

NATURAL HAZARDS Observer

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Grand Challenges for Disaster Reduction

— an invited comment

Each year in the United States, natural and technological disasters are responsible for the loss of hundreds of lives and dollar losses that average more than \$50 billion.¹ As the costs continue to rise, we must move from response and recovery to proactively identifying hazards that pose threats and taking action to reduce the potential impacts. In the past year alone, the United States experienced a multitude of disasters, including winter storms, wildfires, floods, tornadoes, landslides, and, most recently, Hurricanes Dennis, Katrina, and Rita. While the United States was not directly affected, the earthquake and tsunami in the Indian Ocean last December claimed over 240,000 lives across 12 countries and injured, displaced, or otherwise impacted millions, providing a sobering reminder of the importance of strengthening our nation's disaster resilience.

Acknowledging the critical need to enhance community resilience to disasters, thereby minimizing damage and disruption, the interagency Subcommittee on Disaster Reduction, part of the president's National Science and Technology Council, collaborated with scientists around the world to develop a ten-year strategy for disaster reduction through science and technology. The recently published *Grand Challenges for Disaster Reduction* establishes a framework for future federal government investment in science and technology for the purposes of enhancing resilience and reducing vulnerability to natural and technological hazards.

Each grand challenge is introduced below along with the key research requirements and major technology investments necessary for its success.

Grand Challenge #1—Provide hazard and disaster information where and when it is needed. To identify and anticipate the hazards that threaten communities, a mechanism for real-time data collection and interpretation must be readily available to and usable by scientists, emergency managers, first responders, citizens, and policy makers.



Developing and improving observation tools is essential to provide pertinent, comprehensive, and timely information for planning and response.

Key research requirements:

- Develop improved sensing capabilities and deploy expanded, modern, and integrated data collection systems that provide real-time data for use in modeling hazardous conditions, consequence forecasting, and warnings
- Develop protocols for searchable, all-hazards Internet-accessible data systems

- Develop next generation network architectures for real-time data sharing from distributed sensors

Major technology investments:

- Deploy an integrated, reliable information infrastructure that provides real-time access to data and models for hazard analysis, consequence forecasting, and rapid detection of negative outcomes
- Develop universally adopted standards for data sharing to speed transfer of information
- Incorporate geographical location data into systems that provide real-time, high quality, integrated social and environmental information for emergency response purposes

Grand Challenge #2—Understand the natural processes that produce hazards. To improve forecasting and predictions, scientists and engineers must continue to pursue basic research on the natural processes that produce hazards and understand how and when natural processes become hazardous. New data must be collected and incorporated into advanced and validated models that support an improved understanding of underlying natural system processes, including the damage caused by wind and inundation, and enhance assessment of the impacts.

Key research requirements:

- Continue and improve data collection and observations of hazard-related processes
- Develop and improve forecasting models and visualization techniques to provide timely and accurate information on the occurrence of hazardous events, consequences, and immediate steps that should be taken to reduce impacts
- Improve methods for validating these models
- Create and accelerate improvements in models of physical, chemical, and biological processes to enable a greater understanding of hazard interdependencies, predictive patterns, impacts, and cumulative effects on life, property, and the environment

Major technology investments:

- Expand and improve the network that provides access to computational and simulation resources necessary for analysis and prediction

Grand Challenge #3—Develop hazard mitigation strategies and technologies. To prevent or reduce damage from natural hazards, scientists must invent—and communities must implement—affordable and effective hazard mitigation strategies, including land use planning and zoning laws that recognize the risks of natural hazards. The scientific and engineering community can contribute to developing such strategies and work with communities to turn research into practice. In addition, technologies such as disaster-resilient design and materials and smart structures that respond to changing conditions must be used for development in hazardous areas.

Key research requirements:

- Encourage investment in developing, modeling, and monitoring impacts of cost-effective and beneficial mitigation technologies
- Continue development of smart structural systems that detect and respond to changes in structure and infrastructure condition and that predict failure
- Continue development of new materials and cost-effective technologies to retrofit existing inventory of buildings, bridges, and other lifeline structures
- Create integrated all-hazards methodologies for engineered systems

Grand Challenge #4—Recognize and reduce vulnerability of interdependent critical infrastructure. Protecting critical infrastructure systems, or lifelines, is essential to developing disaster-resilient communities. To be successful, scientists and communities must identify and address the interdependencies of these lifelines at a systems level (e.g., communications, electricity, financial, gas, sewage, transportation, and water) with input from scientists and engineers. Using integrated models of interdependent systems, additional vulnerabilities can be identified and then addressed. Protecting critical infrastructure provides a solid foundation from which the community can respond to hazards rapidly and effectively.

Key research requirements:

- Develop improved assessment methods for analyzing the vulnerability and interdependence of infrastructure systems
- Develop innovative assessment models for emergency response procedures, including addressing all threats to public health rapidly and effectively

Major technology investments:

- Develop information acquisition systems that can be used to validate evaluations of resilience and response
- Identify and deploy cost-effective technologies that ensure survivability of critical utilities and other infrastructures

Grand Challenge #5—Assess disaster resilience using standard methods. Federal agencies must work with universities, local governments, and the private sector to identify effective standards and metrics for assessing disaster resilience. With consistent factors and regularly updated metrics, communities will be able to maintain report cards that accurately assess the community's relative level of disaster resilience. Validated models, standards, and metrics are needed for estimating cumulative losses, projecting the impact of changes in technology and policies, and monitoring the overall estimated economic loss avoidance of planned actions.

Key research requirements:

- Establish methods and standards for evaluation of resilience to hazards to include economic, ecological, and technological consequences of disasters
- Use standard methods to gauge improvement in resilience following investments in planning and mitigation

Major technology investments:

- Complete risk assessments for federal facilities, critical facilities, and at-risk communities
- Develop comprehensive pre-event recovery plans

Grand Challenge #6—Promote risk-wise behavior. Develop and apply principles of economics and human behavior to enhance communications, trust, and understanding within the community to promote “risk-wise” behavior. To be effective, hazard information (e.g., forecasts and warnings) must be communicated to a population that understands and trusts the messages. The at-risk population must then respond appropriately to the information. Significant progress is being made, but this is an ongoing challenge that can only be met by effectively leveraging the findings from social science research.

Key research requirements:

- Facilitate research in the social sciences to understand and promote individual and institutional mitigation actions in the face of hazards
- Develop an enhanced understanding of effective techniques for educating the public and gaining community support for preparedness and disaster prevention activities
- Research the effectiveness of, and human responses to, new communications technologies, including mobile phones, the Internet, and cable television on the delivery and successful use of public warnings

Major technology investments:

- Design and implement a standardized messaging system for the general public and specific audiences
- Assemble and coordinate an integrated emergency communications system among response organizations at the federal, state, and local levels

Once these challenges are met, the United States will be more resilient to disasters. But first, disaster resilience must become inherent in our culture, and investments in science and technology are critical to achieving that goal, as are changes at the policy level and in the societal perception of risk. The reality is that we cannot avoid hazards, but we can act to minimize and reduce their impacts. After all, hazards do not become disasters unless the communities they touch are unprepared to deal with them. Successfully reducing disasters depends upon sustained investment in these grand challenges and in recognizing that hazards are a natural part of our complex environmental, constructed, agricultural, political, and social systems—and they are here to stay.

Helen Wood (helen.wood@noaa.gov)
David Applegate (applegate@usgs.gov)
Dori Akerman (dori.akerman@noaa.gov)
Subcommittee on Disaster Reduction

Gene Whitney (gwhitney@ostp.eop.gov)
Office of Science Technology Policy

To find out more about the grand challenges and research requirements and technology investments broken

down by hazard, download a free copy of the publication *Grand Challenges for Disaster Reduction* (26 pp.) from the Subcommittee on Disaster Reduction at <http://www.sdr.gov/>.

¹Mileti, Dennis. 1999. *Disasters by design: A reassessment of natural hazards in the United States*. Washington, DC: National Academies Press.

Call for Manuscripts: Hurricane Katrina Quick Response Research

The Natural Hazards Center is preparing an edited volume, tentatively titled “Learning from Catastrophe: Quick Response Research in the Wake of Hurricane Katrina,” of the quick response social science research conducted after Hurricane Katrina. We strongly encourage researchers who have performed work in the immediate postdisaster timeframe, either through the Center’s own Quick Response program, the National Science Foundation’s Small Grants for Exploratory Research program, or through independently funded research, to submit manuscripts. If you are interested in submitting a chapter, your manuscript should be 30-40 double-spaced pages (average of 250 words per page) and should address the following issues:

- What was the research question?
- What was the methodology of the study?
- What were the sample size and sample characteristics?
- What were the findings?

Contributions are due no later than May 1, 2006. However, we ask that you let us know whether you intend to submit a chapter by January 15, 2006. If you intend to make a submission, please plan to send the Center an abstract, chapter outline, and title by January 15, 2006, so that we may begin organizing the book.

The schedule for publication is:

January 15, 2006	Title, abstract, and outline due
May 1, 2006	Manuscripts due
May-July 2006	Peer review of manuscripts
August 1, 2006	Manuscripts returned for revision
September 1, 2006	Final manuscripts due

Additional details about submission will be announced in *Disaster Research* and posted on the Web at <http://www.colorado.edu/hazards/> as they become available. Direct questions to Greg Guibert at (303) 492-2149 or greg.guibert@colorado.edu.

Natural Hazards Center Recommends Independent Katrina Review

On September 26, the Natural Hazards Center sent the following letter to select members of the U.S. Congress recommending an immediate, independent, and nonpartisan review of governmental policies and response related to Hurricane Katrina. The Center suggested that any panel, commission, or review be composed of experts in hazards and disasters and that the scope of the inquiry be broad enough to address the underlying issues, societal as well as institutional, that contributed to the severity of the catastrophe.

The intent of the letter is to promote the need for a review that draws upon existing knowledge about hazards and disasters, charts a course toward improving the nation's disaster resilience and response capabilities, and ensures that mistakes are not repeated in future disasters. The Center encourages all of our constituents to contact their congressional representatives to share their views on this matter. Download a copy of the letter at <http://www.colorado.edu/hazards/katrinaletter/>.

Dear Senator/Representative:

Hurricane Katrina and the heart-wrenching devastation left in its path have exposed, in the most dramatic way possible, significant failures in disaster mitigation, planning, preparedness, and response. While now is the time for healing and immediate recovery, it will soon become imperative that the institutional and societal failures contributing to the destruction on the Gulf Coast be thoroughly examined to help prevent future tragedies and aid in the long-term recovery effort.

Since its founding in 1976, the Natural Hazards Center in the Institute of Behavioral Science at the University of Colorado has advanced and communicated knowledge on hazard mitigation and disaster preparedness, response, and recovery. The Center is funded by the National Science Foundation and by a consortium of federal agencies that includes NOAA, NASA, USGS, and FEMA. Recently, the Center became a lead investigator in the U.S. Department of Homeland Security's Center of Excellence tasked with researching society's response to terrorism and other extreme events.

On behalf of the multidisciplinary hazards and disasters research and emergency management communities, who have worked for decades to improve the nation's resilience to natural disasters, we strongly encourage an immediate, independent, and nonpartisan review of the governmental response to Hurricane Katrina. We believe the review should be empowered to explore the broad spectrum issues that have directly contributed to this catastrophic event, such as the following:

- How can the current and proposed structure of the U.S. Department of Homeland Security be enhanced to improve the nation's natural hazard and disaster capabilities?
- Would a cabinet-level Federal Emergency Management Agency improve the nation's response capabilities?
- What federal policies and programs are needed to reduce risk in coastal zones and to promote safe and sustainable growth at the state and local levels?
- How can institutional barriers to effective communication across different levels of government be removed to enhance planning, response, and recovery?
- What policies and programs can be developed to specifically target the needs of vulnerable populations—including the poor, elderly, disabled, and children—during disasters?
- What steps can be taken, both immediately and over the long term, to improve the nation's resiliency to extreme events?

Without an independent review capable of addressing these and other pressing issues, the findings of any commission, panel or task force focused exclusively on governmental response will be incomplete. In order to rebuild the nation's trust and lead to positive change, we also strongly recommend that the reviewers be well-respected, experienced researchers and practitioners who represent all points of view. To truly understand what led up to the disaster and how it was managed, it is also crucial that information be obtained from witnesses on a confidential basis. The Natural Hazards Center would be honored to recommend names of qualified experts and to assist in any investigation in any way possible.

We further recommend that policy makers and legislators heed the advice of expert panels that have already identified key challenges and research needs with respect to disaster loss reduction. One such report is the recently published *Grand Challenges for Disaster Reduction* by the Subcommittee on Disaster Reduction of the National Science and Technology Council.

These are difficult times, made more so because of decades of warnings gone unheeded. We believe that it is still possible for some good to come of this tragedy and that the nation should focus its efforts and strengthen its resolve toward preventing future disasters.

The recommendations contained in this letter are from the Natural Hazards Center and may not reflect the opinions of the University of Colorado or its Board of Regents.

Sincerely,



Kathleen Tierney
Director



Greg Guibert
Program Manager

Living on the Edge: The Coastal Collision Course

How should society reduce the inevitable risks of living near the shore? Obviously, we cannot expect people to leave the coasts, but we can expect sound government policies that protect their long-term sustainability and diminish damage to the built environment through mitigation.

Hurricanes are a regular occurrence along the East and Gulf coasts of the United States; 167 tropical storms made landfall during the twentieth century. We are in a new cycle of increased Atlantic hurricane activity, and at the same time there is a continuing coastward migration of Americans. Coastal watershed counties already account for about 50 percent of the population. It seems that everyone wants a waterfront view, and beachfront property has become some of the most expensive real estate in the country. Small beach cottages have given way in recent decades to luxurious, multistory houses, and in South Florida, high-rise condominiums are approaching \$500 million valuations. The "Gold Coast" of Florida, which runs along the southeastern coast between Palm Beach and Miami, has an appraised value exceeding \$1.3 trillion that is highly vulnerable to hurricanes. Any erosion of the beach that takes place, of course, increases the exposure of fixed structures to the impact of coastal storms.



Coastal erosion is a national problem; best estimates are that almost 90 percent of the nation's sandy beaches are receding.¹ This nearly ubiquitous beach erosion problem is particularly troublesome in that the rate of coastal erosion is about two orders of magnitude greater than the rate of sea level rise (SLR), so that even small changes of SLR result in significant land loss.² Since one of the most certain consequences of global warming is an increase in

the rate of global SLR, the already severe coastal erosion problems witnessed in the twentieth century will be exacerbated in the coming decades.

Growing populations and concomitant beachfront development in the face of rising sea levels and shoreline recession defines a coastal collision course. There is also a collision of management philosophy and policies of the three principal federal agencies with statutory authority: the U.S. Army Corps of Engineers, the Coastal Zone Management (CZM) Program administered by the National Oceanic and Atmospheric Administration, and the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program.

The Corps of Engineers has been criticized for its role in encouraging coastal development and poststorm redevelopment through its subsidized sand pumping projects, which renourish beaches. Beach nourishment is seen by an increasing number of coastal communities as a panacea even though many renourished beaches have lasted only a few years rather than decades.³ In contrast, the CZM Program offers states an incentive to better manage beachfront development. Unfortunately, best management practices have rarely been exercised.

Most of the burden of managing coastal development has fallen upon FEMA because of its national flood insurance, which is sought after by homeowners and communities that are literally "living on the edge." FEMA has done an excellent job by providing incentives to build new structures above the storm surge elevation and to strengthen existing structures against windstorm damage, but there has been no direct consideration of horizontal shoreline movement, specifically coastal erosion.³

The lack of coordinated federal erosion programs and policies is abundantly evident as the coastal building boom continues. Nationwide, coastal erosion may be responsible for approximately \$500 million of property damage each year,¹ including loss of structures and land. Within the highest risk flood hazard areas (called V-zones by FEMA) of the Atlantic and Gulf coasts, the risk of damage from erosion is almost equal to (and added to) that from flooding.

If the present trend continues, it is estimated that one of four buildings located within 500 feet (152.4 m) of the U.S. shoreline will be claimed by coastal erosion during the next 60 years.¹ These estimates do not assume any additional beach hardening, nor do they make assumptions about future beach nourishment projects. In actuality, more and more coastal communities are seeking beach nourishment projects funded by the Corps of Engineers. Through these Corps-authorized beach fill projects, the federal government is making 50-year commitments with little to no regard for global change impacts.

Estimates of erosion damage do not include the effects of accelerated SLR due to climate change because projections of future shoreline positions are based on historical observations. If SLR during the next 50 years is 3.9 inches (10 cm) greater than during the past half century, erosion rates would average 11.8 inches (30 cm) per year faster than observed historically. This would increase

erosion rates along the East Coast by 33 to 50 percent on average, greatly increasing the cost of beach nourishment projects, which are designed to “hold the line” and protect shorefront development.

Most moderately to highly developed coastal communities have come to rely on beach nourishment for storm protection. Shoreline armoring is also used. The emplacement of seawalls (without beach fill) in the face of incessant erosion ultimately results in beach loss and hence the degradation of the recreational corridor that draws residents and tourists alike.

Some critics have called for outright retreat from the coastline, but rapidly increasing beachfront development combined with soaring real estate values make the option of retreat and land abandonment politically unpalatable and popularly unacceptable for landowners where “living on the edge” is a physical reality. We are long past the point of decrying that barrier islands as dynamic landforms should not be developed; the reality is quite different, and the goal now must be to maintain and manage environmental qualities. Therefore, beach renourishment is usually considered the only viable option to address erosion hazards, but obtaining Corps funding requires a tremendous investment of time and resources by coastal communities, and the process is largely politically driven.

A national policy for shoreline management is vitally needed.⁴ In the absence of a coherent and consistent framework for managing the shore, Corps projects are undertaken on a project-by-project basis. Overall, federal programs are reduced to ad hoc efforts to deal with

coastal hazards and environmental consequences. Florida has the best program in the nation for dealing with storm impacts and coastal erosion, as well tested in 2004 by Hurricanes Charley, Frances, Jeanne, and Ivan. In fairness to coastal communities that are confounded by the contradictory, or at least divergent, approaches to beachfront management, a coordinated policy and streamlined process to address the nations’ growing coastal hazard losses is clearly needed and long overdue.

Stephen P. Leatherman (*leatherm@fiu.edu*)
Florida International University

Gilbert White
University of Colorado at Boulder

¹The H. John Heinz III Center for Science, Economics, and the Environment. 2000. *Evaluation of erosion hazards*. Washington, DC: Heinz Center.

²Zhang, K., B.C. Douglas, and S.P. Leatherman. 2003. Global warming and long-term sandy beach erosion. *Climatic Change* 64:41-58.

³Crowell, M., and S.P. Leatherman, eds. 1999. Coastal erosion mapping and management. *Journal of Coastal Research* Special Issue 28.

⁴U.S. Commission on Ocean Policy. 2004. *An ocean blueprint for the 21st century*. Washington, DC: U.S. Commission on Ocean Policy.

NEMA’s Recommendations for Naming the Director of the Federal Emergency Management Agency

The National Emergency Management Association (NEMA) released the following recommendations for naming the director of the Federal Emergency Management Agency (FEMA).

Nomination and Confirmation Process for FEMA Director

- The director of FEMA should be a fixed term appointment for not less than five years (as is the director of the Federal Bureau of Investigation in the Department of Justice, for example).
- Regardless of where FEMA is located in the federal government organizational structure, the FEMA director should have a direct report to the president of the United States.
- The president should continue to nominate and the Senate confirm the director of FEMA. Congress should scrutinize the nomination to ensure the appointed individual meets established criteria.
- A vetting process should be established that includes a role for input by emergency management constituent groups (using the judicial nomination process and rating by the American Bar Association as an example).

Recommended FEMA Director Qualifications, Knowledge, and Expertise

- Emergency management or similar, related career at the federal, state, or local government level
- Executive level management, government administration, and budgeting experience
- Understanding of fundamental principles of population protection; disaster preparedness, mitigation, response, and recovery; and command and control
- Understanding of the legislative process
- Demonstrated leadership: ability to exert authority and execute decisions in crisis situations

For more information about NEMA, contact *NEMA*, PO Box 11910, Lexington, KY 40578; (859) 244-8000; <http://www.nemaweb.org/>.

The Disaster That Was Katrina

When Hurricane Katrina came ashore on August 29, she ended decades of anticipation. There were few hazards in the United States more studied by scientists and engineers and there was ample warning that a strong storm could cause the city of New Orleans to flood. Hurricane Camille had demonstrated the vulnerability of coastal communities in Louisiana, Mississippi, and Alabama 34 years earlier and the vulnerability of new development was widely recognized. Additionally, the risk to the residents of New Orleans and the delta country around the mouth of the Mississippi was covered by *National Geographic* (October 2004) and *Scientific American* (October 2001) magazines, as well as by the popular press. In other words, there were few surprises in terms of the damage and the number of people affected.

The failures of the emergency management system to respond quickly and effectively to a catastrophic disaster were also predicted. The scale of the Katrina disaster notwithstanding, the question of whether the U.S. Department of Homeland Security (DHS) was prepared to deal with a catastrophic disaster was answered. Warnings from state and local emergency managers, scholars, policy analysts, political commentators, and former and current Federal Emergency Management Agency (FEMA) officials that the agency responsible for coordinating the federal response was no longer able to do so were not heeded. FEMA had been stripped of functions and disconnected from the national networks of governmental and nongovernmental disaster relief organizations upon which the nation has historically depended during major disasters. Funding cuts; transfers of critical elements to other DHS units; changes in policy priorities; changes in plans and procedures and organizational structures without adequate involvement of the professional emergency management and disaster research communities and without adequate investments in training; and a flood of transfers and retirements of experienced FEMA personnel all contributed to the loss of emergency management capacity.

The "all-hazards" approach that had characterized emergency management during the pre-DHS years was discarded in favor of a counter-terrorism approach. The National Response Plan and other DHS documents, as well as the speeches of DHS leaders, mention all-hazards but are focused on terrorism, particularly terrorism involving so-called "weapons of mass destruction." Decisions concerning the use of federal assets are made in Washington, rather than at regional or state levels.

The problems experienced with the Katrina response reflected the weaknesses of command and control structures. Classic bureaucratic processes can be very effective in dealing with routine tasks in a relatively stable task environment, but are notoriously slow in dealing with the nonroutine and are prone to failure when overloaded. A question that should be addressed is whether the centralization of decision making caused delays in critical decisions, such as the deployment of National Guard units, and mismatches between local needs and national actions.

Clearly, officials at all levels, from the White House to the statehouses to the city halls, suffered from the lack of communication with local officials and affected areas. A more decentralized approach would have saved time and would have better directed resources where they were most needed. Officials might have looked less foolish had they had access to better information and had they a greater understanding of emergency management.

The hazard posed to New Orleans and adjoining parishes by the levee system should have been addressed decades ago. The U.S. Army Corps of Engineers had funding for at least some levee work, but the funding was cut. Officials had funding for an evacuation study, but the money was shifted to other purposes.

The evacuation of New Orleans should have happened much earlier than it did and should have included a larger percentage of the residents. The rule of thumb is that 80 percent of residents will evacuate. That percentage might be improved upon by removing as many obstacles as possible for those who do not have the wherewithal to evacuate on their own and/or stay because they will not or cannot leave a relative, a pet, or the possessions that represent their lives.

For some, particularly the elderly and poor whose worlds are very small, uncertain risk hardly outweighs the uncertainty of the outside world. Clearly, the Katrina disaster revealed the reality of poverty for many Americans and the international community. Statistics on the increasing number of poor in America were released only a few days before Katrina, and the disaster demonstrated that there is a large segment of American society that lives without the economic and social resources necessary to protect themselves and their families. Calls to stockpile water and food for four days seem ludicrous to those who barely have enough money to eat everyday.

Policy makers and disaster researchers do need to understand the looting and violence that kept responders out of New Orleans and terrorized those trapped in the city for days. Clearly, some were thieves and thugs while others were victims of the flooding looking for supplies. Fortunately, weeks after the worst of the flooding, there are indications that there were fewer looters than the media and authorities estimated. Explanation for the disappearance of hundreds of New Orleans police officers has not been found, although some likely were trying to save their own families.

The appropriate role for the military has become a major issue since the early days of the disaster. While the military provided essential security in the city and performed search and rescue, they were ill-equipped to provide daily assistance to victims. The U.S. Coast Guard is the exception. Military police, transportation, medical, and logistics units have clear roles in disaster response. Arguments that the military should become the nation's disaster relief organization have raised a number of issues, beginning with their availability and their training.

The U.S. military is responsible for defending the nation from external threats and it is uncertain that we can depend upon their assistance at all times. The Posse Comitatus Act also limits the use of active and reserve units and federalized National Guard units in support of local law enforcement officials. The National Guard should be a primary resource for state officials, but the restructuring of the guard to support regular forces overseas has reduced the options for governors. Additionally, the deployment of National Guard troops leaves many state and local police, fire, and emergency medical services departments, as well as hospitals and other critical services, understaffed.

Recovery in Louisiana, Mississippi, and Alabama may be very slow. Thousands of evacuees may not return to the devastated communities. Housing those displaced by flood waters and wind may involve years of support. Most victims lacked flood insurance and those who had it will not receive sufficient reimbursement to rebuild without federal assistance. The recovery effort will raise numerous issues, especially the issue of whether homes and businesses in the most vulnerable areas should be rebuilt at all. It is argued that some of the most seriously flooded areas, such as the 9th Ward in New Orleans, should be returned to marshland, and recommendations are being made that there should be greater restrictions on development on the beaches and that more stringent building codes should be adopted and enforced. In Mississippi, officials will have to address the vulnerability of floating casinos.

There are a lot of examples of good coastal zone management in the United States. In Florida, for example, studies document the reduction in property losses when

building codes are strengthened—lessons were learned from Hurricane Andrew. More attention to vertical evacuation and other measures to reduce the vulnerabilities of populations in low-lying coastal areas can also be adopted. A major issue should be whether states should also impose surtaxes on property insurance (as Florida has done) to fund local mitigation programs. Lastly, Katrina will force greater attention to the need to deal with ecological damage from catastrophic disasters. Hazardous materials, sewage, and other debris have to be dealt with in order to restore marshlands, waterways, and woodlands.

Katrina was a man-made, nature-assisted disaster. The hazard along the Gulf Coast was created by our failing to preserve natural barriers to storm surge, failing to regulate development in the most hazardous areas, failing to adopt and enforce appropriate building standards and codes, and failing to prepare residents for a catastrophic storm. We have an opportunity now to remedy some of those problems by moving people a little further away from the Gulf waters, improving development regulation and construction, and educating residents so they can better protect themselves and their property. Hurricane Camille's passage is still evident along the coasts of Louisiana, Mississippi, and Alabama, and Katrina's passage will certainly leave scars and memories, as well. Hopefully, in the rush to rebuild, measures will be taken to assure that the next Camille or Katrina will leave fewer scars and less traumatic memories.

William L. Waugh, Jr.
Andrew Young School of Policy Studies
Georgia State University

Hurricanes Pam and Katrina: A Lesson in Disaster Planning

In the aftermath of 9/11, we were shocked and asked, "How could somebody do this to us?" Four years later, in the aftermath of Katrina, we similarly ask, "How could this happen to us?" Hurricane Katrina is the largest natural disaster to strike the United States in decades. Despite that fact, the immediate response to this gargantuan event left us collectively outraged and ashamed.

The 9/11 tragedy came like a bolt from the blue. Despite the ominous winds that first reached our shores in 1993—with the first bombing of the World Trade Center—most Americans did not know of the gathering wave of extreme religious hatred that was fast morphing into a killer event. But those who tracked such events issued warnings and the intelligence community and the Defense Science Board, among others, had expressed concerns about terrorism and the ability to detect and deter it. In September 1999, the U.S. Commission on National Security (the Hart-Rudman Commission) issued its Phase 1 Report on the threat of terrorism, predicting that "America will become increasingly vulnerable to hostile attack on our homeland, and our military superiority will not entirely protect us....States, terrorists, and other disaffected groups will acquire weapons of mass destruction and mass disruption, and some will use them. Americans

will likely die on American soil, possibly in large numbers."¹ In the weeks after 9/11, once the initial shock passed, focus turned to this report and what it had revealed about terrorism.

Hurricane Katrina was not without its warning signs as well. As a general rule, the disaster research community is much more confident in its ability to predict natural disasters. For the past several decades, when discussion turned to catastrophic natural events, the community could easily rattle off a short list of the most vulnerable locations in the United States. This list would invariably include such events as an earthquake in Northern California or the Midwest, a tsunami along the Pacific Northwest Coast, or a killer hurricane in Miami or New Orleans. In a sense, such events are easier to foretell: there is a historical record of catastrophic natural events that provides clues to location-specific vulnerabilities. Nevertheless, when Katrina finally hit New Orleans, everyone—including those of us who were well-acquainted with the vulnerability of that region—could hardly believe that the so-often predicted "Big One" had finally come.

As 9/11 focused attention on the Hart-Rudman Commission's investigation, Hurricane Katrina generated considerable interest in a smaller, more modest predictor—the

Hurricane Pam planning documents. These documents outline action plans developed by federal, state, and parish planners and operational personnel in Louisiana for a hypothetical catastrophic hurricane named Pam. The action plans were developed in a series of planning workshops that date back to July 2004. Over the course of a year, 80 to 300 participants met and discussed how to respond to Hurricane Pam in a series of structured sessions. The latest of these workshops was held August 23 and 24—not even a week before Katrina made landfall.

Why the interest in Hurricane Pam? Hurricane Pam was envisioned as a slow-moving category 3 hurricane that makes landfall to the west of the city of New Orleans. Over twenty inches (50.8 cm) of rainfall and storm surge result in 10-20 feet (3-6 m) of water in the city—some from overtopping of levees. In the weeks leading to the July 2004 planning exercise, the National Weather Service assisted by mocking up the same weather charts and products for Hurricane Pam that are typically developed for real storms. These products created a ground-truth backdrop that fostered increased realism for the nearly 300 participants in the July 2004 planning workshop.

Innovative Emergency Management's (IEM) technical professionals calculated and established a series of consequences that they believed would result from Pam's winds, storm surges, and rain. The following consequences topped the list:

- Evacuation of the 13-parish area
- 55,000 people in shelters outside the region prior to landfall
- One million people displaced after the storm
- 230,000 children out of school
- 500 miles of flooded roads and one major bridge collapse
- 12.5 million tons of debris
- Almost 250,000 cubic yards of hazardous household waste
- Inoperability of the metropolitan area's sewage system
- 80 percent of structures affected: from minor wind damage to total structural collapse
- \$40 billion in damage to residential and commercial structures

The predicted consequences also included over 175,000 injured, over 200,000 ill, and over 60,000 dead. The resemblance of Hurricane Pam to Hurricane Katrina is close—but, fortunately not too close.

The effectiveness of the consequence predictions is the result of a collaboration between the research community, local emergency management practitioners in the New Orleans region, and private-sector technology implementers. IEM started with information from the research community—behavioral research on how people respond to hurricanes, empirical data on sheltering tendencies, etc.—and melded it with the expectations and knowledge of emergency managers in the local parishes. The intent was to create a “worst-case but plausible event” that could be used to drive action planning.

Against the backdrop of this scenario and these mind-numbing consequences, officials from federal, state, and local agencies created a set of action plans. These plans are based on the notion of Incident Action Plans—one of

the key facets of the National Incident Management System. The language of the Hurricane Pam action plans is immediate, simple, and intuitive. In an eerie premonition of Hurricane Katrina, the action plans lay out the action sequences expected in unwatering New Orleans; searching for and rescuing thousands of stranded residents; caring for and treating hundreds of thousands of ill, injured, and dazed; and many other crucial missions.

The question to be asked is, why has there been such a visceral response to the Hurricane Pam report? Perhaps the answer lies in another question, when was the last time you read the echo of a real event in an emergency plan? As we explore the lessons learned during Katrina, we hope that the value of planning exercises such as Hurricane Pam will not be lost. It created a set of action plans that continues to be in demand by response agencies and officials five weeks after the storm's initial impact.

But, there were other facets of Katrina that were more intractable and unknown. These are ripe for continued research, dialogue, and collaboration. Among the unanswered questions are the following:

- Why and how do rumors transmit through a community and what impact do they have on the effectiveness of the response?
- What factors could cause some emergency officials to abandon their posts during people's hours of need and how could this problem be mitigated?
- What is the chain of events that leads to lawlessness?
- Where is the fine line between looting and survival activities?
- How and why would the victims of an event turn against other victims?

The response to Hurricane Katrina is still ongoing. The wounds of Hurricane Katrina are still fresh. Many of us at IEM who live and work in Louisiana and call it home are still grieving. We lived our quiet lives in Baton Rouge, knowing that the excitement, color, and *joie de vivre* of New Orleans—the City that Care Forgot—lay within easy reach, a scant 70 miles straight down the interstate to the south and east. In the hours after Katrina, the interstate traffic message boards in Baton Rouge carried the blinking epithet, terrible in its simplicity: “All Routes to New Orleans Closed.”

It is inevitable that because there was a Hurricane Pam report there will be greater soul-searching on what the true lessons of Katrina are—for both emergency management and homeland security. In the months ahead, these lessons will be debated and decided in many venues. We owe it to ourselves as a nation to leave no stone unturned to find all the facts and implement the lessons learned for a more disaster-resistant nation. In this search, we all have a role to play—researchers, technologists, and practitioners. Play it well.

Madhu Beriwal
Innovative Emergency Management

¹The United States Commission on National Security/21st Century. 1999. *New World Coming: American Security in the 21st Century*. Washington, DC: The United States Commission on National Security/21st Century.

Recovery by Design: The Ongoing Challenges

Presented by Katrina and Rita

It has been a little more than a month since Hurricane Katrina changed the world as I know it. And then there was Hurricane Rita. I am having difficulty remembering what day or date it is. During this time period, I evacuated twice, changed graduate schools, searched for missing friends, worked on short- and long-term disaster recovery strategies, and refocused current work on Louisiana coastal issues. I have become a human rights watchdog, a guide for researchers and caregivers, and a consultant for religious groups and other nongovernmental agencies, long-term disaster response planners, reporters, grant writers, counselors, nonprofit disaster responders, pastors, and friends. This disaster is personal, and each day brings new and difficult challenges.

There is so much that needs to be done, so many critical human needs to be met, and yet so little time. It is commonly said that in a crisis situation time slows down or stops. But, during disaster recovery the future rushes in, forcing quick decisions to be made that do not adequately consider resilience and sustainability. In a disaster like this, one must think in multiple time frames of recovery (e.g., emergency short term and long term) simultaneously. Being in the midst of a disaster and recovery like this, both personally and professionally, is overwhelming on a good day.

As a researcher, a nonprofit disaster responder, and a local resident, the challenges were and are innumerable and varied:

- Communication was extremely difficult. Information and communications systems were nonexistent, did not work, or were dysfunctional. Cell phones, which worked only intermittently, were usually the only link for communication, but no electricity meant short-lived cell phones. This made consulting and communicating with colleagues regarding urgent information and action quite complicated.
- Outside groups (e.g., nongovernmental organizations, researchers, the media, and even curiosity seekers) expected those of us on the ground to help them with arrangements, coordinate information, and interpret the state of affairs.
- Unsolicited volunteers and goods flowed to the region creating ongoing logistical difficulties.
- Driving time doubled, and access to some regions was denied.
- Basic recovery and research tools were, and in some instances still are, hard to come by: laptops, cell phones, printers, physical space, electricity, and operating funds. In some cases these items were left behind to better accommodate other evacuees.
- Funding opportunities must be researched and corresponding proposals developed, a challenge that is especially difficult to meet during dislocation and relocation in the absence of the aforementioned tools.
- Recovery styles and motives vary by institution and are often at odds with best practices as well as with the wishes of the affected communities. Lack of identifica-

tion of and respect for the local knowledge of poor communities as well as that of the small colleges and universities made the emergency response problematic and likely doomed the recovery and rebuilding phase before it even began.

- The political planning process is difficult to access and influence as it is monopolized by outside interests, contractors, and politicians.
- The political input of indigenous communities is diminished while community members are dispersed across the country.

The enormity of this disaster calls upon all resources to be used in the best and most appropriate manner. In *Rising from the Ashes: Development Strategies in Times of Disaster*, Mary Anderson and Peter Woodrow state that “the need for speed is a myth. Agencies believe that emergencies always require speedy response from the outside. More important than speed is timeliness. To be timely is to be there when needed. Timeliness requires that agencies look before they leap.”¹ We have seen many cases in this disaster where the rush of agencies and volunteers has hindered more than helped. At times, their needs to feel or look helpful seemed to take precedence over the needs of survivors and caregiving systems. The need to be needed seemed to drive the response.

Perhaps the most frustrating and difficult part has been knowing that the incident could have been partially mitigated and better managed, and still can be: the know-how was and is available. In the November 2004 *Natural Hazards Observer*, Shirley Laska detailed the scenario that we are living today.² Watching the hazard event unfold and the disasters become reality has been heartbreaking knowing that the hazards research, application, and activist communities have for decades been developing a knowledge base that could have altered outcomes and can still positively influence the future, if the powers that be would only listen.

For a successful recovery, some of the things that need to happen include:

- Time lines need to be adjusted for long-term sustainable recovery and vulnerability reduction;
- The knowledge and talent of local people and organizations must be respected and used;
- Guidance from local organizations and academic institutions needs to be respected and used;
- Preexisting environmental, economic, and social issues must be addressed; and
- A reading list for recovery policy makers and recovery managers need to be created and utilized.

We must heed the lessons we are learning from this event as it unfolds as well as from the events that came before it.

To do so, we must work together as a single hazards community. In her article “Knowledge Transfer between Researchers and Practitioners,” Alice Fothergill calls for acknowledging the distinct cultures of the research and

practitioner communities, working within institutional restrictions and around them when necessary, supporting the efforts to create a new strata between the research group and the practitioner group, and supporting increased personal and professional interaction between the two groups.³ It is time that we create more than a dialogue between researchers and practitioners. We must create a single disaster response community that no longer accepts two separate cultures—research and practice. Our stereotypes of each other must end.

Despite the obstacles, and as has been demonstrated in past emergencies, local people, grass roots organizations, and institutions did and are doing remarkable, creative, and wonderful things (e.g., 65 grassroots organizations have come together in a collaborative effort to rebuild Louisiana). Adopting a participatory research approach that also incorporates these valuable community resources into the process takes this community building a step further. In his article, “Participatory Research Democracy and Community,” Peter Park says of participatory research that “first, it directly addresses people’s practical problems that arise in their daily struggles for material, psychic, and social well being. Second, it is the people with the problem to solve who do the actual research. Third, the goal of participatory research is to actually bring about change by engaging in beneficial social activities.”⁴ Kathleen Tierney echoed this sentiment when she stated that, “the strength and resilience of our society lies in community-based organizations, neighborhood associations, nongovernmental organizations, schools, workplaces, faith-based organizations, and the millions who volunteer to serve their communities in dealing with extreme events.”⁵

The Continuing Significance of Race and Class among Houston Hurricane Katrina Evacuees

More than a quarter century ago, William J. Wilson published his controversial book, *The Declining Significance of Race*, in which he asserted that conditions were improving for middle-class African Americans and thus, the significance of race was declining in America.¹ Over a decade later, Joe Feagin published his now famous reply to Wilson, arguing that race remains an issue of continuing significance, particularly with respect to perceptions of antiblack discrimination in the United States.² Recent experiences of Hurricane Katrina evacuees in Houston, Texas, highlight the continuing significance of race and class in America and offer new opportunities to explore issues of inequality within a catastrophic context. While Hurricane Katrina provided many significant challenges to disaster researchers, preliminary observations highlight the significance of race, class, looting, evacuation, sheltering, and housing.

Background

On August 29, Hurricane Katrina made landfall in Louisiana creating a catastrophic situation that resulted in the prolonged inoperability of many Gulf Coast residential communities as well as facilities and operational bases for

Among the many things to learn from this disaster, one key lesson is that the survivors, caregivers, and their communities need us all to be working together as one community, with different tasks but a single goal. In the world of disaster recovery, as we believe Park would suggest, there can be no clear distinction between researcher, practitioner, activist, and survivor. The survivors, their caregivers, and their communities must be heard. To the degree that we can learn to work together we will better hear their voice.

Kristina J. Peterson
Presbyterian Disaster Assistance
Center for Hazards Assessment, Response, and
Technology (CHART)
University of New Orleans

¹Anderson, Mary, and Peter Woodrow. 1989. *Rising from the ashes: Development strategies in times of disaster*. Boulder, CO: Westview Press.

²Laska, Shirley. 2004. What if Hurricane Ivan had not missed New Orleans? *Natural Hazards Observer* 29(2): 5-6.

³Fothergill, Alice. 2000. Knowledge transfer between researchers and practitioners. *Natural Hazards Review* 1(2): 91-98.

⁴Park, Peter. 1997. Participatory research, democracy and community. *Practicing Anthropology* 19(3): 8-13.

⁵Tierney, Kathleen. 2003. The challenges we face: Reflections on the 2003 hazards workshop. *Natural Hazards Observer* 28(1): 1-3.

numerous emergency organizations.³ The magnitude of this event, particularly in the city of New Orleans, resulted in a massive evacuation from a couple of large shelters at the New Orleans Convention Center and the Louisiana Superdome to Reliant Park in Houston, Texas, beginning August 31. Reliant Park is a sprawling four site property in downtown Houston that consists of Reliant Stadium, which was not used for evacuees, the Reliant Astrodome, Reliant Arena, and Reliant Center, each of which became large shelters. Additionally, the George R. Brown Convention Center, approximately six miles from Reliant Park, was also used for evacuees from Louisiana. At its peak on September 4, the four sites (Astrodome, Arena, Center, and Convention Center) sheltered approximately 27,100 Hurricane Katrina evacuees.⁴

With funds from the Natural Hazards Center’s Quick Response program, interviews were conducted with 46 evacuees at Reliant Park to gather perishable data regarding evacuees’ experiences and their intentions to rebuild or relocate in Louisiana in the aftermath of Hurricane Katrina. Based on that reconnaissance trip, this article highlights some preliminary observations on issues related to race, class, looting, evacuation, sheltering, and housing.

The Significance of Race and Class

For many Hurricane Katrina survivors, issues of race and class were central to their evacuation experiences. Several evacuees noted that at both evacuation sites in New Orleans and at Reliant Park in Houston almost ninety percent of shelter residents were African Americans (approximately two-thirds of New Orleans was African American when Katrina hit). This stood in stark contrast to the law enforcement, support, and volunteer staffs that were predominately white. Some evacuees reported feelings of discrimination throughout their evacuation and shelter experience. These feelings were based on incidents ranging from perceived discriminatory statements made by public officials to denial of service due to race.

Statements concerning discrimination due to class were less often reported by evacuees. However, it is interesting to note that a *Washington Post*/Kaiser Family Foundation/Harvard University study of Houston shelter evacuees suggested an intersection between race and class: 68 percent of respondents thought that the federal government would have responded more quickly if more people trapped in the floodwaters were wealth and white rather than poor and black.⁵

These perceptions of access and disparate treatment provide support to previous research highlighting both the perceived and actual benefits of white privilege in American society.⁶ In addition, the disproportionate number of working class evacuees in the shelters highlights issues of scarce financial resources. Evacuees frequently reported not having the necessary resources to evacuate prior to Hurricane Katrina and explained this was why they had been in the shelter for two weeks as opposed to living in a hotel in Houston like many middle-class or upper-class dislocated were able to do. Although race and class were significant issues for many evacuees, issues of age, gender, religion, physical and mental disability, previous disaster experience, and care for dependents were also formative influences on evacuees' catastrophe experiences.

“Looting” as Prosocial Behavior?

Following Hurricane Katrina, there were many media reports of chaos, anarchy, and looting, particularly among the residents of New Orleans. Many of the evacuees interviewed in Houston reported observing, or in a few instances, admitted “finding,” “taking,” “borrowing,” “stealing,” or “looting” things for functional purposes. Although there is a widespread public perception, which is portrayed by the media, that looting is an antisocial behavior that involves stealing expensive material possessions, such as televisions, stereos, video recorders, jewelry, and clothing, few evacuees reported this type of behavior occurring. Although a few individuals reported taking boats to assist in the evacuation process, the majority of the “looting” behavior involved taking essentials to survive in increasingly unsanitary and hazardous conditions. In contrast to the antisocial stereotype of looting and hoarding of scarce commodities, almost all of the individuals who reported that others were seen taking things or admitted taking things stated that “taken” goods were shared to help others survive as well. The recipients

of these shared items were often told to conserve or ration them, particularly food and water, because of the uncertainty as to how long it would be before they were evacuated. These preliminary observations suggest a possible prosocial element in appropriating behavior.

Evacuation

Preliminary data from Hurricane Katrina survivors in Houston suggest at least three distinct, but not mutually exclusive types of evacuation: vertical, waterborne, and relocation. Several interviewees reported having evacuated to upper floors or to the roof of a dwelling unit due to the hurricane or the rising flood waters from the breaches in the New Orleans levee system. Most of the vertical evacuees reported that their houses or apartments filled with water in a matter of minutes and that they did not have time to take things with them, forcing them to use what was available to them on the upper floors. Evacuees reported kicking, pushing, sawing, or using a bed railing to break through a higher floor or attic to escape rising waters.

Many individuals reported having to wade, swim, or boat through increasingly contaminated waters to reach safer locations. For many, this evacuation process was complicated by age, mental or physical disability, the need to care for dependents, or material possessions they were trying to take with them. Several individuals who reported “taking” boats first evacuated their own families to safer locations and then engaged in prosocial, altruistic behavior by repeatedly returning to the area to evacuate friends and neighbors. Preliminary observations suggest that similar to the waterborne evacuations of lower Manhattan on September 11, 2001, the waterborne evacuees of New Orleans used their knowledge of the local area to locate elderly residents and people they knew would likely need assistance, often before transporting others.⁷

Most Katrina survivors interviewed reported evacuating to a site such as the New Orleans Convention Center, the Louisiana Superdome, or the Interstate 10 overpass before eventually being evacuated by bus, car, or helicopter to Houston. Although the time spent at the relocation site ranged from minutes to days, almost all interviewees described the site evacuation process as disorderly and disorganized, with minimal communication about where evacuees were heading and when the next transportation would arrive. This created a state of uncertainty and insecurity, irrespective of evacuation site or law enforcement or military presence.

Sheltering

Many evacuees reported spending time in the Louisiana Superdome before, during, and after the hurricane, and almost all found it to be an uncomfortable or miserable experience. This was due in large part to holes in the roof pouring in storm water and the loss of basic electrical, water, and sewage services, which created rapidly deteriorating unsanitary living conditions inside the Superdome. Interestingly, many different evacuees “heard from other people” that fights, fires, rapes, shootings, suicides, murders, and more had occurred inside the Su-

perdome, but almost all said they had not directly observed any of these events, lending substantive support to the prevalence of rumors at the Superdome.

Upon arrival at the shelters at Reliant Park in Houston, most evacuees were grateful to be able to have a place to sleep, shower, be fed three meals a day, and receive medical treatment from the American Red Cross. At Reliant Park, individual and family financial assistance in the form of debit cards from the American Red Cross and the Federal Emergency Management Agency were available to evacuees, and most took advantage of these resources. Many additional social services were available to the evacuees at Reliant Park, such as housing and job offers from cities in other states, offers of Section 8 Housing in Houston from the U.S. Department of Housing and Urban Development, and an airline offering free one-way tickets to reunite dislocated family members. Most of the residents emphasized how grateful they were for the services provided on-site and to the city of Houston for its hospitality and willingness to assist them.

Housing Intentions

A critical element of the research in Houston was capturing evacuees' early intentions to return and rebuild in Louisiana (primarily New Orleans) or relocate elsewhere. Although this research is ongoing, initial intentions indicate a slight majority plan to return and rebuild in New Orleans, a substantial minority plan to relocate in Houston or elsewhere, and some are unsure of their long-term housing intentions due to the uncertainty of the current state of their house, the intentions of other members of their family, or their employment status.

For many natives of New Orleans who had experienced Hurricanes Betsy, Camille, and/or Georges, Katrina marked their first evacuation outside of Louisiana. The anticipated prolonged inoperability of New Orleans provided a unique opportunity for evacuees to reflect upon their lives and the city. Perhaps most surprising was the intent of a few lifetime residents of New Orleans to permanently relocate their entire families to Houston as a result of Hurricane Katrina. Of those predominately working-class African Americans that intend to return to New Orleans, it is important to note that many do not have the financial resources to rebuild or as renters may be significantly constrained in their housing choices due to a shortage of decent, safe, and sanitary houses in a post-Katrina New Orleans.

Future lines of research in this area could yield particularly substantive understanding of how a catastrophe may serve as a catalyst for the reproduction or exacerbation of inequality. Already, there are reports of external real estate speculators attempting to purchase properties in the French Quarter and Garden District of New Orleans in hopes of redeveloping the area.⁸ Although the potential effects of gentrification in a post-Katrina New Orleans are not presently known, this research provided an excellent opportunity to assess the ephemeral intentions and aspirations of evacuees.

Conclusion

This report attempted to highlight the significance of race and class issues by demonstrating that predominantly working-class African Americans did not evacuate because they did not have the financial resources to do so. In addition, this report has provided some preliminary observations on issues related to looting, evacuation, sheltering, and housing among Hurricane Katrina survivors at Reliant Park in Houston, Texas. Based on the scope and severity of the damage and the prolonged inoperability of New Orleans, it will be sometime before the full impact of Hurricane Katrina is known. However, ongoing analysis of these data will provide a starting point for exploring the short- and long-term implications of Katrina and the impacted population. In addition, this research has highlighted the need for disaster studies to focus on both organizational features of disaster and explore how disasters may serve as a catalyst for the reproduction or exacerbation of inequality.

John Barnshaw (barnshaw@udel.edu)
Disaster Research Center
University of Delaware

The author wishes to thank Havidán Rodríguez and Joanne Nigg for their assistance.

¹Wilson, William. 1978. *The declining significance of race: Blacks and changing institutions*. Chicago, IL: University of Chicago Press.

²Feagin, Joe. 1991. The continuing significance of race: Antiblack discrimination in public places. *American Sociological Review* 58:101-116.

³Quarantelli, Enrico. 2005. Catastrophes are different from disasters: Some implications for crisis planning and managing drawn from Katrina. Social Science Research Council Web site. (<http://understandingkatrina.ssrc.org/Quarantelli/>)

⁴Harris County Joint Information Center. 2005. Number of Citizens. Harris County, TX: Harris County Joint Information Center. (<http://www.hcjic.org/default.asp>)

⁵The Washington Post, Kaiser Family Foundation, and Harvard University. 2005. *Survey of Hurricane Katrina evacuees*. Menlo Park, CA: The Henry J. Kaiser Family Foundation. (<http://www.kff.org/newsmedia/upload/7401.pdf>)

⁶Feagin, Joe, Hernan Vera, and Pinar Batur. 2001. *White Racism*. 2nd ed. New York: Routledge.

⁷Kendra, James, and Tricia Wachtendorf. 2003. Creativity in emergency response to the World Trade Center disaster. In *Beyond September 11th: An account of post-disaster research*, ed. J. Monday. Boulder, CO: Natural Hazards Research and Applications Information Center.

⁸Blanton, Kimberly. 2005. Speculators circle New Orleans for real estate deals. *Boston Globe*, September 9, 2005.

Hurricane Katrina: Quick Response Grants

As of October 5, the Natural Hazards Center had activated 24 Hurricane Katrina-related Quick Response grants. As a condition of the grant, grantees are required to submit a report on their research to share with the hazards and disasters community. These reports will be available on the Center's Web site (<http://www.colorado.edu/hazards/qr/>) and announced in the *Observer* and *Disaster Research* when they become available.

Coordinating the Incident Command Post, Emergency Operations Center, and National Incident Management System during Time of Disaster, David Neal, Oklahoma State University

Covering Katrina: The Multiple Dilemmas of Local Journalists, Marguerite Moritz, University of Colorado at Boulder

Diffusion of Information: Access and Use of Mass Media Information Preceding Hurricane Katrina, Traci Hong, Tulane University

Disaster Realities in the Aftermath of Hurricane Katrina: Revisiting the Looting Myth Research Problem, Lauren Barsky, University of Delaware

The Ecology of Peer-to-Peer Communication for a Disaster-Displaced Population, Leysia Palen, University of Colorado at Boulder

Examining Search and Rescue in Large Scale Flooding Events: The Case of Hurricane Katrina and the Gulf Coast, David Simpson, University of Louisville

Housing of Evacuees during Relocation: The Use of Familial and Extrafamilial Networks for Sheltering In Disaster, JoAnne Darlington, University of Louisiana at Lafayette

Hurricane Experience and Emergency Preparation in the Southeast United States, Augusto Newell, Florida International University

Hydro-Meteorological Hazards: How Does Prior Experience Influence Impacts and Adaptation, Francis Adeola, University of New Orleans

Information Flow among Victims of and Responders to the Collapse of Infrastructure in the Aftermath of Disaster, Tisha Pipes, University of North Texas

Major Coastal Storms and Family Functioning, Betsy Garrison, Louisiana State University

Media Trends in Reporting Disasters Following Hurricane Katrina, Richard Olson, Florida International University and Vince Gawronski, Birmingham Southern College

Moving Forward in the Aftermath of a Disaster: The Impact of Communication and Social Capital on the Health and Well-Being of Hurricane Katrina Evacuees, Christopher Beaudoin, Tulane University

Narrative Accounts of Displaced Disaster Victims, Gregory Button, Independent Researcher and Consultant

Needs Assessment for the Grand Bayou Residents, Brenda Phillips, Oklahoma State University and Kristina Peterson, University of New Orleans

Obstacles and Facilitators to Evacuation from Hurricane Katrina, David Eisenman, University of California-Los Angeles

Photographs and Interviews with Children Displaced by the Destruction of Hurricane Katrina, Jennifer Kirschke, University of Colorado at Denver

Post-Katrina Urban Damage Assessment: Deciphering the Signatures of Windstorm Effects, Storm Surge, and Levee Breach Using Remote Sensing Technologies, Beverley Adams, ImageCat, Inc.

Providing for Pets during Disasters, Leslie Irvine, University of Colorado at Boulder

To Rebuild or to Relocate? An Investigation of Postcatastrophe Housing Intentions among Hurricane Katrina Evacuees, John Barnshaw, University of Delaware

Race, Class, and Gender Differences in Governmental Response following a Natural Disaster, Duke Austin and Michelle Miles, University of Colorado at Boulder

Reconstructing Childhood: An Exploratory Study of Children following Hurricane Katrina, Alice Fothergill, University of Vermont and Lori Peek and Megan Underhill, Colorado State University

Reframing Crime: Race, Gender, Class, Criminality, and Enforcement of Laws in a Natural Disaster, Hillary Potter, University of Colorado at Boulder

The Response to Katrina: The Good, the Bad, and the Ugly, Henry W. Fischer III, Millersville University of Pennsylvania

New Research Assistants at the Natural Hazards Center

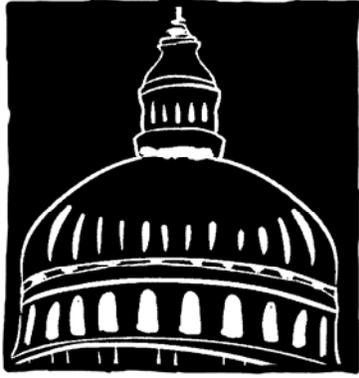
This fall, the Natural Hazards Center welcomed three new research assistants:

Erica Kuligowski is a graduate student in the department of sociology's PhD program. Her bachelor's and master's degrees are in fire protection engineering from the University of Maryland, College Park. Before coming to the University of Colorado, Erica worked for the National Institute of Standards and Technology in the Fire Research Division.

Sophia Liu is a graduate student working on her PhD in a new interdisciplinary program that is part of the ATLAS (Alliance for Technology, Learning, and Society) Institute in combination with a human-computer interaction emphasis in the computer science department. She has a bachelor's degree in social science with a research and analytical methods specialization and a minor in computer science and digital arts from the University of California, Irvine.

Sarah Stapleton is a graduate student in the department of environmental studies' PhD program. She has her master's in civil engineering from the University of Colorado and a bachelor's degree in physics from Creighton University. Sarah is interested in the impacts of climate change on water supplies in developing countries.

Welcome Erica, Sophia, and Sarah, we are thrilled to have you on board!



WASHINGTON UPDATE

Post-Katrina Legislative Update

In the wake of Hurricane Katrina, a variety of new public laws (P.L.) have been passed to ease the response and recovery effort. A plethora of other legislative initiatives have been proposed and will be reported on if and when they are signed into law. The most significant of the new laws are the Emergency Supplemental Appropriations Act to Meet Immediate Needs Arising from the Consequences of Hurricane Katrina, 2005 (P.L. 109-61) and the Second Emergency Supplemental Appropriations Act to Meet Immediate Needs Arising from the Consequences of Hurricane Katrina, 2005 (P.L. 109-62).

P.L. 109-61 appropriates an additional \$10 billion to the U.S. Department of Homeland Security (DHS) for disaster relief and \$500 million to the U.S. Department of Defense (DOD) to help cover costs resulting from immediate relief efforts. P.L. 109-62 appropriates an additional \$50 billion to DHS, \$1.4 billion to the DOD, and \$400 million to the U.S. Army Corps of Engineers for operation and maintenance costs as well as flood control and coastal emergencies. This new law also authorizes the use of the emergency procurement authority of the Office of Federal Procurement Policy Act by executive agencies to make purchases of up to \$250,000 without obtaining competitive quotes for procurements of property or services to be used for Hurricane Katrina rescue and relief operations.

The following laws were also passed as a result of Katrina:

- The Federal Judiciary Emergency Special Sessions Act of 2005 (P.L. 109-63), although not specific to Katrina, allows United States courts to conduct business under emergency conditions.
- The National Flood Insurance Program Enhanced Borrowing Authority Act of 2005 (P.L. 109-65) increases the borrowing authority of the Federal Emergency Management Agency from \$1.5 billion to \$3.5 billion through fiscal year 2008 for carrying out the National Flood Insurance Program.
- The TANF Emergency Response and Recovery Act of 2005 (P.L. 109-68)

provides assistance to families affected by Hurricane Katrina through the program of block grants to states for temporary assistance for needy families (TANF).

- The Flexibility for Displaced Workers Act (P.L. 109-72) provides special rules for disaster relief employment under the Workforce Investment Act of 1998 for individuals displaced by Hurricane Katrina.
- The Katrina Emergency Tax Relief Act of 2005 (P.L. 109-73) creates special rules for use of retirement funds for relief relating to Hurricane Katrina, offers employment relief to employees and employers, implements charitable giving incentives, and establishes other forms of tax relief.
- The Assistance for Individuals with Disabilities Affected by Hurricane Katrina or Rita Act of 2005 (P.L. 109-82) gives assistance to disabled individuals affected by the hurricanes through vocational rehabilitation services.

The full text of these laws is available in any federal repository library and on the Library of Congress Web site at <http://thomas.loc.gov/>.



R. David Paulison Replaces Michael Brown as Head of FEMA

With the departure of Michael Brown from the Federal Emergency Management Agency's (FEMA) top spot, the president designated R. David Paulison, administrator of the U.S. Fire Administration, as acting undersecretary of homeland security for emergency preparedness and response and head of FEMA. Paulison, a 30-year veteran of fire and emergency services served as director of the Preparedness Division of the Emergency Preparedness and Response Directorate/FEMA from 2003 to 2004 and has served as the administrator for the U.S. Fire Administration since December 2001. Before joining FEMA, Paulison was chief of the Miami-Dade Fire Rescue Department. His emergency management experience includes Hurricane Andrew and the crash of ValuJet Flight 592. Read more about Paulison on the FEMA Web site at <http://www.fema.gov/about/bios/paulison.shtm>.

2005 Hurricane Season Recovery Information

From Tropical Storm Arlene, which emerged on June 8, just a week after the official start of hurricane season, to early October's Tropical Storm Tammy, the hurricane season of 2005 has been one of the busiest in memory (and it is not over yet). Hurricane Katrina became one of the most devastating storms in history, taking hundreds of lives across the Gulf Coast and forcing the largest relocation in American history. There have already been 19 named storms this season, resulting in nine federal disaster declarations and, as part of the Katrina relocation effort, emergency declarations have been issued for 42 states and the District of Columbia.

To assist in the recovery efforts, the Federal Emergency Management Agency (FEMA) has dedicated a Web page to recovery information related to the hurricanes of 2005, Dennis, Katrina, and Rita, specifically, broken down by storm and then by the affected states. The Web page, located at http://www.fema.gov/press/2005/hurricane_season.shtm, also features links to general recovery and mitigation information. Another FEMA Web page, http://www.fema.gov/press/2005/resources_katrina.shtm, provides links to information on how to get help in recovering from Hurricane Katrina.

In related news, FEMA has developed an online individual assistance center (IAC) to allow those who have registered for disaster assistance to access information about their cases on the Internet. The release of the IAC follows on the heels of FEMA's launch of an online registration application in fall 2004 that allows individuals to register from any computer or at kiosks set up at disaster recovery centers. The IAC is located at <https://www.disasteraid.fema.gov/>.

FEMA and America's Second Harvest Partner to Feed Disaster Victims

The Federal Emergency Management Agency (FEMA) and America's Second Harvest have signed an official memorandum of understanding establishing a permanent relationship to bring much needed food and

supplies to victims of the nation's worst disasters. As the nation's Food Bank Network, America's Second Harvest works with more than 210 food banks around the country, serving all 50 states and Puerto Rico.

The memorandum of understanding provides a framework for FEMA and America's Second Harvest to continue working together in carrying out disaster response and recovery operations. In addition to coordination of distribution of supplies in a disaster, the agreement includes coordinated outreach campaigns to encourage mitigation of hazard risks and community involvement both before and after disasters occur. Find out more about America's Second Harvest, including the organization's involvement in response to Hurricanes Katrina and Rita, at <http://www.secondharvest.org/>.

Update on Individuals with Disabilities in Emergency Preparedness

In July, the U.S. Department of Homeland Security Office for Civil Rights and Civil Liberties submitted a report to the president documenting the progress made by the Interagency Coordinating Council on Emergency Preparedness and Individuals with Disabilities in overcoming the complex challenges people with disabilities face in times of emergency.

The report documents results achieved and makes eight recommendations that the council believes will better integrate people with disabilities into the nation's disaster and emergency mitigation, preparedness, response, and recovery efforts:

- Increase the rate of participation of people with disabilities in emergency planning
- Increase the rate of participation of people with disabilities in emergency preparedness, response, and recovery drills and exercises
- Direct homeland security funding to promote the full integration of people with disabilities in all aspects of emergency preparedness, response, and recovery
- Urge federal building officials and managers to include the concerns of federal employees and visitors with disabilities in developing emergency plans and continuity of government plans
- Ensure that during an emergency Telecommunications Relay Services personnel and Public Safety Answering Point personnel and captioners can travel to and from their designated facilities to provide continuity of services for persons with hearing and speech disabilities
- Integrate the needs of individuals with disabilities into the National Response Plan and the National Incident Management System
- Coordinate evidence-based federal research into the effectiveness of audio, visual, and/or tactile protocols and technologies related to emergency preparedness, alerting, warning, and response for individuals with disabilities
- Ensure comprehensive medical approaches that address the health care and medical needs of individuals with disabilities across the lifespan of an emergency event

The report is available at http://www.dhs.gov/interweb/assetlibrary/CRCL_IWDEP_AnnualReport_2005.pdf.

USAID Announces Launch of Indian Ocean Tsunami Warning System Program

In August, the U.S. Agency for International Development (USAID) announced the launch of the U.S. government's Indian Ocean Tsunami Warning System (IOTWS) program in response to the 2004 Indian Ocean tsunami. This two-year, \$16.6 million effort will contribute to the development of integrated early warning and mitigation systems that allow countries in the Indian Ocean region to detect and prepare for tsunamis and related coastal hazards.

The program involves a number of key U.S. agencies, each contributing specialized expertise in tsunami warning and disaster management. USAID's Regional Development Mission for Asia in Bangkok, Thailand, will lead the U.S. effort, with technical support from the National Oceanic and Atmospheric Administration, U.S. Geological Survey, U.S. Trade and Development Agency, and U.S. Forest Service. USAID also recently contracted with a joint venture between the International Resources Group (IRG) and Tetra Tech, Inc. to provide overall support to the U.S. program as its "lead program integrator" contractor. IRG-Tetra Tech's principal subcontractor, the Asian Disaster Preparedness Center, will contribute additional on-the-ground technical resources.

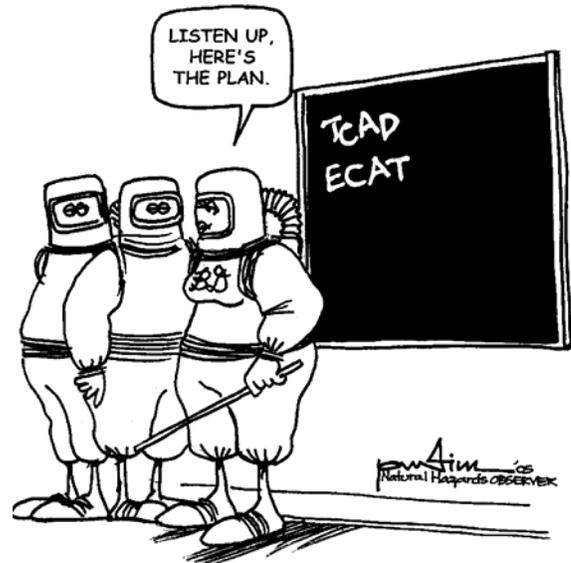
The U.S. program involves close collaboration with the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific, and Cultural Organization. The IOC has the lead responsibility for developing the Indian Ocean's regional warning capabilities. Working with the international community, the U.S. program will provide technical assistance using an end-to-end approach that addresses all levels of early warning capabilities from community-level disaster readiness to national and regional-level tsunami and earthquake detection and warning communications systems. The U.S. approach also promotes multihazard solutions that strengthen capabilities in the Indian Ocean to respond not only to tsunamis, but to other serious coastal hazards, such as cyclones, sea swells, and floods, as well as earthquakes. Until a regional system can operate autonomously, the U.S. program will provide interim support for detecting earthquakes and possible tsunami conditions in the Indian Ocean through the Pacific Tsunami Warning Center in Hawaii and the National Earthquake Information Center in Colorado.

For more information, read the press release at <http://www.usaid.gov/press/releases/2005/pr050817.html> or contact *Tim Beans* at the *USAID Regional Development Mission/Asia* at +66-2-263-7400.

EPA Emergency Consequence Assessment Tool

The Environmental Protection Agency's National Homeland Security Research Center Threat and Consequence Assessment Division is developing an Emergency Consequence Assessment Tool (ECAT) to enhance the ability of risk managers to respond to potential terrorist attacks more quickly and efficiently. ECAT functions as a "defensive playbook" that allows risk managers to prepare

for emergency responses using information developed from a series of priority threat scenarios. It combines the decision-making processes of the emergency response paradigm and the risk assessment paradigm into a tool that provides for rapid communication and informed risk management of chemical and biological warfare agents.



The capabilities of ECAT include quantification of chemical hazards and biological risks; support to emergency responders by providing health-based information and recommendations for personal protective equipment (PPE), standard operating procedures, site controls, and decontamination procedures; and support to risk managers by providing target cleanup levels and techniques for clearance sampling, remediation, and restoration. ECAT also provides computer links to decontamination methods, risk mitigation methods, and information related to toxic agents, site controls, and PPE.

Targeted ECAT users include emergency planners and trainers, emergency responders, risk assessors, and on-site coordinators. For more information, visit <http://www.epa.gov/nhsrc/> or contact *Kevin Garrahan* at (202) 546-3336; e-mail: garrahan.kevin@epa.gov.

DHS Inspector General Initiates Special Office for Hurricane Katrina Oversight

The U.S. Department of Homeland Security (DHS) inspector general has announced the establishment of an Office for Hurricane Katrina Oversight. The office will focus on preventing problems through a proactive program of internal control reviews and contract audits to ensure disaster assistance funds are being spent wisely.

Matthew Jadacki has been tasked with leading the effort on a detail assignment from the National Weather Service. Prior to joining the National Weather Service, Jadacki was the acting chief financial officer for the Federal Emergency Management Agency, responsible for managing all financial management and budget activities, including overseeing the agency's \$12 billion budget.

More details are available on the Office for Hurricane Katrina Oversight Web site at [http://www.dhs.gov/dhspublic/interapp/editorial/Copy_\(2\)_of_editorial_0602.xml](http://www.dhs.gov/dhspublic/interapp/editorial/Copy_(2)_of_editorial_0602.xml).

NFIP Simplifies Adjustment Process for Policyholders Affected by Hurricane Katrina

In recognition of the widespread devastation caused by Hurricane Katrina, the National Flood Insurance Program (NFIP) has modified the way it settles claims to expedite the response to those policyholders in storm-stricken areas. The NFIP is utilizing all available data on water depths, aerial imagery, and information from underwriting files to determine properties where it is readily apparent that flood damage covered by the policy will exceed the amount of insurance purchased. It will be possible to pay the policy limits through dialogue with the insured and without waiting for a site visit to adjust the loss. This process may be used when homes have been washed off their foundations, affected for long periods by standing water, or when only pilings or a slab remain.

The NFIP has waived the usual requirement that the policyholder must submit a proof-of-loss and instead, where the policyholder agrees, will rely on a report by the claims adjuster. The NFIP has urged insurance companies to provide advance checks of around \$3,000 to policyholders who carry contents coverage. Flood insurance assistance is available from the Federal Emergency Management Agency at <http://www.fema.gov/press/2005/katrinainurance.shtm> and (800) 427-4661. Information about the NFIP can be found at <http://www.FloodSmart.gov/>.

Hurricane Katrina and LLIS.gov

In response to the recent Hurricane Katrina disaster, LLIS.gov has created a Hurricane Katrina page for members to access relevant disaster recovery lessons learned, best practices, after-action reports, and other hurricane-related documents. LLIS.gov users can submit comments, experiences, and observations from Katrina that will assist in the development of new lessons learned. In addition, users can post questions, comments, and insights to a Katrina-specific message board.

Information on all phases of the disaster, including response and recovery operations, and all emergency response functions, such as search and rescue, communications, and law enforcement operations, is encouraged. Whether it is the receiving of displaced residents or the sending of personnel and resources to the Gulf Coast, jurisdictions across the nation have been affected by Hurricane Katrina, and LLIS.gov would appreciate feedback on the disaster. LLIS.gov is also seeking similar information about Hurricane Rita.

Membership to LLIS.gov is required and open only to vetted emergency response providers and homeland security officials. For more information and to register, visit <http://www.llis.gov/>.

Comprehensive Transitional Housing Assistance Program for Katrina Evacuees

The U.S. Department of Homeland Security (DHS) and the U.S. Department of Housing and Urban Development (HUD) have implemented a series of measures to accelerate the delivery of federal assistance and provide transitional housing for victims of Hurricane Katrina. To-

gether, these federal programs intend to help displaced individuals and families obtain needed stability while providing them with flexible housing options as the country works to rebuild communities throughout the Gulf Coast region.

Through the Federal Emergency Management Agency's Individuals and Households Program (IHP), DHS will process expedited transitional housing assistance for qualified homeowners and renters displaced by Hurricane Katrina. Because not all evacuees are eligible for assistance through the IHP program, displaced families, including formerly HUD assisted evacuees and those homeless prior to Hurricane Katrina, will qualify for the Katrina Disaster Housing Assistance Program administered by HUD through the established network of local public housing authorities.

A general description of the two programs is available in the press release at http://www.dhs.gov/dhspublic/interapp/press_release/press_release_0766.xml. More detailed information is available through FEMA at <http://www.fema.gov/press/2005/katrinatranshousing.shtm> and HUD at <http://www.hud.gov/offices/pih/>.

NOAA and USGS to Conduct Pilot Project for Flash Flood and Debris Flow Warning System

The National Oceanic and Atmospheric Administration (NOAA) and the U.S. Geological Survey (USGS) have announced plans to conduct a pilot project in Southern California that will improve National Weather Service forecasts of potential debris flows, also known as mud flows. The project's goal is to provide public warnings of imminent threats in and near areas recently burned by wildfires.

The pilot project was announced as the agencies released the *NOAA-USGS Debris Flow Warning System—Final Report*, which outlines an initial plan for the prototype and identifies the potential for expanding the warning system nationwide by developing improved technologies to characterize flash flood and debris flow hazards. These will be combined with existing methods used by the National Weather Service to forecast and measure precipitation.

A principal finding of the task force that developed the report is that the potential exists to enhance and expand the warning system in the future to provide detailed maps that show areas that could be impacted by flash floods and debris flows. Such maps could potentially be generated in real-time during a storm by incorporating improved forecasts and measurements of precipitation into detailed susceptibility models.

For more information about the warning system, visit http://www.usgs.gov/homepage/science_features/debris_flow_ca.asp. The 60-page report can be downloaded from <http://pubs.usgs.gov/circ/2005/1283/>.

Citizen Corps Partners with Meals on Wheels

The U.S. Department of Homeland Security's Citizen Corps has announced a partnership with Meals on Wheels Association of America. State, county, local, and tribal Citizen Corps Councils will work with Meals on Wheels

volunteers to help vulnerable Americans make their homes and communities safer and better prepared for emergencies of all kinds. By training Meals on Wheels volunteers in emergency preparedness, the often underserved vulnerable populations will have greater access to critical preparedness information, guidance, and assurance. For more information about Citizen Corps, visit <http://www.citizen corps.gov/>. To learn more about the Meal on Wheels Association of America, visit <http://www.mowaa.org/>.



NOD Releases Findings of Katrina Rapid Assessment Teams

On October 5, the National Organization on Disability (NOD) released the findings of its Hurricane Katrina rapid assessment teams and announced the formation of an independent task force to address the system-wide challenges brought to light after Katrina. Four assessment teams were deployed in response to the devastation and loss of life caused by Hurricane Katrina to investigate the status of response and recovery for the special needs populations, which included people with disabilities, the elderly, and medically managed individuals. Their goal was to identify and review systemic points of weakness and opportunities for immediate actionable corrections to alleviate suffering during emergency response operations.

The teams gathered data on gaps in response efforts and on long-term recovery needs. They also collected information to support or disprove “stories” that emerged from the disability and senior communities. Their findings and recommendations for action are available in the full 16-page report, which can be accessed at http://www.nod.org/Resources/PDFs/katrina_snake_report.pdf. Additional information about NOD and its Emergency Preparedness Initiative can be found at <http://www.nod.org/emergency>.

Report on the Status of 9/11 Commission Recommendations

On September 14, the 9/11 Public Discourse Project, the nonprofit successor organization to the 9/11 Commission, released the first of several reports that will assess the status of the 41 recommendations made by the commission in July 2004 to make the United States safer and more secure. In *Report on the Status of 9/11 Commission Recommendations—Part I: Homeland Security, Emergency Preparedness and Response* the project participants examine recommendations made in the areas of emergency preparedness and response, transportation security, and border security. Of the 14 recommendations covered, 4 were deemed unsatisfactory, 7 had made minimal progress, and 3 (all in border security) had made some progress. Find out more about the project and download a copy of the report at <http://www.9-11pdp.org/>.

FEMA after Andrew: Revisiting the Past

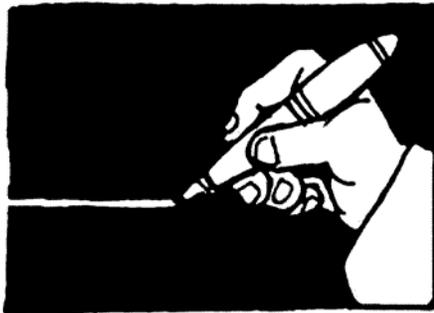
After Hurricane Andrew tore through southern Florida in 1992, Congress asked the National Academy of Public Administration to conduct several studies of the federal government’s capacity to respond effectively to major natural disasters.

The first report, released in 1993, examined the capabilities and performance of the Federal Emergency Management Agency (FEMA) during and after Hurricane Andrew. The report, *Coping with Catastrophe: Building an Emergency Management System to Meet People’s Needs in Natural and Manmade Disaster* (165 pp.), focused on:

- Executive branch coordination and contingency planning, including leadership by the president;
- State and local government capability and coordination with the federal government;
- FEMA’s role, mission, planning, resources, and leadership capabilities;
- The effectiveness of governmental responses to major disasters prior to the establishment of FEMA;
- Lessons applicable to future disasters;
- Congressional oversight practices involving disaster assistance; and
- Governmental coordination with private relief agencies, businesses, and citizen initiatives.

A 1994 follow-up report came at the request of then FEMA director James Lee Witt. *Review of Actions Taken to Strengthen the Nation’s Emergency Management System* (76 pp.) assessed the progress made in implementing recommendations to strengthen FEMA and the nation’s emergency management system during his first six months in office. The academy acted in an advisory capacity for this follow-up report.

Both reports provide interesting reading and a sense of déjà vu and are available for free on the academy’s Web site at <http://www.napawash.org/>.



ON THE LINE

Building Community Partnerships

When it comes to emergency management, community partnerships, also known as public-private partnerships, are vital. Every community is made up of a number of potential partners: government, businesses, nonprofit organizations, the general public, and more. No one group is equipped to protect a community from disaster. Although government has the primary responsibility for protecting its citizens, there is competition for funds, and reducing disaster risks is one of many issues fighting for survival. While money can most certainly help a community minimize its risk, efforts can be enhanced by bringing other resources to bear to devise local solutions. This is where partnerships come into play. By working together, partners can better address community-wide safety needs.

Background

Over the last four years, much of our government has been focused on terrorism, and communities have started to fall behind in addressing their natural hazards. An understandable national shift of attention and funds after September 11, 2001, unfortunately swung the pendulum from all-hazards planning to a single hazard focus. Prior to that fateful day, emergency management leaders were well on the way to increasing America's disaster resilience. But that momentum changed and local governments saw themselves directing staff and resources toward the new trends and the promise of money.

Following the multiple hurricanes in Florida and the Gulf states, attention seems to be shifting back to natural disaster risks. The problem is that decisions about programs and funding for natural events are probably a long way off. In the wake of Hurricane Katrina, there is much to be discussed and considered at the federal level, yet urgency exists to make improvements, and those of us on the front lines of local emergency management can't wait. In fact, any delay makes us more vulnerable to the possibility of a disaster, whether it is the result of a hurricane, earthquake, flooding, tornadoes, landslides, or some other hazard. We should act now by building on the current interest in participation from organizations and individuals in our own cities and towns.

Where Does a Community Start?

A community partnership may be initiated by either the public or private sector. Either way, the emergency management office is a good place to start as it is typically

in contact with organizations in the community, both public and private, and is already responsible for coordinating disaster mitigation, preparation, response, and recovery in their jurisdiction.

There are many organizations interested in collaborating with local emergency management, especially in the wake of Katrina. Nevertheless, the window of opportunity and interest may only be open for a short time, so we must act quickly. It is best to begin with those organizations that have expressed interest and build from there.

Misconceptions Must Be Overcome

A public-private partnership can be a tremendous asset in addressing local and even regional risks. When building these relationships, it must be understood that there are some misconceptions held about each side of the partnership that could hinder progress. If these get addressed in the beginning stages and are stressed with new partners, the early development of the partnership will be much easier.

Government's Take on the Private Sector

Myth: The private sector will be a "cash cow," funding large and long-term projects.

Reality: Businesses fund a variety of projects each year, but their contributions are small and one-time only.

Myth: Money is the most important contribution.

Reality: While money is important, the most valuable resources the private sector can provide are expertise, services, and contacts, both internally and externally. Their time is the key.

Myth: Businesses have a clear understanding of government's roles, as well as their own, in a disaster.

Reality: The general public and many businesses don't really understand the role of government and its limitations. Additionally, businesses don't see the important role they can play in the response and recovery of their community. This reality has changed following Hurricane Katrina as more people and businesses are becoming aware of the interrelatedness of the multitude of players in their communities.

The Private Sector's Take on Government

Myth: The public sector isn't interested in the needs of business.

Reality: Government understands the need for the business community to participate and represent their own needs in policy making. Without input from the business community, government may make ill-informed decisions and important issues may get pushed to the side.

Myth: Government has its disaster bases covered.

Reality: Government is expected to have their bases covered in response, but less so in mitigation, preparedness, and recovery. Since the private sector spends more time on predisaster planning, it is a good resource for government to turn to for addressing a community's predisaster needs.

Myth: Federal assistance will be available to assist businesses when something happens.

Reality: While money will be available, businesses will have to meet certain criteria to receive it (and it won't be enough to put things back the way they were). This myth has been the reason why some businesses don't take action to prepare. Needless to say, it isn't enough of a safety net to justify inaction.

Once they can get past these misconceptions, the public and private sectors can begin moving forward on developing partnerships. Of great benefit to communities are these new relationships, the two-way communication that is fostered, and the resulting long-term disaster reduction programs.

A Personal Perspective

My personal experience with public-private partnerships comes from directing Seattle Project Impact, a Federal Emergency Management Agency (FEMA) initiative that provided seed money to local communities, specifically geared toward mitigation, to try to break the disaster-repair-disaster cycle. In Seattle, we took the federal model a step further by building long-term, sustainable programs that could be first institutionalized and then exported to other cities, counties, states, or countries with similar needs. In turn, we have benefited from other communities sharing their ideas and experiences with us. We strongly believe in sharing information so as to avoid recreating the wheel.

In Seattle, we take a broader approach to defining the public-private partnership that incorporates the entire community. Our partners include local, state, and federal government; small and large businesses; academicians; scientists; neighborhood organizations; volunteer groups; researchers; educators; media; and many others. Everyone has an equal say; all are respected. There's always room for new partners to bring unique perspectives, and by not limiting participation, new ideas are inspired.

Beginning in 1997, our partnership created four mitigation programs that are still going strong today: Hazard Mapping, Regional Home Retrofit, School Retrofit, and Disaster Resistant Businesses. Hazard Mapping has be-

come the foundation upon which all the other programs are built. If people don't understand the risk, they will see no value in mitigation. Hazard Mapping partners have been instrumental in providing us with the most current information about our local risks. We use this information as the basis for public education, which includes resources and information provided by partners on how residents can best protect themselves (e.g., retrofitting).

We have learned a lot about our hazards in the last eight years. This information has facilitated, and will continue to do so, better decision making by planners, elected officials, and members of the business community. Our partners from the U.S. Geological Survey and the University of Washington, private consultants, GIS staff, hazard researchers, and other scientists have helped us build the case for action.



Conclusion

By sharing the responsibility of a community's all-hazards preparedness, community partnerships have become the key to successful emergency management programs. Government will never have enough resources or money to mitigate alone, but businesses and other members of a community can become more involved and make a difference. Every level and individual in a community is ultimately responsible for their community's resilience, first by taking care of themselves and their family, then by participating in taking their community to the next level of readiness. Many hands can move the immovable, and since we're in this together, let's begin building our community legacy today.

Inés Pearce (ines.pearce@seattle.gov)
Seattle Emergency Management

Internet Resources

<http://www.seattle.gov/projectimpact/>
Seattle Project Impact

http://www.seattle.gov/emergency_mgt/
Seattle Emergency Management



CONFERENCES AND TRAINING

Below are the most recent conference announcements received by the Natural Hazards Center. A comprehensive list of hazards/disaster meetings is available at <http://www.colorado.edu/hazards/conf.html>.

Climate Science in Support of Decision Making. Organizer: U.S. Climate Change Science Program (CCSP). **Arlington, Virginia: November 14-16, 2005.** This workshop will examine the capability of climate science to inform decision making. Serving as a forum to address the program's progress and future plans, it will include discussion of decision-maker needs for scientific information on climate variability and change as well as expected outcomes of CCSP's research and assessment activities that are necessary for sound resource management, adaptive planning, and policy formulation. For more information, contact the *U.S. Climate Change Science Program, Suite 250, 1717 Pennsylvania Avenue NW, Washington, DC 20006; (202) 223-6262; <http://www.climate-science.gov/workshop2005/>.*

Survive 16th Annual Business Continuity Conference. **London, England: November 16-17, 2005.** This business continuity conference will inform participants about the recent work of the UK, European, and world governments to ensure preparedness for and resilience to disasters. Some of the conference's topics will include the United Nations' International Strategy for Disaster Reduction, climate change awareness and resilience, international business continuity principles, benefits of a safety culture, insurance implications, crisis management, and enterprise risk. For more information, contact *Survive, Lloyd's Avenue House, 6 Lloyd's Avenue; +44 (0)20 7265 2030; <http://www.survive.com/>.*

International Workshop on Strengthening the Resilience of Local Communities in Coastal Areas to Water Related Natural Disasters. Organizers: Ministry of Foreign Affairs of Denmark and International Strategy for Disaster Reduction (ISDR). **Copenhagen, Denmark: November 16-18, 2005.** Denmark is hosting this international workshop in collaboration with a number of international and regional partner organizations in the ISDR. The purpose of the workshop is to promote dialogue between governments, decision makers, and actors in local communities in the six countries affected by the 2004 Indian Ocean Tsunami. The workshop will contribute to strengthening community disaster reduction in public policy and link coastal zone management and livelihood development processes with disaster reduction. For more information and/or to contribute, contact *Palle Lindgaard*

Jørgensen; e-mail: plj@dhi.dk or Søren Dreyer; e-mail: SDR@cowi.dk; <http://www.dhi.dk/resilience/>.

2005 Australian Earthquake Engineering Society Annual Conference. **Albury, New South Wales: November, 25-27, 2005.** Conference topics and sessions will include tectonic issues and seismic activity modeling; earthquake attenuation; site response, hazard, and microzonation; structural design, performance assessment and retrofitting; geotechnical issues; emergency management, response, and lifelines; codes and regulations; insurance and risk studies; and social and economic issues. For more information, visit <http://www.aees.org.au/>.

American Geophysical Union (AGU) 2005 Annual Fall Meeting. **San Francisco, California: December 5-9, 2005.** The fall meeting provides an opportunity for researchers, teachers, students, and consultants to present and review the latest issues affecting the Earth, the planets, and their environments in space. This meeting will cover topics in all areas of Earth and space sciences. For more information, contact the *AGU Meetings Department, 2000 Florida Avenue NW, Washington, DC 20009; (800) 966-2481; e-mail: fm-help@agu.org; <http://www.agu.org/meetings/fm05/>.*

International Symposium on Tsunami Reconstruction with Geosynthetics: Protection, Mitigation, and Rehabilitation of Coastal and Waterway Erosion Control. Organizers: Asian Center for Soil Improvement and Geosynthetics, King Mongkut's University of Technology Thonburi, and the International Geosynthetics Society. **Bangkok, Thailand: December 8-9, 2005.** The purpose of this symposium is to gather experts to educate participants in the latest technology, applications, and design techniques in the geosynthetics specialization, particularly in relation to the rehabilitation of areas devastated by the 2004 Indian Ocean Tsunami. For more information, visit <http://www.sce.ait.ac.th/acsig/conference/>.

8th Annual Southern and Caribbean Regional Meeting. Organizer: National Oceanic and Atmospheric Administration. **Panama City, Florida: January 17-20, 2006.** This meeting has been rescheduled due to Hurricane Katrina. The themes of the meeting have shifted to coastal hazards, coastal planning, and development. A

new agenda will be developed and will include opportunities for all of the state coastal management programs in the region to share ideas, solutions, experiences, and lessons learned relating to hazards and coastal development. The meeting will focus on bringing in people and groups who have tools and expertise to assist coastal programs in hazards preparedness, recovery, cleanup, and redevelopment. For more information, contact *Kris Herrington*; (301) 563-1168; e-mail: Kris.Herrington@noaa.gov; <http://www.csc.noaa.gov/seocrm/>.

Atmospheric Science and Policy Research—2006 AMS Conference. Organizer: American Meteorological Society (AMS). **Atlanta, Georgia: January 29–February 2, 2006.** The broad theme of the 86th annual meeting is “Applications of Weather and Climate Data” with an emphasis on documenting success stories in the applications of atmospheric, hydrologic, and oceanic sciences and on the research needed to continue benefiting from new knowledge. For more information, call (617) 227-2426; <http://www.ametsoc.org/meet/annual/>.

27th Annual International Disaster Management Conference. Presenter: Emergency Medicine Learning and Resource Center. **Orlando, Florida: February 9-12, 2006.** This conference has been designed to meet the educational needs of individuals and agencies involved with emergency preparedness, response, and disaster recovery, such as firefighters, emergency managers, hospital administrators, physicians, nurses, disaster planning coordinators, medical facility administrators, law enforcement officials, search and rescue responders, civil preparedness officials, mass fatality responders, and others who play important roles in critical incidents. For more information, visit <http://www.emlrc.org/disaster2006.htm>.

5th Annual Infrastructure Resilience and Infrastructure Security for the Built Environment Congress and Expo. Sponsor: State Assemblies for Emergency Response. Organizer: The Infrastructure Security Partnership. **Washington, DC: February 15-17, 2006.** This two-day, international conference will include workshops, a table top exercise, a read team exercise, and keynote presentations by White House officials, the U.S. Department of Homeland Security, the intelligence community, industry, and their European and Asian counterparts. For more information, contact *George DeBakey*, debakey@ejkrause.com or *Barbara Lecker*, lecker@ejkrause.com; <http://www.protectinfrastructure.com/>.

Earth and Space 2006. Organizer: American Society of Civil Engineers (ASCE). **Houston, Texas: March 5-8, 2006.** This conference hosted by the Aerospace Division of the ASCE will bring together experts from a variety of disciplines to discuss exploration, engineering, construction, and operations in challenging environments on Earth, in space, and on other planetary bodies. Technology transfer is a key goal of the conference. Topics of interest include disaster detection and mitigation; remote sensing, geomatics, global positioning and geographic information systems, near-earth objects, and monitoring

and improving infrastructure using space-based and other emerging technologies. For more information, contact the ASCE, 1801 Alexander Bell Drive, Reston, VA 20191; (800) 548-2723; <http://www.asce.org/conferences/space06/>.

2006 Meeting of the Association of American Geographers (AAG). **Chicago, Illinois: March 7-11, 2006.** Geographers and related professionals from the United States, Canada, and abroad are invited to this annual meeting to discuss research, education, accomplishments, and developments in geography and related specialties. For more information, contact the AAG, 1710 16th Street NW, Washington, DC 20009; (202) 234-1450; e-mail: meeting@aag.org; <http://www.aag.org/annualmeetings/>.

2nd Asia Conference on Earthquake Engineering. Organizer: Asia Council for Earthquake Engineering. **Manila, Philippines: March 10-11, 2006.** The theme of the conference is “Seismic Hazards and Damage Mitigation in the Asian Region.” The conference will provide a forum to bring together researchers, professionals, engineers, scientists, and academicians to promote and exchange new ideas and experiences in the broad fields of seismology, earthquake engineering, seismic risk, and disaster mitigation. For more information, contact the Association of Structural Engineers of the Philippines Secretariat; (+632) 411-8603; e-mail: aseponline61@yahoo.com; <http://www.aseponline.org/>.

Global Visions: From Trauma to Promise. Organizer: Association of Traumatic Stress Specialists (ATSS). **Charlotte, North Carolina: March 22-26, 2006.** ATSS holds biannual conferences for education, training, and the opportunity to meet and network with international members, authors, and renowned speakers in the fields of trauma and traumatic stress. For more information, e-mail Admin@ATSS.info; <http://www.atss.info/conference.htm>.

The Third International Conference on Early Warning: From Concept to Action. Sponsor: International Strategy for Disaster Reduction. **Bonn, Germany: March 27-29, 2006.** This conference will bring together a wide variety of governmental and nongovernmental actors, scientists, and practitioners to stimulate and help to implement concrete early warning projects on all continents to bridge existing gaps. Relevant government departments, United Nations agencies, nongovernmental organizations, scientific bodies, private agencies, and all other interested parties are encouraged to fill out a preliminary indication of interest form and to submit proposals for concrete early warning projects. For more information, e-mail ewc3@un.org; <http://www.ewc3.org/>.

100th Anniversary Earthquake Conference Commemorating the 1906 San Francisco Earthquake. Organizers: Earthquake Engineering Research Institute (EERI), Seismological Society of America (SSA), and the California Governor’s Office of Emergency Management. **San Francisco, California: April 18-22, 2006.** The 100th anniversary of San Francisco’s 1906 Earthquake provides a valuable opportunity to learn from the past, assess the

present, and prepare for the future. EERI and the SSA are joining with Disaster Resistant California to focus on how communities can manage their risk through science, public policy, emergency response, and business continuity. For more information, e-mail alethea@1906eqconf.org; <http://www.1906eqconf.org/>.

Postgraduate Training Course in Study and Management of Geological Risks, CERG 2006. Sponsor: Université de Genève, Centre d'Etude des Risques Géologiques. **Geneva, Switzerland: April 24–June 16, 2006.** The objective of this course is for students to develop expertise in the field of natural risk mitigation by integrating

it into the planning of sustainable development. It offers a multidisciplinary approach in the search for solutions for a society confronted with natural risks and aims to develop experts who can advise the public and private sectors to take preventive measures to reduce the impact of natural disasters. The training is intended for geologists, geographers, geotechnicians, civil engineers, and land planners with an interest in humanitarian relief. For more information, contact *Françoise Grondahl, Université de Genève, CERG-Secrétariat, département de Minéralogie, 13 rue des Maraîchers, CH-1205 Genève, Suisse; 0041 22 379 66 02; e-mail: cerg@unige.ch; <http://www.unige.ch/hazards/>.*

Statement by IAEM President on the Hurricanes

The following statement was made by the president of the International Association of Emergency Managers (IAEM), Dewayne West, in response to Hurricanes Katrina and Rita.

As I write this, my heart is heavy watching the events and aftermath of Hurricane Katrina and the approaching Hurricane Rita. I know you all share my concerns. We are in the midst of responding to and recovering from the largest natural catastrophe to strike the United States in our lifetime. Our prayers go out to the victims and our counterparts in the affected areas. Recovery will be long and difficult.

The events that continue to unfold underscore the critical need for strong emergency management programs throughout the world. Any doubt regarding the value of the “all-hazards” approach to what we do or should be doing, has surely been erased. Historically, adequate funding and staffing has not been provided to the extent needed to address the various phases of emergency preparedness. Added to this have been guidelines and restrictions that hamper or prevent real preparedness and mitigation. This has to change if we are to prevent similar occurrences in the future.

As our populations increase and hazards become more complex and challenging, it is crucial that officials recognize the need and their responsibility for adequate funding and support at all levels of government. No longer can we have the “spare tire” syndrome applied to emergency management and expect it to perform flawlessly when disasters occur.

Without question, there will be much finger-pointing by self-made experts and Monday morning quarterbacking in days to come. Unfortunately, it has already started. However, I believe it is our responsibility as emergency management professionals to stay focused and unified in our approach and efforts to highlight the needs and value of our profession. This includes public education, training, professional standards, code enforcement, public policy, funding, mitigation, and legislation. The message is nothing new.

Our efforts must continue to include individuals, families, and communities. Public education programs must be expanded and enhanced, and citizens must be educated regarding their role and responsibility when confronted with a potential disaster. They must be trained in self-help procedures to look after themselves and their neighbors. Then government can concentrate its resources on those citizens and areas not capable of self-help.

We are also responsible for ensuring that we as emergency management professionals are trained and prepared to do our jobs. This includes training and education, professional development, and program standards. If you are not consistently upgrading your knowledge base and capabilities, if you are not proactive in your role and program development, then you need to consider another vocation. Apathy is no longer acceptable regardless of the source. Our role and responsibility is much too serious to be taken lightly.

There must be a renewed effort at all levels to accomplish these goals. If this event doesn't serve as a wake-up call to everyone, then I don't know what it will take. The word must go forth from IAEM members, our partner organizations, and anyone else who can lend support, to convince officials and policy makers that change must come. After all, is that not what we have been saying for some time now? I hope you will join me in this effort—our citizens deserve no less.

For more information about IAEM, contact *IAEM, 201 Park Washington Court, Falls Church, VA, 22046; (703) 538-1795; e-mail: info@iaem.com; <http://www.iaem.com/>.*





INTERNET PAGES

Below are new or updated Internet resources that Natural Hazards Center staff members have found to be informative and useful. Other valuable resources can be found throughout this newsletter. For a more complete list, visit <http://www.colorado.edu/hazards/resources/sites.html>.

Hurricanes and Coastal Management

<http://understandingkatrina.ssrc.org/>

The Social Science Research Council hosts this Web forum that features essays addressing the underlying political, social, and economic issues laid bare by the events surrounding Hurricane Katrina.

<http://mceer.buffalo.edu/research/Reconnaissance/Katrina8-28-05/Default.asp>

A team from the Multidisciplinary Center for Earthquake Engineering Research investigated damage to engineered structures following Hurricane Katrina. Preliminary damage reports and preliminary VIEWS (Visualizing Impacts of Earthquakes with Satellites) deployment images can be found here.

<http://ngs.woc.noaa.gov/katrina/>

http://www.digitalglobe.com/katrina_gallery.html

<http://www.globexplorer.com/disasterimages/>

<http://earth.google.com/katrina.html>

Additional satellite and aerial images of the areas affected by Hurricane Katrina are available on these Web sites.

http://www.floods.org/PDF/ASFPM_HurricaneKatrina_WhitePaper_090905.pdf

Hurricanes Katrina and Rita: Using Mitigation to Rebuild a Safer Gulf Coast, prepared by the Association of State Floodplain Managers, focuses on issues the nation needs to consider and the mitigation approaches that must be incorporated into the reconstruction of the Gulf Coast to reduce the risk of flooding and hurricanes in the future.

<http://www.census.gov/Press-Release/www/2005/katrina.htm>

<http://www.census.gov/Press-Release/www/2005/rita.htm>

These fact sheets from the U.S. Census Bureau feature links to poverty data, population and housing estimates, demographic information, transportation data, and economic information for the areas affected by Hurricanes Katrina and Rita.

<http://sis.nlm.nih.gov/enviro/hurricane.html>

The U.S. National Library of Medicine offers this new Web page, "Hurricanes: Links to Health Information, Including Toxicology and Environmental Health," for emergency response teams dealing with the aftermath of Hurricane Katrina.

<http://www.mvd.usace.army.mil/hurricane/chr.php>

This Web site features news releases, articles, images, and help hotlines related to the response of the U.S. Army Corps of Engineers to Hurricane Katrina.

<http://www-apps.niehs.nih.gov/katrina/>

This National Institute of Environmental Health Sciences (NIEHS) Web site provides useful and readily accessible environmental health information to public health, environmental health, and public safety workers and volunteers deployed to communities affected by Hurricanes Katrina and Rita. The site incorporates an interactive geographic information system.

<http://www.sciencemag.org/sciext/katrina/>

This selection of *Science* magazine articles related to hurricanes, coastal disasters, and disaster policy has been made available to aid policy makers, scientists, and the public in understanding the large-scale forces and smaller-scale scientific, social, political background of Hurricane Katrina.

<http://coastal.er.usgs.gov/hurricanes/>

U.S. Geological Survey Impact Studies for Hurricanes Katrina and Rita are available here.

<http://www.incidentnews.gov/>

This site contains information provided and approved by the unified command for specific hazardous material spill incidents. Hosted by the National Oceanic and Atmospheric Association, it contains news, photos, and other information that may be of interest to involved public, journalists, academics, nongovernmental organizations, and others. Current information concerns response to Hurricanes Katrina and Rita.

http://sciencepolicy.colorado.edu/admin/publication_files/resourse-1766-2005.36.pdf

This paper, "Hurricanes and Global Warming," reviews recent research on tropical cyclones and climate change from the perspective of event risk, vulnerability, and outcome risk and will be published in the December 2005 issue of the *Bulletin of the American Meteorological Society*.

http://www.nasa.gov/vision/earth/lookingatearth/hurricane_2005.html

This new hurricane resource from the National Aeronautics and Space Administration features a wide range of hurricane-related topics, such as hurricane basics, classroom activities, satellite images, news, and links to related resources.

<http://www.asce.org/static/hurricane/journal.cfm>

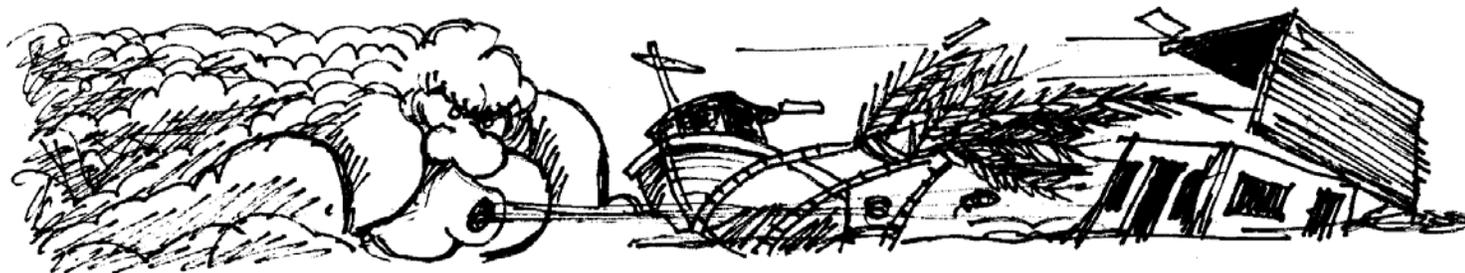
The American Society of Civil Engineers compiled this special collection of journal and magazine articles and proceedings papers related to hurricane events.

http://www.air-worldwide.com/_public/NewsData/000797/The_Coastline_at_Risk.pdf

This new report by AIR Worldwide Corporation, *The Coastline at Risk: Estimated Insured Value of Coastal Properties*, estimates that more than 35 percent of the insurance industry's property exposure in Gulf and East coast states is in coastal counties.

<http://www.csc.noaa.gov/mpass/>

The National Oceanic and Atmospheric Administration created this Web site to help marine protected area managers use social science to accomplish their goals. Specifically, this site provides basic information about social science concepts and methods and guides managers in determining the appropriate tools, such as surveys and cost-benefit analyses, to address their specific issues.



All Hazards

<http://www.gao.gov/docsearch/featured/dpr.html>

The Government Accountability Office (GAO) has posted this bibliography of its disaster-related products.

<http://www.fema.gov/fema/statedr.shtm>

Contact information for state offices and agencies of emergency management is available from this Federal Emergency Management Agency online directory.

http://www.atsdr.cdc.gov/emergency_response/common_misconceptions.pdf

"Common Misconceptions in Disasters: Panic, the 'Disaster Syndrome,' and Looting," a chapter in the book *The First 72 Hours: A Community Approach to Disaster Preparedness*, can be downloaded for free from the U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry.

<http://www2.bfrl.nist.gov/software/CET/>

This cost-effectiveness software tool developed by the National Institute of Standards and Technology helps users make straightforward and consistent comparisons of risk mitigation strategies based on established economic evaluation practices. The free software allows building owners and managers to define hazards scenarios, identify possible consequences of those scenarios, and compare combinations of strategies to mitigate those consequences.

http://www.cdc.gov/mmwr/mguide_nd.html

A new compilation of reports entitled “Natural Disasters,” has been added to the Web site of the Centers for Disease Control and Prevention’s *Morbidity and Mortality Weekly Report*. The compilation features links to previously published reports regarding the assessment of health needs and surveillance of morbidity and mortality after hurricanes, floods, and other natural disasters.

<http://www.nvrc.org/content.aspx?page=5138§ion=5>

The report *Emergency Preparedness and Emergency Communication Access: Lessons Learned Since 9/11 and Recommendations*, prepared by the Deaf and Hard of Hearing Consumer Advocacy Network and the Northern Virginia Resource Center for Deaf and Hard of Hearing Persons, is available here.

<http://www.developmentgateway.com.au/>

This Web site funded by Australia’s Overseas Aid Program provides information on disaster management, including lessons learned from previous disasters, the complex issues relating to reconstruction and resettlement postdisaster, and the challenges facing the reestablishment of economic livelihoods.

<http://www.training.fema.gov/emiweb/edu/surveys.asp>

The results of the 2005 emergency management demographics survey conducted by the International Association of Emergency Managers can be accessed from this Web site.

<http://www.readysouthtexas.gov/>

“Ready South Texas” is a public education and outreach program that teaches children and adults what to do before, during, and after critical incidents.

<http://www.asph.org/acphp/referral.cfm>

This free referral service matches the needs of state and local public health partners in terrorism and emergency response preparedness with available expertise, training, and other educational opportunities and services from the Center for Public Health Preparedness.

<http://www.emforum.org/vforum/lc050914.htm>

A transcript of the Emergency Information and Infrastructure Program Virtual Forum presentation titled “Revolution Needed in U.S. Emergency Management” is available here.

<http://www.publichealthlaw.net/Research/Affprojects.htm>

The Center for Law and the Public’s Health at Georgetown and Johns Hopkins Universities has developed several resources that provide states and territories with information, contacts, and resources to assist in the assessment of the legal issues that will arise in the implementation of the Emergency System for the Advance Registration of Volunteer Health Professionals.

<http://www.irmi.com/Expert/Articles/2005/Gould07.aspx>

This short article, “The Impact of Lifelines on the Estimation of Natural Hazard Loss,” available on the Web site of the International Risk Management Institute discusses damage of utilities and transportation networks resulting in business interruption and facility operation.

Earthquakes and Tsunamis

<http://earthquake.usgs.gov/eqinthenews/2005/usbyae/>

The U.S. Geological Survey National Earthquake Information Center report on the magnitude 7.2 earthquake near the coast of Honshu, Japan, that occurred on August 16, can be found here.

<http://pubs.usgs.gov/pp/pp1661b/>

A new U.S. Geological Survey paper *Local Tsunami Hazards in the Pacific Northwest from Cascadia Subduction Zone Earthquakes* is available here.

http://ioc.unesco.org/INDOTSUNAMI/perth05/perth05_results.htm

This Web page features a summary of the results of the First Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System held in Perth, Australia, in August and a link to the full report.

<http://www.fritzinstitute.org/>

“Lessons from the Tsunami: Top Line Findings,” an aid recipient survey based on interviews with individuals and non-governmental organizations in India and Sri Lanka, provides lessons learned and ideas about how to improve future relief.

Severe Weather, Floods, and Drought

http://www.srh.noaa.gov/fwd/school_wrkbk.pdf

This workbook, *Preparing Schools for Severe Weather*, was developed by the Fort Worth/Dallas, Texas, forecast office of the National Weather Service.

<http://training.nfipstat.com/portal2/default.asp>

New online training courses are added each year to the training station on the National Flood Insurance Program Web site. Training is available for insurance agents, stakeholders, and private citizens.

<http://www.unisdr.org/droughtnet/>

This test site developed by the United Nations Development Programme Drylands Development Center and the International Strategy for Disaster Reduction Africa is designed as a resource for drought reduction in Africa and includes discussion, lessons, and resources for planners, journalists, students, and others interested in drought and drylands issues.

Wildfire

<http://www.irsolutions.net/>

This Web site from consulting firm Integrated Resource Solutions provides information about its projects related to public and homeowner views and attitudes about wildfire, risk perceptions, and creating defensible space around homes as well as associated reports and publications.

The Congressional Research Service Takes on Katrina

The Congressional Research Service (CRS) has been quite prolific since Hurricane Katrina struck in late August. An arm of the Library of Congress, the CRS is known for its nonpartisanship and in-depth analysis, but it does not make its reports available to the public. However, it does not prevent other organizations from posting reports they find relevant. The U.S. Department of State and the Federation of American Scientists have made many Katrina and emergency management-related reports available on their Web sites at <http://fpc.state.gov/fpc/c15783.htm> and <http://www.fas.org/sgp/crs/>, respectively. Among the new and updated reports are the following:

- *Hurricanes Katrina and Rita and the Coastal Louisiana Ecosystem Restoration*, 6 pp.
- *Hurricane Katrina: The Public Health and Medical Response*, 27 pp.
- *Hurricane Katrina: DOD Disaster Response*, 19 pp.
- *Robert T. Stafford Disaster Relief and Emergency Assistance Act: Legal Requirements for Federal and State Roles in Declarations of an Emergency or a Major Disaster*, 17 pp.
- *The Use of Federal Troops for Disaster Assistance: Legal Issues*, 6 pp.
- *Hurricane Katrina: Insurance Losses and National Capacities for Financing Disaster Risk*, 23 pp.
- *The Macroeconomic Effects of Hurricane Katrina*, 6 pp.
- *Hurricane Katrina: Stafford Act Authorities and Actions by Governor Blanco and President Bush to Trigger Them*, 25 pp.
- *Organization and Mission of the Emergency Preparedness and Response Directorate: Issues and Options for the 109th Congress*, 68 pp.
- *New Orleans Levees and Floodwalls: Hurricane Damage Protection*, 6 pp.
- *Disaster Evacuation and Displacement Policy: Issues for Congress*, 6 pp.
- *Federal Disaster Recovery Programs: Brief Summaries*, 13 pp.
- *Federal Stafford Act Disaster Assistance: Presidential Declarations, Eligible Activities, and Funding*, 12 pp.
- *Emergency Communications: The Emergency Alert System (EAS) and All-Hazard Warnings*, 19 pp.

ICC Hurricane Preparedness Kit Distributed to Congress

At the beginning of this year's hurricane season, The International Code Council (ICC) distributed Hurricane Preparedness Kits to congressional representatives from hurricane-prone regions. Designed to aid members of Congress and their constituents in preparing for the impact of a hurricane and dealing with the aftermath, the kits feature a compilation of materials from the ICC, the Federal Emergency Management Agency, and the American Red Cross, among others. Download a free copy of the kit at <http://www.iccsafe.org/government/pdf/HurricaneKit.pdf>. Direct questions to *Chrissy Lebo*, ICC Congressional Relations; (703) 931-4533 x6243; e-mail: congress@iccsafe.org.



CONTRACTS AND GRANTS

Below are descriptions of recently awarded contracts and grants related to hazards and disasters. An inventory of awards from 1995 to the present is available at <http://www.colorado.edu/hazards/resources/grants/>.

Development of Performance Based Tsunami Engineering (PBTE). Funding Institution: National Science Foundation, four years. Principal Investigators: *H. Ronald Riggs (Solomon Yim, Ian Robertson, Kwok Cheung, Yin Lu (Julie) Young)*, Department of Civil and Environmental Engineering, University of Hawaii at Manoa, 2540 Dole Street, Holmes 384, Honolulu, Hawaii 96822; (808) 956-6566; e-mail: riggs@hawaii.edu.

In the event of a tsunami, horizontal evacuation is often not possible due to the potential local source of the tsunami or the number of people to be evacuated. It is essential that existing buildings, or new emergency centers, be evaluated or designed for vertical evacuation. However, there has been a lack of research on the effect of tsunami waves on coastal infrastructure such as buildings, bridges, and harbor facilities. Furthermore, design guidelines are lacking. To overcome this deficiency, this research will develop the methodology and tools for implementation of site specific Performance Based Tsunami Engineering for use in the analysis, evaluation, design, and retrofit of coastal structures and facilities.

Social, Economic, and Physical Effects of a Natural Disaster. Funding Institution: National Science Foundation, three years. Principal Investigators: *Elizabeth Frankenberg (Duncan Thomas, Thomas Gillespie, Bondan Sikoki)*, Department of Sociology, University of California-Los Angeles, 264 Haines Hall, Box 951551, Los Angeles, CA 90095-1551; (310) 267-4967; e-mail: efranken@soc.ucla.edu.

Drawing on demography, economics, geography, public health, and sociology, this project will study the degree of the shock associated with the December 2004 Indian Ocean tsunami, the pace and shape of the recovery process, and the roles that institutions play in helping or hindering the recovery process. Investigators will collect data on and analyze an array of environmental, social, economic, and health indicators to develop new insights into how individuals, households, and communities fare in the aftermath of a disaster. The project will document immediate- and medium-term consequences for mortality, family disruption and relocation, physical and mental health, economic resources and opportunities, housing stock and physical infrastructure, and the physical envi-

ronment. In addition, it will trace the reconstruction of lives and livelihoods, paying particular attention to the roles of social and economic resources prior to the disaster as well as kinship and social networks, community resilience, and receipt and leveraging of external aid. Finally, the research will identify the characteristics of individuals, households, and communities that are associated with mitigating the consequences of the shock on the broad array of indicators of well-being.

The Sri Lankan Tsunami: Societal Resilience in Two Coastal Regions. Funding Institution: National Science Foundation, 18 months. Principal Investigator: *Dennis McGilvray (Michele Gamburd, Randall Kuhn)*, University of Colorado at Boulder, 233 UCB, Boulder, CO 80309-0233; (303) 492-7198; e-mail: dennis.mcgilvray@colorado.edu.

This project compares two culturally, linguistically, and historically different coastal regions of Sri Lanka that were both very badly damaged by the 2004 Indian Ocean tsunami. By looking at subregional differences in tsunami recovery efforts within a single nation-state such as Sri Lanka, it will be possible to distinguish the cultural components from the larger political, economic, and environmental dimensions of the posttsunami situation. Increasing the understanding of the role of local cultural factors in disaster recovery will provide useful information for future global disaster planning and recovery efforts.

Quantifying Early Indicators of Global Climate Change. Funding Institution: National Science Foundation, one year. Principal Investigator: *Diane Debinski*, Iowa State University, 249 Bessey Hall, Ames, IA 50011; (515) 294-2460; e-mail: debinski@iastate.edu.

One of the voids remaining in the scientific understanding of global climate change is the relationship between climate change and the resulting changes expected in ecological communities. Because a large part of North America has been modified by human activities, it is difficult to assess whether ecological changes are being caused by human activities or climate change. Thus, we must look to landscapes where the modification has been less severe. One area in North America where scientists can still study natural processes is that of the Greater Yellow-

stone Ecosystem. Through this research, the investigator aims to provide an early warning system for assessing the effects of climate change with the understanding that documenting changes in montane meadows will assist in understanding how climate change may affect more highly managed areas of the globe.

Tsunami Hazards: Social Cognitive Modeling of Preparedness and Effectiveness of Warnings. Funding Institution: National Science Foundation, three years. Principal Investigators: *Bruce Houghton (Duane Gill), Department of Geology and Geophysics, University of Hawaii at Manoa, 2525 Correa Road, Honolulu, HI 96822; (808) 956-2561; e-mail: bhought@soest.hawaii.edu.*

This project will create a tsunami preparedness model to be used as a decision-making tool by scientists and emergency managers who disseminate risk information. The model will assist intervention planning and assess the effectiveness of outreach programs in preparing at-risk communities in the United States for tsunamis. By examining the basic mental and organizational processes underlying the public's evaluation of risk information and their decision making in the face of change, the research will create a capability to predict the factors that aid and hinder the adoption of protective measures for tsunamis and help guide future education initiatives aimed at strengthening community resilience to tsunami effects.

Building an Interdisciplinary Study of Resilience. Funding Institution: National Science Foundation, two years. Principal Investigators: *Patricia Longstaff (Shiu-Kai Chin, Susan Older), Syracuse University, 215 University Place, Syracuse, NY 13244; (315) 443-3854; e-mail: phlongst@syr.edu.*

Resilience, the ability of a system to bounce back from a "surprise," is a concept fundamental to a variety of disciplines and fields. Scholars from five of these disciplines—ecology, human immunology, human development, computer science, and law/policy—who are interested and experienced in the study of resilience will participate in a collaboration to identify common themes. As a result of this project, new insights in the understanding of resilience will be obtained. Long-term outcomes of this effort will be applicable to critical national goals such as preparing our nation and local communities for terrorist attacks and natural disasters. This project is the beginning of a long-term collaborative effort in resilience with a goal of developing multidisciplinary education on how systems can be managed to improve their ability to bounce back.

"Bio-Safety" or "Bio-Hazard"? Organizational Pursuit and Community Response to a Safety and Preparedness Initiative. Funding Institution: National Science Foundation, two years, \$200,000. Principal Investigator: *Thomas D. Beamish, University of California–Davis, Department of Sociology, One Shields Avenue, Davis, CA 95616; (530) 754-6897; email: tdbeamish@ucdavis.edu.*

This study will investigate community response to the proposed installation of federally funded National Biocontainment Laboratories (NBL) in three U.S. communities. In each case, reputable universities with mature medical

facilities and strong reputations in related fields of study responded to a National Institutes of Health request for proposal to sponsor and manage an NBL for the federal government. Yet, a remarkable range of reactions—strong opposition, growing opposition, and no significant opposition—highlights the importance of understanding variable response to programs ostensibly intended to minimize risk and increase public security and preparedness. The project will rely on a multimethod approach involving in-depth interviews, field study, media analysis, and archival records to draw conclusions.

Exploratory Research on Sensor Based Infrastructure for Early Tsunami Detection. Funding Institution: National Science Foundation, one year. Principal Investigator(s): *Daniel Mossé (Taieb Znati, Louise K. Comfort), Department of Computer Science, University of Pittsburgh, 6423 Sennott Square, Pittsburgh, PA 15260; (412) 624-8923; e-mail: mosse@cs.pitt.edu.*

This project brings together experts from the information technology and disaster management communities to focus on the early and accurate detection of potential tsunami threats. It will identify and examine issues related to the development of a fully integrated sociotechnical solution for early detection of tsunamis and related threats in South Asia. The primary outcome will be a research design for a feasible, low-cost system for early detection with corroborating information from seismic movement in land-based infrastructure systems.

Intergovernmental Challenges of Homeland Security: Explaining Local Government Preparedness Efforts. Funding Institution: National Science Foundation, two years. Principal Investigator: *Brian J. Gerber, Texas Tech University, MS1015, Lubbock, TX 79409; (806) 742-3121; e-mail: brian.gerber@ttu.edu.*

This project will examine local governments' preparedness efforts in implementing homeland security policies. It will address what factors determine effective hazards management policy in a federal system where, very often, the policy making incentives facing national, state, and local governments diverge. The expectation for this project is that it will identify a specific set of causal factors that explain hazard management preparedness at the local government level generally, and homeland security activities specifically.

Coupling Human and Natural Influences on Coastline Evolution as Climate Changes. Funding Institution: National Science Foundation, five years. Principal Investigators: *Brad Murray (Thomas Crowley, Michael Orbach, Joseph Ramus, Martin Smith), Duke University, Box 90230, Durham, NC 27708-0230; (919) 681-5069; e-mail: abmurray@duke.edu.*

Sandy coastlines, such as the U.S. Southeast and Gulf coasts, are constantly shifted and reshaped as waves move sand from one location to another. Research into how such coastlines evolve over spatial scales of kilometers to hundreds of kilometers and over time scales of decades and longer has just begun. Human efforts to stabilize shorelines, localized manipulations that likely affect entire

coastlines, are becoming increasingly prevalent. This research project will incorporate human manipulations into an enhanced computer model of large-scale, long-term coastline change caused by wave-driven sediment transport. Experiments using the coupled human-coastline model will provide the first examination of how human-influenced coastlines evolve, and more specifically, how actions taken at one location are likely to affect other coastal communities.

Field Surveys of the 2004 Tsunami in the Western Indian Ocean. Funding Institution: National Science Foundation, one year. *Principal Investigator: Emile A. Okal, Northwestern University, Evanston, IL 60208-2150; (847) 491-3238; e-mail: emile@earth.northwestern.edu.*

With this funding, the researcher will conduct a quantitative survey of the run-up and inundation of the 2004 Indian Ocean tsunami on the western shores of the Indian Ocean, specifically along Madagascar and Oman. This work will complement the work of various international tsunami teams around the Bay of Bengal, in Somalia, and on the islands of Reunion, Mauritius, and Rodrigues.

Analysis of Transport, Mixing, and Coherent Structures in Hurricane Intensity. Funding Institution: National Science Foundation, four years. *Principal Investigators: Michael Montgomery (Michael Kirby), Colorado State University, Department of Atmospheric Science, Fort Collins, CO 80523-1371; (970) 491-8355; e-mail: MTM@chandra.atmos.colostate.edu.*

This project studies hurricane dynamics with an emphasis on processes that affect the intensity of the tropical cyclone by mixing in moist air or dry air from different sources. It is anticipated that the results of this theoretical work will help in the design of future field experiments, contribute to a better understanding of the processes responsible for fluctuations in hurricane intensity, and provide a basis for better predictions of hurricane intensity.

Integrated Analysis of Robustness in Dynamic Social Ecological Systems. Funding Institution: National Science Foundation, three and a half years. *Principal Investigators: John Anderies (Armando Rodriguez, Ann Kinzig, Marco Janssen, Charles Perrings), Arizona State University, School of Life Sciences, PO Box 874501, Tempe AZ 85287-4501; (480) 965-6518; e-mail: marty.anderies@asu.edu.*

Many societies have endured for long periods, successfully coping with uncertainty, disturbance, and change in the environment. Many other societies have failed in this regard. The core question in this interdisciplinary project is why some social-ecological systems are more successful in dealing with disturbances and change in the environment than others. The investigators hypothesize that an important factor is a well-known phenomenon in engineering: a system cannot be robust to all classes of disturbances. Thus, in developing mechanisms to address an existing suite of uncertainties and environmental risks, society necessarily becomes vulnerable to other classes of disturbances. The research team will employ methods and insights from applied mathematics, electrical engineering

(control), resource economics, archaeology, and ecology to develop an integrated approach to study how societies deal with uncertainty, disturbance, and change.

Citizen Centric Analysis of Anti/Counter-Terrorism e-Government Services. Funding Institution: National Science Foundation, one year. *Principal Investigator: H. Raghav Rao, University at Buffalo School of Management, 325G Jacobs Management Center, Buffalo, NY 14260; (716) 645-3425; e-mail: mgmtrao@acsu.buffalo.edu.*

Although a large research effort has been directed toward improving the internal efficiency and interoperability of anti/counterterrorism (ACT) authorities, only a handful of studies have looked at citizens as an integral part of ACT services. This research will look at ACT services from a citizen-centric perspective and aims to enhance e-government services that help citizens prepare and protect themselves from terrorist attacks. By surveying U.S. citizens and subscribers of the Terrorism Research Center, an ACT service provider, the investigator plans to answer questions related to citizen attitudes about ACT services, the improvement of citizen-to-government ACT information flow using e-Gov facilities, preferences for traditional channels for ACT services versus Internet ACT capabilities, and preferences for nongovernmental versus governmental service providers.

NSF Engineering Awards Money for Katrina Research

The following projects were awarded grants from the National Science Foundation's Directorate for Engineering in the wake of Hurricane Katrina. Awards from the Human and Social Dynamics priority area of the Directorate for Social, Behavioral, and Economic Sciences will be announced in a future *Observer*. Find out more about these awards at <http://www.nsf.gov/awardsearch/>.

Civil and Mechanical Systems

Assessment of Damage to Industrial Facilities and the Resultant Environmental Contamination in New Orleans and the Gulf Coast, \$29,990, Rae Zimmerman, New York University

Assessment of Damage to Underground Tanks in New Orleans in the Aftermath of Hurricane Katrina, \$13,999, Vijaya Gopu, Tulane University

Collection of Economic Impact Data: Implications for Disaster Areas and Receiving Regions, \$29,881, Jamie Kruse, East Carolina University

Collection of Perishable Data on Woodframe Residential Structures in the Wake of Hurricane Katrina, \$15,000, John van de Lindt, Colorado State University

Damage Survey from Hurricane Katrina, \$13,266, Ian Robertson, University of Hawaii

Digital Technology Enhanced Collection of Perishable Hurricane Damage Data, \$28,000, David Frost, Georgia Institute of Technology

Disaster Preparedness and the Use of the Incident Command System for Responding to Hurricane Katrina, \$12,200, David Neal, Oklahoma State University

Electric Utility Damage from Hurricane Katrina, \$9,719, Dorothy Reed, University of Washington

Emergency Response and the Impact of Hurricane Katrina on Texas Public Schools, \$5,909, Kenneth Meier, Texas A&M University

Estimating Damage to Urban Buried Infrastructure in the Aftermath of Hurricane Katrina, \$20,000, Erez Allouche, Louisiana Tech University

Factors Associated with Compliance to Katrina Mandatory Hurricane Evacuation Orders in Seven Louisiana Parishes, \$28,000, Bimal Paul, Kansas State University

How Soon is Soon Enough? Understanding National Public Perception of the Need to Act on Very Long Term Threats as a Result of Hurricane Katrina, \$29,972, Jack Kartz, University of Southern Maine

Hurricane Katrina—Documenting Damage to Multistory Commercial Structures along the Gulf Coast Using Rotary-Wing Unmanned Aerial Vehicles, \$29,453, Robin Murphy, University of South Florida

Hurricane Katrina Debris Removal Operations: The Role of Communication and Computing Technologies, \$14,591, David Mendonça, New Jersey Institute of Technology

Hurricane Katrina and Lessons for Responding and Repairing Catastrophic Levee Failures Applicable to Other Similarly Threatened Areas in the U.S., \$29,729, Raymond Seed, University of California–Berkeley

Identification of Structural Damage in Tanks and Industrial Facilities Due to Hurricane Katrina, \$20,000, Luis Godoy, University of Puerto Rico–Mayagüez

Impacts of Hurricane Katrina Storm Surge on the Human and Built Environments, Marc Levitan, \$29,988, Louisiana State University

Performance of Glass/Cladding of High-Rise Buildings in Hurricane Katrina and Its Impact on the Viability of Vertical Evacuation, \$15,000, Ahsan Kareem, University of Notre Dame

Electrical and Communications Systems

Damage Assessment of Power Infrastructure for Distribution, Telecommunications, and Back-Up, \$30,000, Patrick Chapman, University of Illinois at Urbana-Champaign

Data Collection following Katrina: Interdependencies across Time, Space, and Subsystems Characterizing Bulk Energy Transportation, \$21,756, James McCalley, Iowa State University

Data Collection for Estimating Disruption and Its Causes of Power Quality by Hurricane Katrina, \$29,990, Bei Gou, University of Texas at Arlington

Hurricane Katrina Power and Telecommunication System Failure Modes, \$30,000, Robert Henry, University of Louisiana at Lafayette

Mapping the Coverage Islands of Wireless Base Stations, \$30,000, Prasun Sinha, Ohio State University

Measurements and Learning for Network Damage Assessment, \$30,000, Chuanyi Ji, Georgia Institute of Technology

Robotic Assessment of Incipient Faults in Underground Cable Systems, \$30,000, Alexander Mamishev, University of Washington

Bioengineering and Environmental Systems

Bioaerosol Exposure Hazard Assessment to Emergency Response and Reclamation Personnel, \$30,000, Mark Hernandez, University of Colorado at Boulder

Decontamination of Flood Waters through Modified Fenton's Reaction, \$15,000, Vishal Shah, Dowling College

Isolation and Characterization of Dissolved Organic Matter in Katrina Flood Waters in New Orleans, \$14,700, Robert Cook, Louisiana State

Development of a Novel Membrane Process for the Immediate Production of Drinking Water from Varying Quality Aqueous Sources, \$10,000, Sudipta Seal, University of Central Florida

Ecotoxicological and Functional Genomic Responses of Killifish in the Aftermath of Hurricane Katrina, \$29,870, Andrew Whitehead, Louisiana State University

Impacts of Hurricane Katrina on Water Quality and Bacterial Communities in Southeastern Louisiana, \$22,517, Michael LaMontagne, McNeese State University

Isolation and Characterization of Dissolved Organic Matter in Katrina Flood Waters in New Orleans, \$14,700, Robert Cook, Louisiana State University

Rapid Assessment Techniques in Support of Soil/Sediment Removal Strategies for Katrina Cleanup, \$19,700, James Ranville, Colorado School of Mines





RECENT PUBLICATIONS

Below are brief descriptions of some recent publications on hazards and disasters received by the Natural Hazards Center. Many of these publications are available through local and online booksellers, but information on how to obtain copies directly is also provided.

All Hazards

What Is a Disaster? New Answers to Old Questions. Ronald W. Perry and E.L. Quarantelli, editors. ISBN 1-4134-7985-5. 2005. 442 pp. \$24.99. Available from Xlibris Publishers, International Plaza II, Suite 340, Philadelphia, PA 19113; (888) 795-4274; e-mail: Orders@Xlibris.com; <http://www.Xlibris.com/>.

This book addresses the most basic question in the disaster field: that of defining the phenomenon of study. For theoretical advancement, it is important that researchers begin to develop a consensus about the meaning of disasters and related phenomena. With the rise in international terrorism, one must clarify whether these events are disasters and, if so, what kind of disasters. Similarly, in addition to natural disasters, should riots, explosions, nuclear power plant accidents, dam collapses, and land subsidence be included under the same conceptual umbrella? What practical and theoretical differences does it make if the same label is used or not used for such different situations? The editors have brought together 12 social scientists representing eight disciplines and seven countries to share their definition and vision of disasters. In the process, a wide range of views are expressed and issues raised regarding the relationship of academic versus practical definitions, the impact of grouping types of disasters in different ways, and the epistemologies on which theoretical growth should rest. The book concludes with discussions of the theoretical framework of disaster research and an agenda for disaster research in the twenty-first century.

World Disasters Report: Focus on Information in Disasters. International Federation of Red Cross and Red Crescent Societies. ISBN 92-9139-109-3. 2005. 246 pp. \$30.00. Available from Kumarian Press, 1294 Blue Hills Avenue, Bloomfield, CT 06002; (860) 243-2098; e-mail: kpbooks@kpbooks.com; <http://www.kpbooks.com/>.

Published annually since 1993, this report brings together the latest trends, facts, and analysis of contemporary crises, whether natural or human-made, quick-onset or chronic. Recognizing that information bestows power and lack of information can make people victims of disaster, this edition focuses on information and calls on agencies to focus less on gathering information for their own needs and more on exchanging information with the people they seek to support.

Hazard & Risk Science Review 2005. 2005. 39 pp. Available free online from the Benfield Hazard Research Centre, Department of Earth Sciences, University College London, 136 Gower Street, London, WC1E 6BT UK; +44 (0)20 7679 3637; e-mail: info@benfieldhrc.org; http://www.benfieldhrc.org/activities/hrsr/h&rsr_2005/.

The exposures faced by the world's insurance markets to natural catastrophes were highlighted again in 2004. The Pacific typhoons and severe hurricane damage across much of Florida, the southeast United States, and Caribbean caused insured catastrophe losses of more than \$35 billion. These losses, followed by the devastating tsunami in Asia and further damage most recently from Hurricane Katrina in the United States, reaffirmed the ongoing need for the industry to understand and analyze natural and environmental

risks in order to develop appropriate insurance and reinsurance solutions. This publication provides a digest of over 60 scientific papers published during the last 12 months of relevance to the insurance market, focusing on the four major hazard areas: atmospheric, geological, hydrological, and climate change.

Are You Ready? What Lawyers Need to Know about Emergency Preparedness and Disaster Recovery. American Bar Association. 2005. DVD. \$35.00. Available from Public Entity Risk Institute, 11350 Random Hills Road, Suite 210, Fairfax, VA 22030; (703) 352-1846; <http://www.riskinstitute.org/>.

This documentary-style DVD describes simple but effective ways lawyers can help prepare their communities and the nation for the effects of natural and human-made disasters. Designed for an audience of local government attorneys, risk managers, or anyone else who needs to know how the law affects disaster preparedness and response, it aims to enhance pre-event emergency planning and increase awareness of the legal resources that are available to aid in planning for and coping with disaster. A 98-page coursebook accompanies the DVD.

Policymaking for Critical Infrastructure: A Case Study on Strategic Interventions in Public Safety Telecommunications. Gordon A. Gow. ISBN 0-7546-4345-X. 2005. 212 pp. \$94.95. Available from Ashgate Publishing, PO Box 2225, Williston, VT 05495-2225; (802) 862-0095, (800) 535-9544; e-mail: orders@ashgate.com; <http://www.ashgate.com/>.

This book represents an effort to weave together developments in the field of disaster management with an approach known as Constructive Technology Assessment to help bridge the gap between scholarly research in science and technology and the practical and pressing concerns of policy makers working in disaster mitigation and critical infrastructure protection. The essential argument is that well-founded public policy must be based on an understanding of the social roots of risk and vulnerability in large technical systems and that this understanding must come from studying how these systems grow and change as sociotechnical entities.

Natural Disasters and Extreme Events in Agriculture. M.V.K. Sivakumar, R.P. Motha, and H.P. Das, editors. ISBN 3-540-22490-4. 2005. 368 pp. \$169.00. Available from Springer New York, PO Box 2485, Secaucus, NJ 07094-2485; (212) 460-1500, (800) 777-4643; e-mail: service-ny@springer-sbm.com; <http://www.springeronline.com/>.

Agricultural production is highly dependent on weather, climate, and water availability and is adversely affected by the weather and climate-related disasters. Droughts and natural disasters such as floods can result in crop failures, food insecurity, famine, loss of property and life, mass migration, and negative national economic growth. These disastrous effects can be reduced considerably through proper planning and effective preparation. Vulnerability can be controlled to some extent by accurate and timely prediction and by taking counter-measures to reduce their impacts on agriculture. Based on an expert meeting held in Beijing, China, this book may be

of interest to organizations involved in disaster reduction and mitigation of extreme events.

Severe Weather, Floods, and Dams

Hurricanes and Typhoons: Past, Present, and Future. Richard J. Murnane and Kam-Biu Liu, editors. ISBN 0-231-12388-4. 2005. 464 pp. \$89.50. Available from Columbia University Press Order Department, 136 South Broadway, Irvington, NY 10533; (914) 591-9111, (800) 944-8648; <http://www.columbia.edu/cu/cup/>.

This book surveys the past, present, and potential future variability of hurricanes and typhoons on a variety of timescales using newly developed approaches based on geological and archival records, in addition to more traditional approaches based on the analysis of the historical record of tropical cyclone tracks. It also provides an overview of the developing field of paleotempestology, which uses geological, biological, and documentary evidence to reconstruct prehistoric changes in hurricane landfall. The audience for this book includes tropical meteorologists, geologists, and climatologists as well as members of the catastrophe reinsurance industry, graduate students in meteorology, and public employees active in planning and emergency management.

Economics and the Wind. Bradley T. Ewing, Jerry S. Rawls, and Jamie B. Kruse, editors. ISBN 1-59454-280-5. 2005. 187 pp. \$89.00. Available from Nova Science Publishers, 400 Oser Avenue, Suite 1600, Hauppauge, NY 11788; (631) 231-7269; e-mail: novascience@earthlink.net; <http://www.novapublishers.com/>.

Wind events such as tornadoes, hurricanes, and cyclones affect regional economies, individual households and businesses, and entire industries. Consequently, it is important to understand the impact that wind has on the markets in which businesses and people interact. This book examines the economic issues surrounding wind-related disasters. Contributors include social scientists, economists, risk management and insurance specialists, and civil engineers from around the world.

Reducing Flood Losses: Is the 1% Chance Flood Standard Sufficient? 2005. 69 pp. Available free online (along with background issues papers) from the Association of State Floodplain Managers, 2809 Fish Hatchery Road, Madison, WI 53713; (608) 274-0123; e-mail: asfpm@floods.org; <http://www.floods.org/Foundation/Forum.asp>.

This report of the 2004 Assembly of the Gilbert F. White National Flood Policy Forum addresses the question of the sufficiency of the 1% annual chance flood standard, which is the basis for most flood loss reduction programs today. It summarizes forum discussions about the standard's applicability in increasingly complex situations, whether today's science can provide a better approach, and what counterproductive impacts may have ensued during the years of the standard's implementation. It also provides options for the future and an agenda for action.

The Future of Large Dams: Dealing with Social, Environmental, Institutional, and Political Costs. Thayer Scudder. ISBN 1-84407-155-3. 2005. 432 pp. £45.00. Available from Earthscan, 8-12 Camden High Street, London NW1 0JH, UK; +44 (0)20 7387 8558; e-mail: earthinfo@earthscan.co.uk; <http://www.earthscan.co.uk/>.

Viewed by some as symbols of progress and by others as inherently flawed, large dams remain one of the most contentious development issues on Earth. Building on the work of the now defunct World Commission on Dams, the author enters the debate by examining the impacts of large dams on ecosystems, societies, and political economies. He also analyses the structure of the decision-making process for water resource development and tackles the highly contentious issue of dam-induced resettlement, illuminated by a statistical analysis of 50 cases.

Earthquakes and Tsunamis

Putting Down Roots in Earthquake Country: Your Handbook for the San Francisco Bay Region. ISBN 1-411-30541-8. 2005. 32 pp. Free. Available from the U.S. Geological Survey Information Ser-

vices, Box 25286, Denver, CO 80225; (888) 275-8747; <http://pubs.usgs.gov/gip/2005/15/>. A copy can also be requested from the American Red Cross Bay Area Chapter at (510) 595-4459.

This handbook provides information about the threat posed by earthquakes in the San Francisco Bay region and explains how individuals can prepare for, survive, and recover from these inevitable events. For people who live or work in the region, it explains why they should be concerned with earthquakes, what they can expect during and after a quake, and what they need to do beforehand to be safe and reduce damage.

Keeping Schools Safe in Earthquakes. ISBN 9264016694. 2004. 244 pp. \$50.00. Available free online from the Organisation for Economic Co-operation and Development (OECD) Distribution Center, Extenza-Turpin, 56 Industrial Park Drive, Pembroke, MA 02359; (800) 456-6323; e-mail: oechna@extenza-turpin.com; <http://www.oecd.org/edu/schoolsafety/>.

This report is the product of an ad hoc experts' meeting on earthquake safety in schools. The expert knowledge, opinions, and experiences presented here provide insight into the nature and scope of the problems involved in protecting school buildings and their occupants. An accompanying document, ***OECD Recommendation Concerning Earthquake Safety in Schools*** (2005, 7 pp.), is also available free online.

Tsunamis: Case Studies and Recent Developments. Kenji Satake, editor. *Advances in Natural and Technological Hazards Research* 23. ISBN 1-4020-3326-5. 2005. 343 pp. \$149.00. Available from Springer New York, PO Box 2485, Secaucus, NJ 07094-2485; (212) 460-1500, (800) 777-4643; e-mail: service-ny@springer-sbm.com; <http://www.springeronline.com/>.

Twenty papers comprise this review of tsunami research, which includes various approaches to studying tsunamis: field-surveys of recent tsunamis; analysis of tide-gauge records; numerical simulations of tsunami generation and propagation; tank experiments; and geological studies of tsunami deposits. The first part of the book reports on tsunamis generated by volcanic eruptions and earthquakes around the Pacific Ocean. The second part reports on recent developments in numerical computations, monitoring, and assessments of coastal hazards.

Volcanoes

Ecological Responses to the 1980 Eruption of Mount St. Helens. Virginia H. Dale, Frederick J. Swanson, and Charles M. Crisafulli, editors. ISBN 0-387-23850-6. 2005. 348 pp. \$39.95. Available from Springer New York, PO Box 2485, Secaucus, NJ 07094-2485; (212) 460-1500, (800) 777-4643; e-mail: service-ny@springer-sbm.com; <http://www.springeronline.com/>.

The eruption of Mount St. Helens on May 18, 1980, had a momentous impact on fungal, plant, animal, and human life from the mountain to the far reaches of the ash cloud and mudflows. Although it caused substantial loss of life and property, it also created a unique opportunity to examine a huge disturbance of natural systems and their subsequent responses. Lessons from the volcano inform our larger understanding of ecosystem disturbances, natural processes, and the impact of land use practices. This book synthesizes the ecological research that has been conducted in the twenty-five years since the eruption.

Climate Change

Climate Crash: Abrupt Climate Change and What it Means for Our Future. John D. Cox. ISBN 0-309-09312-0. 2005. 224 pp. \$27.95. Published by Joseph Henry Press. Available from the National Academies Press, 500 Fifth Street NW, Lockbox 285, Washington, DC 20055; (202) 334-3313, (888) 624-8373; <http://www.nap.edu/>.

As scientists search for clues about the history of Earth's climate, they are discovering that alterations in climate can happen quickly and dramatically. While this new paradigm represents a significant shift in the picture of Earth's past, the real question is what it means for the future. This book seeks to answer questions about the mechanisms that might trigger a significant climate

change, how the change might manifest itself, and when a change is likely to happen.

Global Warming: Myth or Reality? The Erring Ways of Climatology. Marcel Leroux. ISBN 3-540-23909-X. 2005. 510 pp. \$129.00. Available from Springer New York, PO Box 2485, Secaucus, NJ 07094-2485; (212) 460-1500, (800) 777-4643; e-mail: service-ny@springer-sbm.com; <http://www.springeronline.com/>.

In the global warming debate, definitive answers to questions about ultimate causes and effects remain elusive. This author seeks to separate fact from fiction in this critical debate from a climatological perspective. Beginning with a review of the dire hypotheses for climate trends, the author describes the history of the 1998 Intergovernmental Panel on Climate Change (IPCC) and subsequent conferences. He discusses the main conclusions of the three IPCC reports and the predicted impact on global temperatures, rainfall, weather, and climate, while highlighting the mounting confusion and sensationalism of reports in the media. He also postulates alternate causes of climate change; analyzes the trends for global temperatures, rainfall patterns, and sea level; and questions whether warming may be considered a benefit in some regions. Finally, he suggests a number of priorities to help climatologists better understand processes of climate change, integrate them into climate models, and accurately predict future changes in climate.

Weather Catastrophes and Climate Change: Is There Still Hope for Us? ISBN 3-937624-81-3, Order number 302-04221. 2005. 264 pp. 29.90 €. Available from Münchener Rückversicherungs-Gesellschaft (Munich Re), Königstrasse 107, 80802 München, Germany; +49 (0) 89/3891-5291; <http://www.munichre.com/>.

This book is a collection of essays from 22 leading experts that presents a comprehensive review of current climate change knowledge. The essays shed light on the causes, effects, and interrelations of global climate development from a variety of perspectives. There is a wide range of topics, including climate history, El Niño, and modern climate models. The book also discusses the potential options for political and social action and spells out the opportunities and risks for the insurance industry.

Health

Use of Former (Shuttered Hospitals) to Expand Surge Capacity: Requirements for Reopening a Shuttered Hospital in an Emergency and Suggestions for Meeting These Requirements. 2005. 208 pp. Available free online from the Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850; (301) 427-1364; <http://www.ahrq.gov/research/shuttered/>.

This report from the Agency for Healthcare Research and Quality offers some important, timely information for emergency responders and public health officials charged with opening shuttered hospitals to respond to the crisis created by Hurricane Katrina and other disasters. Areas of discussion include management teams, facilities, staffing, security, equipment and supplies, and patient transport. A 38-page "Surge Toolkit" and a 99-page "Facility Checklist" are also available.

Management of Public Health Emergencies—A Resource Guide for Physicians and Other Community Responders. 2005. CD-ROM. Free. Available from Jim Lyznicki, American Medical Association Center for Public Health Preparedness and Disaster Response; (312) 464-4520; e-mail: disastercd@ama-assn.org; <http://www.ama-assn.org/ama/pub/category/6206.html>.

In this era of increased threats of terrorism and other catastrophic emergencies, all health care professionals need to become more proficient in disaster response and the management of mass casualties. This compilation of Web- and computer-based resources is designed as a quick and easy reference tool. Featuring timely information, and including more than 1,000 links to useful resources, the guide will better prepare health care professionals to meet the health and mental health needs of children and adults affected by natural disasters, terrorism, and other catastrophic events; participate in hospital, community, and family emergency planning and response efforts; and locate relevant education and training opportunities.

Homeland Security

Frameworks for Higher Education in Homeland Security. ISBN 0-309-09295-7. 2005. 78 pp. \$18.00. Available free online from the National Academies Press, 500 Fifth Street NW, Box 285, Washington, DC 20055; (202) 334-3313, (800) 624-6242; <http://books.nap.edu/catalog/11141.html>.

After the events of September 11, 2001, the U.S. academic community responded with an outpouring of course offerings, concentrations, certificates, and degree programs for students wishing to further their knowledge of homeland security. This occurred without any apparent guidance, direction, or input at the national level. To consider what, if any, national imperative should drive such offerings and programs, the National Academies' Policy and Global Affairs Division convened a committee to discuss whether there are core pedagogical and skill-based program needs; examine current and proposed programs; comment on possible parallels between homeland security, area studies, international relations, and science policy; and suggest potential curricula needs. This report presents the committee's findings and serves as a preliminary analysis of educational issues in homeland security.

Homeland Security: A Complete Guide to Understanding, Preventing, and Surviving Terrorism. Mark A. Sauter and James Jay Carafano. ISBN 0-07-144064-X. 2005. 556 pp. \$69.95. Available from The McGraw-Hill Companies, Order Services, PO Box 182604, Columbus, OH 43272-3031; (877) 833-5524; e-mail: pbj.ecommerce_custserv@mcgraw-hill.com; <http://books.mcgraw-hill.com/>.

This textbook provides a practical foundation in homeland security for professionals, students, and concerned citizens alike. Designed for readers who need to understand both the big picture and their own roles in the war against terrorism, the book provides an overview of an increasingly complex and misunderstood topic. Filled with real-life examples and tips, this resource covers the basics of homeland security, such as national strategies and principles; federal, state and local roles; terrorist history and tactics; cyberterrorism; business preparedness; critical infrastructure protection; weapons of mass destruction; and key policy issues. Each chapter includes an overview, learning objectives, source document, discussion topic, summary, and quiz.

GAO Reports

The Government Accountability Office (GAO) reports provide background information and insight into key issues and concerns of the U.S. Congress. The office frequently publishes studies regarding hazards and disaster policy. Some recent GAO reports and testimonies that might interest *Observer* readers are listed below. Summaries and full text are available on the Web at <http://www.gao.gov/>. Printed copies are also available. The first copy is free. Additional copies are \$2.00 each. To order, contact the GAO, 441 G Street NW, Room LM, Washington, DC 20548; (202) 512-6000; TDD: (202) 512-2537; <http://www.gao.gov/cgi-bin/ordtab.pl>.

Homeland Security: DHS' Efforts to Enhance First Responders' All-Hazards Capabilities Continue to Evolve. GAO-05-652. 2005. 64 pp.

September 11: Monitoring of World Trade Center Health Effects Has Progressed, But Not for Federal Responders. GAO-05-1020T. 2005. 25 pp.

Department of Homeland Security: Strategic Management of Training Important for Successful Transformation. GAO-05-888. 2005. 46 pp.

Climate Change: Federal Reports on Climate Change Funding Should Be Clearer and More Complete. GAO-05-461. 2005. 47 pp.

Hurricane Katrina: Providing Oversight of the Nation's Preparedness, Response, and Recovery Activities. GAO-05-1053T. 2005. 21 pp.

Army Corps of Engineers: Lake Pontchartrain and Vicinity Hurricane Protection Project. GAO-05-1050T. 2005. 8 pp.

The Natural Hazards Center

The mission of the Natural Hazards Center at the University of Colorado at Boulder is to advance and communicate knowledge on hazard mitigation and disaster preparedness, response, and recovery. Using an all-hazards and interdisciplinary framework, the Center 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 Natural Hazards Center is funded through a National Science Foundation grant and supplemented by contributions from a consortium of federal agencies and nonprofit organizations dedicated to reducing vulnerability to disasters. Please send information of potential interest to the Natural Hazards Center or the readers of this newsletter to the address below. The deadline for the next *Observer* is November 16, 2005.

Center phone number(303) 492-6818
Fax(303) 492-2151
E-mailhazctr@colorado.edu

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Copies of the *Observer* and the Natural Hazard Center's electronic newsletter, *Disaster Research*, are also available on the Center's Web site:

<http://www.colorado.edu/hazards/>

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