Reginald DesRoches, Mary Comerio, Marc Eberhard, Walter Mooney, and Glenn J. Rix, “Overview of the 2010 Haiti Earthquake,” *Earthquake Spectra*, Vol 27, No. S1, October 2011.

<sup>25</sup> Nelson and Dillon, 2001, p. 2.

<sup>26</sup> FEMA, 2018e, p. vii.

transparent and innovative approaches to governance; resilient modern, and state-of-the-art infrastructure; and a safe, educated, healthy, and sustainable society.<sup>27</sup>

Observing that Puerto Rico’s “emergency services were immobilized” by Hurricane Maria,<sup>28</sup> the commonwealth’s plan embraces the objective of “emergency services modernization and integration” at the state and municipal levels and a strategic initiative to “[e]nhance public safety and first responders’ ability to deliver reliable, modern, and integrated emergency services”:<sup>29</sup>

Many needed improvements are captured by capital investments discussed in the previous chapter, such as upgrading communications channels used by emergency response personnel; establishing data systems and centers to support decisionmaking, particularly during the response phase directly after an event; building capacity for treating acute and chronic conditions during and after an emergency; and ensuring road conditions allow first responders to reach people with acute needs immediately. In addition, the Government of Puerto Rico and municipalities will need resources to improve emergency preparedness and support response and recovery planning.<sup>30</sup>

The plan also mentions actions taken with respect to the PRNG but only in two specific contexts:

- National Guard facilities are explicitly included among the public buildings that are identified for repair and/or improvement in the recovery plan.<sup>31</sup>
- The plan calls establishing “a protocol in coordination with the National Guard to support local and state-level agencies’ efforts for management of response commodities for shelters.”<sup>32</sup>

Taken together, Puerto Rico’s recovery plans could well reduce the requirement for DoD, capabilities, but it will be important for USARNORTH, USNORTHCOM, and DoD to monitor developments there to better assess capability gaps and calibrate potential future demands: for the foreseeable future, the success of actions by the Government of Puerto Rico and the National Guard Bureau to improve the readiness, resilience, and capabilities of the PRNG should, therefore, remain an area of continuing interest.

---

<sup>27</sup> Government of Puerto Rico, 2018, p. ix.

<sup>28</sup> Government of Puerto Rico, 2018, p. 69.

<sup>29</sup> Government of Puerto Rico, 2018, p. xiii.

<sup>30</sup> Government of Puerto Rico, 2018, p. 147. This strategic initiative is underwritten by 10 more specific recommendations. The specific recommendations address disaster preparedness data analysis and decision support capability, capacity building for community-level preparedness and response, capacity building to incorporate hazard risk reduction into planning and design, resilience building in collaboration with high-risk communities, public information and communication capability for coordinated recovery, capacity building for emergency shelter planning, strengthening emergency management capacity at municipalities, incentivize the design of creative solutions to addressing disaster hazards, building grant writing capacity, and strengthen local nonprofit and NGO involvement in disaster recovery (Government of Puerto Rico, 2018).

<sup>31</sup> Government of Puerto Rico, 2018, p. 132.

<sup>32</sup> Government of Puerto Rico, 2018, p. 296 and elsewhere.

## *Potential Required DoD Capabilities*

As just described, the potential requirements for DoD capabilities in future disasters in Puerto Rico and the USVI will depend greatly on the type and magnitude of the disaster and on local efforts to improve resilience and to develop more capable emergency response capabilities. That said, our research suggests that a number of DoD capabilities could be required in future responses to major disasters in Puerto Rico and the USVI.<sup>33</sup>

We first note that many of the DoD capabilities that are likely to be required in future disaster responses in Puerto Rico and the USVI have already been formalized in DoD PSMA (Table 9.3). Some of these capabilities—emergency route clearance capabilities, for example—would be excellent candidates for prepositioning for PREMA, the PRNG, or USAR in Puerto Rico, assuming they could be maintained in sufficiently hardened shelters near airports or seaports such that they could withstand another major hurricane to make an early contribution in establishing the flow of personnel, equipment, and commodities into Puerto Rico.

In addition to the capabilities that have been formalized in DoD PSMA, our analysis of MA in the responses to hurricanes Irma and Maria in Puerto Rico and the USVI revealed additional capabilities that also could be required and be likely to contribute to future disaster responses there (Table 9.4).<sup>34</sup>

Taken together, the items in Tables 9.3 and 9.4 provide what might be thought of as the DoD capabilities that would provide the “90 percent solution” for most future DoD responses, although we also highlight some additional capabilities that appear to be particularly important for improving the speed of future DoD responses.

With this review in mind, our analyses suggested that several additional DoD capabilities could be particularly helpful for overcoming the key challenges that affected DoD’s speed of response in Irma and Maria.

The first set of DoD capability recommendations relates to increasing the preparedness and resilience of military forces in Puerto Rico and the USVI:

- *DSCA missioning of Puerto Rico-based military capabilities.* As part of the effort to enhance Puerto Rico’s resilience—and lessen the requirement for Title 10 forces in a future disaster response—DoD, USAR, and the National Guard Bureau might give all PR-based forces a secondary mission of DSCA, and ensure that they are resourced, organized, trained and equipped to respond to a future, Maria-like disaster. In a similar vein, it will be important to ensure that Puerto Rico and USVI DSC organizations are up to the task of C2 for both National Guard and Title 10 forces.

---

<sup>33</sup> Based on information from interviews with various USARNORTH staff and with both the first and replacement DCOs, October and November 2017.

<sup>34</sup> In some cases, the MAs in Table 9.4 are simply more-specific versions of the PSMA in Table 9.3.

**Table 9.3. 28 DoD Prescribed Mission Assignments, as of June 2014**

| Category                          | PSMA Number | PSMA Title                                                                                                                 |
|-----------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------|
| Incident awareness and assessment | PSMA-141    | Airborne C2 - Emergency Management Support                                                                                 |
|                                   | PSMA-226    | Aerial Imagery                                                                                                             |
|                                   | PSMA-229    | Full Motion Video (FMV) Capability                                                                                         |
| Theater opening                   | PSMA-70     | Fuel Distribution Points - Ground Vehicle                                                                                  |
|                                   | PSMA-138    | Tactical (Ground) Transportation Support                                                                                   |
|                                   | PSMA-139    | Strategic Transportation Support                                                                                           |
|                                   | PSMA-182    | Emergency Route Clearance                                                                                                  |
|                                   | PSMA-259    | Fuel Distribution Points - Military Rotary Wing Aircraft                                                                   |
| Search and rescue                 | PSMA-210    | DoD ESF 9, Rotary Wing Lift (Medium) for search and rescue (FOS [federal operations support]/direct federal assistance/TA) |
| C2                                | PSMA-76     | Post-Declaration DoD, DCO/DCE (Defense Coordinating Officer /Defense Coordinating Element)                                 |
| Medical                           | PSMA-228    | Temporary Medical Treatment Facilities                                                                                     |
|                                   | PSMA-269    | Rotary Wing Medical Patient Evacuation                                                                                     |
|                                   | PSMA-272    | Activate Patient Movement Enablers                                                                                         |
|                                   | PSMA-273    | Aeromedical Evacuation                                                                                                     |
| Aviation                          | PSMA-136    | DOD/ESF 1 Rotary Wing Lift (Medium)                                                                                        |
|                                   | PSMA-137    | DoD/ESF 1, Rotary Wing Lift (Heavy)                                                                                        |
|                                   | PSMA-140    | Air Component Coordination Element (ACCE)                                                                                  |
|                                   | PSMA-143    | Airspace Control (Ground)                                                                                                  |
| Communications                    | PSMA-170    | Public Affairs Broadcast Transmission Support                                                                              |
|                                   | PSMA-148    | ESF 2, Communications Support to First Responders                                                                          |
|                                   | PSMA-149    | ESF 2, 25-User Communications Package (Fixed Site Teams)                                                                   |
|                                   | PSMA-150    | 75-User Communications Package                                                                                             |
| Other                             | PSMA-31     | Regional and National Activation, Pre-Declaration                                                                          |
|                                   | PSMA-50     | Prepare Sites for Temporary Housing Sites                                                                                  |
|                                   | PSMA-65     | Incident Support Base                                                                                                      |
|                                   | PSMA-66     | Federal Teams Staging Facility                                                                                             |
|                                   | PSMA-271    | Activate Federal Coordinating Center                                                                                       |
|                                   | PSMA-225    | Mortuary Affairs Assistance                                                                                                |

SOURCE: FEMA, *Pre-Scripted Mission Assignments Catalog*, Washington, D.C., June 2014, p. 4.

- *Prepositioning of key early enablers.* Some capabilities, such as heavy equipment for air and seaport debris clearance and repair, clearance of roads near air- and seaports, could speed up the deployment and buildup of DoD forces in a future disaster, while prepositioned capabilities for the repair of dams and water works could save lives or reduce suffering and damage. Although such capabilities arguably should be commonwealth capabilities (e.g., PREMA, or PRNG), Puerto Rico–based USAR also might be assigned these capabilities, and DoD’s excess property programs could be a source for many of them.

**Table 9.4. Additional and Refined Mission Assignments from Hurricanes Irma and Maria**

| Category                          | MA Subject                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Incident awareness and assessment | Weather radar and radar support<br>CAISE<br>Civil affairs community coordination and liaison                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Theater opening                   | Airport joint assessment teams and airfield survey teams<br>Aerial port operations teams<br>Airfield management and commodity distribution<br>MCTs<br>Hydrographic data collection to support port-opening<br>Roll-on, roll-off operations port support and vessel operations<br>MSC C2 element<br>Jet fuel delivery<br>Aircraft refueling capability for rotary-wing aircraft<br>Power restoration<br>Field service unit laundry and bath<br>Civilian surge capacity force<br>Logistics civil augmentation program |
| Search and rescue                 | Fixed-wing C3 platforms to assist search and rescue<br>High-water-capable ground transportation search-and-rescue capabilities                                                                                                                                                                                                                                                                                                                                                                                      |
| C2                                | Planning support<br>Public affairs support                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Medical                           | Deployable temporary medical treatment facilities<br>Deployable surgical intervention services (via DCRF)<br>Medical support facilities<br>Hospital ship                                                                                                                                                                                                                                                                                                                                                            |
| Engineering                       | DoD teams for water supply system survey<br>Water purification                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Maritime                          | Maritime support                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

- *Hardening of Puerto Rico–based facilities, equipment, and personnel.* USACE or other DoD engineering organizations could be tasked with hardening prepositioned equipment sets, headquarters, air- and seaports, or other facilities as part of their training.

The following additional DoD capabilities could speed up future disaster responses in Puerto Rico and the USVI:

- *Capabilities for establishing predisaster conditions.* To facilitate the familiarization of deploying forces with Puerto Rican and USVI human terrain, it will be important to accumulate all manner of territorial handbooks and other reference sources on Puerto Rico and USVI and to resource intelligence support updates to these materials. In addition, efforts should be made to accumulate—or commission—engineering and other studies or system models that map key infrastructure and functional or lifeline systems (e.g., power, communications, water) to better illuminate critical dependencies between these infrastructures and systems and to provide a basis for planning and prioritizing

future responses.<sup>35</sup> Such efforts also could be invaluable in bootstrapping earlier situational awareness and a COP, as discussed next.

- *Situational awareness, COP development, planning, assessment, and liaison capabilities.* Early integration of DoD situational awareness, COP development, planning, assessment, and liaison capabilities with DoD partners is essential. When SLTTs remain in the lead, such efforts will impose only a small burden on DoD, but when SLTTs are unable to plan and lead responses, it will be critically important to have sufficient capabilities to integrate with FEMA and other federal responders. The capabilities needed to expand DCO/E liaisons to meet these sorts of requirements will be of particular importance.
- *JRSOI.* A total of nearly ten days passed between Maria making landfall on September 20 and the transition of authority to JFLCC on September 30. The ability to perform JRSOI of land forces, if needed, will therefore be a key DoD capability for future disasters in Puerto Rico and the USVI. This can be ensured either (1) by opting to use a JFLCC, which has these capabilities, in future such operations; (2) integrating a plug-in organization that can provide a JRSOI capability when another component is chosen for C2 of the operation; or (3) ensuring that future JFMCCs (and even, perhaps, JFACCs) in the USNORTHCOM AOR have organic capabilities for JRSOI of land forces.

Although many of these capability requirements can be formalized in additional PSMAAs, as described earlier, the actual DoD capabilities that might be needed in a future incident will greatly depend on the specific type and magnitude of the incident; the preincident actions taken to improve local, organic capabilities and resilience; and the capabilities and capacity that other, non-DoD partners can contribute.

## Chapter Conclusions

The following points summarize how we addressed the four cross-cutting questions in this chapter:

- Current doctrine provides adequate flexibility for tailoring C2 and operations to meet the requirements of foreseeable future incidents but should be updated to illustrate how doctrine was adapted in the Hurricane Irma and Maria response.
- We offered various recommendations for improving DoD' speed of response in future incidents, including strengthening Puerto Rico and USVI-based capabilities, ensuring JRSOI for land forces, improving the capability to transition to a federal lead, improving integration with FEMA planners, and improving information on predisaster conditions.

---

<sup>35</sup> Useful sources for construction of a territorial handbook (or library) can be found in USARNORTH engineers' excellent July 2017 analysis of the response infrastructure in Puerto Rico, which is not available to the general public. In a similar vein, the DCE for Region VI and the Director of Operational Plans for Louisiana produced a voluminous, 390-page "battle book" for Louisiana that could serve as a model for a similar analysis of Puerto Rico and the USVI (Hogan and Kenney, undated). Another potentially useful source is FEMA, 2014b, and subsequent updates. Finally, the near-real-time results from USACE's Post Landfall Debris Model, which gives detailed damage forecasts in advance of a hurricane making landfall, seem likely to be useful for informing planning for future hurricane responses. For an example of the application of the debris model involving Hurricane Maria, see USACE, "Hurricane Maria Debris Model: Landfall Expected in About 78 Hours," briefing slides, September 17, 2017.

- For states or territories with limited capability and capacity, the responses to hurricanes Irma and Maria in Puerto Rico and the USVI suggest that DoD should be prepared to support federal assumption of planning and leadership functions with additional planners, liaisons, and other capabilities and to provide the full set of capabilities for standing DoD PSMAAs and MAs/MATOs observed in the responses to hurricanes Irma and Maria.
- While the conditions in Puerto Rico and the USVI were unique for various reasons, other states and territories might have similar challenges. The standing DoD PSMAAs and those observed in the hurricanes Irma and Maria response are the “90-percent solution” and will serve DoD well in the future. In addition, we identify a number of other DoD capabilities that should help to facilitate a speedier DoD response in the future.

While we believe that DoD can take several actions that might improve future responses in cases similar to Hurricane Maria, most of the capability changes would need to take place within Puerto Rico and the USVI. These include mitigation, enhanced emergency preparedness for future responses, prepositioning and hardening of key facilities and early entry capabilities and enablers, and similar sorts of actions.

DoD, including the National Guard Bureau, should work with FEMA, Puerto Rico, the PRNG, and the USVI to identify the most cost-effective options for closing capability gaps and an appropriate division of labor that does not create disincentives for Puerto Rico and the USVI to invest in capabilities themselves. For example, DoD, working through the Defense Logistics Agency, the Defense Excess Property Program, or other programs, would appear to be well-positioned to help Puerto Rico and the USVI identify selective, judicious, and high-leverage investments that could substantially increase their capability levels, reduce requirements for DoD capabilities in future hurricane responses, and improve the speed of response for DoD capabilities that might be needed.<sup>36</sup> Thus, another important role for DoD (and FEMA as well) may be to serve as an advocate for capabilities and resources for Puerto Rico and the USVI that would enable them to become more self-sufficient in future incidents.

---

<sup>36</sup> For example, prepositioning of debris-clearing capabilities could be achieved through the procurement or donation to the PRNG of excess DoD bulldozers and construction of hurricane-hardened shelters to house them near airports, seaports, or other locations so that they are immediately available in the aftermath of the next Category 4 or Category 5 hurricane.

## 10. Conclusions

---

As described in Chapter 1, Hurricane Maria meets standard U.S. government definitions of a catastrophic incident, event, and/or complex catastrophe: 65 direct deaths and an estimated 2,910 indirect deaths in Puerto Rico, two direct deaths in the USVI, and an estimated \$90 billion in damage to key infrastructure and systems.

In Chapter 9, we argued that, while Puerto Rico's and the USVI's geographic location and circumstances place them at continuing risk of experiencing future major hurricanes, earthquakes, or volcanic events, investments for recovery, risk mitigation, and emergency preparedness against future harms could help to increase the islands' resilience against the sorts of catastrophic impacts that occurred in September 2017 and thereby reduce the scope and scale of the support that might be required from CONUS, over 1,000 miles away.

The State of Hawaii and U.S. Pacific territories and possessions in the USINDOPACOM AOR also are insular and distant from CONUS and also may be vulnerable to more frequent and violent tropical cyclones: DoD and USINDOPACOM may well benefit from many of the lessons of Hurricane Maria, and these islands could benefit from the sorts of post-Maria mitigation and other remedial actions that are currently being undertaken to increase the resilience of Puerto Rico and USVI.

Beyond tropical cyclones and warming trends, other catastrophic incidents, events, or complex catastrophes—major earthquakes along the San Andreas or New Madrid faults, for example, or in the Cascadia subduction zone or even a nuclear attack from a nation-state actor, such as North Korea—would likely create governance vacuums at the local level and require a significant response.<sup>1</sup>

That said, the likelihood is probably reasonably low that *both* local and state response capabilities would simultaneously be incapacitated in such incidents in the fashion observed following Hurricane Maria in Puerto Rico and that local and state governments would be isolated from neighboring states that can provide assistance. In such cases, adjacent EMAC states would be expected to be able to contribute much greater capabilities much more quickly than in Hurricane Maria in Puerto Rico, and the need for Title 10 forces would accordingly be much diminished.

Nonetheless, a complex catastrophe could present many of the same challenges that were encountered in Puerto Rico and the USVI, including issues with the development of situational awareness and a COP of the scope and scale of harm and with prioritizing and synchronizing life-saving and life-sustaining relief efforts to ensure unity of effort. It is well that, through

---

<sup>1</sup> Indeed, a major theme of FEMA's AAR for the 2018 hurricane season is the need to better prepare for catastrophic incidents.

Vigilant Guard, Ardent Sentry, and other exercises, USARNORTH and its subordinate organizations have increasingly been wrestling with the potential demands of real-world catastrophic disasters and establishing the essential relationships with state and local partners that will contribute to an effective response.<sup>2</sup>

Finally, the multiple, overlapping disasters encountered during the 2017 hurricane also suggest that a larger conversation needs to take place regarding a U.S. government-wide strategic concept for DSCA responses. Such a concept would center on policy decisions on the number, types, and sizes of overlapping incidents that will be used as pacing functions for determining future response capabilities, whether FEMA and its civilian partners or DoD, USNORTHCOM, or USARNORTH, and what capabilities SLTT governments will provide. Such a conversation would appear to be an essential starting point for the necessary policy and operational analyses to guide the development of whole-of-nation response capabilities.<sup>3</sup>

---

<sup>2</sup> See, for example, Tomora Nance, “Vigilant Guard 2018 Improves Skills, Partnership,” press release, Joint Base San Antonio, Tex.: U.S. Army North Public Affairs, March 27, 2018, and Karen Roganov, “Preparations Underway for Ardent Sentry 2019,” press release, Fort Eustis, Va.: Joint Task Force Civil Support, July 12, 2018.

<sup>3</sup> For more on the establishment of requirements for DSCA responses, see Eric V. Larson and John E. Peters, *Preparing the U.S. Army for Homeland Security: Concepts, Issues, and Options*, Santa Monica, California: RAND Corporation, MR-1251-A, 2001.

## A. Chronology of the 2017 Hurricane Season

---

**Table A.1. Chronology of Key Events in 2017 Hurricane Season, August–December 2017**

| Date              | Harvey                                                    | Irma                                                    | Maria | Nate |
|-------------------|-----------------------------------------------------------|---------------------------------------------------------|-------|------|
| August 17, 2017   | Named a tropical storm by NHC; hurricane warnings issued  |                                                         |       |      |
| August 23, 2017   | Emergency declaration for Texas issued (Governor Abbott)  |                                                         |       |      |
| August 24, 2017   | Classification updated from tropical storm to hurricane   |                                                         |       |      |
|                   | Upgraded to a Category 2 hurricane                        |                                                         |       |      |
| August 25, 2017   | Upgraded to Category 3 hurricane at 2 p.m.                |                                                         |       |      |
|                   | Upgraded to Category 4 hurricane at 6 p.m.                |                                                         |       |      |
|                   | Makes U.S. landfall in Rockport, Texas (Category 4)       |                                                         |       |      |
|                   | Major disaster declaration issued for Texas (DR-4332)     |                                                         |       |      |
| August 26, 2017   | Downgraded to Category 1 as the hurricane passes overland |                                                         |       |      |
| August 28, 2017   | Emergency declaration issued for Louisiana (EM-3382)      |                                                         |       |      |
| September 5, 2017 |                                                           | Classification updated from tropical storm to hurricane |       |      |

| Date              | Harvey | Irma                                                       | Maria | Nate |
|-------------------|--------|------------------------------------------------------------|-------|------|
|                   |        | Expected to be an extremely dangerous Category 5 hurricane |       |      |
|                   |        | Storm warnings issued for Bahamas and Turks and Caicos     |       |      |
|                   |        | Emergency declaration issued for the USVI (EM-3383)        |       |      |
|                   |        | Emergency declaration issued for Puerto Rico (EM-3384)     |       |      |
| September 5, 2017 |        | Emergency declaration issued for the USVI (EM-3383)        |       |      |
|                   |        | Emergency declaration issued for Puerto Rico (EM-3384)     |       |      |
|                   |        | Emergency declaration issued for Florida (EM-3385)         |       |      |
| September 6, 2017 |        | Hurricane eye passes over Barbuda at 2 a.m.                |       |      |
|                   |        | Hurricane eye passes over St. Martin at 8 a.m.             |       |      |
|                   |        | Hurricane eye passes over the USVI at 2 p.m.               |       |      |
|                   |        | Hurricane eye passes over Puerto Rico at 8pm (Category 5)  |       |      |
|                   |        | Widespread power outages reported in Puerto Rico           |       |      |
| September 7, 2017 |        | Emergency declaration issued for South Carolina (EM-3386)  |       |      |
|                   |        | Major disaster declaration                                 |       |      |

| Date               | Harvey | Irma                                                               | Maria                                | Nate |
|--------------------|--------|--------------------------------------------------------------------|--------------------------------------|------|
|                    |        | Issued for the USVI (DR-4355)                                      |                                      |      |
|                    |        | Hurricane and surge warnings issued for Florida                    |                                      |      |
| September 8, 2017  |        | Hurricane passes over northern coast of Cuba                       |                                      |      |
|                    |        | Emergency declaration issued for Georgia (EM-3387)                 |                                      |      |
|                    |        | Emergency declaration issued for Seminole Tribe, Florida (EM-3388) |                                      |      |
| September 10, 2017 |        | Makes first U.S. landfall in Cudjoe Key, Florida (Category 4)      |                                      |      |
|                    |        | Makes second U.S. landfall on Marco Island, Florida (Category 3)   |                                      |      |
|                    |        | Major disaster declaration issued for Puerto Rico (DR-4336)        |                                      |      |
|                    |        | Major disaster declaration issued for Florida (DR-4337)            |                                      |      |
| September 11, 2017 |        | Emergency declaration issued for Alabama (EM-3389)                 |                                      |      |
| September 15, 2017 |        | Major disaster declaration issued for Georgia (DR-4338)            |                                      |      |
| September 16, 2017 |        |                                                                    | Named a tropical storm.              |      |
| September 17, 2017 |        |                                                                    | Upgraded to Cat 5 hurricane.         |      |
| September 18, 2017 |        |                                                                    | Hits island of Dominica (Category 5) |      |
|                    |        |                                                                    | Emergency declaration                |      |

| Date               | Harvey | Irma                                                                    | Maria                                                                                                                              | Nate                          |
|--------------------|--------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
|                    |        |                                                                         | issued for the USVI (EM-3390)                                                                                                      |                               |
|                    |        |                                                                         | Emergency declaration issued for Puerto Rico (EM-3391)                                                                             |                               |
| September 19, 2017 |        |                                                                         | Hits the U.S. Virgin Island of St. Croix (Category 4)                                                                              |                               |
| September 20, 2017 |        |                                                                         | Makes landfall near Yabucoa, Puerto Rico (Category 4), resulting in an islandwide power outage and limited running water           |                               |
|                    |        |                                                                         | Major disaster declaration issued for Puerto Rico (DR-4339)                                                                        |                               |
|                    |        |                                                                         | Major disaster declaration issued for the USVI (DR-4340)                                                                           |                               |
| September 22, 2017 |        |                                                                         | National Weather Service orders evacuation of 70,000 people living near Guajataca River, Puerto Rico, because of a compromised dam |                               |
|                    |        |                                                                         | Hurricane hits Turks & Caicos (Category 3)                                                                                         |                               |
| September 25, 2017 |        |                                                                         | Medical supply shortages reported in Puerto Rico; few medical centers have functioning generators                                  |                               |
| September 26, 2017 |        |                                                                         | Downgraded to a tropical storm as Maria continues over sea                                                                         |                               |
| September 27, 2017 |        | Major disaster declaration issued for Seminole Tribe, Florida (DR-4341) |                                                                                                                                    |                               |
| October 5, 2017    |        |                                                                         |                                                                                                                                    | Tropical storm Nate forms off |

| Date              | Harvey                                                    | Irma                                                           | Maria | Nate                                                        |
|-------------------|-----------------------------------------------------------|----------------------------------------------------------------|-------|-------------------------------------------------------------|
|                   |                                                           |                                                                |       | the coast of Nicaragua                                      |
| October 6, 2017   |                                                           |                                                                |       | Classification updated from tropical storm to hurricane     |
|                   |                                                           |                                                                |       | Emergency declaration issued for Louisiana (EM-3392)        |
|                   |                                                           |                                                                |       | Emergency declaration issued for Mississippi (EM-3393)      |
| October 7, 2017   |                                                           |                                                                |       | Makes first landfall in southeast Louisiana (Category 1)    |
|                   |                                                           |                                                                |       | Emergency declaration issued for Mississippi (EM-3393)      |
| October 8, 2017   |                                                           |                                                                |       | Makes second landfall in Biloxi, Mississippi (Category 1)   |
|                   |                                                           |                                                                |       | Emergency declaration issued for Alabama (EM-3394)          |
|                   |                                                           |                                                                |       | Emergency declaration issued for Florida (EM-3395)          |
| October 16, 2017  | Major disaster declaration issued for Louisiana (DR-4345) | Major disaster declaration issued for South Carolina (DR-4346) |       |                                                             |
| November 16, 2017 |                                                           |                                                                |       | Major disaster declaration issued for Alabama (DR-4350)     |
| November 22, 2017 |                                                           |                                                                |       | Major disaster declaration issued for Mississippi (DR-4350) |

SOURCE: FEMA, additional sources.

## B. Public Affairs and Strategic Communication Data

**Table B.1. Analysis of Events in General Buchanan's Interview Log,  
September 29–November 13, 2017**

|                                | Event Count | Percentage of Total |
|--------------------------------|-------------|---------------------|
| Media level                    |             |                     |
| National                       | 32          | 45.1                |
| Local                          | 29          | 40.8                |
| International                  | 6           | 8.5                 |
| Military                       | 4           | 5.6                 |
| Media type                     |             |                     |
| Television                     | 25          | 39.7                |
| Print                          | 24          | 38.1                |
| Online                         | 8           | 12.7                |
| Radio                          | 6           | 9.5                 |
| Event category                 |             |                     |
| Meeting                        | 35          | 35.7                |
| Interview                      | 23          | 25.5                |
| Embedded journalist            | 22          | 22.4                |
| Press conference               | 7           | 7.1                 |
| Press release                  | 7           | 7.1                 |
| Briefing                       | 1           | 1.0                 |
| Phone call                     | 1           | 1.0                 |
| Meeting participants           |             |                     |
| Mayor                          | 29          | 55.8                |
| U.S. military representative   | 6           | 11.5                |
| U.S. delegation                | 5           | 9.6                 |
| Governor                       | 4           | 7.7                 |
| FEMA representative            | 4           | 7.7                 |
| Municipality representative    | 2           | 3.8                 |
| President of the United States | 1           | 1.9                 |
| Vice President                 | 1           | 1.9                 |

SOURCE: "General Buchanan Interview Log," in USARNORTH, 2018a, pp. 57–59.

NOTE: Total of 45 daily codable entries. Most days had multiple events, but not all could be coded according to all criteria, e.g., media level was only coded in cases where codable media outlets were mentioned.

**Table B.2. Locations of Events**

| <b>Location</b> | <b>Number of Visits</b> |
|-----------------|-------------------------|
| Aquadilla       | 1                       |
| Arecibo         | 2                       |
| Barranquitas    | 1                       |
| Bayamon         | 1                       |
| Cabo Rojo       | 1                       |
| Caguas          | 2                       |
| Canovanas       | 2                       |
| Carolina        | 1                       |
| Cayey           | 2                       |
| Ceiba           | 1                       |
| Cidra           | 1                       |
| Culebra         | 1                       |
| Dorado          | 1                       |
| Guayama         | 2                       |
| Humacao         | 1                       |
| Jayuya          | 1                       |
| Las Marias      | 1                       |
| Las Piedras     | 1                       |
| Lares           | 1                       |
| Luquillo        | 1                       |
| Mayaguez        | 2                       |
| Morovis         | 2                       |
| Naguabo         | 1                       |
| Naranjito       | 1                       |
| Ponce           | 4                       |
| San Juan        | 1                       |
| Toa Baja        | 2                       |
| Trujillo Alto   | 1                       |
| Utuado          | 3                       |
| Vieques         | 1                       |
| Yabucoa         | 1                       |
| Yauco           | 2                       |

SOURCE: "General Buchanan Interview Log," in USARNORTH, 2018a, pp. 57–59.

**Table B.3. Analysis of Local Newspaper Reporting**

|                                            | Count | Percent |
|--------------------------------------------|-------|---------|
| Media outlet                               |       |         |
| <i>El Nuevo Dia</i>                        | 51    | 45.9    |
| <i>El Vocero</i>                           | 42    | 37.8    |
| <i>Primera Hora</i>                        | 16    | 14.4    |
| <i>Metro</i>                               | 2     | 1.8     |
| Event reported                             |       |         |
| General reporting                          | 97    | 88.2    |
| Meeting                                    | 8     | 7.3     |
| Timeline                                   | 3     | 2.7     |
| Press conference                           | 2     | 1.8     |
| Topic area                                 |       |         |
| Energy                                     | 28    | 24.3    |
| Coordination of relief/supplies            | 20    | 17.4    |
| Economic impact                            | 15    | 13.0    |
| Healthcare/hospitals                       | 13    | 11.3    |
| Judiciary (crimes, courts, investigations) | 13    | 11.3    |
| Education                                  | 9     | 7.8     |
| Infrastructure                             | 6     | 5.2     |
| Water                                      | 6     | 5.2     |
| Elections                                  | 4     | 3.5     |
| Environment                                | 1     | 0.9     |
| People or entities mentioned               |       |         |
| Puerto Rican government representative     | 18    | 17.5    |
| U.S. military                              | 17    | 16.5    |
| Governor                                   | 15    | 14.6    |
| Mayor                                      | 10    | 9.7     |
| U.S. government representative             | 9     | 8.7     |
| FEMA                                       | 9     | 8.7     |
| Autoridad de Energía Eléctrica             | 7     | 6.8     |
| Puerto Rico Electric Power Authority       | 7     | 6.8     |
| Buchanan                                   | 6     | 5.8     |
| President of the United States             | 5     | 4.9     |
| Tone                                       |       |         |
| Negative                                   | 46    | 41.4    |
| Neutral                                    | 46    | 41.4    |
| Positive                                   | 19    | 17.1    |

SOURCE: Local media reporting compiled by MAJ Jason Morales and MAJ Samuel Figueroa of U.S. Army North during Hurricane Maria operations.

**Table B.4. Newspaper Reporting  
Locations**

| <b>Location</b> | <b>Count</b> |
|-----------------|--------------|
| Adjuntas        | 1            |
| Arecibo         | 4            |
| Arroyo          | 1            |
| Barceloneta     | 1            |
| Barranquitas    | 1            |
| Bayamon         | 5            |
| Cabo Rojo       | 1            |
| Caguas          | 1            |
| Canovanas       | 1            |
| Carmen Yulin    | 2            |
| Carolina        | 2            |
| Cayey           | 1            |
| Ciales          | 1            |
| Cidra           | 1            |
| Comerio         | 1            |
| Culebra         | 1            |
| Dorado          | 1            |
| Guaynabo        | 1            |
| Humacao         | 1            |
| Juana Diaz      | 1            |
| Juncos          | 2            |
| Las Marias      | 1            |
| Las Piedras     | 2            |
| Manati          | 2            |
| Maunabo         | 1            |
| Mayaguez        | 3            |
| Palo Seco       | 3            |
| Patillas        | 1            |
| Ponce           | 2            |
| San Juan        | 6            |
| Toa Baja        | 2            |
| Utuado          | 1            |
| Vega Baja       | 1            |
| Vieques         | 1            |

## Bibliography

---

- “101st Airborne Gets to Work in Puerto Rico, Transports Med Teams,” *Leaf-Chronicle*, September 29, 2018.
- “2017 Atlantic Hurricane Season Fast Facts,” CNN Library, December 15, 2017, 10:36 a.m. ET. As of March 5, 2018:  
<https://www.cnn.com/2017/05/15/us/2017-atlantic-hurricane-season-fast-facts/index.html>
- “2017 Saw Record Insured Losses from Disasters, Study Finds,” Associated Press, April 20, 2018.
- ADP—*See* Army Doctrine Publication.
- ADRP—*See* Army Doctrine Reference Publication.
- Advanced Distributed Learning Initiative, “Pervasive Learning System (PERLS),” webpage, undated. As of November 8, 2019:  
<https://adlnet.gov/projects/perls/>
- Angell, Cory and Doug Roles, “Division Commanders Discuss DART, Other Issues,” press release, February 16, 2010. As of April 23, 2018:  
<http://www.nationalguard.mil/News/Article-View/Article/576621/division-commanders-discuss-dart-other-issues/>
- Angelo, John, “Red Bulls Standby for National Emergencies,” *Northstar Guard Online*, October 24, 2011.
- Army Doctrine Publication 3-28, *Defense Support of Civil Authorities*, July 26, 2012.
- Army Doctrine Reference Publication 3-28, *Defense Support of Civil Authorities*, Washington, D.C.: Headquarters Department of the Army, June 2013.
- Army Techniques Publication 3-28.1, *Multi-Service Tactics, Techniques and Procedures for Defense Support to Civil Authorities (DSCA)*, Air Land Sea Application Center, September 2015.
- Army Techniques Publication 3-93, *Theater Army Operations*, Washington, D.C.: Headquarters Department of the Army, November 2014.
- Army National Guard, *Army National Guard Annual Financial Report, FY 2015*, 2015. As of July 22, 2019:  
<https://www.nationalguard.mil/Portals/31/Documents/ARNGpdfs/FYFinancialReports/FY%202015%20Financial%20Report.pdf>

ATP—See Army Techniques Publication.

Ballhaus, Rebecca, and Siobhan Hughes, “Trump Is Set to Visit Puerto Rico to Survey Hurricane Damage,” *Wall Street Journal*, September 26, 2017. As of July 19, 2019:

<https://www.wsj.com/articles/trump-to-visit-puerto-rico-to-survey-hurricane-damage-1506439721>

Biese, Tristan, “AF Medics Deploy to Puerto Rico, Aid Hurricane Relief Efforts,” Air Combat Command website, October 18, 2017. As of July 19, 2019:

<https://www.acc.af.mil/News/Article-Display/Article/1347716/af-medics-deploy-to-puerto-rico-aid-hurricane-relief-efforts/>

Blanton, Dana, “Fox News Poll: Storms Erode Trump’s Ratings,” Fox News, October 25, 2017, as of November 20, 2019:

<https://www.foxnews.com/politics/fox-news-poll-storms-erode-trumps-ratings>

Blum, Steven, “Army National Guard Division and Brigade Combat Team Designations,”

Washington, D.C.: National Guard Bureau, November 7, 2005. As of July 22, 2019:

<https://www.ausa.org/sites/default/files/TBSR-2005-ARNG-Division-and-Brigade-Combat-Team-Designations.pdf>

Brooks, Drew, “Fort Bragg Troops Aid Puerto Rico Assistance,” *Fayetteville Observer*, September 27, 2017. As of July 15, 2019:

<http://www.fayobserver.com/news/20170927/fort-bragg-troops-aid-puerto-rico-assistance>

Bureau of the Census, “Puerto Rico and the Outlying Areas,” *Geographic Areas Reference Manual*, Washington, D.C.: U.S. Department of Commerce, November 1994, pp. 7-1 to 7-42.

As of November 8, 2019:

<https://www.census.gov/programs-surveys/geography/guidance/geographic-areas-reference-manual.html>

Burke, Ryan, and Sue McNeil, *Toward a Unified Military Response: Hurricane Sandy and the Dual Status Commander*, Carlisle, Pa.: U.S. Army War College Press, April 2015.

Castro, Ruth, “1st MSC Soldiers Receive Satisfaction by Helping Others,” U.S. Army Reserve website, October 9, 2017. As of July 19, 2019:

<https://www.usar.army.mil/News/News-Display/Article/1337596/1st-msc-soldiers-receive-satisfaction-by-helping-others/>

———, “LTG Luckey Recognizes Hurricane Maria Recovery Efforts,” U.S. Army Reserve website, October 26, 2017. As of July 19, 2019:

<https://www.usar.army.mil/News/News-Display/Article/1354215/ltg-luckey-recognizes-hurricane-maria-recovery-efforts/>

- Center for Army Lessons Learned, *Catastrophic Disaster Response Staff Officer's Handbook: Techniques and Procedures*, Combined Arms Center, Fort Leavenworth, Kan., No. 06-08, May 2006.
- Central Intelligence Agency, "Puerto Rico," The World Factbook website, undated. As of November 12, 2019:  
<https://www.cia.gov/library/publications/the-world-factbook/geos/rq.html>
- CFR—See Code of Federal Regulations.
- Chairman of the Joint Chiefs of Staff, "Defense Support of Civil Authorities," August 14, 2009, as of December 20, 2019:  
<https://info.publicintelligence.net/CJCS-DSCA-2009.pdf>
- , "Defense Support of Civil Authorities (DSCA) Standing EXORD," September 10, 2010, cited in CJCSI 3125.01C, 2012, p. E-5.
- Chairman of the Joint Chiefs of Staff Instruction 3125.01C, *Defense Response to Chemical, Biological, Radiological, and Nuclear (CBRN) Incidents in the Homeland*, Washington, D.C., June 4, 2012.
- Chase, Caitlin, Gregory Gonzalez, Daphne Gorman, and Sydney Higginbottom, *Assessing Critical Infrastructure in Puerto Rico's Coastal Zone*, Worcester, Mass.: Worcester Polytechnic Institute, May 4, 2011. As of November 8, 2019:  
[https://web.wpi.edu/Pubs/E-project/Available/E-project-050411-121701/unrestricted/Assessing\\_Critical\\_Infrastructure\\_in\\_the\\_Puerto\\_Rico\\_Coastal\\_Zone.pdf](https://web.wpi.edu/Pubs/E-project/Available/E-project-050411-121701/unrestricted/Assessing_Critical_Infrastructure_in_the_Puerto_Rico_Coastal_Zone.pdf)
- Chigi, George, and Donald Haus, *Hurricane Maria Relief Operations; Lessons and Best Practices*, Fort Leavenworth, Kan.: Center for Army Lessons Learned, January 5, 2018.
- Cisneros, Rigo, "Recovery Continues in Puerto Rico," U.S. Army Reserve website, January 30, 2018. As of July 19, 2019:  
<https://www.usar.army.mil/News/Article/1427379/recovery-continues-in-puerto-rico/>
- Civic Impulse, LLC, "Puerto Rico," GovTrack website, undated. As of July 17, 2019:  
<https://www.govtrack.us/congress/members/PR>
- CJCS—See Chairman of the Joint Chiefs of Staff.
- Code of Federal Regulations, Title 32, National Defense, Section 183.6, Defense Support of Special Events: Procedures.
- Code of Federal Regulations, Title 44, Emergency Management and Assistance, Chapter I, Federal Emergency Management Agency, Department of Homeland Security.

- Cordoba, Jose de, “Puerto Rico Tallies Up Devastation from Hurricane Maria,” *Wall Street Journal*, September 24, 2017. As of July 19, 2019:  
<https://www.wsj.com/articles/puerto-rico-tallies-up-devastation-from-hurricane-maria-1506294520>
- Cronk, Terri Moon, “DoD Continues Round-the Clock Support Following Hurricanes in Caribbean,” press release, September 25, 2017. As of May 21, 2018:  
<https://www.defense.gov/News/Article/Article/1323530/dod-continues-round-the-clock-support-following-hurricanes-in-caribbean/>
- Cummings, Allyson, “Vigilant Guard 18 in Its Final Days,” ABC Fox Montana website, March 8, 2018. As of April 6, 2018:  
<http://www.kfbb.com/story/37607564/vigilant-guard-18-in-its-final-days>
- Davidson, Philip S., *2017 Defense Support of Civil Authorities (DSCA)*, briefing, U.S. Fleet Forces Command, December 21, 2017.
- Davis, Lynn E., Jill Rough, Gary Cecchine, Agnes Gereben Schaefer, and Laurinda L. Zeman, *Hurricane Katrina: Lessons for Army Operations and Planning*, Santa Monica, Calif.: RAND Corporation, MG-603-A, 2007. As of July 17, 2019:  
<https://www.rand.org/pubs/monographs/MG603.html>
- DDASS—See U.S. Department of Defense, Defense Support of Civil Authorities Automated Support System.
- Defense Manpower Data Center, “Counts of Active Duty and Reserve Service Members and APF Civilians by Location Country, Personnel Category, Service and Component,” September 30, 2017.
- Department of Defense 7000.14-R, *Department of Defense Financial Management Regulation (DoD FMR)*, Vol. 11A: *Reimbursable Operations Policy*, Ch. 3, “Economy Act Orders,” March 2012. As of July 17, 2019:  
[https://comptroller.defense.gov/Portals/45/documents/fmr/Volume\\_11a.pdf](https://comptroller.defense.gov/Portals/45/documents/fmr/Volume_11a.pdf)
- Department of Defense 7000.14-R, *Department of Defense Financial Management Regulation (DoD FMR)*, Vol. 11A: *Reimbursable Operations Policy*, Ch. 1, “General Reimbursement Procedures and Supporting Documentation,” November 2014. As of July 17, 2019:  
[https://comptroller.defense.gov/Portals/45/documents/fmr/Volume\\_11a.pdf](https://comptroller.defense.gov/Portals/45/documents/fmr/Volume_11a.pdf)
- Department of Defense 7000.14-R, *Department of Defense Financial Management Regulation (DoD FMR)*, Vol. 11A: *Reimbursable Operations Policy*, Ch. 4, “User Fees,” July 2016. As of July 17, 2019:  
[https://comptroller.defense.gov/Portals/45/documents/fmr/Volume\\_11a.pdf](https://comptroller.defense.gov/Portals/45/documents/fmr/Volume_11a.pdf)

Department of Defense 7000.14-R, *Department of Defense Financial Management Regulation (DoD FMR)*, Vol. 12: *Special Accounts, Funds and Programs*, Ch. 23, “Contingency Operations,” December 2017.  
[https://comptroller.defense.gov/Portals/45/documents/fmr/Volume\\_12.pdf](https://comptroller.defense.gov/Portals/45/documents/fmr/Volume_12.pdf)

Department of Defense Directive 3025.18, *Defense Support of Civil Authorities*, Washington, D.C., December 29, 2010, change 1, September 21, 2012, p. 4.

Department of Defense Directive 3025.18, *Defense Support of Civil Authorities (DSCA)*, Washington, D.C., December 29, 2010, change 2, Effective March 19, 2018.

Department of Defense Instruction 3001.02, *Personnel Accountability in Conjunction with Natural or Manmade Disasters*, May 3, 2010. As of July 17, 2019:  
<https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/300102p.pdf>

Department of Defense Instruction 3025.16, *Defense Emergency Preparedness Liaison Officer (EPLO) Programs*, Washington, D.C.: U.S. Department of Defense, September 8, 2011, Change 1, May 8, 2017.

Department of Defense Instruction 3025.21, *Defense Support of Civilian Law Enforcement Agencies*, Washington, D.C.: U.S. Department of Defense, February 27, 2013.

Department of Defense Instruction 6055.17, *DoD Emergency Management (EM) Program, February 13, 2017*, Change 3 June 12, 2019. As of July 17, 2019:  
<https://www.esd.whs.mil/Portals/54/Documents/DD/issuances/dodi/605517p.pdf?ver=2019-06-12-074129-323>

Department of Defense Manual 3025.01, *Defense Support of Civil Authorities: DoD Incident Response*, Vol. 2, Washington, D.C., August 11, 2016.

Department of Military and Veterans’ Affairs, “Discussion Points: Military Affairs,” working paper, 2019. As of August 9, 2018:  
[http://www.njleg.state.nj.us/legislativepub/budget\\_2019/DMAVA\\_response\\_2019.pdf](http://www.njleg.state.nj.us/legislativepub/budget_2019/DMAVA_response_2019.pdf)

DesRoches, Reginald, Mary Comerio, Marc Eberhard, Walter Mooney, and Glenn J. Rix, “Overview of the 2010 Haiti Earthquake,” *Earthquake Spectra*, Vol 27, No. S1, October 2011, pp. S1–S32. As of November 12, 2019:  
<https://escweb.wr.usgs.gov/share/mooney/142.pdf>

DoD—See U.S. Department of Defense.

DoDD—See Department of Defense Directive.

DoDI—See Department of Defense Instruction.

DoDM—See Department of Defense Manual.

- Drye, Willie, “2017 Hurricane Season Was the Most Expensive in U.S. History,” *National Geographic*, November 30, 2017. As of January 2018:  
<https://news.nationalgeographic.com/2017/11/2017-hurricane-season-most-expensive-us-history-spd/>
- Enfield, David, Chunzai Wang, Sang-ki Lee, and Luis Cid-Serrano, “The Atlantic Multidecadal Oscillation: Impacts, Mechanisms & Projections,” briefing, 2001. As of November 20, 2019:  
[https://www.wcrp-climate.org/decadal/rsmas\\_decadal/talks/Day2/Enfield\\_rsmas.pdf](https://www.wcrp-climate.org/decadal/rsmas_decadal/talks/Day2/Enfield_rsmas.pdf)
- Executive Order 12656, *Assignment of Emergency Preparedness Responsibilities*, November 18, 1988.
- Executive Order 13618, *Assignment of National Security and Emergency Preparedness Communications Functions*, July 6, 2012.
- Federal Emergency Management Agency, “Glossary,” webpage, undated a. As of July 15, 2019:  
<https://emilms.fema.gov/IS822/glossary.htm>
- , “IS 293: Mission Assignment Overview,” webpage, undated b. As of March 25, 2018:  
<https://emilms.fema.gov/IS293/MAOsummary.htm>
- , “National Planning Scenarios,” fact sheet, Washington, D.C., undated c. As of January 2020:  
<https://www.hsdl.org/?view&did=683091>
- , “Updates and Articles, Blogs, and News Releases,” webpage, undated d. As of May 2018:  
<https://www.fema.gov/disaster/4339/updates-blog-and-news>
- , “Updates and Articles, Blogs, and News Releases,” webpage, undated e. As of May 2018:  
<https://www.fema.gov/disaster/4340/updates-blog-and-news>
- , *Pre-Scripted Mission Assignments Catalog*, Washington, D.C., June 2014a.
- , *FEMA Region II Hurricane Annex for Puerto Rico & US Virgin Islands*, October 20, 2014b.
- , *Response Federal Interagency Operational Plan*, Washington, D.C., August 2016a.
- , “Emergency Support Function Annexes,” webpage, updated September 13, 2016b. As of June 24, 2019:  
<https://www.fema.gov/media-library/assets/documents/25512>
- , “FEMA Provides Update on Federal Support to Hurricane Irma Response,” press release, HQ-17-121, September 16, 2017a. As of April 2018:

<https://www.fema.gov/news-release/2017/09/16/fema-provides-update-federal-support-hurricane-irma-response>

- , “FEMA Briefing,” September 28, 2017b. As of October 2019:  
<https://www.fema.gov/media-library-data/1506710200859-18058eab71d731c48f8d4ca13fae0429/0928fema.docx>
- , *National Incident Management System*, 3rd ed., Washington, D.C., October 2017c. As of June 25, 2019:  
[https://www.fema.gov/media-library-data/1508151197225-ced8c60378c3936adb92c1a3ee6f6564/FINAL\\_NIMS\\_2017.pdf](https://www.fema.gov/media-library-data/1508151197225-ced8c60378c3936adb92c1a3ee6f6564/FINAL_NIMS_2017.pdf)
- , “Voluntary and Non-Governmental Organizations Save Lives, Feed, and Support Survivors in U.S. Virgin Islands and Puerto Rico,” press release, Washington, D.C., HQ-17-168, October 8, 2017d. As of September 2018:  
<https://www.fema.gov/news-release/2017/10/08/voluntary-and-non-governmental-organizations-save-lives-feed-and-support>
- , “Disasters,” search tool, 2018a. As of April 6, 2018:  
<https://www.fema.gov/disasters>
- , “The Disaster Declaration Process,” webpage, January 8, 2018b. As of June 24, 2019:  
<https://www.fema.gov/disaster-declaration-process>
- , “Federal Interagency Operational Plans,” webpage, updated May 2, 2018c. As of June 24, 2019:  
<https://www.fema.gov/federal-interagency-operational-plans>
- , “Mission Areas,” webpage, May 2, 2018d. As of August 1, 2019:  
<https://www.fema.gov/mission-areas>
- , *2017 Hurricane Season FEMA After-Action Report*, Washington, D.C., July 12, 2018e.
- , *2017–2019—FEMA Daily Mission Assignments*, July 26, 2018f. As of July 29, 2018:  
<https://www.fema.gov/media-library/assets/documents/128277>
- , *Disaster Relief Fund: Monthly Report as of July 31, 2018*, August 9, 2018g. As of September 4, 2018:  
<https://www.fema.gov/media-library-data/1533917482961-01b251b4ffc8fa6638f514c73c8a20b3/August2018DisasterReliefFundReport.pdf>
- , “Region II: Defense Coordinating Officer,” webpage, April 24, 2019. As of July 15, 2019:  
<https://www.fema.gov/region-ii-defense-coordinating-officer>

Federal Emergency Management Agency Policy 104-010-2, *Mission Assignment Policy*, November 2015.

Federal Emergency Management Agency Public Affairs, “Overview of Federal Efforts to Prepare for and Response to Hurricane Maria,” webpage, October 31, 2017. As of April 2018:

<https://www.fema.gov/blog/2017-09-29/overview-federal-efforts-prepare-and-respond-hurricane-maria>

FEMA—See Federal Emergency Management Agency.

Field, Christopher B., Vicente Barros, Thomas F. Stocker, Qin Dahe, David Jon Dokken, Gian-Kasper Plattner, Kristie L. Ebi, Simon K. Allen, Michael D. Mastrandrea, Melinda Tignor Katharine J. Mach, and Pauline M. Midgley, eds., *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change*, Cambridge: Cambridge University Press, 2012.

Field Manual 3-94, *Theater Army, Corps, and Division Operations*, Washington, D.C.: Headquarters, Department of the Army, April 2014.

Flores, Antonio, and Jens Manuel Krogstad, “Puerto Rico’s Population Declined Sharply After Hurricanes Maria and Irma,” Pew Research Center website, July 26, 2019. As of November 12, 2019:

<https://www.pewresearch.org/fact-tank/2019/07/26/puerto-rico-population-2018/>

Fritz, Angela, “Puerto Rico Has a Long History with Tropical Storms. None of Them Were Like Hurricane Maria,” *Washington Post*, September 19, 2017. As of December 2018:

[https://www.washingtonpost.com/news/capital-weather-gang/wp/2017/09/19/puerto-rico-has-a-long-history-with-tropical-storms-none-of-them-were-like-hurricane-maria/?noredirect=on&utm\\_term=.19ef21636826](https://www.washingtonpost.com/news/capital-weather-gang/wp/2017/09/19/puerto-rico-has-a-long-history-with-tropical-storms-none-of-them-were-like-hurricane-maria/?noredirect=on&utm_term=.19ef21636826)

GAO—See U.S. Government Accountability Office.

Gallagher, Ron, “Bragg Medical-Support Soldiers Heading for St. Thomas Hospital with Irma Aid,” *News & Observer*, September 13, 2017. As of April 2018:

<http://www.newsobserver.com/news/weather/article173014776.html>

Galvin, Todd, and Daniel Schadler, “Assistance from the Seas,” Defense Visual Information Distribution Service website, October 17, 2017. As of April 2018:

<https://www.dvidshub.net/news/252820/assistance-seas>

Guluzian, David, and Trey Ryker, “USS Kearsarge (LHD 3) Providing Critical Hurricane Relief,” *Navy Supply Corps Newsletter*, February 6, 2018. As of April 2018:

<http://scnewsltr.dodlive.mil/2018/02/06/uss-kearsarge-lhd-3-providing-critical-hurricane-relief/>

Garamone, Jim, “Military in Puerto Rico Will Stay Until ‘All Needs Are Met,’ DoD Liaison Says,” *DoD News*, September 29, 2017a. As of May 21, 2018:  
<https://www.defense.gov/News/Article/Article/1330284/military-in-puerto-rico-will-stay-until-all-needs-are-met-dod-liaison-says/>

———, “Military Seeks to Learn Lessons of 2017 Hurricane Season,” *DoD News*, December 11, 2017b. As of February 22, 2018:  
<https://www.defense.gov/News/Article/Article/1393074/military-seeks-to-learn-lessons-of-2017-hurricane-season/>

Gereski, John T., and Christopher R. Brown, “Two Hats Are Better Than One: The Dual-Status Commander in Domestic Operations,” *Army Lawyer*, June 2010, pp. 72–83. As of December 20, 2019:  
<https://www.hsdl.org/?abstract&did=689608>

Gergen, Mike, “United States Northern Command (USNORTHCOM) Defense Support of Civil Authorities Course,” briefing, undated.

Gregory, Phil, “New Jersey Sending 1,100 Emergency Responders to Help Puerto Rico,” WHYY webpage, September 29, 2017. As of June 7, 2018:  
<https://whyy.org/articles/new-jersey-sending-1100-emergency-responders-help-puerto-rico/>

Google Trends, website, undated. As of July 15, 2019:  
<https://trends.google.com/trends/?geo=US>

Government of Puerto Rico, *Transformation and Innovation in the Wake of Devastation: An Economic and Disaster Recovery Plan for Puerto Rico*, San Juan, August 2018. As of November 13, 2018:  
<http://www.p3.pr.gov/assets/pr-transformation-innovation-plan-congressional-submission-080818.pdf>

Governor’s Press Office (New York), “Governor Cuomo Announces National Guard, State Police and First Shipment of Supplies from the Empire State Relief and Recovery Effort Being Sent to Puerto Rico,” press release, September 27, 2017. As of June 6, 2018:  
<https://www.governor.ny.gov/news/governor-cuomo-announces-national-guard-state-police-and-first-shipment-supplies-empire-state>

Hamilton, John, “Vigilant Shield Takes Fight to New Mexico Mountains,” U.S. Department of Defense, November 3, 2017. As of April 6, 2018:  
<https://www.defense.gov/News/Article/Article/1362520/vigilant-shield-takes-fight-to-new-mexico-mountains/>

The Henry J. Kaiser Family Foundation, *Puerto Rico after Hurricane Maria: The Public's Knowledge and Views of Its Impact and the Response*, October 2017. As of November 20, 2019:  
<http://files.kff.org/attachment/Topline-Puerto-Rico-after-Hurricane-Maria>

———, *Kaiser Health Tracking Poll*, November 2017. As of November 20, 2019:  
<http://files.kff.org/attachment/Topline-Kaiser-Health-Tracking-Poll-November-2017>

Hogan, Patrick R., and Christopher M. Kenney, *Louisiana Defense Coordinating Element (DCE) 2014–2015*, briefing, undated.

Homeland Security Presidential Directive-5, *Management of Domestic Incidents*, February 28, 2003.

JFLCC—See Joint Force Land Component Commander.

Joint Force Land Component Commander, *Mission Assignment Transition Criteria Analysis*, October 21, 2017.

Joint Force Land Component Commander J5, *JFLCC MA Analysis*, Vers. 7, October 17, 2017a.

Joint Knowledge Online, “Storyboard Design Document for Defense Support of Civil Authorities (DSCA) Phase 1 Course,” JKO Course ID: J3ST-US010, February 2016.

Joint Special Operations University, *Special Operations Reference Manual*, 4th ed., MacDill Air Force Base: JSOU Press, June 2015.

Joint Publication 1, *Doctrine of the Armed Forces of the United States*, Washington, D.C.: Joint Chiefs of Staff, March 25, 2013.

Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, Washington, D.C.: Joint Chiefs of Staff, June 2019. As of July 16, 2019:  
<https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/dictionary.pdf>

Joint Publication 3-0, *Joint Operations*, Washington, D.C.: Joint Chiefs of Staff, January 17, 2017, change 1, October 22, 2018.

Joint Publication 3-13.2, *Military Information Support Operations*, Washington, D.C.: Joint Chiefs of Staff, November 2014.

Joint Publication 3-28, *Defense Support of Civil Authorities*, Washington, D.C.: Joint Chiefs of Staff, July 31, 2013.

Joint Publication 3-28, *Defense Support of Civil Authorities*, Washington, D.C.: Joint Chiefs of Staff, October 29, 2018. As of July 16, 2019:  
[https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3\\_28.pdf](https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_28.pdf)

Joint Publication 3-31, *Command and Control for Joint Land Operations*, Washington, D.C.: Joint Chiefs of Staff, February 2014.

Joint Publication 3-33, *Joint Task Force Headquarters*, Washington, D.C.: Joint Chiefs of Staff, January 31, 2018.

JP—See Joint Publication.

Kellman, Laurie, and Emily Swanson, “AP-NORC Poll: Low Marks for Trump’s Puerto Rico Response,” Associated Press, October 4, 2017. As of November 20, 2019:  
<https://apnews.com/4618c08e4de94347b67caa4104e19d5a>

Kohler, Thomas A., *US Army North’s Roles and Responsibilities*, April 5, 2016.

Krogstad, Jens Manuel, “Puerto Ricans Leave in Record Numbers for Mainland U.S.,” Pew Research Center website, October 14, 2015. As of November 12, 2019:  
<https://www.pewresearch.org/fact-tank/2015/10/14/puerto-ricans-leave-in-record-numbers-for-mainland-u-s/>

———, “Historic Population Losses Continue Across Puerto Rico,” Pew Research Center website, March 24, 2016. As of November 12, 2019:  
<https://www.pewresearch.org/fact-tank/2016/03/24/historic-population-losses-continue-across-puerto-rico/>

Krogstad, Jens Manuel, Mark Hugo Lopez, and Drew DeSilver, “Puerto Rico’s Losses Are Not Just Economic, But in People, Too,” Pew Research Center website, July 1, 2015. As of November 12, 2019:  
<https://www.pewresearch.org/fact-tank/2015/07/01/puerto-ricos-losses-are-not-just-economic-but-in-people-too/>

Krogstad, Jens Manuel, Kelsey Jo Starr, and Aleksandra Sandstrom, “Key Findings About Puerto Rico,” Pew Research Center website, March 29, 2017. As of November 12, 2019:  
<https://www.pewresearch.org/fact-tank/2017/03/29/key-findings-about-puerto-rico/>

Lamothe, Dan, “Maria Hit 9 Days Ago. Less Than Half of the Puerto Rico National Guard Is on Duty,” *Washington Post*, September 29, 2017

———, “The New General in Puerto Rico Details His Plan to Speed Relief as More Troops Arrive,” *Washington Post*, October 4, 2017. As of February 23, 2018:  
[https://www.washingtonpost.com/news/checkpoint/wp/2017/10/04/as-puerto-rico-relief-expands-the-military-will-set-up-numerous-hospitals-general-says/?utm\\_term=.ebbbf5058158](https://www.washingtonpost.com/news/checkpoint/wp/2017/10/04/as-puerto-rico-relief-expands-the-military-will-set-up-numerous-hospitals-general-says/?utm_term=.ebbbf5058158)

Larson, Eric V., and John E. Peters, *Preparing the U.S. Army for Homeland Security: Concepts, Issues, and Options*, Santa Monica, California: RAND Corporation, MR-1251-A, 2001. As

of July 22, 2019:

[https://www.rand.org/pubs/monograph\\_reports/MR1251.html](https://www.rand.org/pubs/monograph_reports/MR1251.html)

Levenson, Eric, “A Day-by-Day Look at Hurricane Irma’s Path Ahead,” CNN, September 8, 2017, 4:54 PM ET. As of March 5, 2018:

<https://www.cnn.com/2017/09/08/us/forecast-hurricane-irma-timeline/index.html>

Louisiana National Guard Public Affairs Office, “La. Guardsmen Deploy to Puerto Rico to Assist in Maria Efforts,” press release, September 2017. As of June 7, 2018:

<http://geauxguard.la.gov/la-guardsmen-deploy-to-puerto-rico-to-assist-in-maria-efforts/>

Maryland Emergency Management Agency, “Governor Larry Hogan Directs National Guard to Assist Puerto Rico Following Hurricane Maria,” press release, September 29, 2017. As of June 7, 2018:

<http://news.maryland.gov/mema/2017/09/29/governor-larry-hogan-directs-national-guard-to-assist-puerto-rico-following-hurricane-maria/>

McCarthy, Gerard, and Ivan Haigh, “The Atlantic is Entering a Cool Phase That Will Change the World’s Weather,” The Conversation website, May 29, 2015. As of December 2018:

<http://theconversation.com/the-atlantic-is-entering-a-cool-phase-that-will-change-the-worlds-weather-42497>

McCarthy, Gerard D., Ivan D. Haigh, Joël J.-M. Hirschi, Jeremy P. Grist, and David A. Smeed, “Ocean Impact on Decadal Atlantic Climate Variability Revealed by Sea-Level Observations,” *Nature*, Vol. 521, May 28, 2015, pp. 508–510

Metz, Helen Chapin, ed., *Dominican Republic and Haiti Country Studies*, Washington, D.C.: Federal Research Division, Library of Congress, December 1999. As of November 8, 2019:

<https://www.loc.gov/item/2001023524/>

Michigan State Police, *EMAC Deployments to Puerto Rico*, January 9, 2018.

Milken Institute School of Public Health and the University of Puerto Rico Graduate School of Public Health, *Ascertainment of the Estimated Excess Mortality from Hurricane Maria in Puerto Rico*, Washington, D.C., George Washington University, August 2018.

Miller, Gary L., and Ariel E. Lugo, *Guide to the Ecological Systems of Puerto Rico*, Washington, D.C.: U.S. Department of Agriculture, June 2009. As of November 8, 2019:

<https://www.fs.usda.gov/treesearch/pubs/35382>

Nance, Tomora, “Vigilant Guard 2018 Improves Skills, Partnership,” press release, Joint Base San Antonio, Tex.: U.S. Army North Public Affairs, March 27, 2018. As of December 2018: <http://www.jbsa.mil/News/News/Article/1477073/vigilant-guard-2018-improves-skills-partnership/>

National Commission on the Future of the Army, *National Commission on the Future of the Army (NCFA) Minutes—Site Visit to Minnesota*, August 26, 2015.

National Emergency Management Association, Emergency Management Assistance Compact website, undated. As of October 7, 2019:  
<https://www.emacweb.org/>

———, “National Emergency Management Association Is Requesting Proposals for the Development of an After Action Report: ‘EMAC Response to the 2017 Hurricane Season,’” November 14, 2017.

National Guard Bureau, “Dual Status Commander (DSC),” flyer, December 2017. As of May 23, 2018:  
[http://www.nationalguard.mil/Portals/31/Resources/Fact%20Sheets/Dual%20Status%20Commander%20Fact%20Sheet%20\(Dec.%202017\).pdf](http://www.nationalguard.mil/Portals/31/Resources/Fact%20Sheets/Dual%20Status%20Commander%20Fact%20Sheet%20(Dec.%202017).pdf)

National Guard Regulation 500-1, *National Guard Domestic Operations*, National Guard Bureau, June 2008.

National Hurricane Center, “What Regions Around the Globe Have Tropical Cyclones and Who Is Responsible for Forecasting There?” Tropical Cyclones Forecasting FAQs, Miami, Fla., 2014. As of April 5, 2018:  
<http://www.aoml.noaa.gov/hrd/tcfaq/F1.html>

———, “Atlantic Basin Storm Totals by Year (including subtropical cyclones),” table, Miami, Fla., c. 2017a. As of April 5, 2018:  
<https://www.nhc.noaa.gov/climo/images/AtlanticStormTotalsTable.pdf>

———, “Hurricane MARIA Advisory Archive,” Miami, Fla., 2017b. As of March 5, 2018:  
<https://www.nhc.noaa.gov/archive/2017/MARIA.shtml>

National Hurricane Center, Hurricane Research Division, “Why Do Tropical Cyclones Occur Primarily in the Summer and Autumn?” Tropical Cyclone Climatology FAQs, Miami, Fla., 2017. As of April 5, 2018:  
<http://www.aoml.noaa.gov/hrd/tcfaq/G4.html>

National Hurricane Center and Central Pacific Hurricane Center, “2017 Atlantic Hurricane Center,” webpage, undated. As of October 4, 2019:  
<https://www.nhc.noaa.gov/data/tcr/index.php?season=2017&basin=atl>

National Intelligence Council, *Implications for US National Security of Anticipated Climate Change*, Washington, D.C., NIC WP 2016-01, September 21, 2016.

———, *Global Trends: Paradox of Progress*, Washington, D.C., NIC 2017-01, January 2017.

- National Oceanic and Atmospheric Administration, “NOAA’s 2018 Hurricane Season Outlook,” briefing slide, undated a.
- , “Tropical Cyclone Heat Potential: Seven Basins,” webpage, undated b. As of July 15, 2019: <https://www.aoml.noaa.gov/phod/cyclone/data/seven.php>
- , “National Hurricane Center Tropical Cyclone Report: Hurricane Katrina,” 2005. As of April 6, 2018: [https://www.nhc.noaa.gov/data/tcr/AL122005\\_Katrina.pdf](https://www.nhc.noaa.gov/data/tcr/AL122005_Katrina.pdf)
- , “NOAA’s Updated 2017 Atlantic Hurricane Season Outlook,” 2017a.
- , “Extremely Active 2017 Atlantic Hurricane Season Finally Ends,” November 30, 2017b. As of January 2018: <http://www.noaa.gov/media-release/extremely-active-2017-atlantic-hurricane-season-finally-ends>
- , “Billion-Dollar Weather and Climate Disasters: Table of Events,” webpage, 2018a. As of April 6, 2018: <https://www.ncdc.noaa.gov/billions/events/US/2000-2017>
- , “National Hurricane Center Tropical Cyclone Report: Hurricane Harvey,” 2018b. As of April 6, 2018: [https://www.nhc.noaa.gov/data/tcr/AL092017\\_Harvey.pdf](https://www.nhc.noaa.gov/data/tcr/AL092017_Harvey.pdf)
- , “State of the Climate,” search tool, 2018c. As of April 6, 2018: <https://www.ncdc.noaa.gov/sotc/>
- , “Hurricanes and Tropical Storms—Annual 2017,” webpage, January 2018d. As of September 2018: <https://www.ncdc.noaa.gov/sotc/tropical-cyclones/201713>
- , “Forecasters Predict a Near- or Above-Normal 2018 Atlantic Hurricane Season: New Satellite Data and Model Upgrades to Give Forecasts a Boost,” press release, May 24, 2018e. As of June 2018: <http://www.noaa.gov/media-release/forecasters-predict-near-or-above-normal-2018-atlantic-hurricane-season>
- , “NOAA 2018 Atlantic Hurricane Season Outlook,” press release, Washington, D.C., May 24, 2018f. As of June 2018: <http://www.cpc.ncep.noaa.gov/products/outlooks/hurricane.shtml>
- , “Destructive 2018 Atlantic Hurricane Season Draws to an End,” press release, November 28, 2018g. As of December 2018: <https://www.noaa.gov/media-release/destructive-2018-atlantic-hurricane-season-draws-to-end>
- National Preparedness Goal—*See* DHS, 2015.

National Weather Service, “Major Hurricane Harvey—August 25–29, 2017,” Corpus Christi, Tex.: Weather Forecast Office, 2017. As of March 5, 2018:  
[https://www.weather.gov/crp/hurricane\\_harvey](https://www.weather.gov/crp/hurricane_harvey)

———, “Hurricane Nate—October 2017,” Mobile/Pensacola: Weather Forecast Office, September 2018. As of March 5, 2018:  
<https://www.weather.gov/mob/nate>

“NC Sends Troops, Guard Engineers to Puerto Rico to Help with Recovery Efforts,” WTVD-TV website, September 29, 2017. As of June 7, 2018:  
<http://abc11.com/nc-guard-engineers-troops-going-to-puerto-rico-/2468892/>

Nelson, Jeffrey W., and William Dillon, *Earthquakes and Tsunamis in Puerto Rico and the U.S. Virgin Islands*, USGS Fact Sheet FS-141-00, April 2001. As of December 2018:  
<https://pubs.er.usgs.gov/publication/fs14100>

NHC—*See* National Hurricane Center.

NIC—*See* National Intelligence Council.

Nicholas, Peter, “Trump’s Approval Rating Falls to Lowest Level Since Taking Office,” *Wall Street Journal*, October 29, 2017. As of November 20, 2019:  
<https://www.wsj.com/articles/trumps-approval-rating-falls-to-lowest-level-since-taking-office-1509282048>

NIMS—*See* FEMA, 2017c.

NOAA—*See* National Oceanic and Atmospheric Administration.

NORTHCOM—*See* U.S. Northern Command.

NRF—*See* DHS, 2016a.

NWS—*See* National Weather Service.

Office of the Governor (Louisiana), “Louisiana Emergency Teams Assisting Puerto Rico and U.S. Virgin Islands,” press release, September 28, 2017. As of June 7, 2018:  
<http://gov.louisiana.gov/index.cfm/newsroom/detail/1045>

Office of the Texas Governor, *Governor Abbott Establishes Dual Status Command In Response To Hurricane Harvey*, August 27, 2017. As of February 22, 2018:  
<https://gov.texas.gov/news/post/governor-abbott-establishes-dual-status-command-in-response-to-hurricane-ha>

Pasch, Richard J., Andrew B. Penny, and Robbie Berg, *Hurricane Maria (AL152017)*, 16–30 September 2017, Miami, Fla.: National Hurricane Center, April 10, 2018.

Philip, Juanita, and Jessica Barnett, “National Guard Assets Plan Relief Efforts as Hurricane Maria Slams Puerto Rico,” press release, September 20, 2017. As of July 15, 2019: <http://www.nationalguard.mil/News/Article/1317477/national-guard-assets-plan-relief-efforts-as-hurricane-maria-slams-puerto-rico/>

Presidential Policy Directive 8, *National Preparedness*, March 30, 2011.

Public Law 100-707, Robert T. Stafford Disaster Relief and Emergency Assistance Act, November 23, 1988, as amended August 2016. As of May 2018: <https://www.fema.gov/media-library-data/1519395888776-af5f95a1a9237302af7e3fd5b0d07d71/StaffordAct.pdf>

Public Law 104-321, Joint Resolution Granting the Consent of Congress to the Emergency Management Assistance Compact, October 19, 1996. As of July 17, 2019: <https://www.congress.gov/104/plaws/publ321/PLAW-104publ321.pdf>

Public Law 107-296, Homeland Security Act of 2002, November 25, 2002. As of October 7, 2019: <https://www.govinfo.gov/app/details/PLAW-107publ296>

Public Law 109-295, Department of Homeland Security Appropriations Act, 2007, October 4, 2006.

Public Law 112-81, National Defense Authorization Act for Fiscal Year 2012, December 31, 2011. As of April 6, 2018: <https://www.gpo.gov/fdsys/pkg/PLAW-112publ81/pdf/PLAW-112publ81.pdf>

Public Law 113-2, Disaster Relief Appropriations Act, 2013, January 29, 2013. As of July 17, 2019: <https://www.congress.gov/113/plaws/publ2/PLAW-113publ2.pdf>

Puerto Rico Data Lab, “Ricardo Rosselló vs. Carmen Yulín Cruz: Who Has Earned the Most Attention Following Hurricane Maria?” blog post, November 1, 2017. As of May 2018: <https://prdatalab.wordpress.com/2017/11/01/ricardo-rossello-vs-carmen-yulin-cruz-who-has-earned-the-most-attention-following-hurricane-maria/>

Robles, Frances, Lizette Alvarez, and Nichols Fandos, “In Battered Puerto Rico, Governor Warns of a Humanitarian Crisis,” *New York Times*, September 26, 2017, p. A14.

Roganov, Karen, “Preparations Underway for Ardent Sentry 2019,” press release, Fort Eustis, Va.: Joint Task Force Civil Support, July 12, 2018. As of December 2018: <http://www.jtfc.northcom.mil/Media/News/News-Article-View/Article/1573635/preparations-underway-for-ardent-sentry-2019/>

Roper Center, Cornell University, Roper iPoll search page, undated. As of November 20, 2019: <https://ropercenter.cornell.edu/ipoll/>

- Smith, Erich B., “National Guard Wraps Up Busy Hurricane Season,” press release, December 1, 2017. As of July 15, 2019:  
<https://www.nationalguard.mil/News/Article/1384972/national-guard-wraps-up-busy-hurricane-season/>
- Smith, Samantha, and Daniel Cassady, “Puerto Rico’s Horrors Start to Come into Focus,” *Washington Post*, September 24, 2017, p. A1
- Stafford Act—*See* Public Law 100-707.
- Taradejna, Artur, “California Guard Supports Battlefield Circulation,” press release, June 14, 2011. As of November 12, 2019:  
<https://www.nationalguard.mil/News/Article/610271/california-guard-supports-battlefield-circulation/>
- USACE—*See* U.S. Army Corps of Engineers.
- U.S. Army, “Domestic All-Hazards Response Team,” *STAND-TO!*, October 19, 2009. As of April 23, 2018:  
<https://www.army.mil/standto/archive/2009/10/19/>
- , “U.S. Army North’s Task Force 51,” *STAND-TO!*, April 10, 2014. As of January 23, 2018:  
[https://www.army.mil/standto/archive\\_2014-04-10](https://www.army.mil/standto/archive_2014-04-10)
- U.S. Army Corps of Engineers, “Hurricane Maria Debris Model: Landfall Expected in About 78 Hours,” briefing slides, September 17, 2017. As of December 2018:  
[https://www.usace.army.mil/Portals/2/docs/Emergency%20Ops/Disaster%20Impact%20Models/Current%20Season/2017/TC\\_Maria\\_Adv4.ppt](https://www.usace.army.mil/Portals/2/docs/Emergency%20Ops/Disaster%20Impact%20Models/Current%20Season/2017/TC_Maria_Adv4.ppt)
- U.S. Army North, *Defense Coordinating Element (DCE) Battlebook 2014*, November 2013.
- , *Louisiana Defense Coordinating Element (DCE) 2014–2015*, November 2013.
- , “Commander, U.S. Army North Prepared Remarks for the 10 June 2105 Closed Session to the National Commission on the Future of the Army,” 2015. as of August 10, 2018:  
<https://info.publicintelligence.net/ARNORTH-ArmyRoleHomeland.pdf>
- , *Puerto Rico and U.S. Virgin Islands DSCA Response Infrastructure*, briefing, July 2017a, Not available to the general public.
- , “FRAGO 16 to USARNORTH OPORD (AN-OPORD-17-009-16) for DSCA Operations in Response to Hurricane Irma/Maria,” September 21, 2017b.
- , “Public Affairs Estimate (Puerto Rico JOA),” September 29, 2017c.
- , “FRAGO 24 to USARNORTH OPORD (AN-OPORD-17-009-24) for DSCA Operations in Response to Hurricane Irma/Maria,” September 30, 2017d.

- , “FRAGO 28 to USARNORTH OPORD (AN-OPORD-17-009-28) for DSCA Operations in Response to Hurricane Irma/Maria,” October 4, 2017e.
- , “FRAGO 30 to USARNORTH OPORD (AN-OPORD-17-009-30) for DSCA Operations in Response to Hurricane Irma/Maria,” October 6, 2017f.
- , “FRAGO 31 to USARNORTH OPORD (AN-OPORD-17-009-31) for DSCA Operations in Response to Hurricane Irma/Maria,” October 6, 2017g.
- , “Public Affairs Estimate (Puerto Rico JOA),” October 9, 2017h.
- , Hurricane Maria Commander’s Update Briefs, October 11–November 19, 2017i.
- , “FRAGO 40 to USARNORTH OPORD (AN-OPORD-17-009-40) for DSCA Operations in Response to Hurricane Irma/Maria,” October 15, 2017j.
- , “FRAGO 43 to USARNORTH OPORD (AN-OPORD-17-009-40) for DSCA Operations in Response to Hurricane Irma/Maria,” October 18, 2017k.
- , “FRAGO 53 to USARNORTH OPORD (AN-OPORD-17-009) for DSCA Operations in Response to Hurricane Irma/Maria,” October 20, 2017m.
- , “Public Affairs Estimate (Puerto Rico JOA),” October 24, 2017n.
- , “FRAGO 66 to USARNORTH OPORD (AN-OPORD-17-009) for DSCA Operations in Response to Hurricane Irma/Maria,” November 10, 2017p.
- , “Hurricanes 2017 JFLCC AAR,” briefing, San Antonio, Tex., December 13, 2017q.
- , *Building Trust During Crisis: The Federal Military’s Response to Hurricane Maria*, 2018a.
- , *Hurricanes Harvey, Irma, and Maria Response, August–December 2017: Summary Report*, 2018b, Not available to the general public.
- , *Military End-States in DSCA: Transition Planning for Disaster Response*, draft, 2018c.
- U.S. Army North Education Branch, *United States Northern Command (USNORTHCOM)*, 2017.
- USARNORTH—See U.S. Army North.
- USARNORTH CUB—See U.S. Army North, Hurricane Maria Commander’s Update Briefs.
- U.S. Army Pacific, *Defense Coordinating Element–Hawaii Smart Book*, February 13, 2017.
- U.S. Army Reserve, *America’s Army Reserve at a Glance*, 2017. As of April 30, 2018:  
<http://www.usar.army.mil/About-Us/>
- U.S.C.—See U.S. Code.

U.S. Census Bureau, “Quick Facts: Puerto Rico,” webpage, July 1, 2018. As of November 12, 2019:

<https://www.census.gov/quickfacts/PR>

U.S. Code, Title 10, Armed Forces.

U.S. Code, Title 10, Armed Forces, Subtitle E, Reserve Components, Part II Personnel Generally, Chapter 1209, Active Duty, Section 12304 Selected Reserve and Certain Individual Ready Reserve members; Order to Active Duty Other Than During War or National Emergency, Subsection (a), Authority.

U.S. Code, Title 31, Money and Finance, Subtitle II, The Budget Process, Subchapter III, Transfers and Reimbursements, Section 1535, Agency Agreements. (Also known as “the Economy Act”.)

U.S. Code, Title 32, National Guard.

U.S. Code, Title 32, National Guard, Chapter 3, Personnel, Section 315, Detail of Regular Members of Army and Air Force to Duty with National Guard.

U.S. Code, Title 32, National Guard, Chapter 3, Personnel, Section 317, Command During Joint Exercises with Federal Troops.

U.S. Code, Title 32, National Guard, Chapter 3, Personnel, Section 325, Relief from National Guard Duty when Ordered to Active Duty, Subsection (a), Relief Required.

U.S. Code, Title 42, The Public Health and Welfare, Chapter 68, Disaster Relief.

U.S. Department of Defense, Defense Support of Civil Authorities Automated Support System, database, undated a.

———, “DoD Hurricane Relief,” webpage, undated b. As of May 23, 2018:

<https://www.defense.gov/News/Special-Reports/DoD-Hurricane-Relief/>

———, *Defense Support of Civil Authorities Handbook: Liaison Officer Toolkit*, Washington, D.C.: Government Printing Office, GTA 90-01-021, 2010a. As of June 20, 2019:

<https://apps.dtic.mil/dtic/tr/fulltext/u2/a528590.pdf>

———, *Defense Support of Civil Authorities Handbook: Tactical Level Commander and Staff Toolkit*, Washington, D.C.: Government Printing Office, GTA 90-01-020, July 2010b. As of May 3, 2018:

<http://www.dtic.mil/dtic/tr/fulltext/u2/a528591.pdf>

———, *Strategy for Homeland Defense and Defense Support of Civil Authorities*, Washington, D.C., February 2013.

———, “DoD Officials Provide Update on Hurricane Relief Efforts,” press release, September 27, 2017a. As of May 21, 2018:

<https://www.defense.gov/News/Article/Article/1326412/dod-officials-provide-update-on-hurricane-relief-efforts/>

———, “DoD Accelerates Hurricane Relief, Response Efforts in Puerto Rico,” press release, September 30, 2017b. As of April 2018:

<https://www.defense.gov/News/Article/Article/1330501/dod-accelerates-hurricane-relief-response-efforts-in-puerto-rico/>

———, “DoD Hurricane Relief: Situation Summaries,” pop-up page, last update November 3, 2017c. As of May 25, 2018:

<https://www.defense.gov/News/Special-Reports/DoD-Hurricane-Relief/>

U.S. Department of Homeland Security, “NIMS: Frequently Asked Questions,” Washington, D.C., undated a. As of June 24, 2019:

<https://www.fema.gov/pdf/emergency/nims/nimsfaqs.pdf>

———, “What Are Special Event Assessment Rating (SEAR) Events?” fact sheet, Washington, D.C., undated b. As of November 8, 2019:

[https://www.dhs.gov/sites/default/files/publications/19\\_0905\\_ops\\_sear-fact-sheet.pdf](https://www.dhs.gov/sites/default/files/publications/19_0905_ops_sear-fact-sheet.pdf)

———, *National Preparedness Guidance*, Washington, D.C., September 2008a.

———, *National Incident Management System*, Washington, D.C., December 2008b.

———, *National Preparedness System*, Washington, D.C., November 2011. As of August 1, 2019:

[https://www.fema.gov/media-library-data/20130726-1828-25045-9792/national\\_preparedness\\_system\\_2011.pdf](https://www.fema.gov/media-library-data/20130726-1828-25045-9792/national_preparedness_system_2011.pdf)

———, *National Response Framework*, Washington, D.C., May 2013.

———, *National Preparedness Goal*, 2nd ed., Washington, D.C., September 2015. As of May 2018:

[https://www.fema.gov/media-library-data/1443799615171-2aae90be55041740f97e8532fc680d40/National\\_Preparedness\\_Goal\\_2nd\\_Edition.pdf](https://www.fema.gov/media-library-data/1443799615171-2aae90be55041740f97e8532fc680d40/National_Preparedness_Goal_2nd_Edition.pdf)

———, *National Response Framework*, 3rd ed., Washington, D.C., June 2016a.

———, *Nuclear/Radiological Incident Annex to the Response and Recovery Federal Interagency Operational Plans*, Washington, D.C., October 2016b. As of May 2018:

[https://www.fema.gov/media-library-data/1478636264406-cd6307630737c2e3b8f4e0352476c1e0/NRIA\\_FINAL\\_110216.pdf](https://www.fema.gov/media-library-data/1478636264406-cd6307630737c2e3b8f4e0352476c1e0/NRIA_FINAL_110216.pdf)

U.S. Government Accountability Office, *Actions Taken to Implement the Post-Katrina Emergency Management Reform Act of 2006*, Washington, D.C., GAO-09-59R, November 21, 2008.

- \_\_\_\_\_, *Homeland Defense: DoD Can Enhance Efforts to Identify Capabilities to Support Civil Authorities During Disasters*, Washington, D.C., GAO-10-386, March 2010.
- \_\_\_\_\_, *2017 Hurricanes and Wildfires: Initial Observations on the Federal Response and Key Recovery Challenges*, Washington, D.C., GAO-18-472, September 2018.
- \_\_\_\_\_, *Disaster Response: Federal Assistance and Selected States and Territory Efforts to Identify Deaths from 2017 Hurricanes*, Washington, D.C., GAO-19-486, September 2019.
- U.S. Indo-Pacific Command, “About USINDOPACOM,” webpage, undated. As of October 7, 2019:  
<https://www.pacom.mil/About-USINDOPACOM/>
- U.S. National Response Team, “Atlantic Fury 2018,” briefing, April 25, 2018.
- USNORTHCOM—See U.S. Northern Command.
- U.S. Northern Command, “About USNORTHCOM,” webpage, undated. As of October 7, 2019:  
<https://www.northcom.mil/About-USNORTHCOM/>
- \_\_\_\_\_, CONPLAN 3501-08, *Defense Support of Civil Authorities (DSCA)*, May 16, 2008, redacted version posted February 5, 2013a. As of July 15, 2019:  
<https://publicintelligence.net/usnorthcom-dsca/>
- \_\_\_\_\_, “USNORTHCOM Vision,” fact sheet, May 16, 2013b.
- \_\_\_\_\_, CONPLAN 3500-14, *Defense Support of Civil Authorities Response*, July 17, 2014, Not available to the general public.
- \_\_\_\_\_, *Commander’s Estimate—Command, Control, and Coordination Options for the Range of DSCA Operations*, May 31, 2017a.
- \_\_\_\_\_, “NORTHCOM Providing Disaster Relief Following Hurricane Maria,” press release, September 21, 2017b. As of May 21, 2018:  
<https://www.defense.gov/News/Article/Article/1320480/northcom-providing-disaster-relief-following-hurricane-maria/>
- \_\_\_\_\_, “Update: U.S. Northern Command Continues Humanitarian Aid to Puerto Rico and the U.S. Virgin Islands,” press release, No. 17-022, September 26, 2017c. As of May 21, 2018:  
<http://www.northcom.mil/Newsroom/Press-Releases/Article/1325655/update-us-northern-command-continues-humanitarian-aid-to-puerto-rico-and-the-us/>
- \_\_\_\_\_, “Update: U.S. Northern Command Continues Humanitarian Aid to Puerto Rico and the U.S. Virgin Islands,” press release, No. 17-023, September 27, 2017d. As of May 21, 2018:  
<http://www.northcom.mil/Newsroom/Press-Releases/Article/1327239/update-us-northern-command-continues-humanitarian-aid-to-puerto-rico-and-the-us/>

- , “U.S. Northern Command Continues Puerto Rican Relief Efforts,” press release, No. 17-040, October 12, 2017e.
- , *Response to Hurricanes Harvey, Irma, and Maria: 25 August 2017–01 November 2017*, Peterson Air Force Base, Colo.: Office of the Command Historian, November 10, 2017f.
- , “Exord,” website search, May 2018. As of June 26, 2019:  
<https://search.usa.gov/search?utf8=%E2%9C%93&affiliate=northcom&query=exord>
- U.S. Northern Command Publication 3-20, *Title 10 Support to Dual Status Commander Led Joint Task Force Standard Operating Procedures*, January 31, 2012.
- U.S. Pacific Command CONPLAN 5001-13, *Defense Support of Civil Authorities (DSCA)*, December 19, 2013.
- Vock, Daniel C., “The Pact Changing How Governments Respond to Disaster,” *Governing the States and Localities* website, March 2018. As of August 3, 2018:  
<http://www.governing.com/gov-emergency-management-local-federal-fema-states.html>
- Von Jett, Stephen, *Military Information Battalion Rehearses Civil Support*, March 19, 2016. As of May 1, 2018:  
<https://www.dvidshub.net/news/printable/193451>
- Walker, Brett, *Puerto Rico Military Response Commanded by Alabaman*, November 14, 2017. As of January 24, 2018:  
<https://www.dvidshub.net/news/255357/puerto-rico-military-response-commanded-alabaman>
- Weather Underground, “Hurricane and Tropical Cyclones: Top 10 Most Active Hurricane Seasons,” webpage, 2018. As of April 6, 2018:  
<https://www.wunderground.com/hurricane/top10.asp>
- Wilcox, David L. “Army North’s Task Force 51: Ready When It Counts,” *Small Wars Journal*, August 9, 2012. As of January 23, 2018:  
<http://smallwarsjournal.com/blog/army-north%E2%80%99s-task-force-51-ready-when-it-counts>
- Ziffer, Margaret, “Puerto Rican Engineers Depart Theater Early to Support Families Following Hurricane,” U.S. Army website, October 18, 2017. As of August 28, 2018:  
[https://www.army.mil/article/195530/puerto\\_rican\\_engineers\\_depart\\_theater\\_early\\_to\\_support\\_families\\_following\\_hurricane](https://www.army.mil/article/195530/puerto_rican_engineers_depart_theater_early_to_support_families_following_hurricane)