

# Background and Summary

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The disaster resulting from the terrorist attack on September 11, 2001, provided an unprecedented opportunity for the natural hazard research community to contribute its skills and expertise to help better understand what happened, through programs such as the University of Colorado at Boulder's Natural Hazards Research and Applications Information Center's Quick Response (QR) research program and the National Science Foundation's Small Grants for Exploratory Research (SGER). Both programs enabled several teams of scholars to enter the field quickly to collect perishable data in the days and weeks after September 11th. The information they gathered forms a unique set of data that could only have been captured in the short time frame that followed the impact of the disaster; otherwise it would have been lost. Hence, it is a valuable piece of the knowledge our society needs in order to learn how to better cope with and minimize future risks from and impacts of both natural and human-generated events.

This book consists of selections written by some of the researchers who received Quick Response grants or Small Grants for Exploratory Research to investigate questions that arose in the September 11th disaster. Each takes a distinct view of the disaster; their topics span the engineering and behavioral sciences. In their reports, the authors describe their projects and present the findings, lessons, and recommendations that grew out of this post-September 11th disaster research. This summary paper introduces the other contributions in the volume, lists the more salient findings from the research gathered here, makes overall observations about the differences and similarities between the September 11th disaster and other disasters based on these research findings, presents recommendations for improvements to practice and policy, and summarizes needs for future research.

This book should contribute to the further exploration and dissemination of information to help people, localities, and organizations make risk-informed decisions. It also should stimulate thinking to identify areas in which more investigation is needed to build resiliency in the face of risks from natural, technological, and human-induced causes.

## Contents

The selections in this book are grouped loosely into six categories. Readers should note that this is a device for convenience of reading and access to the material, and is not meant to suggest that each study fits narrowly into a specific category. In fact, as is the case with much of hazards and disaster research, each of the research efforts described here tends to span several topics and disciplines, and they are all interrelated to some degree. Another important point is that this collection is in no way a comprehensive look at the September 11th disaster. For example, some aspects of the performance of some infrastructure are examined, but not all aspects of all types. Similarly, some types of human and organizational behavior have been examined in these studies, but certainly not the full range of possible behaviors in all types of organizations that participated in or were affected by the disaster. Further, the studies described here were all of the “quick response” variety, that is, they were initiated immediately after the terrorist attacks happened, sometimes without the luxury of thorough planning or time-consuming background work, and almost always conducted under less-than-optimal conditions. Most of these research projects were meant to be exploratory, pointing the way to questions for future, more intensive and extensive investigation, rather than providing definitive answers. Nevertheless, the range of topics they cover and the scientific understanding they demonstrate combine to give a solid perspective on the questions, confirmations, and puzzles the September 11th disaster has engendered.

Part one is an overview section. Besides this summary, it includes a discussion by Sarah Michaels of quick response research as a method, and a summary by Carlos Restrepo and Rae Zimmerman of a workshop on urban disasters held a few months after the September 11th event. Part two contains reports of research that focused on various issues in response to the disaster. Nancy Grant, David Hoover, Anne-Marie Scarisbrick-Hauser, and Stacy L. Muffet report on the multi-jurisdictional interactions between the federal and local government responders at the scene of the crash of United Flight 93 in Pennsylvania. David Simpson and Steven Stehr examine the process by which victims were identified and information about them managed after the collapse of the World Trade Center towers. James Kendra and Tricia Wachtendorf use the World Trade Center disaster as an exploratory case study to discuss the role and consequences of creativity in emergency response. The paper by Deborah Thomas, Susan Cutter, Michael Hodgson, Mike Gutekunst, and Steven Jones explores how geographic information systems, remote sensing, global positioning systems, and maps were used in the aftermath of the World Trade Center incident.

Part three of the volume includes four contributions dealing with affected buildings and infrastructure in New York City. William Wallace, David

Mendonça, Earl Lee, John Mitchell, and Joe Chow use a systems approach to analyze the interdependence of the critical infrastructure around the World Trade Center complex, and the impacts of their being disrupted. Gordon Warn, Jeffrey Berman, Andrew Whittaker, and Michel Bruneau report on their engineering analysis of one badly damaged building near the World Trade Center. Rae Zimmerman explains how pre-existing flexibility in design, planning, and siting of New York City infrastructures affected the provision and/or resumption of transportation, energy, environmental, and communication services after the disaster. Thomas O'Rourke, Arthur Lembo, and Linda Nozick delineate the consequences of the disaster on civil infrastructure systems in the New York City area.

Individual and collective behavior is the subject of part four. Seana Lowe and Alice Fothergill examine the influences on and motivations of volunteers in the disaster response in New York City. David Sattler reports on his investigation of the psychological distress, resiliency, and coping behaviors reported after the September 11th disaster by samples of young people elsewhere in the United States. Lori Peek describes the reactions and responses of Muslim university students in the New York City area during the aftermath of the disaster. Paul O'Brien relates his use of the traditional hazards-based model of risk communication to understand some of the behaviors of the people affected by the attack in New York City. José Holguín-Veras, Robert E. Paaswell, and Ann-Marie Yali report the findings of a research project aimed at assessing the impact the September 11th disaster had on decisions about intercity passenger travel. Jeannette Sutton applies the established typology of organizational adaptation in disasters to a selection of faith-based organizations that engaged in response activities after the September 11th disaster.

In part five are reports of two studies on the activities of the private sector in the wake of the September 11th disaster. David McEntire, Robie Robinson, and Richard Weber use the World Trade Center incident as a case study of the functions performed by businesses and the coordination that developed between the public and private sectors. Sarah Michaels' work highlights the vital role played by information technology firms to deliver previously contracted services, provide new services, and donate humanitarian aid.

The sixth and final part of the book takes a broader view of the disaster, providing some political context and a glimpse of the many public policy issues that arose. Patrick Gillham and Bob Edwards trace how the sudden transformation of the political climate after September 11th caused organizations that had scheduled social justice protests to alter their plans. Christine Rodrigue evaluates the disaster coverage in the *Los Angeles Times* for the first 12 weeks after the disaster. André LeDuc, Robert Parker, and Kathy Lynn tell how Oregon took the occurrence of the disaster as an opportunity to evaluate the effectiveness of its state agency communications

for emergency response and disaster recovery. Claire Rubin and Irmak Renda-Tanali relate some of the early impacts of the disaster and its implications for federal emergency management systems, programs, and policies.

The volume ends with an appendix listing the many post-September 11th grants awarded by the National Science Foundation for topics related to homeland security.

### **Findings and Observations**

The September 11, 2001, terrorist attack disaster has repeatedly been called “unique.” Although many aspects of the disaster were unprecedented in recent U.S. experience, in most ways the aftermath of the disaster (if not the attacks themselves) was consistent with long-established knowledge and practice about appropriate response to crisis, human behavior in extreme situations, the performance of engineered systems, government disaster policy, and other issues. This conceptual framework for understanding and coping with disasters has been developed as a result of decades of past research on and experience in natural and technological disasters. The practitioners, managers, policymakers, and scientists who have been addressing natural and technological disasters over the years have expertise in responding to many types of emergencies, large-scale coordination of resources and needs, risk assessment for the built environment, designing for conditions of uncertainty, fostering community recovery, strengthening structures for multiple loadings, and simulating complex systems of infrastructure under various conditions—all of which will be needed to combat the impacts of terrorism in the future. That this disaster-based knowledge and expertise is well-suited to addressing possible future terrorism disasters is made clear by the research reported here.

That said, the September 11th disaster did have unusual characteristics that are worth noting. Some grew out of the fact that the disaster was caused by a terrorist attack; some could have developed in other types of disasters as well. Some of these factors presented “new wrinkles” in the scheme of coping with unexpected events, while others were consistent with existing attitudes, behaviors, and procedures.

- Inability to reach the disaster sites via air travel was an unprecedented problem. Organizations, agencies, and businesses could not immediately fly personnel or materials into the area. (For more on this, see the selections in this volume by Michaels; and by Sutton.)
- All three disaster sites (New York City, Washington D.C., and Shanksville, Pennsylvania) were also crime scenes. This posed additional security considerations, and the presence of security and law enforcement personnel made emergency response procedures and coordination more complicated. (For more on this, see the selection by Grant et al.)

- The scope of the disaster was unusually large by U.S. standards: millions of people were affected, multiple geographic areas were impacted, and there was a very high density of population and development in some affected areas. However, it should be noted that the loss of life was small compared to the numbers of people who die worldwide in earthquakes, typhoons, and floods every year. (See the pieces by Rodrigue; and by Rubin and Renda-Tanali.)
- The terrorist risk is unfamiliar to Americans, so neither the public nor officials knew precisely what kinds of individual protective actions could or should be taken, if any. In a flood or tornado, by contrast, most people instinctively realize they should move to high ground or seek sturdy shelter; public agencies know what kinds of warnings or advice to give. (For more on this idea, see the selection by O'Brien in this volume.)
- For decades disaster preparedness and response activities have been relatively non-politicized. But the September 11th disaster had clear political undertones and ramifications. While it is not clear yet what the relationships are among the various factors and effects, it appears that under some conditions (perhaps in the case of a disaster resulting from a deliberate act), responses may not always be as apolitical as they usually are in disasters. In those circumstances there may not be the degree of universal altruism typical of other disasters, or the same degree of respect for everyday rights (of assembly, speech, privacy). (For more on this, see the selections by Gillham and Edwards; by Rodrigue; and by Peek.)

### **Disaster Response**

Although a number of unusual and unanticipated circumstances had to be dealt with during the course of responding to the September 11th disaster, in general the agencies, organizations, personnel, and procedures already in place proved to be workable and flexible enough to meet new and unexpected contingencies. The ability to improvise and to adapt existing knowledge, skills, and resources to an emergency/disaster situation, is one aspect of the non-linear thinking that *Disasters by Design* identifies as being essential to the effective management of future disasters (Mileti, 1999). In addition, technology for information dissemination, communications, and geospatial analysis seemed to carve out a new niche for itself in response activities, (at least in New York City). Some of the researchers' observations on these topics are listed below.

- Emergency response personnel at the Pennsylvania disaster site who had worked together beforehand had stronger and more effective interactions than those who were strangers. The emergency response was helped

further by the fact that personnel had been through training and had conducted exercises of their response procedures. (See the selection by Grant et al. for more on this.)

- In New York City, emergency response personnel and organizations exhibited creativity, resiliency, and improvisation in using and providing products or services (communications, facilities, search and rescue, security, cleanup, etc.), and obtaining additional resources to carry out their activities. (See Kendra and Wachtendorf for details about this activity.)
- Creative action as exhibited by emergency response personnel and groups after the attacks yielded not only positive results but also conflicts and challenges, not unlike those documented in prior studies of the convergence phenomenon after disasters, in which volunteers, opportunists, and others converge on the scene, adding an element of uncontrollability that can complicate emergency operations, safety, and security. (See Kendra and Wachtendorf's contribution for more thinking along these lines.)
- Geographic information systems (GIS), other geo-technologies, and new mapping techniques apparently were used as decision support tools and as vehicles for risk communication in the disaster response and recovery in New York City. (See the piece by Thomas et al. for more on this.)
- The experience of some of the businesses interviewed after the disaster showed that current technology makes it unnecessary for certain types of disaster assistance to be delivered at the actual disaster site. Companies were not confined to using equipment at only one location. For example, remote sites were used to handle backup data, and some telephone services were routed through second and third locations around the country. (See the reports by Michaels; by Zimmerman; and by O'Rourke et al. for evidence of this experience.)
- Two-way pagers turned out to be one of the most reliable and secure mechanisms for contact among emergency response personnel. (See the selection by Michaels for more on this.)
- After the September 11th disaster in New York City, 33 information technology firms formed a team to use their network monitoring techniques to track signals from wireless devices. This enabled the monitoring of cellular or pager communications coming from the World Trade Center debris, helped dispel rumors about wireless communications, helped guide rescue personnel, and confirmed the safety of some people. (Consult the piece by Michaels for more on this.)

## **The Engineered Environment—Structures and Infrastructure**

The three studies reported in this volume that examined the engineered environment suggest that many existing practices for and knowledge about building in damage resistance and coping with unexpected interruptions in normal operations are applicable for protecting against terrorism-caused damage as well, and have benefitted from prior research and experience in natural disasters. Highlights of the findings are listed below.

- In the immediate aftermath of the September 11 attacks, both telecommunication equipment and the emergency procedures enacted by the telecommunications companies performed well. Redundant, dispersed facilities and the ability to quickly bypass damaged nodes were important factors in maintaining systems and restoring lost ones. The best practices and designs have benefitted from lessons learned during previous natural disasters, including the Loma Prieta and Northridge earthquakes. (See the research by O'Rourke et al. for more details.)
- Virtually all damage to underground water, gas, and steam pipelines and telecommunications conduits in New York City on September 11th resulted from direct impact from falling debris or penetration of the ground by projectiles. Thus underground infrastructure likely will be relatively undamaged in future disasters, except in the immediate vicinity of collapsed buildings or failed structures. (See O'Rourke et al.)
- Disruptions in the water distribution system that affected firefighting were overcome in part by using fireboats that pumped water out of the Hudson River. This technique is also part of the earthquake emergency plans of San Francisco, Berkeley, and Vancouver. (See the piece by O'Rourke et al. for more on this technique.)
- The September 11th disaster in New York City confirmed that the degree of flexibility incorporated into the design of infrastructure systems influences the extent to which they are able to perform extraordinary functions in a crisis. Many distribution networks proved extremely flexible in providing users with emergency power, water, communication, and transportation. Both public and private utilities were able to quickly identify, acquire, and manage resources to provide short-term emergency service in New York City. (See the contribution by Zimmerman for a full description of this idea.)
- Despite the loss of a perimeter column over a 17-story height, a 39-story building just south of the World Trade Center tower 2 that was seriously damaged by the tower's collapse did not collapse itself, because its lateral- and gravity-load-resisting systems were highly redundant. (See the selection by Warn et al. for additional thoughts on this topic.)

- Standard tools for the two- and three-dimensional analysis of buildings subject to earthquake shaking can be used to make preliminary judgements about the damage-tolerance of buildings. (See Warn et al.)

### **Individual and Collective Behavior**

Several aspects of individual and group behavior were investigated in the studies reported in this volume. In some instances the findings are in accord with prior knowledge about disasters while in others differences were found. For example, the fact that the September 11th disaster was human-induced and deliberate appears to have resulted in some behaviors not necessarily typical of those that develop in natural disasters.

- Symptoms of psychological distress in response to the September 11th disasters that were reported by university students surveyed at four locations around the United States included having concern about their own and family members' safety, making changes in daily routines and activities as a result of the attacks, feeling angry or depressed, and having trouble sleeping. The level of this distress was relatively low overall (in the single digits and teens), but somewhat higher in New York and South Carolina than in Colorado and Washington. (See Sattler for more on this.)
- Nearly three-quarters of the university students surveyed at each of four locations in the United States reported instances of posttraumatic growth, cognitive adaptation, resource gain, and resiliency after the attacks, such as reassessing their priorities, relationships, and philosophy of life; discovering they were stronger than they thought; and taking positive action by showing concern for strangers, displaying the American flag, or donating money to charity. These reactions fit in with prior theories of responses to psychological distress during and after disasters. (For a full description of these findings, see the piece by Sattler.)
- After the airplanes hit the World Trade Center towers, people in New York City were inundated with official and unofficial advice from multiple sources and through multiple channels to leave the area, take protective action, watch for falling debris, and other information. Official warning messages and media coverage became intermingled. (For more about warnings, see the selection by O'Brien.)
- Some of the variables traditionally thought to influence people's response to warnings were operative in the September 11th disaster (environmental and social cues) and some were not (pre-event influences such as prior disaster experience and warnings). These findings confirm recent thinking by disaster researchers that the popular model for risk communication needs updating. (For more on warnings, see the paper by O'Brien.)



- Some organizations appear to be able to adapt in more complex ways in a disaster situation than has been accounted for in the typology of organizational structure and change most widely used in prior disaster research. For example, faith-based organizations in the vicinity of the New York City disaster used a variety of adaptive strategies to meet the emerging needs of their congregations and the community. (For more on this, see the paper by Sutton.)
- The familiar pattern of convergence behavior (that is, people want to help out, so they converge on the disaster site) was repeated in the September 11th disaster. Volunteers in New York City reported that their motivations for helping were both internal and altruistic, and they also experienced feelings of healing and empowerment as a result of their volunteer work, along with a sense of solidarity with the community. (For more on these observations, see the selections by Lowe and Fothergill; by Peek; and by Grant et al.)
- People not otherwise directly affected by the attacks appeared nevertheless to share a sense of having been victimized (presumably due to the perception that the attacks had been directed at all Americans). Heightened feelings of victimization appeared to play a strong role in the people's decisions to converge on the disaster scenes to render assistance. Another sort of victimization was experienced by Muslim students at universities in the New York City area who were faced with anti-Muslim backlash in public opinion. (See the selections by Lowe and Fothergill; and by Peek.)
- There were indications that the "therapeutic community" that has been repeatedly shown to form in the wake of natural and technological disasters as people pull together to cope with the event may not be as strong or as all-encompassing in human-induced disasters. For example, Muslim students at universities in the New York City area felt themselves to be excluded from the sense of community that other Americans shared. On the other hand, these same Muslim students did report feeling increased solidarity with other Muslims after the disaster. (See the selections by Lowe and Fothergill; and by Peek.)
- A study conducted six months after the disaster found that September 11th had a noticeable impact on the process people used to decide whether to travel by airplane, train, or automobile. Two factors were significant in that choice process: the effects of the September 11th disaster on the individual person, and the person's overall level of stress. In general, the higher the overall level of stress, the less likely the person was to choose air travel. (See Holguín-Veras et al. for details on the project, model, and variables).

### **Private Sector Roles and Activities**

Particularly in the New York City area, the September 11th disaster illustrated several interesting findings about businesses and the relationships between the public and private sectors.

- On its own, the private sector played varied roles in the response to the September 11th disaster in New York City, including building restoration, sanitation services, business relocation and resumption, communications, insurance coverage, transportation, donation management, and equipment repair. (For more, see the selections by McEntire et al.; and by Michaels).
- Businesses interacted with the public sector to fulfill such disaster functions as warning and evacuation, relocation and management of the emergency operations center, perimeter control and law enforcement, security and medical staffing, logistical support of search and rescue teams, information dissemination, and the repair of communications and other infrastructure (McEntire et al. describe these activities.)
- Both the close collaboration among public and private sector entities and the effectiveness of some companies in continuing to serve their clients and also contributing to the rescue and disaster response were found to be a result of such factors as the participants' having had previous disaster experience, having had pre-existing disaster plans or held mock exercises, the presence of communications equipment, willingness to cooperate, and post-event ingenuity. (For more on this, see the selections by Grant et al.; by Kendra and Wachtendorf; by McEntire et al.; and by Michaels).

### **Public Policy and Political Context**

- Since 1965, the federal government has followed a pattern after key disasters of generating after-action studies; enacting new laws; modifying disaster response plans; and making organizational changes. The aftermath of the September 11th disaster fit this basic pattern of action for attempts to improve the federal approach to disaster management. However, there were some unusual aspects in the federal reaction to the September 11th disaster. The legislative process was unusually bipartisan. Both the legislative and executive branches moved quickly to pass new laws and to re-organize. As a result, dramatic changes were made in the federal government's emergency management and counter-terrorism approaches and attitudes. (See the selection by Rubin and Renda-Tanali.)
- The September 11th disaster transformed the political climate in the United States, at least temporarily, so that dissent with government positions became unpopular. Most of the organizations that had arranged

late-September protests against economic globalization and trade liberalization in Washington, D.C., withdrew their support from the events, rather than risk losing legitimacy in the eyes of the media and the public. (See the research report by Gillham and Edwards.)

- In response to the September 11 attacks, state and local governments across the United States activated their emergency response plans and communication processes, in some cases revealing deficiencies in those preparations. Oregon, for example, used the opportunity provided by the increased awareness of risk to conduct an evaluation of its state-level mechanism for communication and coordination in disasters. (See the selection by LeDuc et al. for more on this procedure.)
- For the first 12 weeks after the September 11th disaster, the front page coverage of one metropolitan daily newspaper leaned toward the sensational aspects of the disaster, and presented a fairly narrow political point of view. For 9 of those weeks, 100% of the newspaper's front-page photographs related to the disaster. For the first three weeks, the front page coverage centered on the "disaster" aspects of the event, but in the fourth week it switched to a focus on the related war story. (See the study reported by Rodrigue for details on this evaluation of media coverage.)

### **Recommendations for Future Research**

The research recommendations listed here are some of the more salient of the many questions for further investigation discussed by the contributors to this volume. (Note that a separate set of research recommendations is presented in the selection by Restrepo and Zimmerman, which catalogs the thinking of participants in a workshop held a few months after the disaster.) The research needs summarized below fall into three broad categories. One category calls for further investigation of the applicability of hazards-based models, theories, and tools to the occurrence of terrorism disasters. The second group includes calls for the expansion of hazards/disasters research based on hazards concepts and theories that were borne out by the September 11th disaster, just as they likely would have been in any U.S. disaster. The third category focuses on needs related to quick response research.

### **Research for Coping with Terrorism Disasters**

- Future research should examine the long-term psychological response to terrorist attacks and threats. (See Sattler for a more complete explanation.)
- Further exploration is needed of the ways in which post-disaster therapeutic communities develop. Under what circumstances are people included or excluded? Does it make a difference if the disaster is

human-induced and/or deliberate? (See Peek for related important questions.)

- Research will be needed to determine how to overcome the uncertainty of predicting future attacks, particularly for the benefit of the commercial insurance industry. (Rubin and Renda-Tanali point out this need.)
- The risk communication model used in formulating and disseminating warnings for other types of disasters needs to be refined for a better fit with the risk of terrorism. (See the report by O'Brien on this issue.)
- There is a need to assess the full range of successes and shortcomings associated with mapping technologies, based on the experience in New York City. How did people actually use the maps? How were they incorporated into decision making? (See Thomas et al. for more on this.)

### **Research Needed for Understanding all Types of Disasters**

- Future disaster research should explore creativity in a more systematic way than it has to date: the structure of the creative process, types of creativity, and possible discord. (See Kendra and Wachtendorf.)
- Research should explore whether the same organizational factors that impede or facilitate creativity in business settings can have an impact on the disaster response environment and emergency response organizations. (Kendra and Wachtendorf explore this idea in their paper.)
- The scale, scope, and location of the September 11 disaster in New York City demonstrated the need to better understand the interdependencies among critical infrastructure systems and to model them under different conditions. This is a step toward integrating such models with computer-based decision support systems (as called for in *Disasters by Design* (Mileti, 1999)) that can help with the design of such systems and their management during future disruptions. (See the observations made by Wallace et al.; and by Zimmerman.)
- Research should examine the interaction between the private and public sectors in disaster management. What factors hinder and foster coordination? (McEntire et al. point out questions related to this issue.)
- How applicable to the private sector are the models of disaster management, assistance, and cooperation that have been based on governmental and non-profit operations? (See the report by Michaels.)
- Further research is needed on the way communications technology (such as the wide use of the internet) is changing the formulation, dissemination of, and response to warnings. (See O'Brien.)

- Research should explore the ways in which existing typologies of organizational structure and adaptation need to be modified to take into account the more complex organizational changes that were observed in the September 11 disaster. Do certain types of organizational structures, or adaptations have more success in disaster response? (See Sutton.)
- More research is needed on the factors that facilitate volunteering during disasters, including the motivations of volunteers and their socio-demographic characteristics. (See Lowe and Fothergill.)
- Additional research is needed into how to manage large numbers of victims, from patient information to the process of DNA collection and matching. (See Simpson and Stehr.)
- Thorough exploration is needed of how geo-technologies, particularly mapping, can be integrated effectively into the emergency management cycle for all hazards. (See Thomas et al.)

### **Research on Quick Response**

- Researchers should continue to make progress on developing a systematic approach to conducting quick response research, archiving its information and data, making findings accessible, and refining techniques. (See Michaels.)

### **Recommendations for Practice and Policy**

Based on the findings and observations made during the conduct of the research reported here, the authors have offered numerous ideas for how public policies can be improved to better cope with future disasters, and how the practice of disaster response likewise can be enhanced. Some highlights are summarized below.

#### **Terrorism Disasters**

- Law enforcement and investigative personnel need to be integrated into disaster planning, training, and exercises, because they will have a central role in terrorist disasters. (See Grant et al. for more on this.)
- More media attention to the broader political, social, religious, and other aspects of the September 11th and similar disasters could help Americans better understand the terrorism risk and the consequences of mitigative actions the country might take. (See the paper by Rodrigue.)
- Researchers and practitioners need to determine the best protective actions that people can take in response to terrorism events, so that proper warnings and instructions can be formulated. (See O'Brien.)

- A consistent policy is needed that balances the need to know vs. the need to keep information and databases about critical infrastructure systems secure. (See O'Rourke et al.; and Zimmerman.)

### **All Disasters**

- Disaster response plans and exercises should try to enhance the creativity and improvisational skills of people and organizations. (See Kendra and Wachtendorf.)
- Public officials and agencies should involve businesses, corporations, and faith-based organizations in all types of planning for disaster prevention, response, and recovery. (See McEntire et al.; and Sutton.)
- Practitioners should continue to emphasize networking and partnering, in order to facilitate needed cooperation between the public and private sectors in disaster management. (See McEntire et al.)
- Community service may be an effective recovery strategy for those who feel victimized by the disaster, because it enables them to transform helplessness into feelings of efficacy. (See Lowe and Fothergill.)
- Public policy should address the potential for religious and ethnic discrimination and other forms of social exclusion after human-induced disasters. (See Peek.)
- In their efforts to build and improve levels of preparedness, states and communities across the nation should consider the State of Oregon's approach, which is to help communities do long-term planning, help build local capacity, mitigate all risks, and set up partnerships among government and the private sector. (See LeDuc et al.)
- Emergency responders may need to give more attention in their plans, training, and exercises to handling massive numbers of missing people, casualties, fatalities, and family notifications. (See Simpson and Stehr.)

### **Quick Response**

- There is a need for broader, deeper, and more institutionalized funding for research that can be carried out in the immediate aftermath of disasters. (See Michaels.)

## **References**

Mileti, Dennis S. 1999. *Disasters by Design*. Washington, D.C.: Joseph Henry Press.