

URBAN HAZARD MITIGATION: Increasing Human Security through Re-Assessing the Steps Toward Livable Communities

By Michael J. Armstrong

I. Introduction

For centuries, the hazards inherent in an urban setting have been the subject of, or unavoidable backdrop behind, numerous historic, scientific or literary examinations. These discussions over time have ranged from the documented natural hazards issues contributing to the burial of Pompeii through the human-instigated hazards culminating in the destruction of the World Trade Center towers in New York City. These scenarios and others provide strong testimony that the urban environment presents a unique set of circumstances, creating a distinct subset of the issues surrounding hazard mitigation generally.

These “urban hazard mitigation” factors are many; they are complex; and they do not exist independently. A partial list would include: density of population; urban land use and building construction; the influence and intrusion of transportation systems; the symbiosis between aging housing stock and the urban poor; the necessity of storing dangerous substances and housing the offices of government and high finance all in the same community; the security risks posed by the social issues of unemployment, untreated/untreatable illness, homelessness, racism and other forms of discrimination; and the human vulnerabilities inherent at either end of the life cycle.

“Mitigating hazards” is a transferable notion, applied to a variety of subjects. We envision the application of mitigation to immunization, exercise, and nutrition as we aspire towards better health. We picture it in the form of safer containers and smarter vehicles, as well as warning labels and danger signs, as we go about our daily business. We see it manifested in child-proofing, sophisticated surveillance, and crime prevention as we pursue protection and safety. And sometimes, we observe the evidence of mitigation through “just saying no” to any number of actions of whose application would create, instigate, or facilitate a hazard.

This paper will address the ideas and approaches that might empower those who influence the built environment to assess the types of land use, building design, and other practices in the urban environment that have arguably increased our risks to death, injury, and property damage. The basic tenets of hazard mitigation have been admirably discussed in the past, and they will be restated here as part of the fundamentals of any hazard mitigation strategy. However, -- as we discuss the approaches and implementation of an urban application to hazard mitigation in the context of 2002, this discussion will require a re-assessment of how we govern and how we direct policy, from a national, state, and local level.

In “Disasters by Design,” Dr. Dennis Mileti, Director of the Natural Hazards Research and Applications Information Center at the University of Colorado-Boulder, states:

[n]atural hazards mitigation will not be successful at reducing losses and disruption until it is integrated into the considerations of the daily activities of everyone who has an influence on future losses. This, in turn, will not be possible until hazards mitigation is housed within a redesigned national culture that favors sustainable development and people are reorganized to support that cultural shift.¹

It is at least arguable that the new awareness of terrorist threats, layered on the threats of technological and natural disasters, creates a new paradigm. This paradigm could set the stage for the cultural shift toward supporting sustainable development that Dr. Mileti references, within the context of urban hazards. This shift may begin with new research that accounts more specifically for urban hazards, including the terrorist threat. To date, the bulk of the research in the hazard mitigation field has addressed natural hazards. Given the specific and unique challenges

posed by the urban environment, it is necessary to take another look at that research in the context of urban situations. Significant studies have also looked at hazard mitigation in the realm of technological hazards, ranging from hazardous materials spills to nuclear reactor malfunctions. The nature of these hazards is such that while they can occur anywhere, they are much more potent and create a greater urgency when placed in an urban setting. A smaller body of research has addressed the concept of hazard mitigation as it applies to acts of violent attack, whether by domestic criminals or foreign enemies. In this latter context, the vulnerabilities and complexities posed by urban America seem truly daunting.

Yet we can make progress in all of these urban hazard mitigation challenges if we recognize and employ the approaches common to all forms of hazard mitigation. From that common foundation, scientific research and implementation strategies can show us the way to an increasingly mitigated set of urban hazards. However, the speed of the process, and the rate of success, will be significantly impacted by the degree to which there is an integration and coordination of disciplines. In the end, the influences of capitalism upon urban policy could be harnessed to include urban hazard mitigation as a form of prudent investment and economic recovery.

II. Hazard Identification and Vulnerability Assessment

It is tempting for many commentators and policy makers to run quickly past the under-appreciated and under-utilized first step of hazard identification and vulnerability assessment on their way to creating a hazard mitigation strategy. Yet a simple inventory of the hazards present in the urban environment should serve as an early warning of the necessity for urban policy integration in urban hazard mitigation. The natural hazards – flooding, earthquakes, hurricanes, tornadoes, wildfires, winter weather, mudslides, tsunamis – have cost billions of dollars in government, insurance, and private sector funds. Placed in an urban environment, with varied structural integrity, historic land use errors, and uneven code enforcement, the impacts of these natural hazards become even more horrifying. Similarly, policy makers must be prepared for additional potential impacts considering the overlay of human-caused hazards, ranging from those caused by error to those brought about by design.

Technological advances throughout the 20th Century have caused many urban dwellers, and urban planners, to dismiss the threat of natural hazards to urban environments. Rivers and streams have been retained or rerouted; seismically safe and wind-resistant engineering practices have been applied with increasing success; fire-proof designs have dramatically decreased fatalities caused by burning buildings. Yet entire cities remain developed below sea level in coastal areas; post-disaster building performance studies have indicated flaws in architectural and engineering practices; and structural mitigation in the nation's floodplains provides minimal and temporary protection from floodwaters. Urban sprawl has spawned the new problem of "urban wildland interface" with former city dwellers failing to either create fire-defensible spaces and/or utilize fire-resistant building materials. Researchers are increasing the pile of evidence demonstrating that climate change will have an enormous impact upon large metropolitan areas located along the Atlantic coast.

At the same time, the technological advances of the past have created potential new hazard targets: hazardous material storage and transportation; taller and larger buildings; a dizzying plethora of transportation grids, above- and below-ground; dependence upon communications systems to feed everything from financial management to emergency response; instruments of destruction which are harder to detect and more lethal in their application; new ways of accessing potentially dangerous information; occupation of land previously thought uninhabitable; and the appearance of new elements in our food, air, and drinking water.

Thus, each urban area must revisit its list of identifiable hazards. The identification process must include historical information as well as more recent shared experiences. For example, the question cannot be "when did we last have a flood," but rather "what parts of our city are in an historic floodplain." Applied to the modern built environment, a hazards list must also include the ability to evacuate large buildings, and the capability of transportation systems to move whole neighborhoods. Similarly, the age of a building vis-à-vis the hazard also comes into play, especially with seismic threats. Aging construction is also a factor in flood control projects, ranging from levee failure to the safety of private and public dams. Additionally, some structures, due to the activities they house or the notoriety of their architecture, are now hazards by their very existence.

Progressing from listing hazards to considering their impact upon the built environment involves vulnerability assessment. The concept of vulnerability assessment in this context is clear: given the existence of hazards, what is

the probability of harm or death? How old is the key infrastructure of your community? What building codes were in effect at the time certain structures were erected? If there is a seismic threat, how widespread is the use of non-reinforced masonry? If there is a wind threat, what types of glass are being used in public buildings and how many “safe rooms” are located in or near vulnerable structures? To what magnitude can a particular “flood control” device really withstand floods, and how will such a device react to a multi-faceted event such as water and rain in a hurricane scenario, or earthquake and water in a scenario involving dam safety or undermining of other forms of engineered, or “structural,” mitigation?

Further, we are now in an age where not only is the existence of important public and private buildings, and recognizable landmarks, potentially a hazard, but the manner in which they are occupied and may be evacuated is another necessary part of vulnerability assessment. What kind of impact or explosive detonation can any of the structures in the above special category withstand? Given estimated times of evacuation, are there enough means of egress? What vulnerabilities are posed by the impediments to evacuation – e.g. human frailty, faulty communications systems?

The uniqueness of the urban environment can also pose unique challenges due to co-existing strategies for efficient transportation, affordable housing, isolating technological hazards, economic development, energy delivery, environmental protection, and many other urban issues. In the past, federal and local strategies have teamed to create affordable housing in floodplains, transportation grids that are seismically vulnerable, and the financing of new growth in high hazards areas. These unintended consequences of “stovepipe urban planning” create their own sets of hazards, and require risk assessment as well.

III. All-Hazards, Strategic Planning

This litany of hazards and approaches to assessing risk creates a new urgency around the process of strategic planning for urban hazard mitigation. This urgency requires more than just an urban planner presenting a new long range plan to a planning commission or city council; it requires more than just a transportation expert explaining a new study on traffic patterns; and it requires more than just an energy expert reviewing the threats to energy production and delivery. This new urgency actually requires all of the above, plus the ability to anticipate how the existing vulnerabilities due to natural and technological hazards are now heightened in the context of developing a comprehensive approach to homeland security.

Structures that are thought of as vulnerable to seismic activities also stand to suffer the greatest damage due to explosive or other criminal acts. Deteriorating flood control projects such as dams and levees that pose a flood threat can pose the same threat with a criminal causation if those vulnerabilities are exploited. The use of inferior glass for building facades and windows in downtown corridors creates a nightmare of flying lethal objects, whether the cause is a wind event or the act of a terrorist.

Urban hazard mitigation in the broadest sense is now a shared responsibility between those who can mitigate criminal and terrorist acts through effective investigation and detection, and those who can reduce the vulnerabilities of the built environment. Those involved in law enforcement, those who are security experts, and those who specialize in civilian and foreign intelligence activities are moving quickly to pursue their commitments to urban hazard mitigation. Those who are in the consequence management and pre-event “consequence mitigation” business have most of the tools necessary to make an enormous contribution to mitigating hazards in the urban environment.

The emergency management community has made important progress during the past decade as it demonstrates that mitigating damage from catastrophic events is everybody’s business. Much of that progress is grounded in strategic planning. The establishment of the Federal Response Plan has required a coordinated and interdisciplinary approach to federal support of state and local disaster response needs. The Certified Emergency Manager designation, and the establishment of associate and bachelor’s degrees for emergency management in nearly every state, has encouraged participation and increased the professional skills found in the field of emergency management, including utilizing a diverse group of experts who emphasize strategic planning as a cornerstone of the all-hazards approach. Once strictly the province of “civil defense” experts culled from the ranks of law enforcement and the military, today’s professionals include land use and environmental planners, engineers with specializations in hydrology, hydraulics,

seismology and structural design, communications and information technology experts, and people versed in the areas of economics, housing, political science, transportation, energy, and international relations.

Yet, unless a community was high on the list of frequent natural hazards occurrences, the evolution of this profession and the quality of their work went largely unnoticed. Now, in the aftermath of September 11, the emergency management profession can demonstrate how the combined strengths of its civil defense roots and all-hazards evolution can provide an invaluable resource to the homeland security movement. Those emergency management professionals who have directed their efforts toward the urban environment have an extraordinary understanding of the challenges and opportunities that lie ahead.

Today's urban emergency manager must, by necessity, be a strategic planner. He or she must be able to anticipate and mitigate the consequences of the hazards posed by large political gatherings, the presence of foreign dignitaries, the continued congestion of transportation grids, and airport/seaport/rail facilities. For example, in anticipation of the special threats posed to America's cities, the nation's largest urban centers began coordination between law enforcement officials for incident management and emergency managers for consequence management through the Nunn/Lugar/Domenici legislation.

At a meeting of the Metropolitan Washington, DC, Council of Governments' Emergency Preparedness Task Force in January 2002, a senior county official made a very significant statement. He urged the attendees to adhere to the planning and advice of the professionals in local government. His remarks implied that it would be unwise to allow the urgencies of the post-September 11 environment to derail or reinvent practices, approaches, and solutions that can provide the best foundation for strong homeland security implementation. His thinking reinforces the notion that now is the time to build upon known strengths and past success and to avoid misinterpreting a national security crisis as an emergency management failing.

What September 11 has done is elevate the level of engagement with emergency management planning to heights not previously imagined. Senior political officials, corporate CEOs, mainstream media, and other policy and opinion leaders have turned their attention en masse to a once neglected discipline. Now there are budgetary opportunities, improvements to plans, more sophisticated approaches to communication and information gathering, and a host of other activities underway. If the newly-engaged leadership requires a comprehensive look at all-hazards and adheres to strategic planning as it gathers important information, such participation and sponsorship will insure incredible progress on all fronts of emergency management, including urban hazard mitigation.

In this time of heightened awareness and increased interdependency within metropolitan areas and neighboring urban centers, strategic planning must also be pursued at a regional level. With multiple airports, the seat of national government, a burgeoning high tech industry, and abundant critical facilities, the greater Washington, DC, area is taking steps to strategically plan for emergencies in a way that not only includes the various local governments but the private and non-profit sectors as well. Main and alternate regional information center designs are being planned, and evacuation, warning, and transportation monitoring are all being revisited. The various regional councils of government and other similar organizations which support America's major urban centers also have an opportunity to build upon their history of coordination and facilitation in a new environment of greater political engagement and financial commitment.

IV. Implementation

The real test of a successful urban hazard mitigation strategy will be whether urban governments have the political will and budgetary commitment to gather data and implement plans. Implementation strategies range from new codes that govern new construction and are phased in when building permits are obtained for older structures, to developing new databases of maps and infrastructure analysis. In order to survive in the extremely rough terrain of urban politics, these strategies must be accompanied by public awareness and education, including public participation in their design and the partnering of diverse segments and interests within the urban populace.

The work of hazard mitigation does not easily lend itself to a political dividend, and thus rarely captures the imagination of elected officials interested in demonstrating quick results and keeping a high media profile. Well-intentioned hazard mitigation programs have not lived up to their potential due to this inability to obtain "traction"

with legislators used to a “pot hole filling program” approach to public policy. While the steps of hazard identification/vulnerability assessment, strategic planning, and implementation need to proceed at a pace that involves stakeholders and builds consensus, the process can bog down in an overly academic approach that loses sight of the urgencies it is trying to address. Accordingly, “deliverables” should be identified at each step, with actual project work such as fortifying structures or removing them from harm’s way, occurring with regularity while the less visible work of code enforcement and data gathering continues. Otherwise, a vague mishmash of meetings and “work in development” will be the most that can be delivered to the political sponsor.

Further, an implementation strategy for hazard mitigation, due to its long term nature and impact upon local land use decisions, must involve “ownership” by the various parts of the population it will impact. The real estate and business communities will be concerned about impacts on economic development; environmental and neighborhood organizations will want to protect their quality of life; community development officials and transportation experts will be concerned about the impacts of the strategy upon future growth.

Also, because of the inherent multi-disciplinary nature of its application, such an implementation strategy can run aground when the various disciplines within a governmental organization see the strategy as at odds with their own agendas. The implementation strategy must not only demonstrate the *need* for participation from diverse parts of an organization/community, but it must also demonstrate that it *compliments* the work being pursued by those diverse parts.

In too few occasions, urban hazard mitigation has discovered an ally with urban economic development. In fact, urban hazard mitigation has the best opportunity for successful implementation if it can be shown to be economically viable. The economic consequences of failing to pursue urban hazard mitigation must be clearly explained and repeated. Those costs also deserve more attention from economists and other students of urban economics. In a paper I wrote for *Environmental Hazards* several years ago, I discussed the “political economy of hazards,” and suggested that the forces of capitalism that drive public policy and motivate decision makers can be utilized to promote hazard mitigation.² That approach requires demonstrating the cost savings and profitability of a hazard mitigation strategy.

The alliance between an urban hazard mitigation strategy, the various other disciplines and policy agendas found in an urban setting, and the realities of economic development has been explored in a number of communities in the United States. In fact, this alliance reinforces the notion of a multi-faceted approach to urban living that has variously been described as “sustainable” or “livable” communities. Again, however, the “unglamorous” nature of hazard mitigation has required extra effort to argue for its inclusion in the livability/sustainability pantheon, taking its place alongside the stalwarts of environmental protection, energy conservation, etc. In his “Invited Comment” from the *Natural Hazards Observer* in 1996, Ken Topping talks about this issue of inclusion and how a hazard mitigation strategy in the context of California’s urban centers does fulfill the simplest of definitions of sustainability – “not borrowing against the future.”³

V. Approaches

Part of the challenge of urban hazard mitigation is that the urban settings themselves are not static; that is, populations and their needs increase; buildings and infrastructure age; urban centers continue to attract marginalized persons and families; and urban vulnerabilities multiply and/or change. “Urbanization,” both as a transition from “less urban” to “more urban,” and as a description of the changes which seem to intensify the urban living experience, must be considered as a potential hazard. Yet despite the new challenges arising from urbanization public policy still points toward utilizing the basic approaches to sustainability and livability. In September 2000, the World Bank published its “Urban and Local Government Strategy,” which calls for doing “more than simply retool[ing] the urban development portfolio or seek[ing] stronger performance from it.” The report’s summary goes on to state that the World Bank should

Recognize cities and towns as a dynamic development arena where the convergence of sectoral activities, and collaboration among communities, levels of government, and other private and public sector institutions can create a microcosm of sustainable development for the country. The Bank would therefore apply to urban economies and local governments the same quality and rigor in analysis, advice, and

strategizing that it applies to national economies and central governments. Ensuring well-functioning urban areas requires support to a spectrum of activities, both national and local, that affect urban outcomes. Skills and resources for this effort must be mobilized across sectors, thematic groups, and professional clusters in the Bank Group. The strategy therefore calls for a commitment by a wide coalition of forces within the institution and among external partners to working together in new ways on the urban frontier, with a newly empowered set of clients.

The ultimate aim of this strategy is to promote sustainable cities and towns that fulfill the promise of development for their inhabitants – in particular, by improving the lives of the poor and promoting equity – while contributing to the progress of the country as a whole.⁴

In making the case for an urban sustainability strategy, the Bank's report focuses on the international trend of urbanization and urban transitioning as a catalyst for the strategy, and concludes that "public policies – coupled with community action, private sector commitment, accountable local government, and supportive national government – can make a large difference in the character of urban areas and in their contribution to national development.

Thus the idea of a partnered approach to implementing a public policy of urban sustainability has been stated with increasing frequency and import. The idea of a "supportive national government" has been pursued by a variety of initiatives under the President's Council for Sustainable and Livable Communities, and by various federal agencies. Some of these programs had a "disaster resistance" component. The Federal Emergency Management Agency pursued "Project Impact" in communities including highly urbanized areas; the U.S. Department of Housing and Urban Development teamed with the White House Office of Science and Technology Policy and the National Association of Home Builders (NAHB) to implement Partnerships Advancing Technologies in Housing (PATH); and a number of urban sustainability initiatives were pursued by the U.S. Department of Energy, the U.S. Department of Transportation, and the U.S. Environmental Protection Agency; among others. In some cases, existing programs were redesigned with new approaches for sustainability, and in other cases totally new programs were initiated.

The information and activity in this arena is certainly not limited to the United States. For example, the National Science Foundation (NSF) has pursued studies with the government of Japan in light of the Kobe, Japan, and Northridge, California, earthquakes. The project is entitled "Earthquake Disaster Mitigation for Urban Transportation Systems: An Integrated Methodology that Builds on the Kobe and Northridge Experience."⁵ This study, in reviewing the vulnerability of urban transportation systems, looks at the dependency of modern urban economies on these systems and the need to reduce transportation-related economic losses. The project proposes a cross-cutting methodology, which involves: (1) development of performance criteria and design of mitigation strategies; (2) modeling transportation and economic system response in earthquake disasters; and (3) an economic evaluation of mitigation strategies.

In response to the United Nations' International Decade for Natural Disaster Risk, Professor Ben Wisner at the United Nations University, along with Dr. Jerry Valasquez, has coordinated a research project involving the "Geography of Vulnerability of Megacities," focusing on the venues of Johannesburg; Los Angeles; Manila; Mexico City; Mumbai, India; and Tokyo. The project is designed to improve disaster mitigation and management to save human, physical and financial resources, emphasizing vulnerability over geographical areas and socio-economic groups.

In 1995, the U.S. Department of Energy published a paper on "Renewable Energy Systems as Emergency Power Sources."⁶ In the paper, solutions to the frequent occurrence of energy grid failure after a catastrophe are discussed, including specific systems and implementation methodologies that have been tested in actual events.

The FEMA pre-disaster mitigation initiative known as "Project Impact" involved awarding grants to local governments, with minimal restrictions, to pursue "disaster reduction" strategies, ranging from mapping and public education, to building retrofits and demolitions. The "success" of the program depended upon the disposition and readiness of the recipient community to effectively utilize the grants and pursue the same partnered, comprehensive approach referenced in several studies including Dr. Mileti's *Disasters by Design* and the World Bank's urban strategy.

In a number of urban venues, results occurred which embrace the concept of urban hazard mitigation in a sustainability/livability context. In Seattle, Washington, the community implemented a home retrofit and energy efficiency program, and pursued “non-structural” retrofits for public schools. Driven by neighborhood organizations and a local government already schooled in effective public/private partnerships, this activity was credited for reducing losses during the earthquake of early 2001. In Oakland, California, the combined hazards of fire, earthquake, and economically depressed populations presented a huge challenge. Oakland’s approach, again using neighborhood organizations as its vehicle, was to award incentives including rebates for disaster-resistant housing and subsidies for low income housing to increase safety. In Berkeley, California, city leaders pushed through an ambitious program to systematically retrofit low income housing throughout the city to reduce seismic vulnerability. And in Austin, Texas, a combined approach to preparedness and hazard mitigation—addressing the multiple hazards of floods and wind—resulted in the purchase of weather radios, construction of “safe rooms” to withstand F5 force winds, and the acquisition and demolition of properties in the floodplain.

In the Northeastern U.S., Buffalo, New York, used its grant program to implement HAZNY-- a methodology which rates and tracks hazards -- to direct planning and code enforcement decisions. In Trenton, New Jersey, the community looked for ways to leverage grants from other federal agencies to develop a comprehensive approach to the flooding, pollution, commerce and housing issues attached to the Assupink Creek area. Similarly, in Newark, New Jersey, East Haven, Connecticut, and other cities plagued by a convergence of classic urban challenges, these grants were seen as a welcomed extra tool to address issues that ultimately blended into economic development strategies.

The good news is that urban political leadership and civil servants are becoming increasingly sophisticated at the art of blending and leveraging federal grants, and seeking private sector partners, to create strategies that embrace sustainability as essential rather than optional. Some of the most revealing activities, however, continue to occur after a catastrophe. After the California earthquakes of 1989 and 1994 (Loma Prieta and Northridge, respectfully), the ripple effect of catastrophes on regional and national economies was especially evident. The inability of a bridge or interstate highway to carry vehicles, the disincentive for businesses to maintain or establish activities, the whole readjustment of citizen attitude toward their homes and workplaces, and the residual impacts on the public psyche have all been tied to negative economic and sociological results. These events, in urban areas, emphasized the extra vulnerability and extra need for strategic approaches to the challenges of policy implementation in the urban environment. This begs the question, what about our cities in the aftermath of September 11?

VI. Urban Hazard Mitigation as a Component of Homeland Security

There is much discussion about urban environments themselves now being hazards by virtue of being urban, ie., by being convenient targets for terrorism as well as more vulnerable to technological and natural hazards. The combined existence of dense population concentrations, key economic and political activities, and structures of remarkable architectural stature give rise to the fear that our urban centers will be the epicenters of 21st Century catastrophic events. In the January 14, 2002, issue of *Newsweek*, Steven Brill writes about the ramifications on urban development caused by rising insurance costs for urban structures post-September 11.⁷ In the article, financier Warren Buffett is quoted as saying that “this [issue] could slowly but surely lead to the de-urbanization of America and the closing of any iconic buildings.”⁸ In an article specific to iconic buildings, Jesse Katz writes in the December 2001 issue of *Los Angeles* magazine about Los Angeles’ tallest building, the Library Tower, and the specter of uneasy tenants and a future mostly populated by low-rise projects.⁹

Yet even in the context of terrorism, some familiar themes are being sounded. The Government Accounting Office (GAO) January 2001 report on Embassy Construction is headlined “Better Long-Term Planning Will Enhance Program Decision Making.”¹⁰ In another GAO Report, on Homeland Security, risk management expert Raymond J. Decker talks about effective risk management approaches as a guide to preparedness. He states that such approaches include “a threat assessment, or vulnerability assessment, and a criticality assessment. . . . Risk management principles acknowledge that while risk generally cannot be eliminated, enhancing protection from known or potential threats can reduce it. . . . This general approach is used or endorsed by federal agencies, government commissions, and multi-national corporations.”¹¹

In his new book, *Fear Less: The Real Truth About Risk, Safety, and Security in a Time of Terrorism*, Gavin de Becker talks about how September 11 has exposed our human tendencies to compartmentalize knowledge and fears

of risks.¹² His analysis suggests that while there is still a need to act, we must first appropriately categorize and develop approaches to the risks in our world. He proposes that there are many other risks to which we have assigned labels in our minds, and coming to terms with the world's new realities will require a similar process and analysis. He states that "to compartmentalize is not to deny; it is to acknowledge the reality of something, look right at it, and place it, literally, in a mental compartment, in a kind of quarantine, separated from our moment-to-moment thinking in such a way that we can manage life. The theory here is to change what we can change and accept what we cannot change."¹³ De Becker goes on to state:

Before 9/11, many felt that they didn't need to learn too much about violence because the police would handle it, the government would handle it. But now, with the death of denial, we know that violence touches us all and belongs to us all. We have some learning to do, some preparation of new compartments into which we can place our anxieties.

In the meantime, during the adjustment period, to be prepared for something, you must predict it, at least in the general sense. To predict something, you must believe it is at least possible. The more likely we believe the outcome is, the better prepared we tend to make ourselves. ...[A]cceptance of reality is always the highest ground you can find – and the safest – because from there you can see what is coming. From there, you can evaluate risks and organize defenses.¹⁴

The connection between catastrophic events and societal behaviors is a constant source of study by sociologists at various academic locales around the United States. In her paper on "The Social Impacts of Extreme Physical Events," Joanne Nigg of the University of Delaware's Disaster Research Center states that "questions of vulnerability will differ not just across national boundaries, but will vary across regions in the United States, and even among cities in the same region. ... Vulnerability reduction also has another major consequence: it moves concerns about natural hazards out of the exclusive domain of emergency management agencies...into departments that have as a mission the future development of the community – planning and zoning, economic development, risk management – as well as into the office of the jurisdiction's chief executive officer..."¹⁵ Again, an approach which effectively utilizes a coalition of multiple disciplines can offer an important component to the development of a Homeland Security strategy.

VII. Next Steps

The talents, resources, and research described herein are necessary to any strategy for meeting the challenges of the various hazards – natural, technological and terrorist – facing urban America. It is critical that the nation's political leadership and policy makers understand, and utilize, the tools which can make a significant impact on reducing vulnerability, mitigating property damage, and minimizing threats of injury and death.

For several years, a variety of methodologies have been utilized to improve the ability to anticipate disaster, estimate losses, and blend the knowledge of natural and technological solutions to reduce risk. Now, new approaches are being developed to reduce vulnerability. It is appropriate to build upon all of these approaches and move toward the design of a National Vulnerability Index (NVI). The NVI would employ a universal approach to assessing and ranking structures regarding their vulnerability. A variety of factors, ranging from age and building materials to the design and purpose of the structure, would be considered and given weight. A process of effectively allocating resources and moving toward a disaster resistant urban environment must gain momentum.

The development of the NVI will most likely require discussion between various groups, organizations, government agencies, and other interested parties. The private sector, the building sciences community, and those who have researched and tested this concept must be included. Consensus may or may not be easily achieved. But the active pursuit of such an index will result in a focused and cost-effective approach to urban hazard mitigation.

Local governments are frequently promised assistance from the federal government and other sources, but there is no unifying mechanism to implement approaches that can make a lasting impact on vulnerability reduction. For example, the author experienced this dilemma in administering pre-disaster mitigation grants at highly urbanized locales like Trenton and Newark, New Jersey, or Oakland, California. This experience evidenced the reality that a variety of federal initiatives could, if bundled together, maximize the ability of local government to develop a

strategy for a sustainable urban environment that includes a strong urban hazard mitigation component. Certainly, one solution is revisiting the regulations governing use of federal funds. But, a catalyst for reviewing grant expenditure approaches might be the development of a National Vulnerability Index.

VIII. Conclusion

Thus the themes of hazard identification and vulnerability assessment, and the ideas of strategic planning and coordinated implementation-- the very building blocks of sustainable urban hazard mitigation-- all have a critical role to play in the design of a homeland security strategy. As we are seeing with the governmental efforts to create cohesive homeland security strategies, every policy area is a factor and must be included.

This presents an opportunity for the modern emergency management professional to fully utilize their skills as an inter-agency coordinator, trainer, and resource manager. The pieces of information they can provide, and the methodologies utilized for assessment, planning and implementation in the area of hazard mitigation, are all valuable and essential to meet the expectations of the citizenry for its government.

Which buildings are most vulnerable? What systems could be endangered with greatest consequence? What existing conditions could be exploited to trigger a crippling blow? How are our urban centers reviewing building codes, land use, code enforcement, and public education/awareness practices?

The very inter-connectivity of disciplines which makes urban centers extra vulnerable to natural and technological hazards is of course equally at play in the context of homeland security. The “crazy quilt” of urban challenges -- transportation, environmental hazards, energy, emergency management and public safety, at-risk populations, aging infrastructure, and all the rest -- takes on added significance when viewed through the lens of homeland security.

Americans have been challenged by their leaders to be vigilant, yet confident and aware, yet trusting, in our common values as a source of hope and protection. There are new calls to national service, with results ranging from an upswing in support for those in military service, first responder jobs and volunteer activities, to increased budgets for the National Corporation for Public Service (AmeriCorps) as well as for community service activities in the private and non-profit sectors.

This “reawakening” shows that a shift in how we view our urban hazards begins with each urban dweller understanding the role of individual responsibility – not just in reporting suspicious activities, but in how and where we build, what we demand as consumers, how we vote, and how we spend money. These individual decisions underscore the potential for change contained in an urban community.

As a professional community, those of us who have committed time and resources to hazard mitigation must redouble our efforts and demonstrate our resources as we continue to pursue the goals of reducing the risks – from whatever source – to our nation’s cities. Our national, state and local leadership, and our private sector executives, are best served by a partnered, multi-disciplinary approach that sees security and sustainability as complimentary components of American urban policy.

End Notes

¹ Dennis S Mileti. "Disasters by Design: A Reassessment of Natural Hazards in the United States." (Washington, DC: Joseph Henry Press, 1999) 267.

² M.J. Armstrong. "The Political Economy of Hazards." *Environmental Hazards* 2. (New York: Elsevier Science, 2000) 53-55.

³ Ken Topping . "Mitigation from the Ground Up: Sustainable Cities in California." Reprinted in *Disaster Research* 197. (Boulder, Colorado: University of Colorado Natural Hazards Research and Applications Information Center, Volume XX, Number 6, July 1996) 1-4.

⁴ "Cities in Transition: World Bank Urban and Local Government Strategy," (Washington, DC: The International Bank for Reconstruction and Development/The World Bank, 2000) 5-6.

⁵ P. Gordon, J. Moore, H. Richardson, M. Shinozuka, S. Chang, and S. Werner, representing the United States, and N. Okada, H. Kameda, S. Tanaka, H. Tatano, N. Nojima and H. Wakabayashi, representing Japan. "Earthquake Disaster Mitigation for Urban Transportation Systems: An Integrated Methodology that Builds on the Kobe and Northridge Experience." (U.S.–Japan Cooperative Research Initiative in Urban Earthquake Disaster Mitigation, grant numbers CMS-9812053 and 9816193, September 1998-August 2001).

⁶ R.F. Stauffer. "Renewable Energy Systems as Emergency Power Sources." (Washington, DC: U.S. DOE, Office of Energy Efficiency and Renewable Energy, 1995).

⁷ Steven Brill. *Newsweek*. January 14, 2002, 50.

⁸ *Ibid*, 51.

⁹ Jesse Katz . *Los Angeles*. December 2002, 96.

¹⁰ Report to the Chairman, Committee on Foreign Relations, U.S. Senate. "Embassy Construction: Better Long-Term Planning Will Enhance Program Decision Making." (Washington, DC: United States General Accounting Office, January 2001).

¹¹ Statement of Raymond J. Decker, Director, Defense Capabilities and Management before the Senate Committee on Governmental Affairs. "Homeland Security: A Risk Management Approach Can Guide Preparedness Efforts." (Washington, DC: United States Government Accounting Office, October 2001) 3, 7.

¹² Gavin de Becker. *Fear Less: The Real Truth About Risk, Safety, and Security in a Time of Terrorism*. (New York: Little, Brown and Company, 2002).

¹³ *Ibid*, 24

¹⁴ *Ibid*, 35.

¹⁵ Joanne Nigg. "The Social Impacts of Extreme Physical Events" (Newark, Delaware: University of Delaware's Disaster Research Center, 1996) 13-15.

Biography

Michael J. Armstrong is a Principal at ICF Consulting in Fairfax, Virginia. Located in ICF Consulting's Emergency Management Practice, he is managing support activities for the U.S. Department of Justice regarding victims of terrorism, the U.S. Food and Drug Administration regarding contingency planning for "mad cow" disease, and the U.S. Department of Defense regarding demonstrating the capabilities of a common web portal for first responder internet applications, along with developing emergency management applications for ICF's Energy, Community Building, and Change Management Practices.

Mr. Armstrong is the former Associate Director for Mitigation (Senate-confirmed) and Region VIII Director (Presidential appointee) for the Federal Emergency Management Agency. He chaired the White House Subcommittee for Natural Hazard Reduction and acted as the Director's representative to the American Red Cross National Board of Governors. During his tenure at FEMA, Mr. Armstrong administered the nation's disaster prevention programs including pre- and post-disaster local planning, building design, land use, structural rehabilitation and building removal grants. His FEMA activities also included overseeing the National Earthquake Hazards Reduction Program, the National Dam Safety Program, and components of the National Flood Insurance Program. Mr. Armstrong established FEMA's first organizational components addressing the disciplines of mitigation planning and mitigation outreach. His regional work included inter-agency and inter-jurisdictional coordination for terrorism, technological and natural hazards preparedness, disaster response and recovery, and federal support for chemical stockpile incineration preparedness. He coordinated FEMA's Center for Excellence in Disaster Community Relations and chaired the agency's reinvention of its Employee Performance System.

Mr. Armstrong spent over a decade in local and state government, where he served as an Assistant City Attorney specializing in land use and personnel issues, and as Deputy Director of the Colorado Governor's Office of Energy Conservation. He holds a *Juris Doctorate* from the Pepperdine University School of Law where he served on the Law Review, and a Bachelor of Arts in English and Bachelor of Science in Journalism from the University of Colorado at Boulder. He was born in Long Beach, California, and resides in Washington, DC.