

The “Phases” of Emergency Management

Background Paper

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Preface

This paper was prepared for the Intermodal Freight Transportation Institute (ITFI) at the University of Memphis to help advance research, education, and outreach related to intermodal freight transportation. The primary audience for the paper includes IFTI faculty, staff, and students as well as representatives of the public and private organizations that support IFTI.

The paper is part of an ITFI initiative to improve mutual understanding between the public and private sectors relative to intermodal freight transportation. Many of the referenced documents are available online, and links are provided in the text or in the list of references.

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The author is solely responsible for the content, findings, and conclusions.

Abstract

Emergency management is often described in terms of “phases,” using terms such as mitigate, prepare, respond and recover. This paper examines the origins, underlying concepts, variations, limitations, and implications of the “phases of emergency management.” The purpose is to provide background information for transportation researchers and practitioners.

The paper looks at definitions and descriptions of each phase or component of emergency management, the temporal versus functional distinctions of the various phases, the importance of understanding interrelationships and responsibilities for each phase, some newer language and associated concepts (e.g., disaster resistance, sustainability, resilience, business continuity, risk management), and the diversity of research perspectives. In addition, the research identified some confusion in the use of terms, largely attributable to unresolved questions as to whether the “all hazards” approach to emergency management is adequate for “homeland security.” The paper attempts to clarify the important words and phrases most likely to be misunderstood, cause confusion, or require contextual definition.

The “Phases” of Emergency Management

The purpose of this paper is to provide an overview of the “phases” of emergency management in the United States and to identify sources and potential topics for more focused research. The paper is divided into five sections:

- What are the “phases”?
- Recent adaptations, changes, and confusion
- Definitions and descriptions for each phase
- Conceptual issues
- Closing

The term “emergency management” is used here to encompass all of the activities carried out by the federal, state, and local agencies that are referred to as “emergency management agencies (EMAs),” and, more broadly, the efforts of the public and private sectors to deal with hazards, risks, and disasters of all types.

Alternative definitions are examined for some key terms, but many other terms are used without offering specific definitions. As noted in the paper, readers should be alert for unusual or multiple meanings. Among practitioners, words and phrases have meanings not immediately or fully understood by outsiders. Further, since emergency management is an interdisciplinary field of study, the languages of multiple disciplines are intertwined. Since the primary audience for the paper is focused on transportation, transportation examples and comparisons are used in many sections.

WHAT ARE THE “PHASES”?

Emergency management in the United States has been described for the past three decades as a “four phase” process, involving:

- Mitigation
- Preparedness
- Response
- Recovery

These terms have been widely used by policy makers, practitioners, trainers, educators, and researchers. As illustrated in Figure 1 the four phases are often described as part of a continuous process. Similar graphics can be found on web sites and in textbooks, training manuals, reports, and other materials published throughout the U.S.

Some additional examples are shown in Figure 2, including an excerpt from *Natural Hazards Informer* (No. 4, September 2009) published as an enclosure to Transportation Research Board (TRB) Research Results Digests. The title of that document is “A Guide to Planning Resources on Transportation and Hazards.” (LeDuc 2009)



Figure 1. Four Phases of Emergency Management (NEHRP 2009)

Many of these graphics, from Figures 1 and 2, show overlap of adjacent phases.¹ This acknowledges that critical activities frequently cover more than one phase, and the boundaries between phases are seldom precise. Most sources also emphasize that important interrelationships exist among all the phases. For example, “mitigating” flood damage by restricting development in a flood plain will reduce the problems in “responding” to flooding. These interrelationships are discussed more in a subsequent section.

The concept of “phases” has been used since the 1930s to help describe, examine, and understand disasters and to help organize the practice of emergency management. In an article titled *Reconsidering the Phases of Disaster*, David Neal cites different examples of different researchers using five, six, seven, and up to eight phases long before the four phases became the standard. (Neal 1997)

So what is the basis for the “four phases”? The widespread use of “mitigation, preparation, response, and recovery” to help describe “comprehensive emergency management” is the result of work by the National Governors’ Association (NGA) in the late 1970s. The NGA formed a Subcommittee on Disaster Assistance in 1977 in response to concerns among the Governors regarding the lack of coordination of emergency management at both the federal and state levels.

At the federal level more than 100 programs were scattered across multiple agencies, some focused on “natural disasters” and others on “civil defense” and protection from enemy attack. In 1978 the NGA formed a team within their Center for Policy Research (subsequently renamed the Center for Best Practices) to examine the situation under an initiative referred to as the “Emergency Preparedness Project.” (NGA 1979)

¹ Some sources suggest that “phases” should be referred to more accurately as “functional activities” or “components” or “aspects” of emergency management. The implications are examined in a following section, but these terms (phases, activities, components, aspects) are used interchangeably in this paper unless otherwise noted.

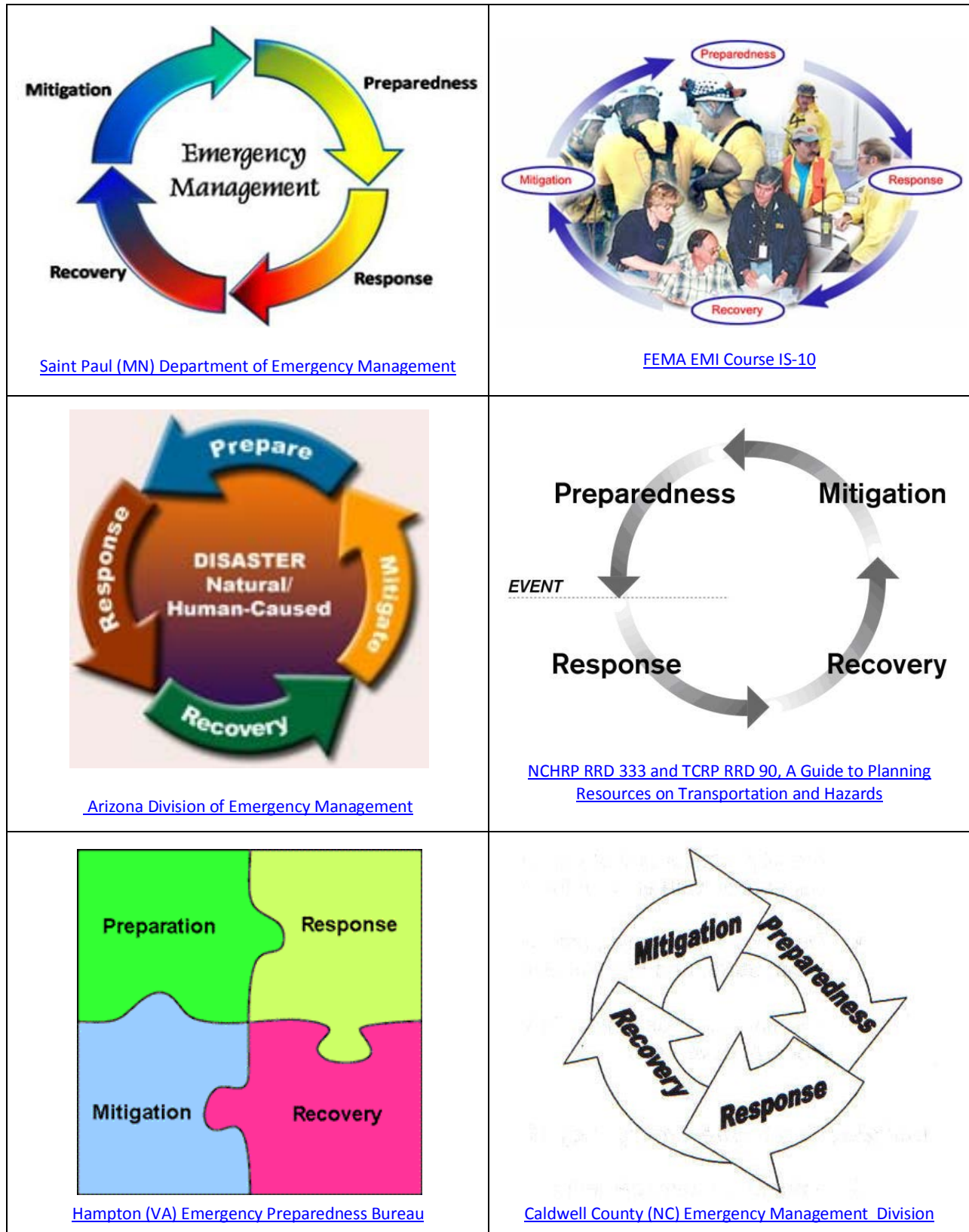


Figure 2. Additional Illustrations of the “Four Phases of Emergency Management”

In a closely related action in 1979 President Carter, a former Governor, created the Federal Emergency Management Agency (FEMA) with an Executive Order that combined numerous disaster-related programs from multiple federal agencies.

The results of the NGA's study were presented in *Comprehensive Emergency Management: A Governor's Guide*. (NGA, 1979) This seminal report, only 56 pages in length including appendices, is available at a FEMA website. [Link](#)

The recommendations in the NGA report are still relevant today, and two aspects are especially important for examination of the phases of emergency management. First, the NGA recommended that the scope of emergency management, as practiced at the federal and state levels, needed to expand beyond "preparedness" and "response" to include a set of activities they described as "mitigation" and another set of activities they described as "recovery." The authors concluded that:

It is evident that the close links between mitigation, preparedness, response, and recovery are not adequately understood. (NGA 1979)

Figure 3, from the NGA report, describes the prevailing situation in 1978 as viewed by the NGA study team. Most state emergency offices were found to be focused almost exclusively on preparedness and response. Those emergency management offices were involved in "recovery" only to the extent of administering federal grants. Some mitigation and recovery activities were occurring, but not in coordination with other aspects of "comprehensive emergency management" as envisioned by the NGA team. From the report:

Although most legislation enables a broader approach, both federal and state governments have managed disasters mainly in terms of preparedness for and response to expected disaster events. For example, Pennsylvania emphasizes flood preparedness; Texas and Florida have developed hurricane response plans and procedures. (NGA 1979)

Figure 4, also from the NGA report offers "suggested linkages," including a note that describes the figure as a "function linkage diagram" and "not an organizational chart or model."

From the NGA text:

[Figure 3] illustrates general patterns of current state disorganization in the context of comprehensive emergency management. [Figure 4] suggests links that could provide a comprehensive emergency management program. These two diagrams do not describe a specific organizational chart; rather, they illustrate important functional and management linkages with which governors may wish to compare their own operations. (NGA 1979)

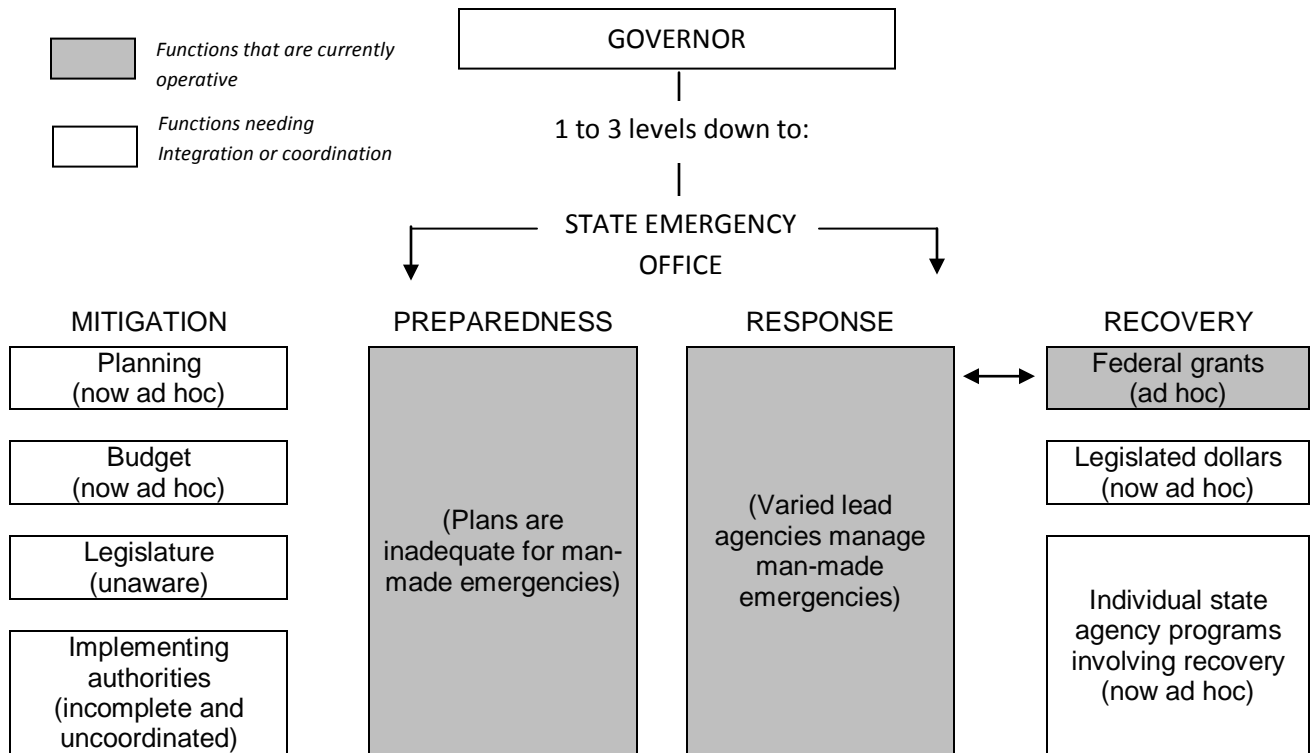


Figure 3
Current (1978) State Emergency Operations
 (general patterns of fragmentation for all-risk management)

A second aspect of the NGA report that is especially relevant for this research relates to the “all-hazards” approach to emergency management. Although the NGA report does not use the phrase “all-hazards,”² the concept is inherent in the NGA’s description of “Comprehensive Emergency Management (CEM).” Further, one of the most important weaknesses identified in the study was that federal and state governments used separate approaches and separate sets of resources to deal with “civil defense” and “natural disasters.” Also, significant gaps were identified in addressing other types of risks. From the NGA report:

All states have emergency offices (SEOs) which plan for, and coordinate responses to, natural disasters and possible attack. Few SEOs, however, coordinate technological hazards, energy and materials shortages, or long-onset natural disasters such as droughts and internal disturbances. Not one comprehensively coordinates mitigation and long-term recovery for all risks. Overall, SEOs coordinate response to only 40 percent of all emergencies that occur. (NGA 1979)

² The NGA report uses “all risks” in several places, including the headings for the figures shown here as Figures 3 and 4.

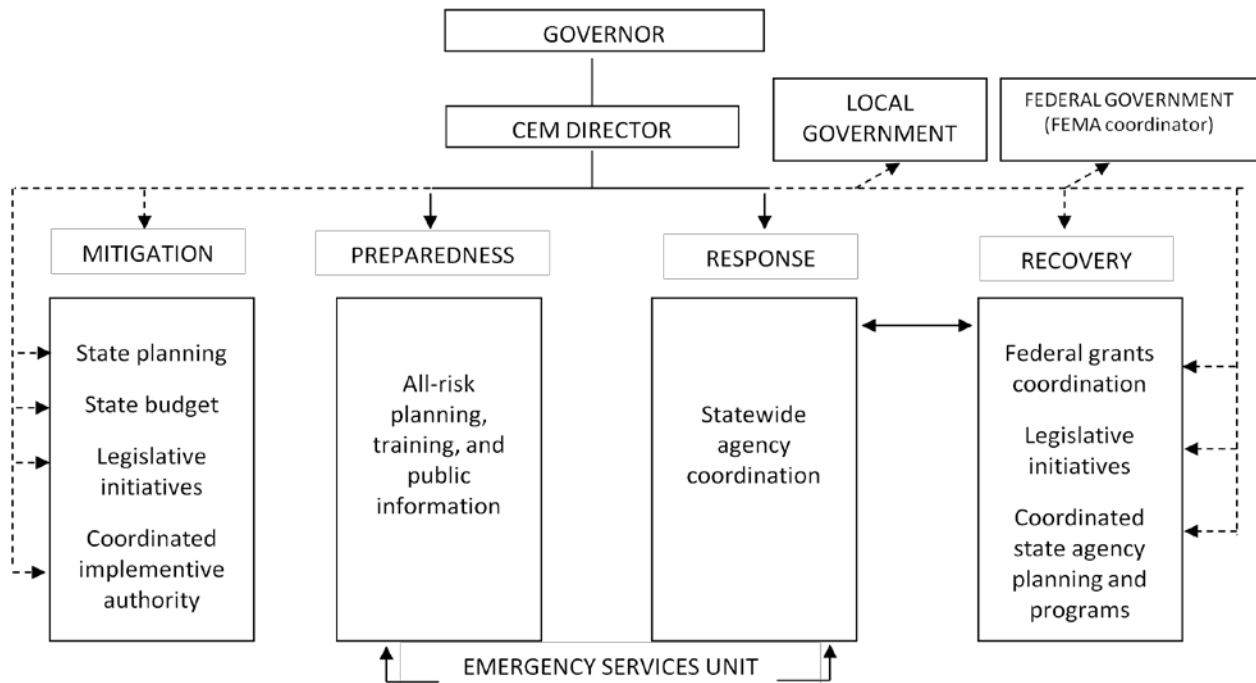


Figure 4
Suggested Linkages for Comprehensive Emergency Management
 (coordinating all risks, four phases, with state development plan)

In summary, the NGA concluded that federal and state efforts should be expanded to include *mitigation* and *recovery* and that all hazards (natural and manmade, including enemy attacks) should be addressed as part of Comprehensive Emergency Management. The phrase “Comprehensive Emergency Management” or “CEM” is still used, but “all-hazards” is used more widely to encompass the basic concepts of CEM.

Sources for more information on the events that have shaped the development of emergency management in the U.S. include introductory chapters in two books (Chapter 1 in *Introduction to Emergency Management* (Haddow 2008) and Chapter 2 in *Living with Hazards, Dealing with Disaster: An Introduction to Emergency Management* (Waugh 2000)) and a 2006 Congressional Research Service (CRS) Report (Hogue 2006).

The following sources also provide historical information and insight:

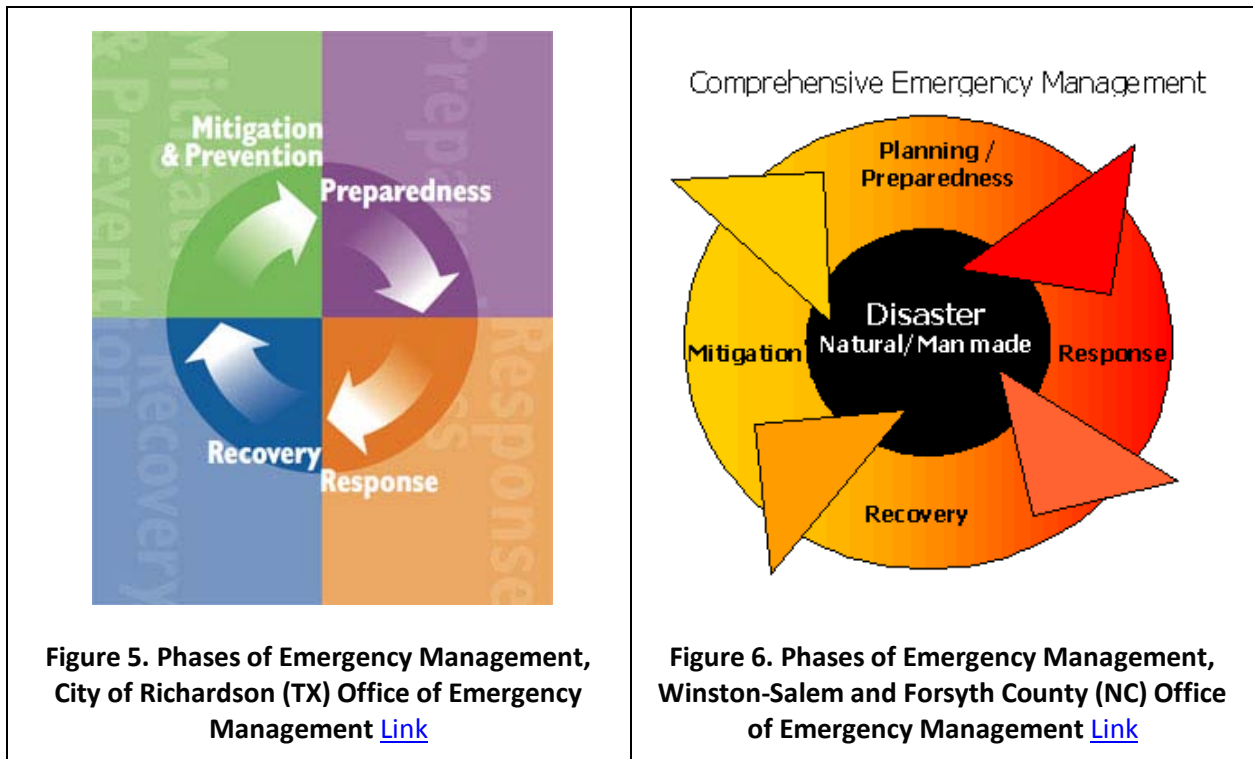
Emergency Management: The American Experience 1900-2005, edited by Claire Rubin

Facing Hazards and Disasters: Understanding Human Dimensions, by the Committee on Disaster Research in the Social Sciences: Future Challenges and Opportunities, Division on Earth and Life Studies, National Research Council of the national Academies, published in 2006 by the National Academies Press [Link](#)

RECENT ADAPTATIONS, CHANGES, AND CONFUSION

Although the “four phases” are part of the common language and theoretical underpinning of emergency management in the U.S., a number of adaptations can be found. Some sources now refer to five phases rather than four. Others have changed the descriptive terms for one or more of the phases. Important sources appear to disagree on the language, and a number of government publications examined as part of this research are more confusing than informative.

Some of the recent changes are subtle and involve only additional words, perhaps to be more descriptive. See, for instance, Figures 5 and 6. In Figure 5, “mitigation” is changed to “mitigation and prevention.” Another variation is shown in Figure 6, using “planning/preparedness” rather than just “preparedness.”



Other changes seem more significant, and most of those changes revolve around conflicts, actual or perceived, between the “all hazards” approach to emergency management and the need to enhance “homeland security.” Part of the impetus for the NGA recommendations in 1979 was to combine federal resources previously divided to address natural disasters separately from civil defense. The events of September 11, 2001, revived many of the same underlying issues and questions.

Is the “all hazards” approach to emergency management adequate for a new era with heightened concerns for terrorism on such a large scale? Should the risks of terrorism be considered differently than other risks? Should responsibilities be divided among different agencies? How should limited resources be allocated? A myriad of other questions have been asked. One author described the dilemma this way, from the perspective of emergency managers:

Terrorism had been a concern of emergency managers long before the attacks on the World Trade Center and the Pentagon. Indeed, emergency managers have long viewed terrorism as one of the many threats that they had to address, although they tended to focus on the similarities between the risks posed by terrorism and those posed by other hazards, rather than on the differences. Moreover, emergency managers tended to see terrorism as a federal, rather than a state or local problem. But in the years since 9/11, local emergency managers have been compelled to divide their attention between a new national priority, the “war on terror,” and the “old” wars against the more common—and more likely—natural and technological disasters. For some emergency managers, particularly those in cities and urban counties, a greater emphasis on terrorism has seemed reasonable, given that terrorists have selected large urban centers and symbols of Western culture as targets. For others, continuing to focus primarily on floods, fires, tornadoes, hurricanes, earthquakes, and other hazards has seemed to be the reasonable course. (Waugh 2007)

One of the practical questions that had to be addressed following 9/11 was whether FEMA, an independent federal agency, should become part of the newly proposed Department of Homeland Security (DHS). With national attention focused on terrorism, FEMA was moved to the new department along with several other federal agencies when DHS was created in 2003. However, the debates about whether FEMA should be independent have been ongoing, involving various interest groups, researchers, and public officials at all levels of government. While FEMA is still part of DHS, the Post-Katrina Emergency Management Reform Act of 2006 reversed some of the organizational changes that had been made within DHS, and FEMA now has essentially all of the same programs and powers it had as an independent agency plus additional responsibilities spelled out in the Act. (Hogue 2006)

Whether “all hazards” can be reconciled with a security-focused approach to terrorism is beyond the scope of this research, as are questions about the best organizational arrangements for FEMA. However, it seems clear that the surrounding issues have affected the ways that the “phases” of emergency management are understood and described.

The related change that seems to have the most momentum is to add “Prevention” as a separate, fifth phase or component of emergency management. For instance, *Principles of Emergency Management*, an independent study manual produced by FEMA, includes a single reference to “all four phases of emergency management,” but then in a subsequent section elaborates on the “five phases of emergency management activities.” Much of the subsequent discussion of the “five phases” in that manual relies on the diagram shown as Figure 7 below. (FEMA 2006)

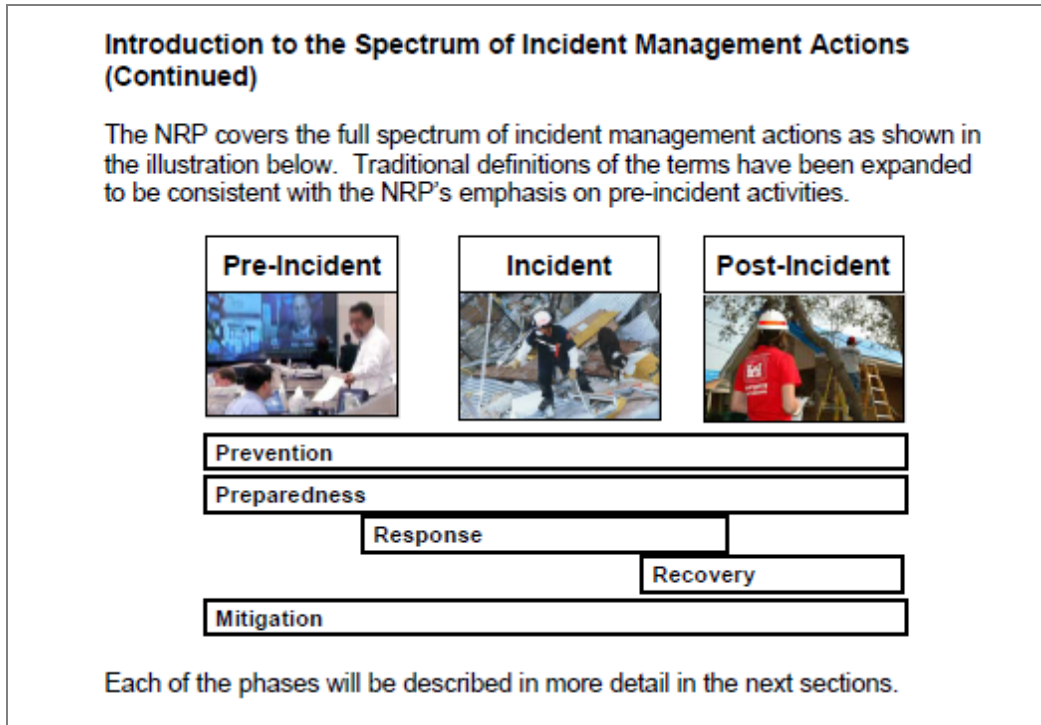


Figure 7. Principles of Emergency Management (FEMA 2006)

The title to this figure refers to the “spectrum of incident management actions,” but the text refers to “phases.” In this figure, time periods are defined as “pre-incident,” “incident,” and “post-incident.” The “phases” are not cyclical and are depicted more as parallel activities, with three of the five (prevention, preparedness, and mitigation) spanning the entire period from pre- to post-incident.

Perhaps the most convincing evidence that “prevention” is now an accepted addition is found in the 2007 update of the National Fire Protection Association’s *NFPA 1600, Standard on Disaster/ Emergency Management and Business Continuity Programs*. This document has been endorsed by several sources as a national “standard” that “shall apply to public, not-for-profit and private entities.”³ The 2007 update adds “prevention” as a fifth “aspect” of the “conceptual framework,” and the introduction includes this note:

The 2007 edition [of *NFPA 1600*] incorporates changes to the 2004 edition, expanding the conceptual framework for disaster/emergency management and business continuity programs. Previous editions of the standard focused on the four aspects of mitigation, preparedness, response, and recovery. This edition identifies prevention as a distinct aspect of the program, in addition to the other four. Doing so brings the standard into alignment with related disciplines and practices of risk management, security, and loss prevention. (NFPA 2007)

³ The 2007 edition is endorsed by the National Emergency Managers Association (NEMA), the International Association of Emergency Managers (IAEM), and the U.S. Department of Homeland Security (DHS). An updated version of *NFPA 1600* is scheduled for release in 2010. (NFPA 2009)

So is it clear that we are now talking about five phases (or activities, components, aspects), with “prevention” as the addition? Not so fast. Some disagreement and confusion are noticeable.

For instance, the U.S. Code defines FEMA’s mission as including five phases, but uses “protection” rather than “prevention”:

The primary mission of the Agency is to reduce the loss of life and property and protect the Nation from all hazards, including natural disasters, acts of terrorism, and other man-made disasters, by leading and supporting the Nation in a risk-based, comprehensive emergency management system of preparedness, protection, response, recovery, and mitigation. (6 U.S.C. Sec. 313, November 1, 2009)

Consider also the differences between documents that make up the *National Response Framework*. The *Emergency Support Function (ESF) #1 (Transportation) Annex* includes the following that is consistent with adding “prevention” as the fifth piece:

ESF #1 also participates in prevention, preparedness, response, recovery, and mitigation activities . . . (FEMA 2008)

However, the core *National Response Framework* document does not use “prevention.” It uses “protection”:

Emergency management is the coordination and integration of all activities necessary to build, sustain, and improve the capability to prepare for, protect against, respond to, recover from, or mitigate against threatened or actual natural disasters, acts of terrorism, or other manmade disasters. (DHS 2008)

Adding to the confusion, the core *National Response Framework* document also refers to “the three phases of effective response: prepare, respond, and recover.” That is not a typo, three phases of *response*. (DHS 2008, 27) [Link](#)

Efforts to integrate emergency management with transportation planning and management are complicated by the confusion of terms and the differences between the “all-hazards” approach and other approaches that emphasize “security.” Three examples are offered below to illustrate.

First, a 2007 edition of the *TR News*, published by the Transportation Research Board, included the “All-Hazards Taxonomy” shown in Figure 8. In spite of the “All-Hazards” heading, many of the described objectives and functions focus on security against terrorism. The article, authored by a DHS official, attributes the taxonomy to a DHS “mission analysis of homeland security requirements.” (Malak 2007)

Figure 9 is from a report, *Homeland Security Strategic Planning: Mission Area Analysis*, which seems to describe the above referenced “mission analysis.” (HSI 2007) The two figures (Figures 8 and 9) are virtually identical, but the Figure 9 heading (top box) from the mission analysis document is labeled “Secure the Homeland” rather than “All-Hazards Taxonomy” as in the *TR News* article. Another DHS publication, *Target Capabilities List: A Companion to the National Preparedness Guidelines*, includes

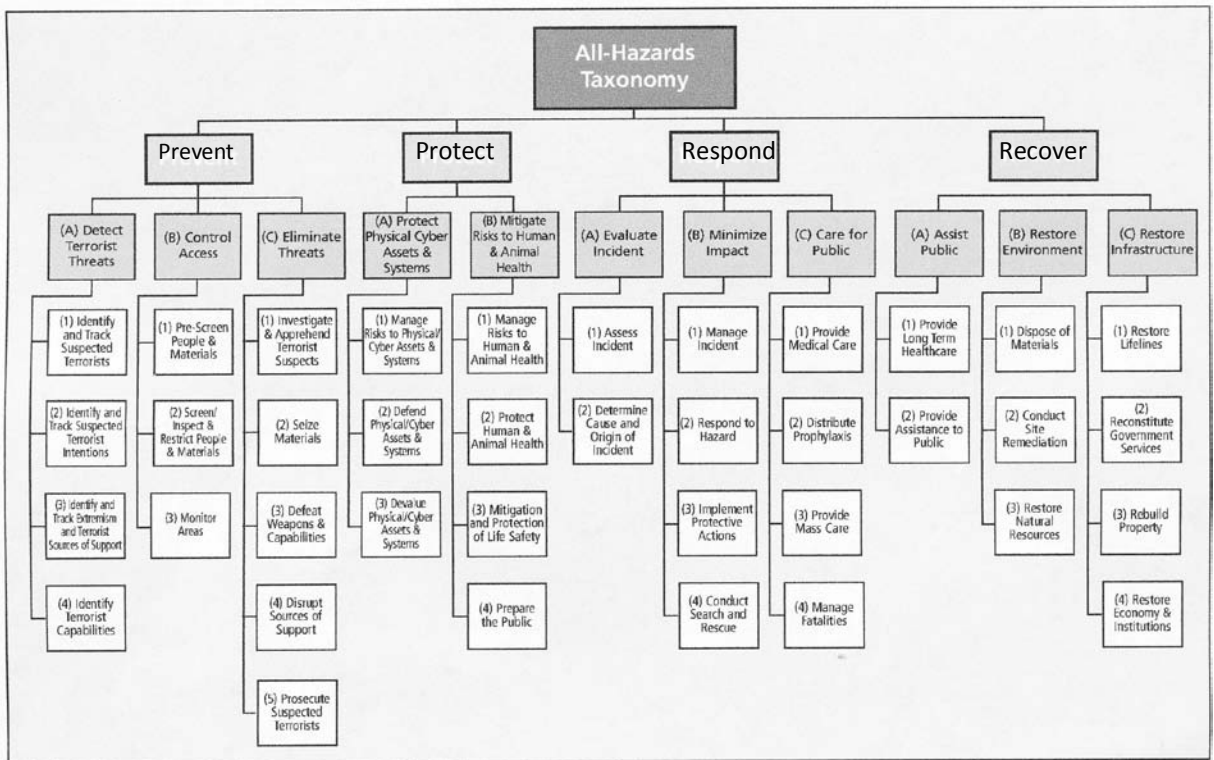


Figure 8. "Capabilities-Based Planning for the National Preparedness System" from TR News, No. 250

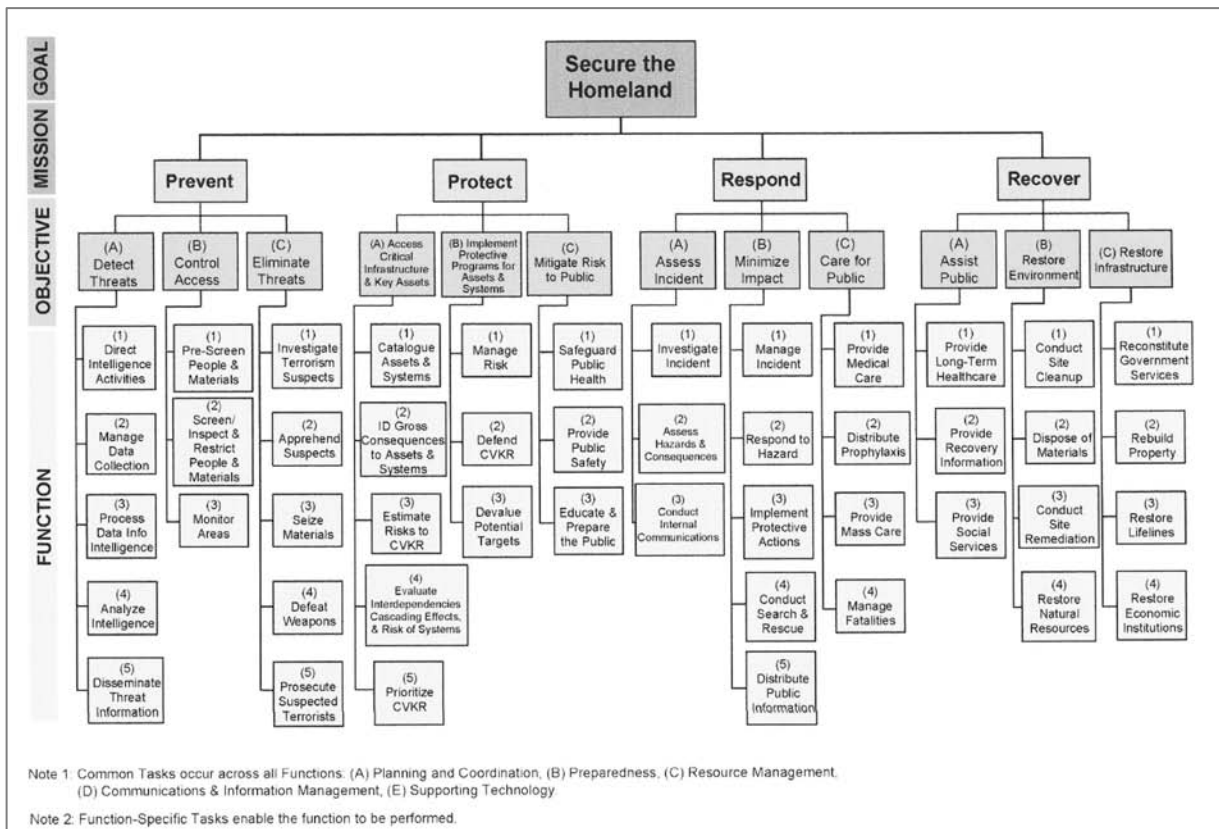


Figure 9. Homeland Security Strategic Planning: Mission Area Analysis, Final, March 28, 2007 by Homeland Security Institute for DHS, Science and Technology and Preparedness Directorates

a similar diagram, but this third version is labeled “Homeland Security All-Hazards Taxonomy.” (DHS 2007) The implication is that in 2007 DHS viewed the differences between “all hazards” and “homeland security” as a matter of labeling more than substance.

Figures 8 and 9 both include both “prevent” and “protect” but not “prepare” or “mitigate.” The explanation for the different terms may be that DHS documents sometimes use “all-hazards” in describing *preparedness* rather than overall *emergency management*. For instance, the *National Preparedness Guidelines*, published in 2007, includes this description:

As directed by the President in HSPD-8, the *Guidelines* adopt an all-hazards approach to preparedness. An all-hazards approach addresses capabilities-based preparedness to prevent, protect against, respond to, and recover from terrorist attacks, major disasters, and other emergencies. (DHS 2007b, 3) [Link](#)

FEMA’s *Comprehensive Preparedness Guide, CPG101, Developing and Maintaining State, Territorial, Tribal, and Local Government Emergency Plan* includes the illustration shown below as Figure 10, referring to the four pieces as “homeland security mission areas.” Figure 10 obviously does not include “mitigation,” but the text for that document elaborates on the mission areas with a paragraph that refers to “mitigation” as “part of the preparedness effort,” followed by descriptions of “prevention” and “protection” that fit within most definitions of mitigation:

Prevention actions help keep the risk posed by a hazard or threat from occurring or getting worse. Examples of prevention activities include planning and zoning, land development regulation, storm water management, fusion center operations, law enforcement, and fire prevention inspections. *Protection* actions focus on people, property, critical infrastructure, and natural resources. They include measures to modify structures, secure facilities and people, and conserve the environment. . . . (FEMA 2009)

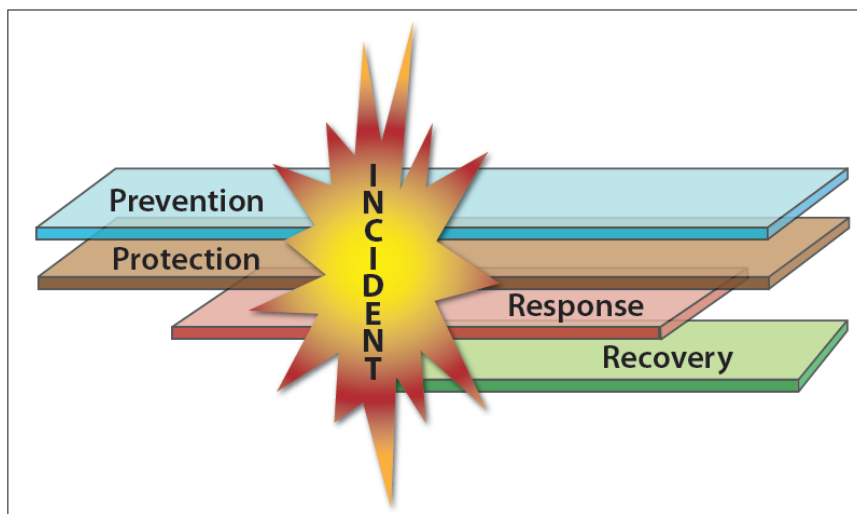


Figure 10. Homeland Security Mission Areas (FEMA 2009)

A second example from the transportation perspective is a Federal Highway Administration (FHWA) website titled “Highway Infrastructure Security and Emergency Management Professional Capacity Building.” In explaining the capacity building program, the website refers to the “natural linkage between highway infrastructure security and emergency management.” The masthead for the website (Figure 11) includes a cyclical graphic similar to others shown in previous figures, but with four phases, using “protect” but not “prevent” or “mitigate”:

- Protect
- Prepare
- Respond
- Recover



Figure 11. Masthead from FHWA Website (FHWA 2009) [Link](#)

The final example, Figure 12, is from *Recovering from Disasters: The National Transportation Recovery Strategy*, published by the U.S. Department of Transportation in November 2009. The cyclical diagram is titled “Emergency Management Cycle,” but it includes only three phases. The words “mitigation,” “prevention,” and “protection” are all used in the document, but are not referred to as “phases.” (USDOT 2009)

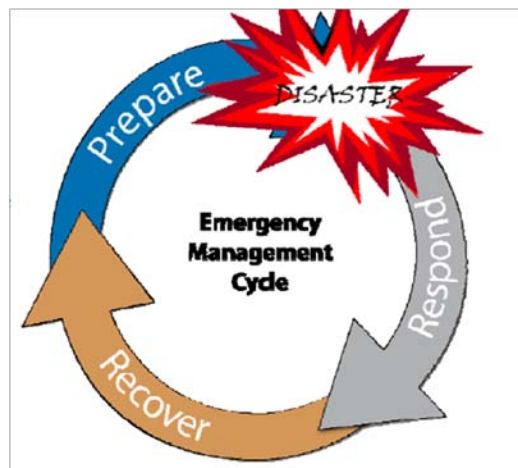


Figure 12. “Emergency Management Cycle” from *Recovering from Disasters: The National Transportation Recovery Strategy*

To summarize, Figure 13 shows the use of five key words in the order presented in the sources discussed above. Each phrase is shown in a unique color to assist in comparing between categories. The only consistencies across all five are in the use of “response” and “recovery.”

| <i>ESF #1 (Transportation) Annex</i> | <i>National Response Framework Core Document</i> | National Preparedness Documents | FHWA Security and Emergency Management Website | National Transportation Recovery Framework |
|--|--|--|---|---|
| prevention preparedness response recovery mitigation | prepare for protect against respond to recover from mitigate against | Prevent Protect Respond Recover | Protect Prepare Respond Recover | Prepare Respond Recover |

Figure 13. Use of Prevent, Prepare, Respond, Recover, Mitigate, and Protect

Figure 14 highlights the uncertainties faced by practitioners trying to reconcile “comprehensive” or “all hazards” emergency management, as practiced for the past thirty years, with the newer security-focused use of similar terms. This listing of the “five phases of emergency management” is an uncomplicated solution from the website of an emergency management agency serving a moderately sized county (population approximately 170,000) near Cleveland, Ohio. (MCEMA 2009)

The five phases of **Emergency Management** are

Mitigation
Preparedness
Response
Recovery
and
Homeland Security

Figure 14. The Five Phases of Emergency Management
Medina County, Ohio [Link](#)

DEFINITIONS AND DESCRIPTIONS OF EACH PHASE

Regardless of the number of phases and the confusing use of terms, how are the various phases (activities, aspects, components) defined? What actions are included under each phase? Are the definitions used in various sources significantly different? To help answer these questions Table 1 displays definitions and descriptions of each phase from five representative sources:

- *Comprehensive Emergency Management: A Governor's Guide*, the 1979 report that is widely cited as the source for the concept of the "four phases" and the "all-hazards" approach to emergency management
- *Principles of Emergency Management*, a Federal Emergency Management Agency (FEMA) self-study document
- *National Response Framework*, a key document, also produced by FEMA, to guide a "unified national response to disasters and emergencies"
- *Tennessee Code Annotated*, as an example of how the phases are defined in laws that specify the duties and responsibilities of public agencies responsible for emergency management
- *National Fire Protection Association 1600—Standard on Disaster/Emergency management and Business Continuity Programs*, a national standard endorsed by several organizations with responsibilities for emergency management

All of these sources define emergency management with at least four phases: mitigate, prepare, respond, and recover. Three of the sources include "prevent" as a separate, fifth phase. Those based on four phases essentially combine under the single heading of "mitigation" the activities that are described separately as "mitigation" and "prevention" by the other sources.

The most notable differences in Table 1 relate to "recovery." The descriptions of "recovery" are generally broader than the descriptions of other phases of emergency management, with different sources emphasizing different aspects. In addition, the responsibilities for different aspects of recovery seem less well defined. Two of the sources distinguish between short- and long-range recovery, but the others do not. The *Tennessee Code Annotated* refers only to the "rapid and orderly start of restoration and rehabilitation" without addressing anything beyond the "start." Two of the five sources (the *National Response Framework* and *NFPA 1600*) refer to mitigation components within their descriptions of "recovery." Overall, the descriptions of recovery, especially from the two FEMA sources, are more abstract than the descriptions of the other phases. The descriptions of other phases rely on active terms such as "activities," "tasks," and "actions," but the recovery phase is described more in terms of goals and desired content.

No contradictions are noted in Table 1. Most of the other differences seem attributable to the purpose and style of the source document.

For the transportation community, it may be helpful to look more closely at the use of the word "mitigation." In a transportation context "mitigation" is most often used when human decisions, such as to build a new highway or bridge or to extend a runway or expand a port, may cause damage to the

Table 1. Phases of Emergency Management: Definitions and Descriptions from Five Sources*

| Phase | Source | | | | |
|-------------------|---|---|--|---|--|
| | National Governors' Association (NGA) <i>Comprehensive Emergency Management: A Governor's Guide</i> May 1979 | DHS, Federal Emergency Management Agency (FEMA) <i>Principles of Emergency Management, Independent Study</i> February 2006 | DHS, Federal Emergency Management Agency (FEMA) <i>National Response Framework Glossary/Acronyms</i> http://www.fema.gov/emergency/nrf/glossary.htm Accessed July 2009 | Tennessee Code Annotated 58-2-101 "Emergency management" means the preparation for, the mitigation of, the response to, and the recovery from emergencies and disasters... July 2009 | National Fire Protection Association <i>NFPA 1600—Standard on Disaster/Emergency Management and Business Continuity Programs</i> including Annex A Explanatory Material 2007 Edition |
| Mitigation | Mitigation includes any activities that actually eliminate or reduce the probability of occurrence of a disaster (for example, arms build-up to deter enemy attack or legislation that takes the unstable double-bottom tanker off the highways). It includes long-term activities designed to reduce the effects of unavoidable disaster (for example, land-use management, establishing comprehensive emergency management programs, or legislating building safety codes). | Mitigation refers to activities that are designed to: Reduce or eliminate risks to persons or property, or Lessen the actual or potential effects or consequences of an incident. | Activities providing a critical foundation in the effort to reduce the loss of life and property from natural and/or manmade disasters by avoiding or lessening the impact of a disaster and providing value to the public by creating safer communities. Mitigation seeks to fix the cycle of disaster damage, reconstruction, and repeated damage. These activities or actions, in most cases, will have a long-term sustained effect. | Reduction of vulnerability of people and communities of this state to damage, injury, and loss of life and property resulting from natural, technological, or manmade emergencies or hostile military or paramilitary action; | Activities taken to reduce the severity or consequences of an emergency. <i>No explanatory material provided for "Mitigation"</i> |
| Prevention | <i>No definition provided for "Prevention"</i> | Prevention: – Means actions taken to avoid an incident or to intervene to stop an incident from occurring. – Involves actions taken to | Actions to avoid an incident or to intervene to stop an incident from occurring. Prevention involves actions to protect lives and property. It involves applying | <i>No definition provided for "Prevention"</i> | Activities to avoid an incident or to stop an emergency from occurring. <i>Explanatory Material:</i> Activities, tasks, programs, and systems intended to |

| | | | | | |
|---------------------|--|---|---|---|---|
| | | <p>protect lives and property.</p> <ul style="list-style-type: none"> – Involves applying intelligence and other information to a range of activities that may include such countermeasures as: <ul style="list-style-type: none"> · Deterrence operations · Heightened inspections · Improved surveillance · Interconnections of health and disease prevention among people, domestic animals, and wildlife. | <p>intelligence and other information to a range of activities that may include such countermeasures as deterrence operations; heightened inspections; improved surveillance and security operations; investigations to determine the full nature and source of the threat; public health and agricultural surveillance and testing processes; immunizations, isolation, or quarantine; and, as appropriate, specific law enforcement operations aimed at deterring, preempting, interdicting, or disrupting illegal activity and apprehending potential perpetrators and bringing them to justice.</p> | | <p>avoid or intervene in order to stop an incident from occurring. Prevention can apply both to human-caused incidents (such as terrorism, vandalism, sabotage, or human error) as well as to naturally occurring incidents. Prevention of human-caused incidents can include applying intelligence and other information to a range of activities that includes such countermeasures as deterrence operations, heightened inspections, improved surveillance and security operations, investigations to determine the nature and source of the threat, and law enforcement operations directed at deterrence, preemption, interdiction, or disruption.</p> |
| Preparedness | <p>Preparedness activities are necessary to the extent that mitigation measures have not, or cannot, prevent disasters. In the preparedness phase, governments, organizations, and individuals develop plans to save lives and minimize disaster damage (for example, compiling state resource inventories, mounting training exercises, or installing warning systems). Preparedness measures also seek to enhance disaster response operations (for example, by stockpiling vital food and medical supplies,</p> | <p>Preparedness is defined as the range of deliberate, critical tasks and activities necessary to build, sustain, and improve the operational capability to prevent, protect against, respond to, and recover from domestic incidents. Preparedness is a continuous process involving efforts at all levels of government and between government and private-sector and nongovernmental organizations to identify threats, determine vulnerabilities, and identify</p> | <p>Actions that involve a combination of planning, resources, training, exercising, and organizing to build, sustain, and improve operational capabilities. Preparedness is the process of identifying the personnel, training, and equipment needed for a wide range of potential incidents, and developing jurisdiction-specific plans for delivering capabilities when needed for an incident.</p> | <p>Preparation for prompt and efficient response and recovery to protect lives and property affected by emergencies</p> | <p>Activities, tasks, programs, and systems developed and implemented prior to an emergency that are used to support the prevention of, mitigation of, response to, and recovery from emergencies.</p> <p><i>No explanatory material provided for "Preparedness"</i></p> |

| | | | | | |
|-----------------|---|--|--|---|--|
| | through training exercises, and by mobilizing emergency personnel on a standby basis). | required resources. | | | |
| Response | Response activities follow an emergency or disaster. Generally, they are designed to provide emergency assistance for casualties (for example, search and rescue, emergency shelter, medical care, mass feeding). They also seek to reduce the probability of secondary damage (for example, shutting off contaminated water supply sources, cordoning off and patrolling looting-prone areas) and to speed recovery operations (for example, damage assessment). | Response begins when an emergency event is imminent or immediately after an event occurs. Response encompasses the activities that address the short-term, direct effects of an incident. Response also includes the execution of EOPs and of incident mitigation activities designed to limit the loss of life, personal injury, property damage, and unfavorable outcomes. | Immediate actions to save lives, protect property and the environment, and meet basic human needs. Response also includes the execution of emergency plans and actions to support short-term recovery. | Response to emergencies using all systems, plans, and resources necessary to preserve adequately the health, safety, and welfare of persons or property affected by the emergency | Immediate and ongoing activities, tasks, programs, and systems to manage the effects of an incident that threatens life, property, operations, or the environment. <i>Explanatory Material:</i> The response of an entity to a disaster or other significant event that might impact the entity. Activities, tasks, programs, and systems can include the preservation of life, meeting basic human needs, preserving business operations, and protecting property and the environment. An incident response can include evacuating a facility, initiating a disaster recovery plan, performing damage assessment, and any other measures necessary to bring an entity to a more stable status. |
| Recovery | Recovery activities continue until all systems return to normal or better. They include two sets of activities: Short-term recovery activities return vital life-support systems to minimum operating standards (for | The goal of recovery is to return the community's systems and activities to normal. Recovery begins right after the emergency. Some recovery activities may be concurrent with response efforts. | The development, coordination, and execution of service- and site-restoration plans; the reconstitution of government operations and services; individual, private-sector, nongovernmental, and | Recovery from emergencies by providing for the rapid and orderly start of restoration and rehabilitation of persons and property affected by emergencies. | Activities and programs designed to return conditions to a level that is acceptable to the entity. <i>Explanatory Material:</i> Recovery programs are designed to assist victims and |

| | | | | | |
|--|---|--|--|--|--|
| | <p>example, cleanup, temporary housing). Long-term recovery activities may continue for a number of years after a disaster. Their purpose is to return life to normal, or improved levels (for example, redevelopment loans, legal assistance, and community planning).</p> | <p>Recovery is the development, coordination, and execution of service- and site-restoration plans for impacted communities and the reconstitution of government operations and services through individual, private-sector, nongovernmental, and public assistance programs...</p> <p>Long-term recovery includes restoring economic activity and rebuilding community facilities and housing. Long-term recovery (stabilizing all systems) can sometimes take years.</p> | <p>public-assistance programs to provide housing and to promote restoration; long-term care and treatment of affected persons; additional measures for social, political, environmental, and economic restoration; evaluation of the incident to identify lessons learned; postincident reporting; and development of initiatives to mitigate the effects of future incidents.</p> | | <p>their families, restore institutions to suitable economic growth and confidence, rebuild destroyed property, and reconstitute government operations and services.</p> <p>Recovery actions often extend long after the incident itself.</p> <p>Recovery programs include mitigation components designed to avoid damage from future incidents.</p> |
|--|---|--|--|--|--|

* A similar chart, is contained in *Disasters by Discipline: Necessary Dialogue for Emergency Management Education*, by Brenda D. Phillips, based on a presentation at a workshop, "Creating Educational Opportunities for the Hazards Manager of the 21st Century," Denver, Colorado, October 22, 2003. <http://training.fema.gov/EMIWeb/downloads/DenverFinal.doc> (November 15, 2009)

environment. For instance, the mandatory environmental impact statements (EISs) for federally funded construction projects must address mitigation measures to offset environmental damage. Federal funds are available under FHWA's Congestion Mitigation and Air Quality (CMAQ) program to help reduce air pollution caused by highway traffic. A process known as "compensatory mitigation" offsets the damage to wetlands caused by transportation projects, by restoring or enhancing wetlands at another site.

In contrast, "mitigation" in the context of emergency management involves actions by humans to reduce or avoid the adverse impacts of disasters. Mitigation is the primary goal. The expected benefits are in the form of avoided future costs.

In the language of the two disciplines combined, mitigation may require mitigation. For instance, a decision to raise the elevation of a roadway to "mitigate" community disruption during recurring high water events might require "mitigation" to offset damage caused by roadway construction in the habitat of an endangered species.

The following are examples of "mitigation" from an emergency management perspective, taken from a FEMA document describing the National Incident Management System (NIMS):

- Public education and outreach activities designed to reduce loss of life and property destruction
- Floodplain management and land-use regulations
- Building codes, seismic design standards, and wind-bracing requirements for new construction, or repairing or retrofitting existing buildings⁴
- Measures to ensure the protection and resilience of CIKR (Critical Infrastructure and Key Resources) designed to ensure business continuity and the economic stability of communities
- Acquiring damaged homes or businesses in flood-prone areas, relocating the structures, and returning the property to open space, wetlands, or recreational uses
- Identifying, utilizing, and refurbishing shelters and safe rooms to help protect people in their homes, public buildings, and schools in hurricane- and tornado-prone areas
- Vital records programs at all levels of government to prevent loss of crucial documents
- Intelligence sharing and linkage leading to other law enforcement activities
- Mapping of hazard or potential hazard zones, using geospatial techniques
- Management of data regarding historical incidents to support strategic planning and analysis
- Development of hazard-specific evacuation routes (DHS 2008b)

The five sources quoted in Table 1 are representative; but none of the listed definitions/descriptions are universally accepted as "standards" for any of the phases. Numerous other definitions/descriptions can be found in a document maintained by Dr. Wayne Blanchard on the FEMA Higher Education website. In November 2009, almost 30 definitions/descriptions were included for "mitigation," more than 30 for "preparedness," more than 20 for "response," and almost 30 for "recovery." (FEMA 2009b) [Link](#)

⁴ Although not included in the cited FEMA document, seismic retrofitting of bridges is an example of "mitigation."

CONCEPTUAL ISSUES

In an article titled “Reconsidering the Phases of Disaster” David Neal writes “disaster researchers have used disaster phases to organize important findings and recommendations about disasters [and] practitioners have relied upon these categories to improve their disaster capabilities.” He concludes that “the uses of different phases of disaster have provided a good heuristic device for researchers and practitioners,” but addresses a number of problems and concerns as to whether the use of phases may stifle “how researchers define and study disasters and how practitioners manage disasters.” Neal offers a number of perspectives as the foundation for new approaches and to help “recast [the use of disaster phases] in a more sophisticated manner.” His suggestions include the following:

- Disaster phases are mutually inclusive
- Disaster phases are multidimensional
- Disaster phases should reflect social rather than objective (clock or calendar) time
- Disaster phases should include multiple perceptions (e.g., disaster managers, emergency responders, victim)
- Researchers should consider how various cultures adjust to disasters and hazards and should recognize the theoretical assumptions about cyclical and linear processes, social change, and determinism (Neal 1997, 254-260) [Link](#)

With Neal’s article as background, this section examines some conceptual issues that seem especially relevant for IFTI’s purposes. Observations and suggested sources for additional information are offered under the following headings:

- Temporal or functional?
- Responsibilities and interrelationships
- Supplements, complements, enhancements, and overlays
- Research perspectives

Temporal or Functional?

As noted earlier, “phase” is used in this paper synonymously with terms such as functional activities, components, and aspects. However, the use of “phases” in research and in the practice of emergency management can be problematic.

A basic question is whether “phase” in this context should be interpreted as a temporal or a functional description. Common use of the word “phase” is distinctly temporal, and temporal considerations are certainly important for emergency management. In the book *Living with Hazards, Dealing with Disasters: An Introduction to Emergency Management*, William Waugh, refers to “activities” and “functions” rather than “phases” and offers this observation:

Initially, the four all-hazards functions were described as "phases," with mitigation and preparedness being predisaster activities, response being disaster activities, and recovery being postdisaster activities. To some extent, the notion of phases is still assumed, but there is

increasing recognition that the activities can and should overlap considerably. Disaster responders, for example, should be taking measures to facilitate recovery, as well as to encourage preparedness for the next disaster and mitigation to reduce its impact. (Waugh 2000)

In fact, the seminal NGA report published in 1979 implies both temporal and functional implications. The report includes the following explanation:

Emergency-related activities are clustered into four phases that are related by time and function to all types of disasters. The phases are also related to each other, and each involves different types of skills. (NGA 1979)

However, the NGA report does not refer to the phases as being part of a cycle and does not include any cyclical diagram such as shown in Figures 1, 2, 5 and 6.

The different approach illustrated in Figure 7 (on page 9) adds a separate temporal scale (i.e., “pre-incident,” “incident,” and “post-incident,”) and shows how the five separate phases (i.e., activities, components, aspects) overlap those three times periods.

Figure 15 is another, unique way of describing the relationships and overlaps between time periods and functional activities. The outer ring of the wheel is divided simply into “before” and “after” the event without a precise definition of the mid-point opposite “impact.” The center of the wheel is divided into five sections that characterize activities within the community. The middle ring uses the standard four phases (aspects) of emergency management. The author does not elaborate, but the lines that divide the sections into equal parts in Figure 15 might actually fluctuate to divide the pieces of the pie into different size pieces depending on the characteristics of the event, the community, and many other variables.

The Foreword to the book, *Emergency Management: Principles and Practice for Local Government (2nd Edition)*, published by the International City/County Management Association (ICMA) refers to “all four phases of emergency management: mitigation, preparedness, response, and recovery efforts.”

However, a subsequent section on the Phases of Disaster asserts that “to develop thresholds that trigger particular actions, it is necessary to understand how disasters typically develop,” and refers to “phases” based on work by Russell Dynes and others:

- Pre-disaster phase
- Pre-impact phase
- Impact phase
- Emergency phase
- Recovery phase (ICMA 2007; Dynes 1981)

Dynes et al qualify their five “time phases” in much the same way that others qualify the CEM-based four phases: “For any given disaster, however, there may be considerable overlap between phases . . . These distinctions among various phases are arbitrary, but each of them captures different sets of disaster demands.” (Dynes 1981)

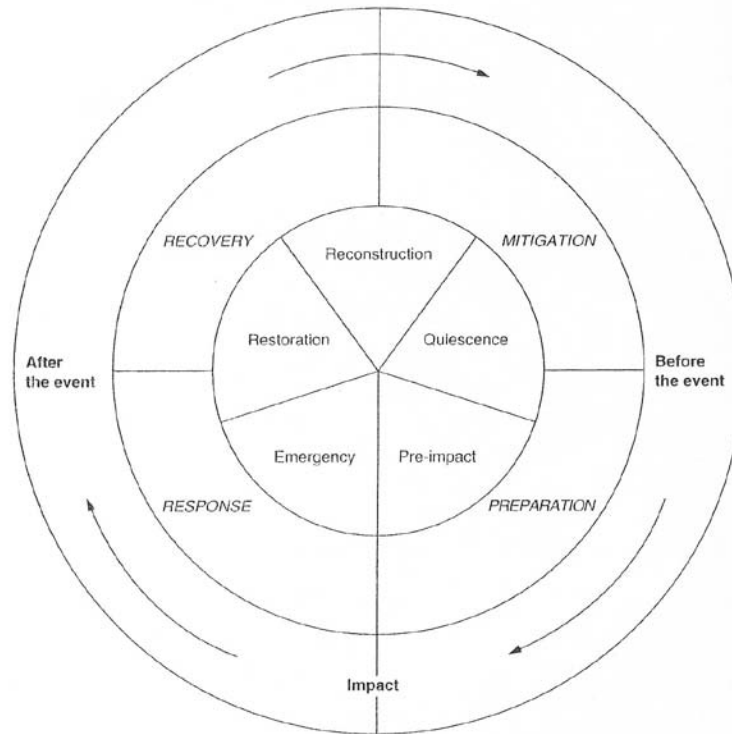


Figure 15.
The Disaster Cycle (Alexander 2002)

One final note on how the “phases” are perceived within the emergency management profession. A textbook, *Introduction to Emergency Management* (3rd Edition), by Haddow, Bullock, and Coppola, includes references to the four phases of emergency management and identifies them as “response, recovery, preparedness, and mitigation.” However, the idea of connecting these components in some sort of sequence is barely addressed. In fact, the authors refer to the four components as “disciplines of emergency management,” and add their own fifth “discipline.” The book has ten chapters, including:

- The Disciplines of Emergency Management: Mitigation
- The Disciplines of Emergency Management: Response
- The Disciplines of Emergency Management: Recovery
- The Disciplines of Emergency Management: Preparedness
- The Disciplines of Emergency Management: Communication

The most notable reference to “phasing” is in the introduction to the chapter on recovery, using the word “function” rather than “phase” or “discipline”:

There is often a theoretical debate over when the response function ends and the recovery function begins. For this book the response function is classified as the immediate actions to save lives, protect property, and meet basic human needs. The recovery function is not so easily classified. This function often begins in the initial hours and days following a disaster event and

can continue for months and, in some cases, years, depending on the severity of the event. (Haddow, 2008)

All of these sources seem to agree that circumstances (i.e., “disaster demands”) are more important than “clock or calendar time” in determining the beginning and ending of “phases” or categories of activities. These sources also seem to confirm the NGA’s notion that the “phases” are related to each other and to all types of disasters by both time *and* function.

Responsibilities and Interrelationships

If “emergency management” is defined on the basis of the four (or five) phases as described in the previous sections, does it follow that “emergency management agencies” are equally responsible, or at least equally involved, in all of those phases (i.e., activities, aspects, components)? Is it even desirable or achievable for EMAs to be equally involved in each phase? Referring back to Figure 4, the NGA report in 1978 recommended “linkages” between all four phases and not necessarily that direct responsibility or even leadership for all four should be assigned to the EMA. The NGA report also concluded that different skills are needed for different phases:

Preparedness and response personnel need a fast-action, authoritative, operational, and decision-making approach to their work. They need systems-planning skills, training skills, and technical expertise.

Mitigation and long-term recovery personnel, by contrast, require analytic, evaluative, and policymaking skills. They also require political acumen and knowledge of the state development plan. (NGA 1979)

This is not to suggest that the organization of EMAs need to be changed or that responsibilities need to be reassigned. The issue is whether the respective roles and resources of all stakeholders are well defined and understood. The commonly used graphics (Figures 1, 2, 5 and 6) and the usual descriptions of the phases do not provide much insight.

EMAs have relatively small staffs and limited budgets.⁵ They accomplish their missions primarily through coordination, communication, management of processes, and by building and maintaining effective networks and relationships.

For certain functions the EMAs are directly responsible and accountable, and, presumably, have the concomitant resources. For instance, the EMA is expected to ensure a functioning emergency operations center (EOC) during crises, to keep elected officials and responsible agencies advised when major incidents occur, to activate warning systems, conduct training and exercises, comply with various record keeping and reporting requirements, and administer various mitigation and recovery grants programs. However, the EMA does not have the authority or resources to ensure land use controls and building

⁵ For instance, the FY 2009-2010 budget for the State of Tennessee shows 94 positions for the Tennessee Emergency Management Agency. For comparison, the budget for the Tennessee Department of Transportation has almost 4,900 positions; for the Tennessee Department of Safety more than 1,700.

codes that reduce vulnerabilities, strengthen dams, build seismic-resistant bridges, or require other agencies or businesses to invest in mitigation or preparedness.

In practice, most EMAs are judged primarily on what happens during “response.” Stated bluntly, the authors of *Introduction to Emergency Management* quote an unnamed but “well-respected” state emergency manager as saying:

I won’t lose my job if I don’t mitigate, but I will lose my job if I don’t respond. (Haddow 2008)

So, then, who will lose his or her job if the community does not have effective mitigation programs? Who will lose a job if recovery is too slow or too costly or leaves the community just as vulnerable as before?

The point here is that the utility of the “phase” model of emergency management is limited unless complementary information addresses the relative responsibilities for each phase. A related weakness of the phase model, especially the cyclical version (Figures 1, 2, 5, and 6), is that such diagrams do not depict the relationships among “non-adjacent” phases. The cyclical models often show overlap between adjacent phases, helping convey that the divisions between phases are not precise and that what happens in one phase impacts the next. However, what about phases that are not adjacent?

Two examples are offered here to show how these interrelated issues—clarifying responsibilities and considering interrelationships between phases—can be addressed. Both examples relate to mitigation.

The first, shown as Table 2, is from FEMA’s *Local Multi-Hazard Mitigation Planning Guidance*. That document provides guidelines and requirements for “Local Mitigation Plans” which communities must prepare and adopt as prerequisites for certain FEMA grants. (FEMA 2008b) [Link](#)

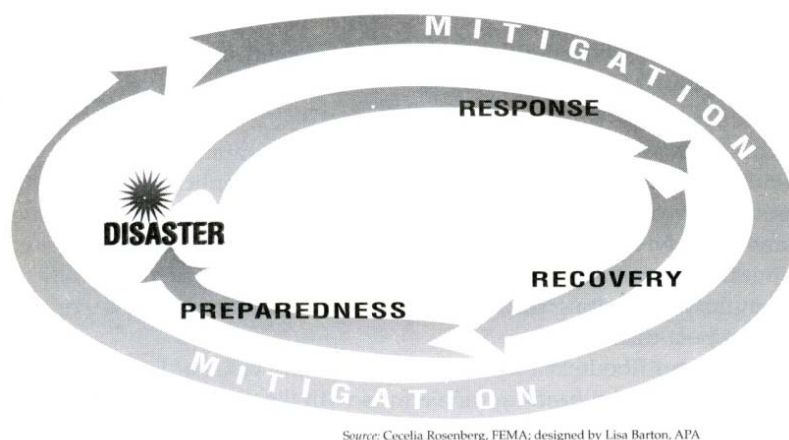
The table contains a comprehensive list of “methods” for local governments to implement mitigation strategies. The list does not specifically identify the responsible agency of local government, but it is sufficiently detailed for most responsibilities to be obvious. The column on the right-hand side of the figure is not well explained in the document, and is a little puzzling, especially with regard to the final category, “Programs.” Some of the identified programs fit the “land use” description, but many do not. Regardless, this adds complementary information needed to identify some specific responsibilities for “mitigation.”

Table 2. Methods for Local Governments to Implement Mitigation Strategies

| Plans | |
|---|----------------------|
| Local Comprehensive Plan General Land Use Plan Sustainability Plan Capital Improvements Plan Redevelopment Plan Post-Disaster Redevelopment / Recovery Plan Regional Development Plans Watershed Protection/Enhancement Plan Open Space Plan Flood Mitigation Plan Military Base Development/Redevelopment/Reuse Plan College Campus Plans | Land Use |
| Comprehensive Emergency Management Plan Evacuation Plan | Emergency Operations |
| Codes, Regulations, & Procedures | |
| Zoning Ordinance Subdivision Regulations Building Code/Permitting Landscape Code Solid Waste & Hazardous Materials Waste Regulations Property Deed Restrictions Tree Protection Ordinance Site Plan Review Architectural/Design Review Storm Water Management Soil Erosion Ordinance | Land Use |
| Programs | |
| Beach Conservation & Restoration Program Historic Preservation Program Construction/Retrofit Program Transportation Improvement/Retrofit Program School District Facilities Plan Environmentally Sensitive Purchase/Protection Program Long-Range Recreation Facilities Program Economic Development Authority Land Buyout Program Downtown Redevelopment Authority Local and/or Regional Evacuation Programs "Firewise" and other Fire Mitigation Fire Rescue Long-Range Programs Mutual Aid Agreement Temporary Animal Relocation Program | Land Use |

Source: *Local Multi-Hazard Mitigation Planning Guide* (FEMA 2008b)

Figure 16 is a unique way of emphasizing that mitigation has overarching relationships with all of the other phases. This figure is from a report entitled *Planning for Post-Disaster Recovery and Reconstruction*, published by the American Planning Association (APA) in 1998.⁶ (Schwab 1998)



Source: Cecelia Rosenberg, FEMA; designed by Lisa Barton, APA

Figure 16. Phases of Emergency Management: The Disaster Life Cycle
Planning for Post-Disaster Recovery and Reconstruction (Schwab 1998)

The APA research was sponsored by FEMA, and the report is sometimes referred to as APA Planning Advisory Service Report 483/484 and sometimes as FEMA 421. A FEMA website describes the report as follows:

FEMA 421 introduces community planners to policies for rebuilding and recovery after disasters and provides guidance on how to plan for post-disaster reconstruction. FEMA 421 also guides development of a natural hazards element as part of a local, general, or comprehensive plan. This document thus equips planners and others involved in post-disaster reconstruction at all levels of government with the tools needed to create (or re-create) communities that will withstand natural disasters. (FEMA 2009c)

The report does not elaborate on the diagram shown in Figure 16, and the diagram may simply reflect a planning bias or an appeal to the core audience for PAS reports—professional planners, whose primary role in emergency management is through mitigation. Regardless, this version more effectively addresses the relationships between phases and could be used in conjunction with Table 2 to more completely address responsibilities of different stakeholders.

⁶ The 300+ page report begins with a chapter on the “The Role of Planners in Post-Disaster Reconstruction” and includes background information, a “tool kit” including a Model Recovery and Reconstruction Ordinance, and case studies in five communities—one each focused on floods, tornadoes, hurricanes, wildfires, and earthquakes. Three [chapters](#) can be downloaded from FEMA.

Supplements, Complements, Enhancements, and Overlays

Comprehensive Emergency Management (CEM)—encompassing all hazards and all phases —has been a cornerstone of emergency management over the past 30 years. However, some different ways of thinking about emergency management have been suggested by scholars, research centers, professional organizations, public agencies, and private companies. Some of these ideas and themes have been presented as alternatives to “CEM.” Most, however, are better described as supplements, complements, or enhancements to CEM or perhaps as overlays.

A few of these different ways of thinking about emergency management are briefly described below along with some suggested sources for more complete examination. The ideas are addressed under three interrelated themes—reduce vulnerability, improve sustainability, and increase resilience, followed by a comparison of the three with CEM and another concept. The section ends with a cursory look at some terms more commonly used in the private sector.

Reduce Vulnerability

The notion of reducing vulnerability is sometimes described in terms of developing “disaster resistant” communities. In an article titled *By Design: The Disaster Resistant and Quality-of-Life Community*, Don Geis asserts that “the only real way to minimize the growing human and property losses from earthquakes, hurricanes, and severe flooding is rooted first and foremost in how we design and build our communities in the first place in these hazard-prone areas.” His definition focuses on the built environment:

A DRC (disaster resistant community) represents the safest possible community that we have the knowledge to design and build in a natural hazard context. It is a means to assist communities in minimizing their vulnerability to natural hazards by maximizing the application of the principles and techniques of mitigation to their development and/or redevelopment decision-making process. (Geis 2000)

Geis emphasizes that “disaster resistant design” should consider:

- Relationship of development to natural (ecological and geological) systems
- Development and redevelopment patterns
- Configuration and scale of public infrastructure
- Design, location, and service capacity of community facilities
- Neighborhood and commercial district design
- In general, the overall capacity, functioning, and relationship of the various components and systems of our communities (Geis 2000)

Reducing vulnerabilities (i.e. building “disaster resistant communities) is at the core of “mitigation” as described by most sources; and examples of mitigation have already been cited, from the National

Incident Management System (NIMS) document (page 20). The following examples are from the web pages for the FEMA Mitigation Directorate⁷:

Mitigation focuses on breaking the cycle of disaster damage, reconstruction, and repeated damage . . . Mitigation includes such activities as:

- Complying with or exceeding floodplain management regulations
- Enforcing stringent building codes, flood-proofing requirements, seismic design standards and wind-bracing requirements for new construction or repairing existing buildings
- Adopting zoning ordinances that steer development away from areas subject to flooding, storm surge or coastal erosion
- Retrofitting public buildings to withstand hurricane-strength winds or ground shaking
- Acquiring damaged homes or businesses in flood-prone areas, relocating the structures, and returning the property to open space, wetlands or recreational uses
- Building community shelters and tornado safe rooms to help protect people in their homes, public buildings and schools in hurricane- and tornado-prone areas [Link](#)

Improve Sustainability

The concept of improving sustainability in the context of emergency management is attributable to a book, *Disasters by Design: A Reassessment of Natural Hazards in the United States*. The book is based on an assessment, sponsored by the National Science Foundation and others, of two decades of natural hazards research. The author, Dennis Mileti, observes that:

Events during the past quarter-century have shown that natural disasters and the technological hazards that may accompany them are not problems that can be solved in isolation. . . . Losses from hazards—and the fact that the nation cannot seem to reduce them—result from shortsighted and narrow conceptions of the human relationship to the natural environment.

To redress those shortcomings, the nation must shift to a policy of "sustainable hazard mitigation." This concept links wise management of natural resources with local economic and social resiliency, viewing hazard mitigation as an integral part of a much larger context. (Mileti 1999, 2)

Mileti identifies six objectives that "must simultaneously be reached to mitigate hazards in a sustainable way and stop the national trend toward increasing catastrophic losses from natural disasters." The six objectives are:

- Maintain and enhance environmental quality
- Maintain and enhance people's quality of life
- Foster local resiliency and responsibility

⁷ FEMA administers an array of grant programs related to mitigation. [Link](#) A 2005 study by the Multihazard Mitigation Council of the National Institute of Building Sciences (NIBS) assessed the costs and benefits of those programs on a national basis and in eight communities, including Jefferson County, Alabama. The [study report](#), *Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities*, is available online.

- Recognize that vibrant local economies are essential
- Ensure inter- and intra-generational equity
- Adopt local consensus building (Mileti 1999, 6)

Two documents from FEMA offer additional insight on sustainability from the perspective of emergency management:

- Planning for a Sustainable Future: The Link Between Hazard Mitigation and Livability ([FEMA 364](#))
- Rebuilding for a More Sustainable Future: An Operational Framework ([FEMA 365](#))

These documents also reinforce the close relationships, or imprecise differences, between the ideas of “reducing vulnerability” (e.g., disaster resistance) and “increasing sustainability.” The two FEMA documents were produced as part of a now discontinued program that was referred to as “Project Impact: Building A Disaster-Resistant Community.”

The word “sustainability” is used even more widely and with broader definitions and implications in the transportation community. See, for instance, the TRB [Committee on Transportation and Sustainability](#), the AASHTO [Center for Environmental Excellence](#), or the [Transportation Sustainability Research Center](#) at UC Berkeley.

Increase Resilience

The concept of *resilience* is widely discussed in the emergency management literature and in public documents, and at least two research centers have focused significant efforts on defining, understanding, and measuring disaster resilience:

- MCEER (formerly the Multidisciplinary Center for Earthquake Engineering Research) headquartered at University at Buffalo, The State University of New York [Link](#)
- The Community and Regional Resilience Institute (CARRI), part of the Southeast Region Research Initiative (SERRI) operated by the Department of Energy's Oak Ridge National Laboratory [Link](#)

MCEER defines resiliency this way:

Disaster resilience . . . is the ability of social units (e.g., organizations, communities) to mitigate hazards, contain the effects of disasters, and carry out recovery activities in ways that minimize social disruption, while also mitigating the effects of future disasters. (MCEER 2006)

A paper commissioned by CARRI offers this definition:

Resilience refers to the ability of a human system to respond and recover. It includes those inherent conditions that allow the system to absorb impacts and cope with the event, as well as postevent adaptive processes that facilitate the ability of the system to reorganize, change, and learn in response to the event. (Cutter 2008)

Two more definitions are listed below, both referring to adaptability and capability for self-organization:

- The capacity of a system, community, or society potentially exposed to hazards to adapt, by resisting or changing, in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures. (SDR 2005, 17)
- The amount of disturbance a system can absorb and still remain within the same state . . . the degree to which the system is capable of self-organization (p. 35) . . . the degree to which the system can build and increase the capacity for learning and adaptation. (Klein 2003, 35-40)

MCEER researchers developed the “resilience triangle” illustrated in Figure 17. The idea is that “resilience-enhancing measures aim at reducing the size of the resilience triangle through strategies that improve the infrastructure’s functionality and performance (the vertical axis in the figure) and decrease the time to fully recover (the horizontal axis).” (MCEER 2006)

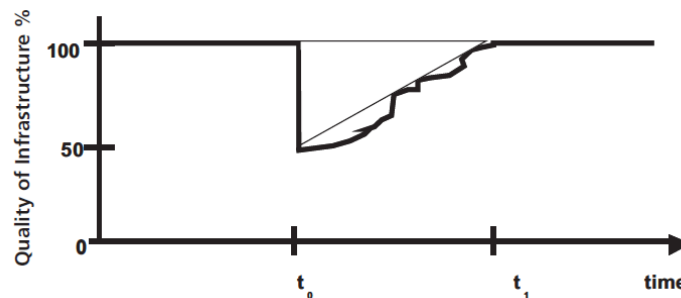


Figure 17. The Resilience Triangle (Tierney 2007, 14)

In the Figure 17 example, more effective mitigation might have resulted in infrastructure quality (i.e., functionality) being reduced to only 75% instead of 50% following the event. More effective response and planning for recovery and replacement of damaged infrastructure might have reduced the t_1 time.

MCEER describes “Four Rs” as fundamental properties of resilience:

Robustness - strength, or the ability of elements, systems, and other units of analysis to withstand a given level of stress or demand without suffering degradation or loss of function;

Redundancy - the extent to which elements, systems, or other units of analysis exist that are substitutable, i.e., capable of satisfying functional requirements in the event of disruption, degradation, or loss of function;

Resourcefulness - the capacity to identify problems, establish priorities, and mobilize resources when conditions exist that threaten to disrupt some element, system, or other unit of analysis (. . . consisting of the ability to supply material - i.e., monetary, physical, technological, and informational and human resources to meet established priorities and achieve goals); and

Rapidity - the capacity to meet priorities and achieve goals in a timely manner in order to contain losses and avoid future disruption. (MCEER 2006)

The Victoria Transport Policy Institute (VTPI) website includes a several [pages](#) on “Evaluating Transportation Resilience,” and a paper presented at the TRB annual meeting in 2009 describes a specific methodology to evaluate transportation resilience. The TRB article, by Kevin Heaslip and others, includes a thorough literature review and proposes a set of measures divided into four “metric groups:” individual, community, economic and recovery. The recovery group includes three specific measures: emergency response capabilities, access to goods and materials, and resources available. (Heaslip 2009)

A final comment regarding “resiliency” is that the term is widely used, and, the meaning often seems much broader than the definitions offered by MCEER, CARRI, and the other sources cited above. For instance, a report developed by The Infrastructure Security Partnership (TISP) and published by the American Society of Civil Engineers (ASCE) is entitled *Regional Disaster Resilience: A Guide for Developing an Action Plan*. The first sentence of the report emphasizes “preparedness”:

[The report] provides a much-needed strategy to develop the level of preparedness necessary for communities to adequately deal with major disasters in today’s complex and interdependent world. (TISP 2006)

Further, the definitions section in the TISP report describes resilience as a “capability” to “prevent or protect” and to “recover and reconstitute.” “Resilience” is described using most of the same terms used in other sources to describe Comprehensive Emergency Management.

A second example also uses the same words. Emerald Group Publishing has announced a new journal for 2010, *International Journal of Disaster Resilience in the Built Environment*. The announcement includes the following statement, mentioning prevention, mitigation, response, and reconstruction:

[This journal] aims at developing the skills and knowledge of the built environment professions and will strengthen their capacity in strategic and practical aspects of disaster prevention, mitigation, response and reconstruction to mitigate the effects of disasters nationally and internationally. (Emerald 2009)

No criticism is intended for the above examples. They are cited only to highlight that “resilient” is being used broadly to convey a wide range of ideas and “best practices” in emergency management.

Comparisons with CEM

A journal article, *A Comparison of Disaster Paradigms: The Search for a Holistic Policy Guide* compares Comprehensive Emergency Management (CEM) and some new “paradigms,” including the three discussed above—reducing vulnerability (disaster resistance), sustainable mitigation, and resilience. The authors of the paper also propose another approach they describe as Comprehensive Vulnerability Management (also as Invulnerable Development). (McEntire 2002)

The preface to the article, published in 2002 by David McEntire and others at the University of North Texas, includes the following:

The following article discusses the current emphasis and attention being given to the future of emergency management, as well as theoretical constructs designed to guide research and help practitioners reduce disaster. It illustrates that while the disaster-resistant community, disaster-resilient community, and sustainable development/sustainable hazards mitigation concepts provide many unique advantages for disaster scholarship and management, they fail to sufficiently address the triggering agents, functional areas, actors, variables, and disciplines pertaining to calamitous events. In making this argument . . . any future paradigm and policy guide must be built on—yet go further than—comprehensive emergency management. (McEntire 2002)

The proposed concept is described as follows:

Comprehensive vulnerability management could be defined as holistic and integrated activities directed toward the reduction of emergencies and disasters by diminishing risk and susceptibility and building of resistance and resilience. The values, decisions, and policies that guide comprehensive vulnerability management are based on careful and continued assessments of the liabilities and capabilities from both the physical, social, and organizational environments. . . .(McEntire 2002, 273)

Table 4 provides a concise summary and comparison of the different approaches in terms of primary hazards/triggering agents, emphasis on phases/functional areas, actors, variables, and disciplines. (The McEntire article provides a much more detailed explanation of the proposed Comprehensive Vulnerability Management and more insight on what the authors view as the relative strengths and weaknesses of CEM and the other approaches to emergency management.)

Another important trend in emergency management is to bridge the gap between the public and private sectors, to create mutually beneficial partnerships, share information and knowledge, and, central to the purpose of this paper, to improve communication. Accordingly, two additional ways of thinking about emergency management, used more prevalently but not exclusively in the private sector, are highlighted below—“continuity” and “risk management.”

Business Continuity

Just as “emergency management” can be defined in part as the work carried out by “emergency managers,” “continuity” can be defined in part as the work carried out by “contingency planners.” Many contingency planners in the U.S. are members of the Association of Contingency Planners (ACP), and ACP provides the following description of “Business Continuity Planning”:

Business continuity planning should be an integral part of every business -- large and small, public and private, for-profit and non-profit. Every business should plan for how it would continue to operate in the face of interruption from a variety of natural or man-made hazards.

It may seem to be daunting, but business continuity planning doesn't have to be complex. At the basic level, the planning process follows a logical progression of steps:

1. Identify what hazards apply to your business. These can be natural hazards (e.g. severe weather, earthquakes, volcanic eruptions, etc.) or man-made hazards (e.g. computer viruses, vandalism, theft, etc.).

Table 4
Comparison of Disaster Paradigms

| | Comprehensive emergency management | Disaster-resistant community | Sustainable development and sustainable hazards mitigation | Disaster-resilient community | Invulnerable development/comprehensive vulnerability management |
|---------------------------|---|--|--|--|--|
| Hazards/triggering agents | Natural, technological, civil, biological | Natural | Natural (especially flooding) and technological to a lesser extent | Natural | Natural, technological, civil, biological |
| Phases/functional areas | Mainly preparedness and response | Mitigation | Mitigation and recovery | Recovery and mitigation to a lesser extent | Mitigation, preparedness, response, and recovery |
| Actors | Mainly the public sector (particularly emergency managers and first responders) | Mainly the public sector (particularly urban planners and engineers) | Urban planners, engineers, insurance agencies, non-government organizations, environmentalists, and citizens | Mainly individuals and groups involved in recovery from the public, private, and nonprofit sectors | Most, if not all, organizations from the public, private, and nonprofit sectors, as well as citizens in general |
| Variables | Mainly physical | Mainly physical | Physical and social to a lesser extent (depending on the scholar and due to the excessive focus on hazards) | Social and physical to a lesser extent | Physical and social |
| Disciplines | Mainly sociology and public administration | Mainly geography and engineering | Geography, engineering, and environmental science; anthropology, economics, and sociology to a lesser extent | Mainly psychology, sociology, and economics; geography and engineering to a lesser extent | The vast majority of fields from the hard and soft sciences as well as epidemiologists and others in the medical field |

Source: David A. McEntire, Christopher Fuller, Chad W. Johnston, Richard Weber, *A Comparison of Disaster Paradigms: The Search for a Holistic Policy Guide*, *Public Administration Review*, May/June 2002, Vol. 62, No. 3

2. Determine the risk that these hazards pose to your business. Probability, severity and length of impact . . . will help determine how much and what kind of risk each poses.
3. Develop plans and procedures to help your business prepare for, respond to and recover from interruptions. . . .
4. Continue to refine your plans through exercises and evaluation of how they performed in real events. (ACP 2007)

The ACP has teamed with “long-term partner” the Institute for Business and Home Safety (IBHS) to utilize their Open for Business Toolkit. [Link](#)

Some contingency planners are also trained and certified by DRI International (DRII), and the DRII website includes a Professional Practices section. Information is provided under ten subject areas, and sources for additional information are identified. [Link](#)

As noted previously, the *NFPA 1600, Standard on Disaster/Emergency Management and Business Continuity Programs* is widely cited in both the public and private sectors in the U.S. as a standard for business and for government agencies. Also as noted, the 2007 update to NFPA 1600 added “prevention” as the fifth “aspect” of emergency management. The final draft of the 2010 update is now complete and awaiting final approval through the NFPA process. In the 2010 update, “continuity” receives significant attention beyond just being part of the title of the standard. Selected excerpts from the draft 2010 version of *NFPA 1600* are shown below to further describe “continuity”:

Purpose. This standard provides the fundamental criteria to develop, implement, assess, and maintain the program for prevention, mitigation, preparedness, response, continuity, and recovery. . . .

Definitions

3.3.1 All-Hazards. An approach for prevention, mitigation, preparedness, response, continuity, and recovery that addresses a full range of threats and hazards, including natural, human-caused, and technologically caused.

3.3.2 Business Continuity. An ongoing process to ensure that the necessary steps are taken to identify the impact of potential losses and maintain viable recovery strategies, recovery plans, and continuity of services. . . .

3.3.4 Continuity. A term that includes business continuity, continuity of operations [COOP], operational continuity, succession planning, continuity of government [COG], and resilience.

Explanatory Material

A.3.3.2 Business Continuity. The term *operational continuity* is the more general term for *business continuity*. It applies not only to for-profit companies but to organizations of all types, such as nongovernmental, public interest, and governmental organizations. This term represents a broader definition of continuity than the term *business continuity*. This broader definition is appropriate to entities in both the public and private sector. . . .

A.4.2 It is not the intent . . . to restrict the users to program coordinator titles. It is recognized that different entities use various forms and names for their program coordinator who performs

the functions identified in the standard. An example of a title for the public sector is emergency manager, and an example of a title for the private sector is business continuity manager. . . .

A.6.4.5 Plans for business continuity, continuity of government, and continuity of operations are generally similar in intent and less similar in content. Continuity plans have various names in both the public and private sectors. These include business continuity plans, business resumption plans, and disaster recovery plans. . . .

Business continuity planning in the private sector incorporates both the initial activities to respond to an emergency situation and the restoration of the business and its functions to pre-incident levels. . . .

Specific areas to consider in continuity plans include the following:

Succession. To ensure that the leadership will continue to function effectively under emergency conditions. When practical, there is a designation of at least three successors for each position.

Pre-delegation of emergency authorities. To ensure that sufficient enabling measures are in effect to continue operations under emergency conditions. Emergency authorities have been enacted that specify the essential duties . . . and that enable the leadership to act. (NFPA 2009)

Risk Management

Volumes of information about “risk management” are available in the literature, and web searches yield an overwhelming number of links. Different definitions are offered for “risk” and even more for “risk management.” Related concepts and processes are described as business risk management, business crisis and continuity management, operational risk management, financial risk management, risk analysis, risk assessment, risk communication, risk management framework, risk management planning, risk management principles, and so forth.

In addition, many of the principles and practices of risk management developed primarily within the private sector are being applied and adapted in the public sector. Examples in the transportation arena include the use of risk assessment to identify critical infrastructure and use of risk management to prioritize security enhancements. The Public Entity Risk Institute (PERI) provides risk management services and resources for “public entities, small businesses, and nonprofit organizations.” [Link](#)

For the purposes of this paper, three interrelated aspects of private-sector risk management are highlighted. First, businesses have a different perspective on “risks” than most public agencies. Businesses are concerned about the same natural and man-made hazards as are public agencies, but businesses are also concerned about other events and circumstances that can be just as devastating to the business. The following list, from the Casualty Actuarial Society (CAS), divides business risks into four types and provides examples for each category:

Hazard risks, such as:

- Fire and other property damage
- Windstorm and other natural perils
- Theft and other crime, personal injury
- Business interruption

- Disease and disability (including work-related injuries and diseases)
- Liability claims

Financial risks, such as:

- Price (e.g. asset value, interest rate, foreign exchange, commodity)
- Liquidity (e.g. cash flow, call risk, opportunity cost)
- Credit (e.g. default, downgrade)
- Inflation/purchasing power
- Hedging/basis risk

Operational risks, such as:

- Business operations (e.g., human resources, product development, capacity, efficiency, product/service failure, channel management, supply chain management, cyclicity)
- Empowerment (e.g., leadership, change readiness)
- Information technology (e.g. relevance, availability)
- Information/business reporting (e.g., budgeting and planning, accounting information, pension fund, investment evaluation, taxation)

Strategic risks, such as:

- Reputational damage (e.g., trademark/brand erosion, fraud, unfavorable publicity)
- Competition
- Customer wants
- Demographic and social/cultural trends
- Technological innovation
- Capital availability
- Regulatory and political trends (CAS 2003)

The above list of examples specifically mentions only a few of the catastrophic events normally associated with emergency management in the public sector (e.g., earthquakes, hurricanes, terrorism). The CAS source document is clear that the list provides examples and is not exhaustive. But, why are the “most disastrous” kinds of events not included? The following quote from *CFO Magazine* may provide some insight:

Kevin O'Marah, chief strategy officer at AMR Research, goes so far as to say that "protecting against natural disasters is too expensive to be worth it. The more mundane stuff is the bigger issue." (Hyatt 2009)

This suggests a basic “risk management” decision. Protecting against some events may be so expensive that the costs would put the business out of business, now. Not spending the money to reduce the risks *might* lead to business failure, but not now.

The second point to highlight is that risk management is often described as an integral part of management at all levels of the organization, but risk management is *practiced* differently at different levels of most organizations. Consider, for instance, the following excerpts from a publication by The Conference Board, titled *Trends in Corporate Security . . . Cops, Geeks, and Bean Counters: The Clashing Cultures of Corporate Security*:

In most companies, the security function is divided into three distinct worlds: physical security, IT security, and risk management—the realms of “cops, geeks, and bean counters.” Bridging this

clash of cultures and creating a common frame of reference is essential if companies are to manage their total security needs in an effective manner.

As corporations attempt to upgrade security, they often find that coordination and control are difficult to achieve. Accountability is dispersed . . . The security function itself is generally scattered into three distinct silos:

- Physical security (protection of people, goods and facilities)
- IT security (protection of data and communications)
- Risk management (protection of finances)

These three silos are separated not just by their distinct locations on the organizational chart, but by a clash of cultures as well:

- Physical security specialists are usually recruited from law enforcement and the military, where they are trained to respect an authoritarian command structure;
- IT security is part of the world of high technology, where innovation is admired and a libertarian value system often prevails;
- Risk managers are integral to the world of corporate finance, where the primary objectives are to maximize returns, minimize costs, and avoid losses.

It is hard to image three more disparate cultures. Each has its own educational and career path, its own jargon, and its own distinctive worldview. . . . In a nutshell, corporate security exists in three different worlds [and] . . . companies must bridge this clash of cultures and create a common frame of reference for the function. (Cavanagh 2004)

This Conference Board article was focused on “security,” but the same observations could have been made (and perhaps expanded) if the focus had been more broadly on “risk management” or “emergency management” and had included more than three perspectives and cultures—perhaps adding operations managers (focused on operational risks), public affairs (focused on reputational risks), or legal (focused on liability and regulatory risks).

The final point is that a new approach seems to be gaining credibility in the business community to address risk in a more holistic way—considering all of the types of risks described above and integrating all of the internal perspectives. The term frequently used is “Enterprise Risk Management (ERM).” The Casualty Actuarial Society (CAS) has a web site dedicated to ERM and uses the following definition:

ERM is the process by which organizations in all industries assess, control, exploit, finance, and monitor risks from all sources for the purpose of increasing the organization’s short and long term value to its stakeholders. (CAS 2009)

The CAS web site includes educational and research material prepared by CAS and partner organizations and an extensive ERM bibliography. [Link](#)

Another influential organization, known as COSO⁸, offers the following definition:

Enterprise risk management deals with risks and opportunities affecting value creation or preservation, defined as follows:

Enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives. (COSO 2004)

Research Perspectives

Before ending this paper, the next few paragraphs address the fact that most of the research cited in this paper was conducted by sociologists, geographers, economists and other researchers with backgrounds other than "emergency management." Most of the work was considered "hazards research" or "disaster research," and much of the formative research was accomplished through the [Disaster Research Center](#) (DRC), formed at Ohio State in 1963 and moved to the University of Delaware in 1985, and at the [Natural Hazards Center](#) (NHC) at the University of Colorado at Boulder, founded in 1976. Another influential center was the [Hazard Reduction and Recovery Center](#) (HHRC) at Texas A&M University, founded in 1988.⁹ (Oyola-Yemaiel 2006)

All three of these centers describe themselves on their respective web pages as "interdisciplinary." The DRC is "working to not only maintain our strong foundations in the social sciences but also to strengthening our multi-disciplinary and interdisciplinary research." The Natural Hazards Center is "using an all-hazards and interdisciplinary framework" and "fosters information sharing and integration of activities among researchers, practitioners, and policy makers from around the world; supports and conducts research; and provides educational opportunities for the next generation of hazards scholars and professionals." The HHRC, housed in Texas A&M's College of Architecture, is "interdisciplinary in nature and includes the expertise of architects, planners, sociologists, policy analysts, and engineers."

A 2006 "electronic textbook," entitled *Disciplines, Disasters and Emergency Management: The Convergence and Divergence of Concepts, Issues and Trends from the Research Literature*, includes a separate chapter from the perspective of each of the following disciplines:

⁸ The Committee of Sponsoring Organizations of the Treadway Commission ([COSO](#)) is a voluntary private-sector organization "dedicated to guiding executive management and governance entities toward the establishment of more effective, efficient, and ethical business operations on a global basis."

⁹ Many other centers have also accomplished important research and have ongoing programs. The HHRC has a web page with links to [Disaster, Hazard, Risk and Emergency Management Research Centers](#). In addition, a growing number of colleges and universities offer undergraduate and advanced degrees in emergency management and related topics. A FEMA website, [Colleges, Universities and Institutions Offering Emergency Management Courses](#), has a list of schools by category.

- Anthropology
 - Business
 - Communications
 - Comparative Politics
 - Criminal Justice
 - Economics
 - Engineering
 - Environment
 - Geography
 - Gerontology
 - Information Sciences
 - International Studies
 - Journalism
 - Law
 - Management
 - Meteorology
 - Political Science
 - Psychology
 - Public Administration
 - Public Health
 - Social Work
 - Sociology
- (McEntire 2006)

Table 5 below from the introductory chapter of the same textbook, written by McEntire. The article includes a condensed summary of the typical views and predispositions of 15 disciplines on the topic of vulnerability. Ten of the fifteen are shown here.

Table 5. Views and Recommendations Regarding Vulnerability by Selected Disciplines

| Discipline | View(s) of Vulnerability | Recommendation(s) |
|-----------------------|---|--|
| Anthropology | Vulnerability emanates from constraining values, attitudes and practices | Alter attitudes to discourage risk-taking practices and susceptibility |
| Emergency Management | Vulnerability is the lack of capacity to perform important functions before and after disaster strikes (e.g., evacuation, search and rescue, public info, etc.) | Foster public awareness about disasters and build capacities through hazard and vulnerability analyses, resource acquisition, planning, training and exercises |
| Engineering | Vulnerability occurs when structures and infrastructure cannot withstand the forces of hazards | Design and construction of buildings and infrastructure that promotes disaster resistance |
| Geography | Vulnerability is determined by the use of hazard-prone areas | Land-use planning that takes into account hazards to reduce risk |
| Homeland Security | Vulnerability is due to cultural misunderstandings, permeable borders and fragile infrastructure, and weak disaster management institutions | Correct domestic and foreign policy mistakes, enhance counter-terrorism measures, protect borders and infra-structure, and improve WMD capabilities |
| Journalism | Vulnerability is a result of insufficient public awareness about hazards and how to respond to disasters | Dispel myths about disasters, foster increased media capabilities, and educate the public about hazards |
| Law | Vulnerability results from negligence, which is a failure to act as reason or legal statutes dictate | Understand the law, alter statutes, and ensure compliance to widely accepted ethical practices in emergency management |
| Psychology | Vulnerability is a function of overlooking or minimizing risk and not being able to cope emotionally with stress and/or loss | Help people to recognize risk and provide crisis counseling to enable resilience |
| Public Administration | Vulnerability results from misguided laws, the failure to implement policies effectively, and an inability to enforce regulations | Strengthen response and recovery capabilities through preparedness measures, improved policy implementation and increased code enforcement |
| Sociology | Vulnerability is a product of inaccurate assumptions about disaster behavior and related to race, gender, age, disability, etc. | Understand behavioral patterns in disasters and pay attention to needs of special populations |

Source: Excerpts from McEntire 2009; Adapted from McEntire, David A. 2003. "Searching for a Holistic Paradigm and Policy Guide," *International Journal of Emergency Management* 1 (3): 298-308.

The point of the previous few paragraphs and Table 5 is to emphasize that the sources cited in this paper are based on work by many different disciplines, each with different perspectives and paradigms. With “emergency management” maturing as a profession and as a distinct field of study, opportunities are present to integrate the work of these multiple disciplines and to add contributions from the field of transportation.

A 2006 publication from the National Academies provides a more thorough exploration of hazards and disaster research and the implications for the future. The report, *Facing Hazards and Disasters: Understanding Human Dimensions*, focuses on studies of hazards and disasters by social scientists, “particularly research undertaken during the past three decades with support provided by the National Science Foundation through the National Earthquake Hazards Reduction Program (NEHRP). Since the establishment of NEHRP in 1977, a cadre of social science researchers—from such disciplines as geography, sociology, political science, psychology, economics, decision science, regional science and planning, public health, and anthropology—has made continuing contributions to the development of knowledge about societal response to hazards and disasters.” (Committee 2006)

CLOSING

The concepts advanced by the NGA in the late 1970s, specifically the “all hazards” and “all phases” approach to emergency management, seem still relevant and fundamentally sound. However, the current language of emergency management (and homeland security) seems to confirm the theorems suggested by Stanley Kaplan in 1997. In a presentation and subsequent article, both entitled *Words of Risk Analysis*, Kaplan offered these theorems:

Theorem 1: 50% of the problems in the world result from people using the same words with different meanings.

Theorem 2: The other 50% comes from people using different words with the same meaning. (Kaplan 1997)

The intent of this paper is to provide important background information for transportation researchers and practitioners and to help clarify the important words and phrases most likely to be misunderstood, cause confusion, or require contextual definition. This overview is also intended to provide some insight for each phase of emergency management, the temporal versus functional distinctions, the importance of interrelationships and responsibilities for each phase, some newer language and associated concepts (e.g., disaster resistance, sustainability, resilience, business continuity, risk management), and the diversity of research perspectives.

The transportation community has significant responsibilities that fall within all of the “phases” of emergency management. Further, the governmental agencies and private business involved in transportation have significantly more resources than the agencies that focus on “emergency management.” Hopefully this paper will encourage and assist the transportation community to become a more active and assertive partner in emergency management.

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