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THESIS

ORGANIZATIONAL LEADERSHIP'S IMPACT ON EMERGENT BEHAVIOR DURING DISASTER RESPONSE AND RECOVERY OPERATIONS

by

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September 2011

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Since the events of 9/11 and Hurricane Katrina, emergency management has put great efforts into formalizing response and recovery structures following natural and man-made disasters. However, these formalized structures are not often flexible enough to allow for the innovation that each different disaster may require to best meet the needs of the impacted citizens in the most effective and efficient way possible. As emergency management continues to become more complex, organizational leadership will be challenged to balance the need for standard operating procedures and policies against the ability to leverage emergent behavior that allows for innovation in addressing the specific problems brought on by each unique disaster.

This thesis focuses on identifying under what circumstances emergent behavior is desired within the context of emergency management, and how organizational leadership can impact the factors that enhance or inhibit emergence during response and recovery operations. Using participant observation methods over the course of many years of disaster leadership, eight different incidents were analyzed for the identification of leadership themes that impacted emergent behavior.

As a result of these findings, five themes emerged in which emergency management's organizational leadership can most effectively impact self-organizing behavior within its ranks. With an understanding of when emergence is desirable, and by developing the capacity and an organizational culture that supports the vacillation between structure and innovation, emergency management officials will be better able to lead effective responses to complex incidents.

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ORGANIZATIONAL LEADERSHIP'S IMPACT ON EMERGENT BEHAVIOR DURING DISASTER RESPONSE AND RECOVERY OPERATIONS

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LIST OF ACRONYMS AND ABBREVIATIONS

ADA   Americans with Disabilities Act

CERT   Citizen Emergency Response Team

DAC   Disaster Assistance Center
DRC   Disaster Recovery Center

FCO   Federal Coordinating Officer
FEMA   Federal Emergency Management Agency

HIPAA   Health Insurance Portability and Accountability Act

ICS   Incident Command System

JFO   Joint Field Office

MDRC   Mobile Disaster Recovery Center

NIMS   National Incident Management System
NRF   National Response Framework

OFA   Other Federal Agency

SFI   Strategic Foresight Initiative
SOP   Standard Operating Procedure

TSA   Transportation Security Administration

UCG   Unified Coordination Group

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I. INTRODUCTION

A. PROBLEM STATEMENT

In the past decade, emergency management has changed significantly. It has grown to include responses to and recovery from terrorist attacks, such as 9/11, under a new umbrella, "homeland security." Recommendations following events during this time have called for increased command and control structures for crisis response. Events, such as Hurricane Katrina and 2009 H1N1 Pandemic Influenza, have forced non-traditional emergency management government entities, such as public health and social services, to take a more active role in disaster management. An increased emphasis has been placed on incorporating voluntary agencies, faith-based groups, private sector, special-needs advocacy groups and pet advocacy groups into disaster planning, response and recovery.

At the same time, response and recovery issues have become much more visible in the eyes of the public due to a 24/7 news cycle. Cable news stations' coverage of events, such as the Indonesian Tsunami, Hurricane Katrina, the 2010 earthquake in Haiti, and the 2011 Japan earthquake, tsunami, and ensuing nuclear emergency, provide images, stories, and commentaries around the clock. Reporters have leveraged a variety of media including traditional television broadcasts with channels devoted exclusively to news coverage, as well as websites with both written stories and video clips. Media outlets have found ways to engage citizens as storytellers, thus reaching out to them almost as extensions of their staff, which was aptly demonstrated during the 2009 Presidential elections in Iran when the Iranian government attempted to restrict media coverage. Citizens filled the gap by utilizing personal communications devices and social media to get their story out through media outlets, such as CNN, with its use of "i-reporters" or through Facebook or Twitter. Web 2.0 technology has ultimately allowed citizens to become actively engaged as events unfold to share information, broker resources, or simply tell their personal stories to a worldwide audience.

Web 2.0 technology is, however, just one way that individuals self-organize during times of crisis. Local citizens have always been the true "first responders" often initiating notification calls to emergency officials, attempting rescues and beginning first aid to victims. Recent history is full of such examples: on 9/11 a group of total strangers on Flight 93 worked together to thwart the terrorists' plot to crash the plane into the Capitol or White House; following Hurricane Katrina hundreds of citizens formed what was eventually dubbed the "Cajun Navy," which rescued nearly 4,000 survivors, and the cofounder of Acadian ambulance service, Michael Knight, used his 200 ambulances and medevac helicopters to evacuate 7,000 people (Stephenson & Bonabeau, 2007). Even after emergency personnel arrive on scene and the incident transitions from an informal citizen led response to a more formal emergency management led response, citizens continue to play a crucial role in the response and recovery process. Through both recognized voluntary agencies, such as the American Red Cross or the Salvation Army and ad hoc networks, citizens come together in times of need to provide critical services to their communities (Palen, Hiltz, & Liu, 2007).

In an attempt to capitalize on the public's desire to assist during times of crisis and incorporate them into the formalized process, government emergency management officials have established programs, such as Citizen Corps and built Citizen Emergency Response Teams (CERTs), to augment first responders in times of need. Government agencies have also incorporated voluntary agencies, faith-based groups, private sector, special-needs advocacy groups and pet advocacy groups into disaster planning, response and recovery efforts. Although all of these efforts have demonstrated emergency management's willingness to engage the public more frequently in response and recovery, their methods for doing so remain focused on accomplishing this through the formalized command and control structure. This focus on command and control was recommended by the 9/11 Commission through the establishment of a "unified incident command system" (Commission, 2003). It was further reinforced following Hurricane Katrina, and touted as the best method for improving response to disasters and terrorist attacks (Stephenson & Bonabeau, 2007).

The challenge lies in that formalized structures for command and control are not typically fully understood by ad hoc groups or informal networks that emerge to provide vital resources during response and recovery. Low-income residents are less likely to have access to the Internet, cell phones, or televisions that officials may use to distribute evacuation orders or shelter locations. Elderly people, people with disabilities, and those who are unemployed may be more socially isolated than those with active social circles, and ultimately leaving them fewer resources for transportation and lodging than others. With fewer resources available to them, these vulnerable populations turn to their familiar networks, such as family members, churches, neighborhood organizations, or local non-profits for help. As a result, these networks form emergent communities to fill what they perceive as a gap in services or to augment services. Without the ability or knowledge of how to actively interface with the formalized command and control structure, the possibility exists for duplication of services, inequitable services across communities, inaccurate information being distributed, or worse yet, potential loss of life due to an unawareness of impending danger.

Additional challenges lie within the emergency management community in employing emergent or self-organizing behaviors amongst their own ranks. Given the significant amount of time, attention and funding devoted to developing comprehensive disaster response plans, self-organizing in creative ways during response operations is often viewed as a failure to plan effectively (Kendra & Wachtendorf, 2003).

Further research into organizational leadership's ability to encourage factors that enhance emergent behavior during disaster response and recovery operations can help emergency responders innovate when the standard operating procedures are insufficient and leverage the public as a resource to emergency management officials as opposed to a liability. If more effective ways to encourage emergent behavior within the ranks of emergency management are not identified, the profession will be hard pressed to interface with the public and empower them to be part of the success of response and recovery operations. As a result, emergency managers will remain hamstrung by

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command and control environments and officials may continue to view citizens as victims in need of support services rather than survivors vested in the success of the operation.

B.   RESEARCH QUESTION

When is emergent behavior a desired trait within the context of emergency management?

C.   ARGUMENT

If emergent behavior is desired for the completion of operational responsibilities, then organizational leadership should support such behavior through encouraging factors that enhance emergence while discouraging those that inhibit emergence.

Traditional emergency management practices, such as mutual aid agreements, memorandums of understanding, and contracting mechanisms, often supply the necessary material and human resources for routine disasters that happen on a frequent basis in a community, state, region, or nation. Although such a system allows for requesting additional resources from the next agency within the hierarchy, various limits exist that may impact response and recovery operations, specifically, in unprecedented, or "extraordinary" disasters, such as the 9/11 terrorist attacks or Hurricane Katrina:

- demand for a particular resource may exceed the supply on-hand;
- the timeline for deploying the asset to the impact area may greatly hamper response or recovery operations;
- people in greatest need for resource support may not be able to communicate effectively with officials, which leaves them without adequate resources
- the standard operating procedure of the responding agency either inadvertently delays the process or it simply does not address the specific need.

Such circumstances lead to a need for greater flexibility in meeting these gaps in response and recovery needs of a disaster community. Self-organization, by definition, emerges for the purpose of addressing identified needs and is, therefore, well suited to

help fill such gaps. For example, the public may have additional resources not available to officials or provide innovative solutions for wider distribution or use of existing resources.

Even in "routine" disasters, variables, such as topography, unemployment rates, poverty rates, urban versus rural settings, etc., are so extensive as to make each disaster unique. As such, each deserves a unique approach to solving the resulting challenges. Innovative approaches are driven by the emergency management system's ability to encourage emergence or self-organizing behavior both internally amongst its ranks, and with the general population.

History is full of examples where communities have self-organized during times of disaster. During the Civil War, Clara Barton identified a gap in the treatment of wounded soldiers on the battlefield and rallied women to provide food and bandages to both Union and Confederate Soldiers (American Red Cross, 2010). Following the unprecedented U.S. earthquake in San Francisco in 1906, Mrs. Anna Amelia Holshouser sewed sheets, carpets, and blankets together to make a tent to house herself and her neighbors and rallied others to help her run a soup kitchen (Solnit, 2009). During World War II, after reading an article on military security, civil engineer Philip Johnston recognized a specific need he and others he knew could meet. He utilized his skills in speaking Navajo to recruit other Navajo speakers and then persuaded the U.S. Marine Corps to pilot a program eventually known as the Navajo code talkers, credited by many for the success of the Marines in taking Iwo Jima (Wilson, 1997). More recently, on September 11, 2001, over a field in Shanksville, Pennsylvania, passengers of United Airlines Flight 93 self-organized to thwart terrorists' intent on crashing into the U.S. Capitol. Following Hurricane Katrina, hundreds of citizens formed what was eventually dubbed the "Cajun Navy," which rescued nearly 4,000 survivors and the cofounder of Acadian ambulance service, Michael Knight used his 200 ambulances and medevac helicopters to evacuate 7,000 people (Stephenson & Bonabeau, 2007).

Despite evidence to the contrary, emergency management officials often state groups that self-organize following disasters are disorganized, dysfunctional, opposed to public authorities, and inefficient (Stallings & Quarantelli, 1985; Kartez & Kelley, 1988;

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Vieweg, Palen, Liu, Hughes, & Sutton, 2008). In regards to social media forums, emergency managers have expressed hesitation in utilizing non-governmental social media forums citing concerns that information posted in such sources is not verified and could put people at risk if inaccurate information is posted by the public (Palen et al., 2007). Additionally, research regarding outcome effectiveness is lacking. For example, despite thousands of reports geo-tagged on the *Ushahidi Haiti* site, including 56 people trapped in rubble, no available reports, at the time of this writing, have been posted documenting how many people were saved because of their reports to the site.

A command and control model of incident management during disasters was recommended by the 9/11 Commission through the establishment of a "unified incident command system" (Commission, 2003). It was further reinforced following Hurricane Katrina, and touted as the best method for improving response to disasters and terrorist attacks (Stephenson & Bonabeau, 2007). Since then, emergency officials have been functioning in parallel tracks with self-organizing communities, and rely on the command and control model to address potential problems or challenges, with a reliance on pre-scripted plans, standard operating procedures, or tradition. However, had it not been for the self-organized passengers of United Flight 93, the "Cajun Navy" and Michael Knight's Acadian Ambulance Service, many more lives would have been lost as a result of those disasters. The public has taken to the use of Web 2.0 technology, and social media in particular, to seek information and share resources as another method of self-organizing during times of disaster.

Emergency management can identify the balance between the use of command and control style leadership and emergent leadership required to innovate. Through establishing such balance, emergency management leadership can enhance emergence within their own organizations and leverage the public's desire to self-organize during disaster response and recovery as an additional tool to save lives and expedite recovery operations.

D. SIGNIFICANCE OF RESEARCH

This thesis serves to fill a gap in existing research related to emergent behavior during times of disaster by focusing specifically on the impact of organizational leadership on identified factors that impact such behavior amongst those tasked with responding to such events. It adds to the national discussion on ways to build more resilient communities through the engagement of citizens at all levels in disaster response and recovery in conjunction with an adaptive emergency management system. As a result of identifying possible methods for organizational leadership to impact emergent behavior during response and recovery operations, future research efforts can be focused on creating organizational cultures wherein such leadership techniques are encouraged, indeed expected, thereby facilitating the creation of resilient communities.

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II. LITERATURE REVIEW

The emergency management landscape has evolved in the past several years with officials putting significant efforts into the development of plans and standard operating procedures to guide them during disaster response and recovery operations. During the same time period, the United States has been faced with unprecedented disasters, such as the 9/11 terrorist attacks and Hurricane Katrina, which have resulted in consequences far beyond what a Standard Operating Procedure (SOP) is designed to address. In the face of these "extraordinary" disasters, or in other words, those that are either catastrophic or unusual in nature, many citizens have sought out ways to fill gaps standard processes could not meet. Creativity and "outside the box" thinking have also been actively touted as necessary characteristics of effective emergency managers (Kendra & Wachtendorf, 2003). The purpose of this thesis is to determine methods for organizational leadership to impact emergent behavior during response and recovery operations following a disaster. This review begins by differentiating between terms that have sometimes been used interchangeably in literature related to disaster response and recovery: "convergence," emergence" and "self-organization." By drawing parallels between the different terms, this review will support the argument that different terms are often used within existing literature to define similar behaviors. Next, the review addresses existing literature that identifies factors that may influence convergence, emergence and self-organization to understand better how organizational leadership may impact such behavior. Thirdly, within the context of self-organization and emergence defined herein, this literature review also discusses the role of Web 2.0 technology during disasters. Lastly, the review discusses complex adaptive systems and the applicability of complexity theory to emergency management to aid in understanding why emergent behavior is desirable in some settings, but not so in others.

A. CONVERGENCE

Researchers Fritz and Mathewson may have been the first to look closely at the concept of convergence as it relates to disaster response and recovery in their work,

Convergence Behavior in Disasters: A Problem in Social Control. According to Fritz and Mathewson (1957), convergence consists of "movement toward the disaster-struck area from the outside—external convergence—and movement toward specific points within a given disaster-related area or zone—internal convergence." In an attempt to understand the motivations of those who participate in convergence activities, they identified five major types of convergers: the returnees, the anxious, the helpers, the curious and the exploiters (Fritz & Mathewson, 1957).

Fritz and Mathewson (1957) state that a majority of response tasks are completed by the locally impacted population or those neighbors within closest proximity, dubbed "the helpers," when no formal organizations are available and those tasks are gradually turned over as formal organizations arrive on scene. However, they also state that disaster survivors have indicated a preference for informal solutions to a number of disaster needs, such as sheltering or housing, choosing to stay with family or friends, indicating the importance of familiarity and intimacy in rendering informal aid (Fritz & Mathewson, 1957). An additional observation is in regards to the factors that motivate external convergers to donate. According to Fritz and Mathewson, evidence suggests that personal identification or involvement with an individual or organization within the impacted area is more likely to result in donations, which reinforces that familiarity is a factor in the convergence of helpers (Fritz & Mathewson, 1957).

B.   EMERGENCE

According to *Emergent Citizen Groups and Emergency Management* by Robert Stallings and E. L. Quarantelli (1985), emergent groups are "private citizens who work together in pursuit of collective goals relevant to actual or potential disasters but whose organization has not yet become institutionalized." They indicate that emergent groups are more than the groups of independently acting individuals who converge during disasters, such as the helpers described by Fritz and Mathewson, because emergent groups develop an internal structure that did not exist previously to accomplish a function, goal or task new to them (Stallings & Quarantelli, 1985). According to Stallings and Quarantelli (1985), emergent groups may appear at any stage in the disaster cycle:

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preparedness, response or recovery; while convergent groups are a direct result of the actual event, and therefore, limited to response and recovery phases. Researchers Kendra and Wachtendorf explain that convergence and emergence are in many ways complementary:

> Converging volunteers often gravitate toward groups that have emerged in response to disasters, either to provide additional support or to perform tasks that complement those of emergent groups. At the same time, by providing ever-larger numbers of volunteers, convergence sets the stage for further emergence. (Kendra & Wachtendorf, 2002)

Although Stallings and Quarantelli (1985) identify several characteristics of emergent groups, they do not identify many specific factors that support or inhibit such groups from forming or remaining engaged during response and recovery efforts. However, they do note, much like convergers, emergent groups tend to form in response to a perceived need for immediate action to an issue or problem that appears to be unrecognized by others. They state that situational factors, such as presence, when the need is identified, or possessing skills and knowledge about the identified gap, impact member involvement (Stallings & Quarantelli, 1985). Additionally, they state that recognition of emergent group efforts by other organizations appears to be a major impetus to their sustained involvement (Stallings & Quarantelli, 1985).

Lastly, Stallings and Quarantelli (1985) touch on a possible inhibiting factor to emergence. They postulate emergent groups begin with neutral or positive views of officials feeling that officials will support them once attention is called to their issue. According to their research, hostility only comes after they feel that officials are not adequately addressing their plight (Stallings & Quarantelli, 1985). However, according to Stallings and Quarantelli (1985), officials often view emergent groups as being in opposition to their traditional, formalized structure, and thus, create an adversarial relationship from the start.

C.   SELF-ORGANIZATION

Sandra Bloom discusses self-organization in relation to complexity theory in her 2000 work, *Chaos, Complexity, Self-Organization and Us*, which focuses on how various

systems with several different components can lead to well-organized and patterned behavior. According to Bloom (2000), self-organization "is a notion that holds that new levels of form, organization, and complexity often arise out of the interchanges between organisms and their contexts." Following this line of thought, researchers Palen, Hiltz, and Liu (2007) state that citizens will self-organize through both formal and informal networks to provide needed commodities, shelter, or services, such as childcare or transportation during times of disaster. This definition considers that self-organization may indeed be a result of existing individuals converging within a disaster area to render aid, such as the "helpers" described by Fritz and Mathewson (1957), as well as the new, emergent groups that form a new organized structure to accomplish a task new to them, as described by Stallings and Quarantelli (1985).

The most significant distinction between self-organization and other terms, such as convergence and emergence, is that self-organization refers specifically to a group of people that organizes with enough goal or mission clarity to serve as a motivator, but leaving procedural boundaries loose enough for individual participation and adaptation, which occur as participants learn through formal and informal feedback loops (Seele, 2001). Therefore, it appears that although subtle distinctions exist between the terms "convergence," "emergence," and "self-organization," current literature as it relates to disaster response and recovery has often used these terms interchangeably to loosely describe groups of people that come together in the wake of a disaster to address a perceived unmet need during the response and recovery phases.

D.   IDENTIFIED FACTORS

A limited amount of research exists regarding emergent behavior of emergency responders or emergency management officials during response and recovery operations. However, literature is full of examples in which citizens rallied to enable their own recovery or to support others and addresses some specific factors that contribute to these self-organizing communities. Exploring these indicators and identifying correlations to emergency management officials' behavior may serve as a starting point for discussion on how organizational leadership may impact emergence within their own ranks.

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Researchers Kendra and Wachtendorf (2003) identified several examples of emergency personnel thinking creatively in the wake of 9/11 to address unforeseen challenges. For example, according to the U.S. Coast Guard, nearly 500,000 people left Manhattan on 9/11 via some type of boat as part of an ad hoc evacuation. To accomplish such a monumental and unique feat, Coast Guard officials at the point of embarkation were empowered to use their own discretion to permit boats to exceed certificated passenger loads. According to Kendra and Wachtendorf (2003), the Coast Guard example is one, "where process was adjusted with respect to ambient conditions and authority devolved to personnel closer to the scene for greater flexibility." Although Kendra and Wachtendorf identified examples of emergent behavior and the Coast Guard example speaks to empowerment and flexibility as factors that enhanced creative thinking, their research was not designed to identify such factors specifically. They did, however, recommend further research be conducted to "examine whether or not the same organizational factors that impede or facilitate creativity in business settings have an impact in the disaster response environment" (Kendra & Wachtendorf, 2003).

As described earlier, Fritz and Mathewson (1957) noted the significance of familiarity and intimacy with individuals or organizations in the impacted area as factors that support rendering aid. Furthermore, familiarity and intimacy also applies when impacted populations are seeking help from others, who prefer to seek shelter and housing from those with whom they are most familiar and intimate before turning to other agencies or organizations (Fritz & Mathewson, 1957). Although this research indicated familiarity and intimacy were important elements in terms of people who seek assistance, it did not address these as potential factors for those offering assistance. For example, although it may be assumed that a local church spontaneously opens its doors as a shelter during a disaster in response to an identified need in the community, are they persuaded to do so based on an intimacy or familiarity with those in need or are their doors open to all who seek help regardless of familiarity? Although familiarity and intimacy with the impacted population cannot clearly be stated as definitive factors to

emergent behavior, it cannot be ruled out either as it is a logical argument that the church may open its doors based on familiarity but keeps them open after the familiars have left due to the needs of the remaining shelter residents.

Stallings and Quarantelli (1985) note that initial factors impacting emergence are often situational, such as being present when the event occurs and identification of a specific need or gap in service. The next logical situational factor, as Stallings and Quarantelli (1985) indicate, is the group's ability to meet the identified need with existing skills or knowledge. However, they also discuss the importance of recognition from formal organizations that can aid in emergent groups sustaining their activities. According to their research, emergent groups are often inhibited by officials' initial views that they are in some way in opposition to formal, recognized agencies (Stallings & Quarantelli, 1985). Researchers Kartez and Kelley (1988) reinforced this factor by stating, "municipal law enforcement in particular, (tends) to view volunteer emergence as a crowd control problem."

Another factor common in the literature that inhibits or enhances self-organization based on quantity and availability by the impacted population is accurate, timely information about the disaster impacts. It is important to note that timely, accurate information from officials is not necessarily enough. In the Federal Emergency Management Agency's (FEMA's) *Strategic Foresight Initiative (SFI) Summary Findings,* dated May 2011, "individuals usually receive confirmation of information received from emergency officials from non-official sources before taking action." Additionally, in *Recovery in Aceh: Towards a Strategy of Emergence*, authors Daniel Curran and Herman B. "Dutch" Leonard (2005) state, when impacted individuals have good information about conditions within their communities they are more likely to take action to address those conditions. Often, lack of accurate information is the need identified by self-organizing communities and results in their taking action to fill this information gap, which is discussed in greater detail in the following section, "The Role of Technology in Self-Organization Following Disasters".

Resiliency, an individual's ability to thrive despite adversity, is another term frequently referenced as a factor influencing emergent behavior. In the 2001 article

entitled, *Are You Resilient*, Rachele Kanigel discusses how individuals can be overwhelmed when faced with "impossible adversity" but "challenging experiences over time that are just manageable" helps them to build coping skills. Curran and Leonard reinforce the balance necessary to maintain resilience in describing Sudan where, according to Curran and Leonard (2005), "Violence has depleted social capital and human capital so that indigenous capacity for resilience and adaptation has been eroded." When describing self-organizing systems, Bloom (2000) states that when a non-linear system cannot maintain equilibrium, it will look for ways to stabilize based on its history. Therefore, it follows that a history of resilience in the face of adversity, or "challenging experiences over time" as described by Curran, results in greater success at re-establishing stability while a history of following traditional approaches that do not enable resiliency may jeopardize stability. Fikret Berkes (2007) reinforces the link between resilience and self-organization as well in *Understanding Uncertainty and Reducing Vulnerability: Lessons from Resilience Thinking* by stating that centralized decision making may hinder an organization's ability to learn from past mistakes.

Kanigel (2001) summarized a great deal of research related to resiliency by articulating a number of common attributes: persistence, an active approach to problem solving, optimism, strong social support, flexibility, self-confidence, and a feeling of control over their lives. Curran (2005) also states the importance of social support as a critical factor of successful emergence, as well as timely, objective information to support decision making. The research of Maeseele, Verleye, Stevens and Speckhard (2008) support many of these same factors and also includes curiosity and an energetic approach to life. Although this small body of literature offers a variety of factors contributing to emergent behavior, only two of the studies focused on emergence as it relates to natural or man-made disasters. Kanigel's article is a summary of a number of researchers' works from the past 40 to 50 years related to a wide range of traumatic experiences including those of war veterans, victims of violence, and industry deregulation. However, a case can certainly be made that extraordinary disasters are also traumatic experiences and the lessons learned from research in these areas indeed may have applicability in a disaster

environment as well. Therefore, based on the literature related to resiliency discussed in this thesis, and its linkage to emergence, it follows that factors that impact resiliency to disaster response and recovery activities will impact emergent behavior.

Very little literature is available regarding factors that inhibit emergence. Maeseele et al. (2008) briefly speak to the fact that inadequate, inaccurate, or deliberately misleading information disseminated by the government undermines public trust, which in turn, causes people to speculate or respond in an appropriate manner. Curran (2005) adds that additional factors that inhibit emergence include "an unwillingness to accept risk, a fear of failure and exposure, and criticism from within."

Recent use of Web 2.0 technology may also shed some light on factors that have either positive or negative impacts on emergence. Following the Virginia Tech shootings, a Facebook group entitled *I'm ok at VT* stood up within two hours of the shootings, which was followed by many others. Like the California wildfires, despite concerns that such sources are not verified, forum members developed roles, structures, and norms that guided their behavior (Vieweg et al., 2008). Regardless of officials' timelines for releasing of victim names, lists were compiled on Facebook first, and because of the process they had established as acceptable "validation," the lists were never incorrect (Vieweg et al., 2008). As researchers Vieweg et al. (2008) stated in their findings, "The phenomenon (of collective intelligence) runs counter to popular mythology around disaster behavior of civic post-disaster engagement as hysterical, prone to error, and even dangerous—a view that pervades current disaster management policy and technological orientations."

One significant issue noted by the researchers was Facebook members felt exploited when news organizations began contacting them for interviews, noting the students had viewed these Facebook sites as communication sites to keep each other informed, not something to be "co-opted by others" (Vieweg et al., 2008).

E. THE ROLE OF TECHNOLOGY IN EMERGENCE FOLLOWING DISASTERS

As mentioned earlier, information appears to be a critical factor in self-organization, either through receiving of accurate information that enables them to take positive steps that aid in their recovery, or through a lack of information that may mobilize them to action to address that unmet need. Social media sites, such as Facebook and Twitter, have facilitated the public's involvement in disaster response and recovery by offering a forum for information gathering and sharing. In *Back Channels on the Front Lines: Emergent Uses of Social Media in the 2007 Southern California Wildfires*, researchers Sutton, Palen and Shklovski (2008) found that people use information from a variety of sources to collect information to inform their actions following disasters. These sources included family or friends using mobile phones, websites advertised in traditional media, alternative news sources and blogs, and photo sharing sites, such as Flickr or Picasa (Sutton et al., 2008). Emergency managers have often been hesitant to use these same social media forums citing concerns that information posted in such sources is not verified and could put people at risk if the public posts inaccurate information (Palen et al., 2007). However, in the 2007 southern California wildfires, Sutton, Palen and Shklovski (2008) saw evidence "that community forums were increasingly seen as reliable, authoritative sources of information both by community insiders and by outsiders." In fact, local officials and firefighters collaborated with a local community website for residents, rimoftheworld.net, in an effort to provide more accurate, current, local information as quickly as possible (Sutton et al., 2008).

The 2010 Haitian earthquake and the 2011 earthquake and tsunami in Japan also demonstrated a number of ways technology could support public involvement in response and recovery efforts regardless of geographic boundaries. Donations to volunteer organizations were made via SMS test messaging; Haitians and Japanese in need posted their requests and pictures on Facebook and Twitter; humanitarian agencies used these same venues for soliciting volunteers and donations.

Crisiscommons.org is a global volunteer organization whose mission is to "become the leading volunteer organization developing shared technological solutions, enabling information sharing in all phases of emergencies with the desire to alleviate suffering and loss of life" (Crisis Commons, 2010). One of their collaboration sites, *Ushahidi Haiti*, allowed the public to submit incident reports for categories ranging from emergency and public health issues to available services being offered. Reports were submitted through SMS text messaging, a web form, e-mail, or Twitter. Photos or video links could be added. Volunteers from around the world then took those reports and geo-tagged them onto a map. They also added to the reports from other resources, such as SMS, web, email, radio, phone, Twitter, Facebook, television, list-serves, live streams, and situation reports (Ushahidi, 2010). Following the 2010 Haitian earthquake, the Ushahidi platform has been used in several international disasters including the 2010 earthquakes in Chile and New Zealand, as well as the more recent 2011 Japan earthquake and tsunami.

Although such examples provide emergency management officials with the potential vehicle for supporting self-organization, they provide little information on the specific factors that facilitate such behavior except perhaps aiding in a feeling of actively participating in the process of information exchange and validation. Part of the challenge may lie in the lack of consistent terminology to define the specific behavior. As mentioned earlier, terms, such as "self-organization," "emergence," and "resiliency," were not widely associated with disaster survivors until recent years when social theorists began applying these traditionally biological and ecological terms to the social sciences.

F.   COMPLEX ADAPTIVE SYSTEMS

Complex adaptive systems are systems comprised of many different participants, known as agents that are interconnected yet have the ability to learn from their experiences, or adapt, through feedback loops with the environment (Eoyang, 2004). Several key elements comprise complex adaptive systems. First, complex adaptive systems are non-linear meaning the effects are not necessarily in proportion with the cause. The interconnectedness between agents results in patterns and structures, which

may appear to have minimal effect at the micro level but when observed across the entire system, result in macro-level impacts. An example is that of the Butterfly Effect, made famous by MIT meteorologist Edward Lorenz. Lorenz discovered, while running mathematical computer models for weather forecasts, that very minor changes in one element of the data could result in major implications at later stages. The Butterfly Effect is the idea that if a butterfly begins flapping its wings in Beijing in March, he could drastically change hurricane patterns in the Atlantic by August (Lienhard, 1988). This particular example is certainly relevant in the context of emergency management.

Secondly, effective feedback loops are critical to agents learning from past mistakes or taking cues from the present environment or other agents. In the emergency management context, these loops often occur through a two-way information exchange between officials and the public. When information is either inaccurate or unavailable, effective feedback loops are no longer in place and the system either fails, as it is no longer able to maintain equilibrium, or citizens emerge and fill the information gap. One such example in disaster environments comes from researchers Palen and Liu in their 2003 paper "Citizen Communications in Crisis: Anticipating a Future of ICT-Supported Public Participation," in which they describe the citizen known as "Ranger" Al following the 2003 San Bernardino, California fires. Following the outbreak of fires within his community, "Ranger" Al chose not to evacuate and found himself flooded with calls from concerned neighbors about the status of their homes when such information was unavailable from local officials (Palen & Liu, 2003). Eventually, another person from outside the fire evacuation area developed a website and posted the information provided by "Ranger" Al, which resulted in more than one million hits (Palen & Liu, 2003). As described by researchers Smith and Stevens (1994), effective feedback loops contribute resiliency to the systems that remain open to such feedback because they continue to sustain their organization, or maintain equilibrium, despite neighboring turbulence.

Lastly, is the element of emergence within complex adaptive systems. In this context, emergence is a global property that arises from multiple non-linear interactions between agents and/or the environment (Bennet & Bennet, 2008). The Butterfly Effect is an example of emergence. Another example of emergence is when a system slowly

changes over time, and due to an unplanned event, reaches a threshold that can no longer be sustained and results in large-scale change (Bennet & Bennet, 2008). An example within the emergency management system would be Hurricane Katrina. The small, incremental changes made over a number of years did not prepare the system for such an event, and as a result, large-scale changes to the emergency management system resulted including the passing of the Post Katrina Emergency Management Reform Act and the rewrite of the National Response Plan into a National Response Framework (NRF).

G. WHEN IS EMERGENT BEHAVIOR DESIRABLE

Over the years, emergency management has become more complex with a greater number of agents interacting amongst a broad array of events to include natural disasters and man-made events to include terrorism. Aided by advent of Web 2.0 technology, disasters are no longer bound geographically but have developed more permeable boundaries that enable the involvement of many more stakeholders than just those directly within the path of destruction. The literature has provided a number of examples of emergent behavior in the wake of disasters, but it is important to identify when emergent behavior is most desirable and when it is not necessary or perhaps a hindrance.

According to Bolten and Stolcis in the 2008 article "Overcoming Failure of Imagination in Crisis Management: The Complex Adaptive System:"

> Incremental administrative changes are adequate in addressing organizational problems and improving effectiveness during periods of stability and equilibrium. They are ineffective, however, when "wicked" problems alter the decision-making environment because there is little room to react to changing conditions. (Bolten & Stolcis, 2008)

As an example, the effects of Hurricane Katrina would certainly be classified by most as a "wicked" problem requiring the ability for innovative solutions to problems previously unanticipated, such as a massive levee failure within New Orleans. In such situations, emergent behavior is needed to think creatively about potential solutions that impact life safety. Emergency management officials must have the flexibility to make changes to standard operating procedures or routine processes when doing so enhances the resiliency of the system or aids in maintaining its equilibrium. The author argues that,

based on her experience, all disasters have some propensity for emergent behavior as a desired trait in that the emergency management community should always be striving to provide the most expeditious service possible to communities impacted by disasters, regardless of what is "typically" done. If standard procedures are estimated to prove inadequate to address the problems at hand, new solutions should be encouraged and attempted assuming the necessary level of risk that inevitably follows.

However, not every situation calls for emergence and not every level of risk is acceptable. For example, encouraging emergent behavior in the processing of payroll is not desirable, the standard operating procedure most likely works fine, and if not, slow incremental change that can be evaluated and tested before implementation is a sound approach. Emergency management officials should always follow standard operating procedures designed to keep people out of harms way. For example, attempting a dramatic rescue without proper training and equipment may result in additional victims who require rescue or are now at risk of death. By most accounts, the Post Katrina Emergency Management Reform Act was appropriate and necessary legislation following the events of Hurricane Katrina in 2005. Yet, the legislation itself took more than a year to be written and passed, and several more years in some cases before changes mandated were implemented. Although many may argue with the pace of the implemented changes, the incremental pace did allow for more careful and deliberate thought about the ramifications that would follow each change. This change included, in cases such as the development of the NRF, a public comment period allowing for a finished product more inclusive in its development and production.

Not every emergency management situation calls for creative thinking and emergent behavior. Routine, administrative tasks can usually be accomplished within the confines of standard procedures, existing laws, or current regulations. However, during disaster operations, programs and services that impact the survivors should always be evaluated in the context of that unique situation and emergent behavior encouraged in an attempt to provide the right solution at the right time.

H.   CONCLUSION

Existing literature as it relates to disaster response and recovery operations utilizes terms, such as convergence, self-organization, and emergence to describe groups of people who form in reaction to an unmet need in an attempt to fill that gap. This situation closely follows the definition of emergence from complexity literature wherein emergent behavior is the innovative or unplanned result of interactions amongst agents in a complex adaptive system, or a system that has the ability to learn and adjust according to feedback loops.

Not every situation within the complex adaptive system of emergency management is appropriate for emergent behavior. Routine, administrative tasks or legislative changes lend themselves well to a more thorough and deliberate process of incremental change. However, disaster response and recovery duties that are operational in nature and have a direct impact on survivors are well suited for opportunities for emergence and self-organization. Effective feedback loops and inclusion of stakeholders, or agents, allow for enhanced resiliency.

The literature has offered a number of factors that may impact emergent behaviors during response and recovery operations. Enhancing factors include: intimacy or familiarity, relevant knowledge or skill set for the problem at hand, recognition by officials or others, de-centralized authority or empowerment to the lowest hierarchical level possible, timely, accurate information; persistence; an active approach to problem-solving; flexibility, optimism, self-confidence, and strong social support. Factors deemed by the literature to inhibit emergent behavior include tradition, hierarchy or an over reliance on formal structures, an unwillingness to accept risk, a fear of failure, or fear of criticism.

Therefore, if emergent behavior is desired during activities impacting survivors during response and recovery operations, then emergency management's organizational leadership should support such behavior through encouraging factors that enhance emergence while discouraging those that inhibit emergence. This thesis evaluates these factors in the context of specific disaster examples wherein organizational leadership

attempted to enhance emergent behavior. The results identify recommendations for additional research on how organizational leadership can create environments in which emergent behavior is most appropriate.

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III. METHODOLOGY

Research for this thesis used a qualitative data approach known as participant observation and was conducted within the scope of the researcher's routine job duties. Participant observation has been chosen because it is a method "that attempts to understand the motives and meanings of people's behavior from the viewpoint of those involved in the behavior being studied" (Sociology, 2003). According to researchers K. DeWalt and B. DeWalt (2002), "Participant observation is a method in which a researcher takes part in the daily activities, rituals, interactions, and events of a group of people as one of the means of learning the explicit and tacit aspects of their life routines and their culture." Key elements of participant observations include: living within the research environment for an extended period of time, learning and using accepted terminology, actively participating in a variety of routine events and extraordinary activities with other participants, using conversation as an interview technique, informally observing during leisure activities; recording observations in field notes, and using both tacit and explicit information in the analysis of the data (K. DeWalt & B. DeWalt, 2002). As an emergency management professional with more than 20 years of experience, the author is in a unique position to leverage the key components of this methodology to analyze the available data effectively since the participant observation method is primarily interpretive (Sociology, 2003). Therefore, the researcher's expertise within the field increases the likelihood that observations will be evaluated within the appropriate context (Smith, 1997).

To understand better how participant observation is best suited for this thesis, it is helpful to look more closely at each key element of the process and its relationship to the role of participant or observer.

A. LIVING WITHIN THE RESEARCH ENVIRONMENT

As an emergency management professional for more than 24 years, the author has been actively living within the environment she is researching, which allows her instant access to other participants within the environment and provides a certain amount of

credibility as a participant within the emergency management community. Access to the research environment and acceptance or rapport within that environment is often a significant barrier to those embarking on ethnographic research. Fortunately, given the author's past and current professional roles, access and rapport are already in place for this research.

Living within the research environment makes it possible to observe behaviors and interactions that may not be available to the outsider. For example, individual agents may behave differently within group settings, such as meetings than in private settings. Someone who appears disengaged or shy may react very differently when engaged in conversation with one or two trusted agents. As a result of living within the community being researched, observations are based on real events rather than those constructed as part of a known experiment and involve intimate details frequently unavailable when using other research methods, such as case studies. Ultimately, this lends a level of validity and detail to participant observation not always found in other methods.

B.   USING ACCEPTED TERMINOLOGY

To maintain the relationships and rapport with other participants, the researcher must understand and use the accepted terminology from the environment in which the individual is actively engaged. The author's educational background and professional training have prepared her to function within the emergency management environment effectively, which includes the proper use of common emergency management terminology. Her familiarity with the Incident Command System (ICS), the National Incident Management System (NIMS), the National Response Framework (NRF), legislative mandates and presidential directives allow her to "talk the talk" within the professional culture, which also enhances the rapport and credibility amongst other agents in the emergency management system.

C.   ACTIVELY PARTICIPATING IN VARIETY OF EVENTS

Access to the environment and use of accepted terminology, coupled with the author's role as a leader within the emergency management system, allow her to engage in a variety of events actively in which observations relevant to the research of emergent

behavior may be captured. As part of her routine professional responsibilities, she interacts with other participants in time sensitive, stressful circumstances, such as those encountered during disaster response activities, when the primary focus is on life safety. Additionally, the author participates in recovery operations, which although certainly still maintain a sense of urgency, allow for more deliberate interactions between participants. Agents interact within meetings, conferences before and after disaster events, organizational recognition events allowing for informal interactions, etc. These numerous and varied interactions allow this researcher to gather data in a variety of settings, which aids in drawing correlations about the impact of organizational leadership on emergent factors by identification of potential patterns of behavior. For example, how a person interacts with others when under extreme stress may be very different then interactions that occur while at a company picnic. Therefore, observations of these varied interactions between agents allow the researcher potentially to avoid jumping to conclusions but instead look for patterns that emerge within a variety of circumstances.

D.   CONVERSATION AS AN INTERVIEW TECHNIQUE

It is through the varied interactions described above that observations occur. One significant method for obtaining data is with conversation as an interview technique. By engaging other participants in routine conversation, the researcher may accomplish two important tasks. First, conversation aids in building trust and rapport with other participants as they engage in two-way dialogue sharing information with each other and learning about each other. As previously discussed, the degree to which such trust and collaboration is established influences the degree to which information gathered is dependable and accurate (K. DeWalt & B. DeWalt, 2002).

Secondly, if the researcher allows the other participant to drive the conversation and assumes the role of an active listener, the researcher may gain insight into the participant's point of view. The researcher follows the lead of the participant but occasionally asks questions to focus the topic or clarify something the researcher may not understand. Data from such conversations are generally captured in field notes, as soon after the conversation is held as possible, to facilitate accurate recall of the conversation.

E.   INFORMALLY OBSERVING LEISURE ACTIVITIES

Informally observing leisure activities aids in data collection, as described above, by helping a researcher look for possible patterns of behavior that may or may not exist within other, more structured interactions. This observation can aid the researcher in identifying possible influences on the observed behavior, such as environment, number of people involved, the influence of stress or tension, and the effect of sedentary versus more physical activities, etc.

F.   USING FIELD NOTES

According to researchers Emerson, Fretz, & Shaw (1995) field notes are used by ethnographers to describe, "experiences and observations the researcher has made while participating in an intense and involved manner." K. DeWalt and B. DeWalt (2002) echo this sentiment by stating an effective observer must be able to attend to details to ensure accurate data collection.

This researcher maintains a log on all disasters she works and captures details of meetings and other interactions, including notes from informal conversations. These logs will form the basis of the data and will be augmented by other available products within the disaster environment to include: incident action plans, situation reports, e-mails and meeting minutes.

The field notes used within the context of this thesis will be used simultaneously for both data and analysis. Field notes are subject to the researcher's perceptions and interpretations. As such, this researcher's expertise in disaster response and recovery will aid in the validity of observational data.

G.   TACIT AND EXPLICIT INFORMATION IN DATA ANALYSIS

What gives participant observation such an advantage in the study of social interactions or behaviors is its ability to incorporate explicit information participants may articulate about themselves with tacit information garnered by the researcher engaged in participant observation.

As researchers K. DeWalt and B. DeWalt (2002) stated, "Living, working, laughing, and crying with the people whom one is trying to understand provides a sense of self and the other that is not easily put into words." However, it is this tacit or implied understanding that comes from an amalgamation of observed behaviors and interactions as documented through field notes and analyzed, through an iterative process, which informs the interpretation of meaning.

Of note, is the iterative nature of data analysis in participant observation. When an individual is immersed within a culture, profession, or way of life, it often becomes difficult to continually view observed data from a fresh point of view. Therefore, K. DeWalt and B. DeWalt (2002) recommend continually examining the researcher's conclusions in light of the overall data by applying a critical eye and the following.

- Looking for consistencies and inconsistencies amongst participants
- Checking participant reports of behavior against the researcher's observations
- Looking for breakdowns by examining data that does support a conclusion, as well as data that does not
- Drawing alternative explanations based on participant views, views of colleagues, or existing literature on the topic
- Examining extreme or contrary data and including them in the analysis, rather than excluding them as outliers or irrelevant

H. SUMMARY

Participant observation is well suited for research involving social systems and social interactions by allowing an "insider's" viewpoint of the system being analyzed. This insider viewpoint exposes the researcher to situations and circumstances unavailable to others and allows for collection of enhanced data that is accurate and valid. Through an iterative process of reassessing the research questions and hypotheses in light of the data being collected and insight gained through its analysis, new hypotheses and questions emerge (K. DeWalt & B. DeWalt, 2002).

This researcher will utilize data from a number of disasters from throughout her career and analyze them in the context of participant observation by continually

reassessing the validity of conclusions. Tacit information will be made explicit within field notes and other analytic notes by using it to aid in the interpretation of nonverbal behaviors and better understand agent responses.

Through this qualitative method, logical correlations will be made between factors that enhance or inhibit emergent behaviors and the ability of organizational leadership to impact such factors.

IV. ANALYSIS AND FINDINGS

A. OBSERVED INCIDENTS

The following is a description of various observed interactions amongst emergency management practitioners during recovery operations. These interactions occurred during a variety of incidents and include observations from the author's time with a government agency, as well as with a non-governmental agency with a role in disaster response and recovery operations. Table 1 is used to provide a graphic representation of the narrative based on observed factors determined to enhance or inhibit emergent behavior as documented in current literature: intimacy or familiarity, relevant knowledge or skill set, recognition by officials or others, de-centralized authority or empowerment, timely and accurate information, persistence, an active approach to problem solving, flexibility, optimism, self-confidence, strong social support, tradition, hierarchy or reliance on formal structures, unwillingness to accept risk, fear of failure, or fear of criticism. The chapter concludes with an analysis of leadership techniques used throughout these situations and their observed effect on emergent behavior.

	Strategic Timeline	Tribal Consultation	Geographic Divisions	Team Building	Follow-Up Session	DACs	MDRCs	Bus Crash
Factors that Enhance Emergence								
Intimacy/familiarity								
Relevant knowledge/ skill set								
Recognition by others/ officials								
De-centralized authority/ empowerment								
Timely, accurate Information								
Persistence								
Active approach to problem solving								
Flexibility								
Optimism								
Self-confidence								
Strong social support								
Factors that Inhibit Emergence								
Tradition								
Hierarchy/ formal structure								
Unwillingness to accept risk								
Fear of failure								
Fear of criticism								

Table 1: Observed Factors That Enhanced or Inhibited Emergent Behavior

Table 1.   Observed Factors That Enhanced or Inhibited Emergent Behavior

1.   Strategic Timeline Exercise

Part of the standard practice of the observed agency during response and recovery operations is for the planning section to develop a strategic timeline wherein each operational branch and support section document their relevant milestones for placement on a timeline. The resulting product is intended to aid leadership in strategic decisions regarding resource allocation, service effectiveness, and expense allocation. Typically, the planning section approaches each section and/or branch within the disaster structure one on one and requests input from each respective area. Obtaining the input often requires repeated requests from the planning section and results in a list of activities from each area that are not well coordinated with other stakeholders and, in some cases, are not accurate or detailed representations of appropriate milestones.

In the case of this particular disaster recovery operation, a member of the senior staff suggested a new approach to gathering more accurate information in a timelier

manner, by engaging the management from each operational branch and section collectively. A blank timeline was printed covering six months on large poster-sized papers and hung on the wall. The senior staff gathered the leads from each operational branch and section in the room and had them sit in a large semi-circle facing the timeline. Each was provided with a stack of blank *Post It* notes with each branch or section utilizing a different colored *Post it*. This staff was asked to each write their respective unit's milestones on the different colored *Post It* notes. The facilitator had been given instructions to allow all the participants to place their respective notes on the timeline simultaneously, with the intention of creating an unscripted and perhaps chaotic environment for participants to interact. Instead, the facilitator began by asking one branch to come to the front of the room, describe what was written on each *Post It* note and place it on the timeline. The branch reporting out began describing in great detail the importance of each task and how it related to that branch's overall mission; however, no mention was made of any of the tasks interfacing with other branches or sections. At this point, the author interrupted the exercise and asked the facilitator to let everyone come to the front of the room at the same time and simply start placing *Post It* notes on the timeline. His expression indicated confusion so the author attempted to clarify by telling him, "Make it a free for all." The author joined the person from one branch, began placing some *Post It* notes of her own and invited everyone to do the same.

At this point, approximately one dozen participants approached the timeline and began placing their *Post It* notes on the appropriate dates. Another eight to 10 staff remained in the semi-circle watching, as they did not have a responsibility to assign *Post It* notes to the timeline. The author and another member of her team placed some informal milestones on the timeline, such as National Gone Fishing Day, National Wig Out Day, and National Hag Fish Day, in an attempt to keep the exercise lighthearted. Throughout the exercise, the author asked both participants and observers what they were noticing. One participant stated, "It was like a dance," while another told a colleague, "Wait, if you put that (*Post It*) there, that impacts mine," causing him to rearrange his milestone accordingly. The entire exercise lasted approximately 45 minutes and resulted in a fairly detailed timeline based on input from all of the stakeholders.

Several factors that enhance emergent behavior were observed during this exercise. First, each participant possessed the requisite knowledge to identify the specific milestones within respective areas to document them rapidly on the *Post It* notes. The exercise also demonstrated how interconnected the previously viewed disparate functions really were. Although each branch and section had what it perceived to be a clearly defined role, and some recognized this role was entirely to support another branch or section, the branches that thought they functioned independently of the others seemed most surprised to realize their reliance on the actions of others. It also indicated that some members of the team might be hesitant to take action in an unstructured environment as demonstrated by the facilitator altering the directions. By having each branch present and place *Post It* notes one at a time, it would have followed a linear process focused on the individual elements and how they add up to a whole. Instead, the exercise became "messy and uncontrolled," non-linear, demonstrating that it was not the actions of the separate agents that make the timeline strategic, but rather the actions of their interplay.

The non-linear structure of the exercise served to enhance emergence by allowing everyone to participate simultaneously. Therefore, the hierarchal nature of the traditional command and general staff meeting was no longer in play, perhaps allowing participants to feel more empowered and take an active approach to problem solving. Additionally, since senior leadership was also actively engaged with placing *Post It* notes and asking questions, participants were likely to feel their efforts were being recognized and acknowledged by leadership. Finally, since all branches were actively engaged, strong social support resulted as exemplified with one participant referring to the exercise as "a dance."

One last notable observation was the length of time it took to complete the exercise. The spontaneous nature of the tasking coupled with an accelerated completion boundary of less than one hour, resulted in a more comprehensive completion of a task that previously had taken a week or more. Although the assertion cannot be made that an appropriate amount of pressure, in terms of a time limit, was a factor in the success of the exercise, it is possible that, coupled with other emergent factors, a sense of urgency may indeed enhance emergent behavior.

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2.   Tribal Consultation

In the author's capacity with the federal government, she once worked in a state that had suffered several disasters impacting most of the state and several federally recognized tribes. In many states, relationships between tribal officials and state officials are often strained, with tribes wishing to express their sovereignty and maintain their tribal identity, while states desiring to be fair to all constituents, worry about a perception of favoritism, and consequently, relegate them to the same status as county governments, which is a perceived slight by many tribes. In keeping with Executive Order 13175, and the Department of Homeland Security's tribal consultation and coordination policy, the author worked with the state and her team to design an effective tribal consultation strategy for this work during disaster recovery operations.

The author and her team began by delivering in person an invitation from the State Coordinating Officer and the author to join the unified coordination group (UCG) within the Joint Field Office (JFO). Since this UCG serves as the lead decision-making body within a JFO, it was felt that this action was a tangible way to express commitment to the government-to-government relationship held with the tribal partners. This attempt required a tremendous amount of trust in the author's leadership on behalf of the state given the past tumultuous relationship between the state and some of the tribes. Fortunately, she had worked with these officials before and they had developed a mutual respect and trust for each other. After several days of consideration, the state finally agreed to the author's request to include the tribes in the leadership structure. Additionally, many of the staff were uneasy with having the tribal nations represented equally within the JFO. Some made comments that tribes try to take advantage of government assistance, some indicated frustration at some tribal officials' unwillingness to listen and engage in mutually beneficial dialogue. The author encouraged the staff by stating this was an opportunity to learn from each other and that she believed if one tribe continually displayed inappropriate behavior detrimental to the group dynamic, the other tribes would "police" the behavior.

In the end, the tribal representatives played critical roles in the operational planning and execution of the recovery mission through the collaborative incident action planning process. As partners, full advantage was taken of the opportunity to increase awareness and educate each other regarding tribal, state and federal policies and procedures related to disaster recovery. When one tribe monopolized the conversation about a particular topic for several days, the other tribes did indeed "police" them, telling them to please "let it go" and move on to other issues. In addition, a better understanding of the challenges tribal governments face during disaster response and recovery operations was gained. Although the extent of tribal participation varied by tribe, each tribe was extended the same offer and indicated its appreciation for being included in the command structure.

Additionally, the author chose to elevate the position of tribal liaison to a direct report to the Federal Coordinating Officer (FCO) to demonstrate the significance of the relationship between the federal government and federally recognized tribes. The tribal liaison was empowered as a subject matter expert in tribal relations to lead agency program teams and ensure they remained respectful of tribal culture when delivering services while simultaneously working to leverage tribal resources in the response and recovery efforts. To aid them in their efforts, a tribal task force was created led by the tribal liaison and comprised of appropriate program area staff with the skill sets necessary to work with tribal partners, such as significant customer service experience, experience in effective collaboration, and excellent interpersonal communication skills. The tribal liaison attended all meetings and remained engaged in the eligibility for tribal applicants throughout the recovery process in the field. The tribal liaison briefed the designated tribal point of contact following all meetings and no member of the tribal task force conducted visits to the tribe without coordination through the tribal liaison.

Through effective consultation and coordination with eight federally recognized tribes in this disaster, the mutual exchange of information aided in educating each other better about respective governmental laws, policies and procedures. As a result of this newfound understanding, each respective entity identified best practices and opportunities for improvement within its respective policies and procedures for future

events. One tribal president said to the author, "The tribe needs to work with the local government, the state government, and the federal government but we must have a seat at the table." Through an effective tribal consultation strategy, all impacted tribes were offered a seat at the table.

Several factors listed in the literature as enhancing emergent behavior, and some that inhibit, appeared to be at play throughout this process. Careful thought went into the decision of who would comprise the tribal taskforce to ensure all members possessed the required skill set to implement the taskforce effectively. This expertise was modeled by the tribal liaison who was a true subject matter expert in tribal relations and his self-confidence aided in his ability to lead the taskforce. Staff's desire to keep with traditional JFO structures, perhaps aided by a fear of failure or criticism, made them hesitant to embrace the tribes as part of the leadership structure. However, when agency leadership, joined by state counterparts, continually acknowledged the relationship and began erecting structures to support it, such as the tribal liaison reporting line direct to the FCO and having oversight of a specially designed tribal taskforce, staff began to realize the recognition from officials this process was garnering. Leadership always remained optimistic about the process and the tribal liaison had a level of familiarity, if not with specific tribal officials, with their cultures and customs, and thereby, facilitated mutual respect. The creation of the tribal taskforce also enhanced a feeling of control by the taskforce members as they were empowered to interpret policies broadly to ensure processes unique to tribes were considered. Lastly, rather than predicting outcomes, flexibility was maintained throughout the process by relying on the learning process mutually engaged in to drive actions. This flexibility made it possible to reevaluate actions continually to remain focused on the consultative process.

3.   Geographic Divisions

Approximately one week after arriving at one disaster, the author chose to implement a division construct for the recovery operation based on a number of factors. Although frequently used within the ICS, organizing into geographic divisions was a foreign concept for many of the staff assigned to her operation. Currently, no standard

operating procedures exist within her organization for functioning within geographic divisions. The only current guidance available is a draft job description for the division supervisor position. Therefore, various forms of the structure had been used in prior disasters with varying degrees of success.

In an effort to address the angst of several within the JFO management structure, the author held an unconventional command and general staff meeting. A room with no tables and only chairs placed in a circle to create an environment with a more flat structure as opposed to the traditional hierarchical model was used. The author began by explaining her intent to use the division construct for this disaster and stated that she understood there might be apprehension, based on prior experiences, in using this model. She then stated that the purpose of this meeting was to throw all concerns out openly and address them as a team in an effort to create a model that would work effectively on this disaster.

Out of approximately 22 people in the room, two people expressed the most concerns and the greatest amount of resistance with the implementation of geographic divisions. One provided the example of a prior personal experience in which a division supervisor made a commitment on behalf of the program that was unable to be met due to program policy. As a result, the staff member indicated that he was "stuck cleaning up" the mess the division supervisor had left behind. The other resistant staff person to the idea continually expressed his frustration at "adding another layer" to the operational structure, and stated that divisions may work well for "response operations" but hinder effective "recovery operations." Both staff indicated their reluctance to have "an Operations person supervising my staff."

The author shared her personal experience in past disasters that utilized geographic divisions. She explained one case in which she was assigned as a division supervisor and was told she was the "face of the FCO" with local officials; however, she was given no authority over the human and material resources assigned to her division. Rather, all elements of command and control remained within the JFO and her role as a division supervisor was to liaise with local officials and provide administrative support to staff working within her division, such as helping them prepare their timecards or travel

vouchers to be sent to the JFO for approval. The author explained the problem with that approach was that she had little awareness of the actual activities occurring within her division because ultimately all of the division staff reported straight to the JFO. On many occasions, local officials would call her with requests or questions, to which she could not respond or answer because she was not allowed to direct resources or lacked situational awareness of activities happening at the JFO. This lack of awareness proved especially problematic during town hall meeting settings at which she was expected to answer the questions of local citizens but had no authority to make commitments on behalf of the organization to address their concerns.

The author explained to the team that on another disaster utilizing geographic divisions, she saw the challenges in providing too much autonomy to the division supervisors. During that disaster, she worked at the JFO where the message from leadership was consistently "the division supervisors are in charge." The problem in that case was that division supervisors were making commitments for resources they currently did not possess or which required the approval of state officials before implementing. For example, one division supervisor provided the JFO with a list of where disaster recovery centers were to be placed in accordance with local officials wishes. However, state officials decide where and when disaster recovery centers will be opened. Additionally, some support for such centers is provided from a strategic level at the JFO, such as the contracts for security personnel to reduce costs and increase efficiency. The author then explained to the team that it was her intent to find the "happy medium" on this disaster, and thus, create an environment that allowed for effective two-way communication between field elements and the JFO.

The author then attempted to address each of the expressed concerns one at a time, and looked to the leadership within the room for additional solutions. A method for selecting division supervisors was discussed, since no cadre of such from which to choose existed. The author explained that she was much more concerned about their skill sets in diplomacy, interpersonal communication, and team building than their knowledge of specific FEMA programs. Many in the room agreed stating division supervisors would be less likely to misspeak about program eligibility if the program was somewhat

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unfamiliar to them. The author further explained the intention was not to add additional layers but rather empower staff as much as possible at the lowest level of the organization and provide a bottom-up information and decision loop as opposed to the more traditional top-down model normally used in the organization.

The author explained the key, in her mind, to the success of implementing geographic divisions on this disaster would lie in an ability to communicate effectively as a team up, down, and across the divisions, branches, and sections. An example of how division supervisors would be empowered to make decisions within their division was then discussed. The author provided the following scenario and asked for input:

> The State, in coordination with the appropriate Branch at the JFO, could decide on dates and locations of disaster recovery centers within each division with the support of information provided by the Division Supervisors and their staff who ultimately would have the best situational awareness about needs, available resources, etc. within the impacted communities. Once the schedule has been agreed upon, it would be published within the Incident Action Plan. The Division Supervisor would then share the schedule with local officials and answer their questions regarding federal resources available at such centers.

The input from staff was that such a construct could work, if indeed everyone communicated effectively and frequently to ensure accurate information flow. One individual expressed concern that a member of his staff may no longer be "needed" if division supervisors began to help coordinate recovery centers. The author tried to assure him that perhaps the result would be more of a role change as opposed to his position being eliminated. Although the division supervisors would now be responsible for ensuring the recovery centers operated efficiently and effectively, the staff person who used to do this from the JFO would have greater responsibility for helping to ensure effective communication flow up, down, and across, provide technical expertise to the division supervisors, and would still retain the responsibility of coordinating schedules with his state counterpart.

The issue of empowerment, the author explained to the group, really comes to play in the event of a crisis. If, for example, a disaster recovery center was scheduled to close at 5pm one day, and the local mayor called the division supervisor stating that a

community that had been overlooked was planning to seek out the recovery center the next day, the division supervisor would be empowered to commit to the mayor that the recovery center would be open an additional day to meet the needs of the citizens. The division supervisor should then immediately call the appropriate branch director at the JFO to explain the change in plans and assist in reallocating resources as necessary to meet other commitments. The staff in the meeting acknowledged such a process would address their concerns about layers and who is in charge. In addition, the author reinforced to the branch directors that the division supervisors would be expected to rely on the subject matter expertise that those branch directors provided them through appropriate staffing of the divisions. Therefore, the division supervisors would not need to speak directly to matters of program eligibility because they would have a program expert provided by JFO branch directors working for them. The branches agreed that if indeed the division supervisors relied on the expertise of the people working for them, and they retained their dotted line relationship of providing technical support to those same staff, then this would address their concerns.

The meeting lasted approximately two hours and the two individuals who had expressed the most concerns stated they now understood the intent of the design and would support the structure. Despite this consensus, problems with implementation continued for approximately two to three weeks. The first hurdle came in identifying leadership staff for the divisions to include a division supervisor and task force leaders from five different branches. For the division supervisors, one staff member from a program area that had served as a division supervisor during other disasters with positive feedback from subordinates, peers and supervisors was selected. For the two remaining positions, two staff members new to the organization but in prior careers had demonstrated their leadership capability including key elements of coordination and communication were chosen. To offer support to the two new division supervisors, the help of a member of one of the JFO sections was enlisted. He had also served as a division supervisor on other disasters with positive feedback provided by subordinates, peers and supervisors. He agreed to mentor the two new division supervisors in their roles. At the same time, the five branches were also identifying a subject matter expert

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from each of their program areas to serve as task force leaders within each of the three divisions. Although all five of these program areas expressed significant challenges identifying staff they felt were qualified to serve as task force leaders, all but one filled the positions, although due to staff availability, they trickled in over the course of seven to 14 days, which ultimately delayed the startup of the divisions in the field.

One branch proved to be an entirely different matter. The branch director continued to state that no task force leaders were available to serve in this role. Additionally, he repeatedly told his supervisor, the operations section chief, he did not want division supervisors supervising "my staff." He stated it was his job to approve their overtime, sign their travel vouchers, etc. He stated he felt his role was being usurped by the division supervisors. Also, he sent an e-mail to all branch staff, approximately 80 people, in which he described the concept to them as one where the division supervisors "have the ability to work on issues like a place for you to fax your time sheets, get additional supplies, deal with courier service, broken equipment etc. up in your respective areas," while stating that he continued to be responsible for overseeing the entire program. During the same time period, the operations section chief received an e-mail from the branch director's day to day supervisor, when not assigned to a disaster, inquiring as to why a division supervisor construct was being used and how was it going to be implemented. At this point, the author contacted the senior official at the regional office and asked if she had his support for implementation of geographic divisions. She explained to him that she was receiving tremendous pushback from two branches in particular both of which lie within the same division of the regional office, and that it appeared their supervisors in the region were also encouraging resistance to this plan. He stated he was in full support of the author's role as FCO. After the conversation, she received a phone call from a regional division director who stated he had been told his staff was not supporting the FCO. The author gave him several examples of the two JFO branch directors' resistance to being part of the overall team including stating, "I don't work for Operations" in front of several other staff, deliberately hiding information from leadership counterparts, inability to staff the divisions with task force leaders, and an unwillingness to relinquish supervision control to division supervisors. The author

explained that on more than one occasion, she had been told by the JFO branch directors they had discussed these matters with staff in the regional office who agreed with their course of action in resisting. The division director apologized, asked how he could help support, and requested in the future that the author call him directly when she had a problem with someone in his division.

The author's analysis of the challenges related to implementation of geographic divisions begin with an acknowledgement that many feel the ICS is an extremely rigid hierarchical structure due to its reliance on "command and control." Although that may be the case at the local incident commander level, the role of the author's agency is much more about collaboration and cooperation than command and control. Empowering staff to the lowest level possible, in this case a geographic division, helps decentralize authority and enhances collaboration and cooperation with local officials. Since many of the staff were entrenched in the traditional hierarchical command and control model, relinquishing control and empowering subordinates was not comfortable for them. Many were concerned about repercussions after the disaster from day to day supervisors back at the regional office reflecting their fear of criticism, while others expressed concerns they would lose situational awareness if people no longer reported directly to them at the JFO. In this case, recognition from officials was needed not just from senior leadership within the JFO, but also from the senior official at the regional office and the appropriate division directors. Once external leadership support was demonstrated to the branch directors who had remained hesitant, their resistance became a hindrance to their performance in the eyes of others as opposed to an appropriate behavior. Their fear of failure was now related to their inability to demonstrate support for the divisions.

Despite the initial resistance to implementing geographic divisions, leadership's persistence paid off as described below in the examples "Division Team Building Exercises" and "Follow-Up Session Regarding Geographic Divisions."

4.   Division Team Building Exercises

Since time constraints of a response operation were not applicable, some team building exercises were conducted for a week before deploying the division supervisors

and their leadership to the field. During that week, each division supervisor met privately with each branch director and section chief to do some relationship building including listening to their concerns about decision-making authorities, approval of overtime, eligibility determinations, and any other items that arose so they could reach consensus on how they might effectively collaborate. Next, each division supervisor was asked to meet with his or her team members and develop a plan for how to communicate effectively with the JFO leadership to further reinforce the need for effective collaboration and communication. The teams were told that each division's plan would be considered to develop an overall implementation plan to avoid several different ways of doing business. Instead, one overall plan would include the best ideas from each plan. Although the intention was for the geographic branch director to meet with the other branches and coordinate the overall implementation plan, these meetings did not occur due to competing operational needs, and therefore, no written implementation plan was ever fully developed or disseminated.

Lastly, the day before the division teams were deployed to the field, each team participated in three different team-building exercises at the JFO facilitated by two members of command staff and the author. Each division was told to choose a different team leader for each exercise. Each group was given 45 minutes to conduct the exercise and debrief as a group before rotating to the next exercise. The exercises were taken from the author's recollections of a leadership workshop she had attended the previous year, called True Growth. The instructions she used for each exercise were as follows.

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Team Building Exercise 1
5 Person Teams

All exercise instructions take place out of view from exercise area. Teams have 15 minutes to complete the exercise and 15 minutes to debrief.

1. Ask the team to identify a team leader. Ask team members to step away while instructions are given to the leader.
2. The entire team will be blindfolded before entering the room
3. In the room will be a length of rope approximately 30' long
4. The facilitator will hand the team leader one end of the rope to begin the exercise.

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5. The team leader must walk the team through creation of a 5-pointed star placed on the floor (or a table if the team has problems getting up and down from the floor) utilizing the rope
6. Once anyone from the team puts their hand on the rope, they may not remove it. They may slide their hand across the rope but they cannot remove their hand (i.e. switch hands, etc)
7. The leader will be given 5 minutes to brief the team and prepare for the exercise and 10 minutes to execute their plan.
8. After team has prepared, have them put on blindfolds and line up behind the team leader with their hands on the persons shoulders in front of them
9. Facilitator leads team into the room winding them around to create confusion before leading the team leader to the rope
10. Facilitator hands team leader one end of the rope and exercise begins
11. Facilitator should warn team members of hazards (such as walls) if they get near
12. Facilitator should call out when the team has 10 minutes remaining, 5 minutes and a 2-minute warning.
13. At the end of the exercise (15 minutes) have team remove blindfolds and see their result
14. Debrief the team asking them what they thought went well and what they thought needed improvement, particularly as it relates to the team leader.

Team Building Exercise 2
5 Person Teams

All exercise instructions take place out of view from exercise area. Teams have 15 minutes to complete the exercise and 15 minutes to debrief.

1. Ask the team to identify 2 team leaders. Ask team members to step away while instructions are given to the leaders.
2. Explain to leaders that when they enter the play area, they will see 3 hula-hoops on the ground. Once team members are assigned to their hula-hoop stations, they may not leave their stations during play. They may not move their hula-hoops.
3. The first hula-hoop contains a photograph. One member of their team should step inside the hula-hoop and cover this position. This person is not allowed to speak but must communicate to teammate(s) in the second hula-hoop what he/she sees in the photograph.
4. One or more team members step inside the second hula-hoop. They may speak and are to describe to the team member(s) at the third hula-hoop what is in the photograph held by the person in position 1.
5. The remaining team member(s) are assigned to the third hula-hoop. They have a box of items. Within the box are the items from the photograph. Their job is to replicate the photograph as exactly as possible by placing the items into the hula-hoop as team member(s) from station 2 describe.
6. The team leaders have 15 minutes to complete the exercise (including explaining the exercise to the team and planning their execution). Team leaders participate with their teams.

7. Facilitator should call out when the team has 10 minutes remaining, 5 minutes and a 2-minute warning.
8. Debrief the team asking them what they thought went well and what they thought needed improvement, particularly as it relates to the team leader.

Team Building Exercise 3
5 Person Teams

All exercise instructions take place out of view from exercise area. Teams have 15 minutes to complete the exercise and 15 minutes to debrief.

1. Ask the team to identify a team leader. Ask team members to step away while instructions are given to the leader.
2. All team members except the leader will be blind folded before entering exercise area
3. The team leader will be responsible for leading his or her team through a maze carrying a "container" of toxic waste held by ropes requiring proper tension to maintain stability
4. The goals is to navigate the maze and place the toxic waste in an appropriate dumping site without dropping the container
5. The team leader may use verbal directions or help guide the team physically but cannot actually move the toxic waste himself/herself. Toxic waste delivery and disposal must be accomplished by the team.
6. If the container is dropped, the team leader is responsible for issuing additional instructions to the team about how to pick the toxic waste back up and resume movement
7. The facilitator should tell the team that he/she will notify the team members of any walking hazards the team leader may miss as they navigate obstacles.
8. If team members hear "halt" from anyone, they should immediately stop movement until the hazard has been addressed.
9. The team leader has 15 minutes to complete the exercise, including explaining the exercise to the team and planning their execution.
10. Facilitator should call out when the team has 10 minutes remaining, 5 minutes and a 2-minute warning.
11. Debrief the team asking them what they thought went well and what they thought needed improvement, particularly as it relates to the team leader.

The author facilitated the hula-hoop exercise. During the debriefings, she would ask staff what they thought their team leaders did effectively, what they thought they may have done better, and what were the biggest challenges of each hula-hoop position. In general, they were all very complimentary of each other and their work as team leaders or subordinates. The consensus from those in the first hula-hoop was that it was

tremendously difficult to provide non-verbal direction. Focusing on non-verbal communication forced them to communicate outside of their comfort zone but allowed them to understand non-verbal communication better as a tool.

The participants from the second hula-hoop indicated their frustration with not being given specific verbal instructions to complete the task, and found that although they almost always confirmed their choice with the person in the first hula-hoop, they often forgot to check for understanding with the recipients of their message, or those in the third hula-hoop.

The participants in the third hula-hoop agreed it was a tremendous challenge to build something based on a vision of a person they could not see or hear, which was the person in the first hula-hoop. When the author asked one participant how that felt, he answered, "We just had to trust the people in the second hula hoop to tell us what we needed to know." The author then asked if the participants felt this might apply to the geographic divisions as well wherein they would need to trust in the division supervisor to tell them what they needed to know from the JFO and they laughed and agreed.

When all of the exercises were complete, the teams were brought together for a group debrief about what they had learned going through the different exercises. Their comments follow.

- Communication is key
- Everyone communicates differently
- Teamwork
- Trust
- Lack of visual situational awareness challenge=frustration and new wise words
- Listening is critical
- Team Leader Challenges
    - Clear communication
    - Check for understanding with subordinates
    - Knowing names
    - Knowing subordinate skill set for proper placement

- Could have used more time in planning exercise

- "Retreat and regroup" can be good.

- All groups accomplished same goals in different ways = flexibility to see not one way to succeed.

- Comparison between hula hoop exercise and JFO—Division communication

- Emphasizes need for good hand-off information between shift changes (trust)

- Staying calm good, if too excited or can't think.

- Unity of command—listening to team lead critical to reduce confusion.

- Communicate goals (5-point star)

- Assumed "good faith" of others (everyone trying).

- No one gave up!!

Parallels can be easily drawn between the participant's comments and the identified factors that enhance emergent behavior discussed in the literature. Once again, ensuring the facilitators possessed the skill set to facilitate effectively, without directing, the exercises proved crucial to allowing the team dynamics to emerge. Effective communication was a common theme, which the literature states is a critical factor in emergence, either through groups coming together to fill a gap in communications or using effective communications to complete their activities and collaborate more effectively. In this case, teams also saw effective communications as an element to building trust; if someone communicated freely, that individual must be trustworthy. Their comments on teamwork and staying calm were on point with the desire through the division construct to decentralize and empower field staff, again on point with factors that enhance emergent behavior. They took an active approach to problem solving through their ability to create new forms of communication when visual situational awareness was hampered and through the method of "retreat and regroup." They developed strong social supports through the exercises as exemplified by everyone assuming "good faith" and believing in the unity of command. Lastly, persistence was one of the most pervasive factors with all participants agreeing that no one gave up, even when unsure if the mission was actually being accomplished.

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5.   Follow-Up Session Regarding Geographic Divisions

Approximately two weeks after implementing geographic divisions, another command and general staff meeting was held utilizing the chairs grouped in a circle as described earlier. In addition to the staff from the first meeting, the division supervisors were invited to attend as well. The goal for the meeting was to develop a table that listed the most common activities that occurred within the field based on experiences of the past two weeks. Specifics of which elements made sense at the JFO level were discussed and which should be coordinated at the field level. The author provided a few examples to work from and then the group chose the remainder of items selected. At the end of the group session, many indicated this was extremely helpful and wished it had been done immediately. The author explained that it might have looked very different had the group tried to task everything prior to having local experiences to inform the process and they agreed.

Following the session, the geographic branch director and the experienced division supervisor expressed to the author that challenges still existed with one program area. They stated that the branch director had not really staffed them with task force leaders but rather with people who did not have supervisory skills, and as a result, many of the program staff working within the divisions refused to take direction from the division team, and preferred instead to work directly with the branch director at the JFO. The author asked the division supervisor, the geographic branch director, the appropriate section chief and the branch director to join her for a meeting to discuss the problem. The branch director insisted that he had tried asking some of his leadership to assume the position of task force leaders but they were refusing due to "all of the added responsibilities." The author asked what were the added responsibilities to which he replied, "all of the reporting," and she then asked the division supervisor what reporting was being required. He stated he asks only for three items each day: 1) is everyone present and accounted for, 2) how many site visits are scheduled for the day, and 3) how many projects they plan to write up that day. Upon hearing this, the branch director indicated he did not know why some of the program staff refused the duty, as this did not seem like a large demand after all. The author asked him what he would do to handle

span of control if there were no divisions since he could not effectively support 20–25 direct reports. He acknowledged that he would have to ask some members of the team to take greater leadership responsibilities to assist, and therefore, agreed to go back to the program staff and clarify that what was wanted from a task force leader was not a great deal of extra responsibility.

Additionally, the author asked the branch director and the division supervisors to hold a joint meeting via conference call with all program staff working throughout the state and explain the division construct, the three small pieces of information collected daily, and how the task force leaders, division supervisors, and branch director were all working collaboratively to provide support, but not competitively. They agreed to do so and when the author followed up later that week, several told her that the meeting went well, three task force leaders were now in place with the skill sets to supervise others, and things were much smoother. The author thanked the branch director for finally showing his support of the construct through his actions, despite his personal opinion about its place in disaster recovery operations.

The analysis of this interaction begins, as previously discussed, with the observation that an initial unwillingness to accept risk existed, perhaps over concerns of failure since despite changes in supervision, one branch director saw program success as ultimately his responsibility. He had also expressed great concern about losing informational awareness if staff members he typically relied on as direct reports to him were now reporting to someone else outside of his chain of command. Although frequent reiteration by JFO leadership of the intent of the construct, coupled with leadership support from outside of the JFO, certainly aided in assuaging the branch director's concerns, the author believes that it took actual examples of collaboration and teamwork before he could fully support the divisions. Through the intimacy and familiarity he was building with the division directors, and aided by their engaging him as challenges and problems arose, he realized his power was not being usurped but rather leveraged in a different way. He had been transformed from a supervisor responsible for telling people what to do to an influencer who had the ability to persuade people through dialogue and

mutual respect. As in other examples, the resistant branch director possessed the skill set to truly lead and motivate a group of people accustomed to reporting to him and ultimately encouraged them to give the construct a fair shot at success.

6. Disaster Assistance Centers (DACs)

In the author's initial face-to-face meeting with the state disaster officials, she expressed her desire to work collaboratively with them to implement service delivery methods based on the needs of the impacted citizens, rather than simply following a blueprint based on what had always been done before. For example, perhaps in some of the more rural areas of the state, it would make more sense to send in a small team of staff to go door-to-door addressing survivor needs as opposed to opening a fixed disaster recovery center and expecting survivors to come to the location. The three agreed it was important to identify ways to best meet the needs of the survivors in the impacted communities and try new models where appropriate.

When the appropriate branch director and section chief arrived at the disaster, the author reiterated her conversation to them that she had with the state. Initially, the branch director indicated his agreement, but after consulting with his partners from another federal agency in the JFO and his supervisor at the regional office, he returned and explained why it was impractical to go door-to-door assisting clients. He explained that although the agency may be able to move relatively quickly from house to house, the OFA process was quite lengthy and required up to three separate visits with an applicant to complete the process. He further explained that prior to the disaster being declared, the regional staff had made an agreement with the OFA's staff that everything done would be completed three times to accommodate the needs of the OFA. The author explained that although everyone was partners with the OFA, and in most cases, could accommodate its needs, each individual also had an obligation to make decisions that expedited services to the survivors, and in some instances, the OFA might need to conduct additional visits through its own funding if the other needs had already been met, such as the longer term centers frequently operated when the agency's facilities had closed.

The author then proposed an alternate approach. In rural areas with low registration numbers, a small team of program staff could be sent to a public building, such as a local library, to meet with survivors. Prior, the agency staff could go door-to-door in neighborhoods, as it always did, explaining to survivors what services were offered in a fixed DRC and that if all of the services of a DRC were needed, a fixed DRC XX miles away in XX county was available to them. However, if there were only a few questions for the agency, or the OFA, the local library on XX date from 4 PM to 7 PM would be open to answer any questions. Such an approach would allow for a smaller number of federal staff to leverage an existing public facility without the need for facility leases, contracted security to guard equipment, etc., and thereby, provide an expeditious and cost effective method for meeting the needs of survivors. After several renaming iterations, the branch director chose the term Disaster Assistance Center to describe these small strike teams. Although the final implementation looked different from the original proposal, larger teams working full days and making three trips to the site to accommodate the OFA, it did prove to be a cost effective way of meeting the needs in rural communities where registration numbers did not support large fixed facilities.

Within this incident, as previously described with others, the author's team took an active approach to problem solving, with all team members committed to identifying cost effective service methods that would provide aid expeditiously. With senior leadership from within the JFO, as well as leadership from the OFA in full support, there remained little disincentive to try the new approach. Additionally, as the branch director was very confident in his abilities and his entire team possessed the required knowledge to support a DAC, the risk of failure was minimal. People would still be serviced but might simply have to wait longer if the number of community members requiring assistance from the DAC were miscalculated. Lastly, senior leadership at the JFO remained flexible and empowered the branch director to alter the proposal to something he would be more comfortable with, such as larger teams, working longer hours, three visits to accommodate the OFA, and the ability to provide a name for the teams.

Although these changes had some negative impact to the cost effectiveness of the original proposal, the cost was minimal and the result was buy-in from the entire branch under his leadership.

7.   Mobile Disaster Recovery Centers (MDRCs)

During recovery operations, one of the tools to assist survivors is large recreational vehicle with the living spaces converted to office workstations. Each vehicle contains approximately eight work stations and is equipped with satellite communications for phones and internet connectivity, which allows workers to conduct business effectively anywhere it is possible to obtain a satellite signal. These vehicles are most frequently used as MDRCs, which, despite their name, are not typically mobile at all in some parts of the country, but instead, are pulled up behind a fixed facility, such as a church or community center, and satellite communications are used to provide phones and Internet to the building so it can be used as a short-term DRC.

Upon arrival in the state, the author was asked why it was always required to identify buildings for the "mobile" disaster recovery centers to work from —why was is not simply possible to pull up in a parking lot and take care of people? The author explained that she too did not understand and would work with the staff to do just that, if possible, to focus on going where the survivors were rather than being reliant only on places with water and power restored to buildings. The author called a meeting with the DRC Taskforce, comprised of several sections with a stake in recovery centers and the branch with primary responsibility for that operation. She asked why MDRCs had to be attached to buildings rather than putting them in a parking lot near survivor's homes and allowing their needs to be met on the vehicle.

First, the author was told it was necessary to use buildings because the vehicles were not compliant with the Americans with Disabilities Act (ADA). She explained her understanding of ADA required access to the services being offered on the vehicle, not actual access to the vehicle. Therefore, as long as the staff stepped off the vehicle, staff could meet with mobility-impaired survivors underneath the vehicle's awning at a table. The branch director stated that the author was mistaken and the author replied that she

would confer with the agency's disability experts and legal counsel. The author did so and received an answer within 24 hours that it was indeed possible to use the vehicle as proposed; in fact, the vehicles had been used that way many years prior when first acquired. She pulled the DRC Taskforce back together and gave them the information at which point the branch director asked for that information in writing. The author provided the answer in writing as requested at which point he began explaining that his supervisor at the regional office also opposed the idea due to a number of other factors. He stated they had safety concerns about being on the vehicle in bad weather. The author explained that the vehicle would then simply be closed and appropriate shelter sought just as done in fixed facilities during tornado warnings. He stated he had concerns about heat, but she told him the vehicles had air conditioning. He stated another federal agency needed privacy due to the nature of the information obtained from people and she explained the vehicle was no less private than a facility where the OFA sits rights next to the staff. The author asked the other sections if they also had concerns about using them as mobile units and heard none, except in the case when due to volume, canopies might be erected over tables in a parking lot rather than servicing people on the vehicle, in which case concerns were expressed about either extreme heat or severe weather. The author explained canopies should be a last resort option due to the challenges with erecting them and breaking them down each day coupled with weather issues but that nothing should not be ruled out.

Later that day, the author was approached by a section chief who asked two other members of command staff and herself to come outside the JFO for an experiment. A MDRC had been created in the parking lot and the section chief requested a walk through with the author and others posing as disaster survivors. Upon approaching, it became apparent the intention was to make the experience as uncomfortable and ill suited as possible. The inside of the vehicle was not used as originally discussed, but rather all services were placed in the parking lot. The waiting area had no awning, which left the staff to role-play as survivors wilting in the hot sun. Signage was hung using paperclips so any small breeze would bring banners down on top of people's heads. The author obliged and went through the MDRC as if she were a survivor. Following the exercise,

the section chief who had requested this presence outside asked what she thought of the role-playing exercise. She explained that he was very creative in providing objections in a visual way, but it was clearly staged to be uncomfortable. He agreed, stating the branch staff had rearranged everything when he came inside to get the author and the other two command staff members. He stated the original plan was to operate the MDRC inside of the vehicle and give it a more "true" test of functionality and privacy. Several people approached the author and told her privately that many within the branch did not wish to staff MDRCs in this manner because they were not as comfortable as fixed sites. In addition, it often required them to change hotels more often to keep up with the moving of the vehicles instead of staying at a fixed site for several days or weeks at a time.

Despite JFO leadership's recognition of this effort and augmented by the support of the disability experts and legal counsel, regional tradition of using the MDRCs to augment a fixed site were unable to be overcome.

In analyzing this incident, the author observed strong social support within the branch as an inhibitor to the emergent idea, perhaps leaving the branch director fearful of criticism by his subordinates for not advocating more for their personal comfort. Perhaps he was unwilling to accept the risk of losing favor with some colleagues at the regional office and some subordinates, despite the fact that the proposal would have expedited assistance to those communities impacted by the disaster. In this case, the importance of the mission could not overcome his desire to maintain more comfortable working conditions for his staff and his persistence also proved to be an emergent inhibitor as he continued to raise new issues each time a previous one was adequately addressed.

8.   Bus Crash

While working for a non-governmental organization, the author was part of a team that responded to a bus crash in a very rural part of a state, not far from several state lines. The crash resulted in nearly a dozen fatalities and approximately 25 injured persons were transported to hospitals in three separate states. The bus was part of a caravan of 17 buses transporting approximately 900 people but had separated from the others to take an alternate route. Since the crash occurred in a rural area, it was more than 30 minutes

before someone came across the crash site and another 30-45 minutes to drive to a location that had cell phone coverage and could call 911. This delay in getting help to the scene served to traumatize those on board further as they waited in cold, snowy conditions for life-saving emergency services to reach them.

Although a number of challenges on this disaster occurred, one of the most significant challenges faced by the author's agency, the government agencies involved, and the charter bus company, was identification of those on the bus that crashed and reunification of family members separated by being airlifted to hospitals in multiple states. Spouses and friends were separated by hundreds of miles, in unfamiliar surroundings. In one case, two unaccompanied minors were transported to one hospital in one state while one parent was transported to a second state and the other parent to yet a third hospital in a third state. Unlike airlines, buses are not required to carry manifests, and in a caravan situation, people often exchange seats with those on other buses throughout the trip to chat with friends or family. Many left their luggage or purses on the original bus so they no longer possessed valid identification while others simply lost their identification during the accident, which scattered wallets and other personal belongings across a wide debris field and over the edge of a mountainous road.

A representative from the government agency on scene, a representative from the bus company and the author collaborated to identify methods for tackling the identification and family reunification challenges. First, the private organization that had sponsored the trip was contacted but it refused to comment, which indicated a concern for legal ramifications, and as such, referred all questions to an attorney. The author then tried contacting the travel agency that had made the plans for the group and it did possess a list of all 900 people registered for the trip. The agency agreed to send the list to try to contact family members. However, if the list were only to be shared with the government agency involved or the author's agency, either internal privacy policies or the Privacy Act prevented the sharing of this information with the other responding partners. Therefore, the travel agency was asked to send the list to the bus company as it was not bound by those same policies or laws and could freely share the list with the rest of the team.

Next, the team began working with the hospitals to release information about the identification of those they had hospitalized and the status of their release to develop plans for family reunification and mental health support. The hospitals insisted HIPAA bound them, although the team tried to explain that the author's agency was exempt from HIPAA and not asking for any medical information from the patients. In two cases, this explanation sufficed, but in one case, it was only after a personal visit was made to the hospital administrator by a federal government official that the hospital recognized it could release the information sought without violating HIPAA.

Once the team had the list of those hospitalized and a general idea of whom else was on the impacted bus, it was possible to move forward with plans for family reunification, but once again, it took the effective collaboration of all partners. Neither the government entity nor the author's agency had the legal authority or proper funding to coordinate family reunification in such an accident. The bus company was willing to absorb the costs but did not have a mechanism to complete the task. By working in tandem, each accomplished parts of the mission relevant to the respective agencies: the government agency coordinated with the TSA to allow the injured individuals to board airplanes despite their lack of valid identification, the bus company established a contract with the travel agency used by the author's agency to pay all travel bills. Thus, the author's agency was then responsible for conducting the actual casework needed and arranging for family reunification, which allowed for the leveraging of expertise without being a part of the exchange of money between the travel agency and the bus company.

Several factors enhancing emergent behavior were present during this event. First, as with all other events described in which factors enhancing emergence were observed, the staff all possessed expertise in its respective areas about what its agencies could and could not accomplish within the scope of existing laws or policies. Effective collaboration amongst the three primary agencies was clearly at play and the team also took an active approach to problem solving. The team's persistence paid off as it worked together to define the scope of each agency's legal authorities, and discovered that the limitations of one agency were not always shared by the other agencies. Timely, accurate information sharing as the team discovered new obstacles or identified ways around them

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aided in its success. One potential factor not discussed in the literature, but perhaps at play, and worth exploring in greater detail, was the unusual nature of the event and the resulting circumstances. Perhaps, when faced with an "extraordinary" disaster, everyone felt less encumbered by standard procedures knowing they were not written to address the type of circumstances we faced. Perhaps the leaders felt an implied permission for risk taking behavior when faced with the extraordinary.

B.   SUMMARY OF OBSERVED FACTORS IMPACTING EMERGENCE

All eight of the events described previously fall within the category of emergent behavior as described within the literature related to complex adaptive systems: the innovative result of interactions amongst various agents in a complex adaptive system. Present within all six incidents during which factors enhancing emergent behavior were observed was the factor of relevant knowledge or skill set. In four of the six incidents, the enhancing factors of recognition by officials or others, de-centralized authority or empowerment, an active approach to problem solving, and flexibility, were observed. In the remaining two examples during which inhibiting factors were present, tradition and an unwillingness to accept risk were common to both events. Table 2 provides a graphic representation of the results.

Table 1: Observed Factors That Enhanced or Inhibited Emergent Behavior

	Strategic Timeline	Tribal Consultation	Geographic Divisions	Team Building	Follow-Up Session	DACs	MDRCs	Bus Crash
Factors that Enhance Emergence								
Intimacy/familiarity		X			X			
Relevant knowledge/ skill set	X	X		X	X	X		X
Recognition by others/ officials	X	X			X	X		
De-centralized authority/ empowerment	X	X		X		X		
Timely, accurate Information				X	X			X
Persistence				X				X
Active approach to problem solving	X			X		X		X
Flexibility		X		X		X		X
Optimism		X		X				X
Self-confidence		X				X		
Strong social support	X			X				X
Factors that Inhibit Emergence								
Tradition			X				X	
Hierarchy/ formal structure			X					
Unwillingness to accept risk			X				X	
Fear of failure			X					
Fear of criticism			X				X	

Table 2.   Observed Factors That Enhanced or Inhibited Emergent Behavior

C.   LEADERSHIP TECHNIQUES AND THEIR OBSERVED EFFECT

In analyzing the leadership lessons learned throughout the incidents, some patterns began to emerge that are also reflected in current literature described as "meta-leadership" or, perhaps more accurately, "enabling leadership." Researchers Uhl-Bien, Marion, and McKelvey (2007) describe enabling leadership as that which works to allow the adaptive and learning nature of a complex adaptive system to thrive, and therefore, result in innovative approaches or techniques. In general, they refer to five techniques enabling leaders leverage to impact emergent behavior positively within their organizations: fostering interaction, fostering interdependency, introducing an appropriate amount of tension, establishing and maintaining appropriate boundaries between more administrative systems, such as those needed to address policy and political pressures, and the adaptive systems required for innovation to occur, and they manage "up" within their organizations serving as champions to the innovative ideas created by the adaptive systems.

Many of these concepts are also reflected in literature related to meta-leadership, defined by Marcus, Ashkenazi, Dorn, & Henderson (2007) as those leaders who take complex problems, and driven by curiosity, facilitate agents across organizations or divisions to accomplish shared objectives and "activate that which has not been otherwise discovered." According to Marcus et al. (2007), meta-leadership is accomplished through the leader's ability to leverage the requisite qualities of self-awareness, self-regulation, motivation, empathy, and social skills. It is clear that these same attributes are required to actively engage the five techniques describes by Uhl-Bien et al. and is described in greater detail within each technique.

1. Fostering Interaction

Fostering interaction generally requires motivated, self-regulated leadership as demonstrated through trustworthiness, and self-aware as demonstrated through confidence (Hein, 1999). Leadership can foster interactions between system agents in a variety of ways to include: establishing a physical environment that encourages interactions and reduces potential barriers created by hierarchy; scheduling opportunities for interaction such meetings or establishing rules that require interaction; and closely monitoring the environment to understand the forces influencing the system's ability to be adaptive, or learn.

In each incident observed within this thesis, except for the MDRC incident, leadership fostered interactions amongst agents. In several of the incidents, interaction was fostered first by scheduling a meeting or exercise requiring the attendance of a number of agents. Often, as leadership monitored the environment, it noticed barriers to the ability of the agents to interact and took steps to remove the barriers. Examples include holding some meetings "in the round" to remove physical barriers of tables and perceived barriers of hierarchical titles displayed by table tents, instructing the facilitator to "make it a free for all" by allowing all agents to engage simultaneously during the strategic timeline incident, or using social skills to establish trust and synergy with system agents as demonstrated in the incidents of tribal consultation, geographic divisions, and the bus crash.

2.   Fostering Interdependency

Fostering interdependency is about creating pressure amongst the agents to act on information (Uhl-Bien et al., 2007). Interdependency occurs because of conflicts between agents, as they begin to adjust their respective actions or elaborate their information to resolve conflict (Uhl-Bien et al., 2007). This technique is enabled by leadership's ability to self-regulate (Hein, 1999) and resist the more traditional role of "leader as problem solver" and allow instead, conflicting constraints from agents to emerge. In some cases, leadership uses their social skills to encourage the sharing of ideas and concerns while other times it may set rules designed to foster interdependency, such as assigned workgroups.

Throughout six of the observed incidents, leadership fostered interdependency by creating a sense of urgency in some cases, such as the establishment of the DACs, wherein agents are compelled to move quickly to meet the needs of community members impacted by disasters. By reinforcing the time sensitive nature of recovery centers, it forced conflicting constraints to manifest, such as the need for the OFA to visit a site three times regardless of the need for the author's agency to do the same. Leadership, while designing the strategic timeline exercise, also fostered interdependence. By directing all agents to participate simultaneously, conflicts began to emerge as they exclaimed, "Wait, if you put that (*Post It*) there, that impacts mine." One of leaderships' most persuasive techniques to foster interdependence comes from allowing for autonomy. In the case of the geographic divisions, leadership explained the division supervisors would be greatly empowered to resolve issue at the field level. Leadership then encouraged each division supervisor to sit privately with each branch director to listen to the latter's concerns and suggestions.

3.   Tension

Tension also creates an impetus to act and to expand information and adaptability (Uhl-Bien et al., 2007). For leadership to introduce tension in a healthy way that drives innovation, as opposed to an unhealthy way that creates panic amongst agents, it must be self-aware, and therefore, able to manage its own stress levels effectively (Hein, 1999).

Additionally, leadership can use empathy to introduce diversity within a team (Hein, 1999). By introducing diverse agents into the system, the group is often exposed to new perspectives, which aids in a group that may be bogged down by consensus or traditional methods (Uhl-Bien et al., 2007). Since conflict drives tension, effective organizational leadership must understand the difference between conflicts related to a disagreement of ideas versus those based in interpersonal conflict, which can be disruptive to the social dynamic of the group (Uhl-Bien et al., 2007).

In four of the incidents observed in this thesis, tension was a tool leadership leveraged to enhance emergence, and in one case, the tension may have involved disruptive, interpersonal conflict. Helpful tension was created by leadership through reinforcing a sense of urgency for mission completion in many cases, such as the timed team building sessions or the bus crash. In some cases, leadership introduced tension through the inclusion of diverse members of workgroups, such as the tribal taskforce or the disaster recovery center taskforce. During the DAC incident, leadership often played devil's advocate with agents continually challenging them to ask "what if." When they expressed concerns, leadership would reply, "what is the worst that can happen from trying this approach, people wait in longer lines?" However, in one case, the MDRC incident, the individual most resistant kept stating he was not opposed to the idea yet continually raised objections. Each time the objection was overcome, he raised others, until finally he manipulated the outcome perhaps indicating more of an interpersonal conflict as described above than an ideational conflict. In this case, leadership failed to recognize the difference at the time, which leads to the belief that agent selection is a critical task of organizational leadership when working to create an adaptive system. Agents who are flexible, creative, and better able to tolerate ambiguity are likely to be more successful members of complex adaptive systems.

4. Boundaries

As described by Uhl-Bien et al. (2007), boundaries refer to leadership's ability to manage the interactions between the administrative systems that involve issues, such as external politics or top-down preferences, and the adaptive systems that innovate.

Effective organizational leadership utilizes empathy, through political awareness, and social skills, through personal influence (Hein, 1999) to help manage this boundary interface.

In seven of the eight incidents, organizational leadership utilized techniques related to maintaining healthy boundaries between the two systems. For example, in the tribal consultation incident, leadership took on the task of managing the external political pressures from the state and its hesitance to bring the tribes into the Unified Coordination Group to prevent the external pressures from suppressing the adaptive system. In the case of the geographic divisions, organizational leadership used its influence to garner support from leadership outside of the JFO to help relieve anxiety of agents related to implementation of a bottom up structure. In several of the incidents, leadership re-aligned agents to the intended mission, not through inhibiting creativity, but rather by asking agents to describe the impact of the actions they were discussing. By focusing agents on the impact, or outcome, it was easy to evaluate if the impacts lined up with the articulated mission. For example, when the mechanistic processes of how the DACs would operate began to inhibit the project from moving forward, leadership asked questions, such as how having a few more people on the team or staying open a few more hours, impacted the outcome. Agents were unable to articulate a significant difference to the mission, but leadership also recognized the importance of these two details to team members' motivation, and therefore, remained flexible and allowed the project to realign accordingly.

5. Championing Innovation

Championing ideas is expressed through leadership's ability to "manage up" and promote innovate ideas within their organizations (Uhl-Bien, 2007). Championing occurs when leadership leverages its social skills, through influence, its self-regulation, through flexibility and risk taking behavior, and its motivation, through commitment, initiative, and optimism (Hein, 1999). It adopts a "pro-innovation" environment by working toward the development of policies and strategies that enable emergence (Uhl-Bien, 2007).

In four of the eight incidents, organizational leadership leveraged this technique. For example, in the tribal consultation, geographic divisions, and DAC incidents, leadership within the JFO touted the success of these measures to organizational leadership outside of the JFO through publishing success stories in organizational newsletters, sharing "best practices" with colleagues in other JFOs, and providing written feedback on the challenges, successes, and lessons learned as part of the formal after action process that occurs following disaster responses. In the case of the MDRC, organizational leadership championed and "managed up" by gaining the support of the agency's disability and legal experts, but fell short in motivating the primary agent within the JFO.

In summary, patterns of leadership behavior were identified through the data analysis and fell within five recognized themes from literature: fostering interaction, fostering interdependency, tension, boundaries, and championing ideas. Leadership's ability to foster interactions and establish or maintain appropriate boundaries between more administrative systems, such as those needed to address policy and political pressures, and the adaptive systems required for innovation to occur, were present in seven of the eight incidents. Fostering interdependency came next in frequency with six observations, followed by tension and championing ideas. Table 3 provides a summary of results.

Table 2: Leadership Techniques Impacting Emergent Behavior

	Strategic Timeline	Tribal Consultation	Geographic Divisions	Team Building	Follow-Up Session	DACs	MDRCs	Bus Crash
Techniques that Enhance Emergence								
Fostering interactions	X	X	X	X	X	X		X
Fostering interdependency	X		X	X	X	X		X
Introducing healthy tension			X	X	X		X	X
Establishing and maintaining boundaries		X	X	X	X	X	X	X
Championing Ideas		X	X			X	X	

Table 3.   Leadership Techniques Impacting Emergent Behavior

V. CONCLUSION

In the past decade, emergency management has undergone significant changes. What may have once been classified as "routine" disasters have grown into complex systems, each possessing unique characteristics that require unique approaches to resolve them. Emergency management has partnered with other government entities, such as public health, a growing number of voluntary agencies, faith-based organizations, the private sector and a wide range of advocacy groups.

Simultaneously, the general public has demonstrated an interest in becoming more actively engaged in disaster response and recovery operations through the use of Web 2.0 technology, and the demonstration of self-organized behavior. Current literature often uses the terms convergence, self-organization, and emergence to describe groups of people that come together following a disaster to a draft perceived unmet needs. To date, many professionals within the emergency management community have relied solely on the command-and-control structures recommended following the events of 9/11 and reinforced after Hurricane Katrina, which left little flexibility to encourage emergence within their own organizations yet alone with self-organized citizens.

This thesis answers the research question, "When is emergent behavior a desired trait within the context of emergency management?" Command and control structures, hierarchical models, are the norm for many bureaucratic organizations, and have proven extremely effective for slow, incremental changes, such as administrative procedures, policies, or laws, which allows for more effective evaluation of resulting ramifications. However, they lack the flexibility to change quickly during disaster response and recovery operations based on feedback from agents within the system or the environment. Each disaster impacts the affected population differently due to factors, such as topography, unemployment rates, poverty rates, and population density of the impacted areas. These variables make each disaster unique, and therefore, require a unique approach to addressing the accompanying response and recovery issues. Innovative approaches are driven by emergency management's ability to encourage self-organizing

or emergent behavior amongst its own staff, which may also lead to acceptance and encouragement of the same behavior within the general population.

The emergency management enterprise can appropriately be described as a complex adaptive system. Such systems are comprised of many different agents, frequently interacting and adapting based on feedback loops with each other and the environment resulting in behaviors more than the sum of their parts. Complex adaptive systems are nonlinear, have the ability to learn or adapt, and possess emergence as a global property.

To best leverage creative problem solving during response and recovery operations, organizational leadership within the complex adaptive system of emergency management should create environments in which emergent behavior is encouraged. Factors that enhance emergent behavior include intimacy or familiarity, relevant knowledge or skill set for the problem at hand, recognition by officials or others, decentralized authority or empowerment to the lowest level possible, timely, accurate information, persistence, an active approach to problem solving, flexibility, optimism, self-confidence, and strong social support. Factors inhibiting emergent behavior include tradition, hierarchy or an over reliance on formal structures, an unwillingness to accept risk, a fear of failure, or fear of criticism.

Through the ethnographic method of participant observation, eight incidents during response and recovery operations were analyzed for the presence of factors that enhanced or inhibited emergence. All eight incidents were impacted by the factors described with relevant knowledge or skill set the most common enhancing factor, and tradition and an unwillingness to accept risk most the two most common inhibiting factors.

The most interesting findings in the data analysis came from the examination of patterns in organizational leadership that emerged across all eight incidents. These patterns fell within five categories of leadership techniques deemed effective for supporting environments in which emergence can occur: fostering interaction, fostering interdependency, introducing an appropriate amount of tension, establishing or

maintaining appropriate boundaries between administrative systems and adaptive systems, and championing ideas created by the adaptive systems. Shared attributes amongst many of these techniques were the leadership qualities of self-awareness, self-regulation, empathy, and social skills.

Although the findings were limited to the eight incidents described, certain inferences can be made and additional research conducted to build upon this study's reliability. One such inference is that enabling leaders must leverage a wide range of skill sets and leadership attributes to impact one or more of the five leadership techniques identified herein effectively to aid in the creation of enabling environments. Another inference is that in many cases they require the support of leadership from outside the current operational environment to ensure success. The implications of these findings support the notion that for an emergency management system to effectively create and support emergent behavior, the presence of factors that enhance or inhibit emergence may not be enough. These factors must be augmented and supported by the overall organizational structure and facilitated through the employment of enabling leaders. Additional research should be conducted to explore possible ways for emergency management organizations to provide for enabling leaders through recruitment, ongoing training, and the creation of an organizational culture that supports innovation.

If the emergency management community can effectively foster leadership that has the ability to vacillate between the slow, deliberate environment most appropriate for administrative and legislative changes and the dynamic and rapidly changing environment created by disaster response and recovery operations, it may indeed be able to facilitate the creation of resilient communities. When emergency management personnel and the public at large have the ability to interact effectively, not through command and control, but through coordination and collaboration, they all become members of a single system adapting to their complex environment, and displaying emergent properties that move them toward a common goal.

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LIST OF REFERENCES

American Red Cross. (2010). *Clara Barton: Founder of the American Red Cross.* Retrieved from http://www.redcross.org/museum/history/claraBarton.asp

Bennet, A., & Bennet, D. (2008). The decision-making process for complex situations in a complex environment. In F. Burstein & C. W. Holsapple (Eds). *Handbook on decision support systems* (1st chapter). New York: Springer–Verlag. Retrieved from U.S. Army War College website: www.carlisle.army.mil/proteus/docs/bennet-the-decision-making.pdf

Berkes, F. (2007). Understanding uncertainty and reducing vulnerability: Lessons from resilience thinking. *Natural Hazards*, *41*(2), 283–295. Retrieved from SpringerLake website: www.springerlink.com/index/Q75841P72X145T86.pdf

Bloom, S. (2000, August). Chaos, complexity, self-organization and us. *Psychotherapy Review*, *2*(8).

The Commission (2003). *The 9/11 commission report: Final report of the national commission on terrorist attacks upon the United States*. New York, New York: W.W. Norton & Company, Inc.

Crisis Commons. (2010). *Mission statement*. Retrieved from http://crisiscommons.org/

Curran, D., & Leonard, H. (2005). Recovery in Aceh: Towards a strategy of emergence. Retrieved from Harvard Business School website: www.hbs.edu/research/pdf/05-082.pdf

DeWalt, K., & DeWalt, B. (2002). *Participant observation: A guide for fieldworkers*. AltaMira Press. A Division of Rowman and Littlefield Publishers, Inc. Walnut Creek, CA.

Emerson, R. M., Fretz, R. I., & Shaw, L. L. (1995). *Writing ethnographic field notes*. Chicago: The University of Chicago Press.

Eoyang, G. (2004). *Complex adaptive systems (CAS)*. Retrieved from Actrix Users Home Pages website: http:users.actrix.co.nz/bobwill/CASmaterial.pdf

Federal Emergency Management Agency (FEMA). (2010, March). *National disaster housing strategy implementation plan*. Retrieved from www.fema.gov/pdf/emergency/disasterhousing/ndhs_implementation_plan.pdf - 2010-03-26

Fritz, C., & Mathewson, J. H. (1957). *Convergence behavior in disasters: A problem in social control.* Committee on Disaster Studies. Disaster Research Group. Retrieved from Open Library website: http://openlibrary.org/books/OL7161399M/Convergence_behavior_in_disasters

Hein, S. (1999). *Ten habits of emotionally intelligent people*. The EQ Institute. Retrieved from webhome.com website: http://webhome.idirect.com/~kehamilt/ipsyeq.html

Kanigel, R. (2001). Are you resilient*? New England Financial Journal*, 46–51.

Kartez, J., & Kelley, W. (1988). Research-based disaster planning: Conditions for implementation. In L. K. Comfort (Ed.), *Managing disaster: Strategies and policy perspectives* (pp. 126–146). Durham, NC: Duke University Press.

Kendra, J., & Wachtendorf, T. (2002). *Rebel food…renegade supplies: Convergence after the world trade center attack.* Disaster Research Center. (Preliminary Paper 316). University of Delaware, Newark, DE.

Kendra, J., & Wachtendorf, T. (2003). Creativity in emergency response to the world trade center disaster. In Natural Hazards Research and Applications Information Center, Public Entity Risk Institute, and Institute for Civil Infrastructure Systems, (Special Publication No. 39.) *Beyond September 11th: An account of post-disaster research.*

Lienhard, J. (1988). *The butterfly effect*. University of Houston. Retrieved from the University of Houston website: http://www.uh.edu/engines/epi652.htm

Maeseele, P., Verleye, G., Stevens, I., & Speckhard, A. (2008). Psychosocial resilience in the face of a mediated terrorist threat. *Media, War & Conflict*, *1*(1): 50–69. Retrieved from Media, War & Conflict website: http://mwc.sagepub.com/content/1/1/50

Marcus, L., Ashkenazi, I., Dorn, B., & Henderson, J. (2007). *The five dimensions of meta-leadership.* National Preparedness Leadership Initiative. Cambridge, MA: Harvard School of Public Health.

Palen, L., & Liu, S. (2007). Proceedings of CHI Conference—San Jose, CA, April 28-May 3, 2007. *Citizen communications in crisis: Anticipating a Future of ICT-Supported Public Participation.* Retrieved from CiteSeer[x]beta website: http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.157.3104

Palen, L., Hiltz, R., & Liu, S. (2007, March). Online forums supporting grassroots participation in emergency preparedness and response. *Communications of the ACM*, *50*(3). Retrieved from ACM DL Digital Library website: http://portal.acm.org/citation.cfm?id=1226766

Schoch-Spana, M., Courtney, B., & Norwood, A. (2009). Expanding the public's role in health emergency policy. *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, *7*(1).

Seele, R. (2001). *Towards a model of self-organised transformation in teams and organisations*. Retrieved from New Paradigm Consulting website: www.new-paradigm.co.uk/Self-Org%Change.htm

Smith, M. (1997). Participant observation and informal education. *The Encyclopedia of Informal Education*. Retrieved from www.infed.org/research/participant_observation.htm

Smith, T., & Stevens, G. (1994). *Emergence, self-organization and social interaction: Arousal-dependent structure in social systems*. University of Rochester. Retrieved from Santa Fe Institute website: www.santafe.edu/media/workingpapers/94-08-046.pdf

Sociology.org.uk 2003. (2003). *Research methods: Participant observation.* Retrieved from www.sociology.org.uk/mpoprint.pdf

Solnit, R. (2009). *A paradise built in hell: The extraordinary communities that arise in disaster*. New York, New York: Viking Penguin Group.

Stallings, R., & Quarantelli, E. L. (1985). Emergent citizen groups and emergency management. *Public Administration Review*, *45*, 93–100.

Stephenson, D., & Bonabeau, E. (2007). Expecting the unexpected: The Need for a networked terrorism and disaster response strategy. *Homeland Security Affairs*, *III*(1). Retrieved from http://www.hsaj.org/?article=3.1.3

Sutton, J., Palen, L., & Shklovski, I. (2008). Proceedings of the 5th International ISCRAM Conference—Washington, DC, USA, May 2008. *Backchannels on the Front Lines: Emergent Use of Social Media in the 2007 Southern California Wildfires*. Retrieved from University of Colorado at Boulder Computer Science website: http://www.cs.colorado.edu/~palen/connectivIT/about_crisis_informatics.html

Uhl-Bien, M., Marion, R., & McKelvey, B. (2007). Complexity leadership theory: Shifting leadership from the industrial age to the knowledge era. *The Leadership Quarterly 18*, 298–318. Retrieved from SciVerse ScienceDirect website: http://www.sciencedirect.com/science?_ob=PublicationURL&_tockey=%23TOC%236575%232007%23999819995%23662236%23FLA%23&_cdi=6575&_pubType=J&_auth=y&_acct=C000228598&_version=1&_urlVersion=0&_userid=10&md5=e694f3edb26775b0e0c9f3f774e1bb16

Ushahidi Haiti. (2010). *Home page*. Retrieved from http://haiti.ushahidi.com/main

Vieweg, S., Palen, L., Liu, S., Hughes, A., & Sutton, J. (2008). Proceedings of the 5th International ISCRAM Conference–Washington DC, USA, May 2008. *Collective Intelligence in Disaster: An Examination of the Phenomenon in the Aftermath of the 2007 Virginia Tech Shooting.* Retrieved from CiteSeer[x]beta website: citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.156.7056...

Wilson, W. (1997, February). World War II: Navajo code talkers. *American History.* Retrieved from HistoryNet.com website: http://www.historynet.com/world-war-ii-navajo-code-talkers.htm

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