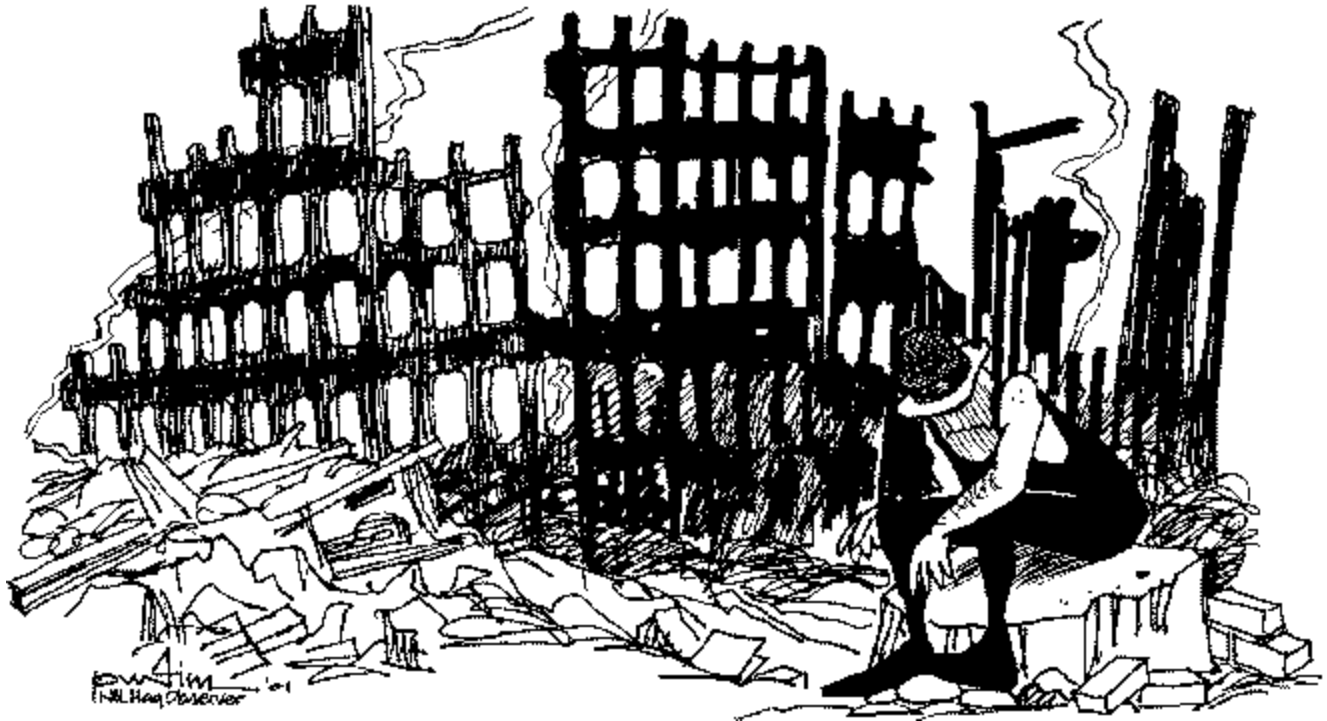




# NATURAL HAZARDS Observer

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## Learning from September 11th

—an invited comment

On September 11th, Americans shared a common bond—the sense of being under siege from an enemy force. We live in a world that is instantly connected through television, radio, and the Internet, and because of that, on that day, the same events that affected eye witnesses of these attacks affected every one of us. Since then, in many ways we have not been a nation of individuals, but rather a single human community called the United States of America. That collective response extended beyond our nation's borders, as people from around the world reacted to the events at the World Trade Center and the Pentagon.

In the weeks and months that have followed, each of us and the organizations for which we work or the communities to which we belong have sought ways to assist our

nation, and especially New York City and Washington, D.C., to respond to and recover from the horrific acts of violence. While we do that, we must also consider what we should do to prepare for the grim possibility of another attack similar to the ones that occurred on September 11. The natural hazards research and applications community is no different from other segments of the population. We have much to offer and much to learn.

### What We Know

According to 50 years of social science research, in extreme situations—hurricanes, nuclear power accidents, tornadoes, earthquakes, or terrorist attacks—human beings initially react in fundamentally similar ways. Though

much of this research was undertaken because of considerable and repeated losses due to floods, earthquakes, hurricanes, and other acts of nature, we know that the body of scientific knowledge about how people feel and behave in natural disasters provides valuable lessons for all types of disastrous events.

From this research, we know that the glue that holds our society together in nondisaster times is a very impersonal thing. Under normal circumstances, people relate to others who are outside their circle of family and friends on a superficial level and are generally motivated by individual goals and needs. This is more true in big cities like New York or Washington, D.C. than in smaller or rural communities.

Most disasters transform the way people connect with each other. The first response is shock and disbelief. This numbing lasts for a very short time, until we understand the nature of the actual impact. Our interactions with others are then transformed by basic human emotions of sympathy, empathy, and even guilt for having survived. We set aside our individual identities and focus on the impacted community. Collective good takes priority over individual goals.

During the emergency period following a disaster, the best in humanity becomes apparent. People give to one another; they seldom steal from or feel indifferent to others. In contrast with the common notion that people will burn and loot stores after a disaster, society actually becomes *more* cohesive. People stop doing routine work and divert their energy to helping respond to disaster needs. This reorganization can and often does look like chaos to the untrained observer, but it is really a neighborhood, or a city, or a nation reorganizing itself to cope with a catastrophe.

From an organizational (e.g., community, state, or nation) point of view, the events of September 11 hold many other similarities to a massive earthquake or catastrophic hurricane, both of which create widespread destruction and loss of life. While no environmental event can compare to the events in New York and Washington, there are many lessons that can be and have been drawn from research on the impacts of natural disasters (and previous terrorist attacks, for that matter) that can help our nation respond to and recover from the events of September 11.

America's emergency management community is the most professional, sophisticated, and capable group of response and recovery personnel in the world. They have worked tirelessly, not only since September 11, but long before that, to incorporate the lessons that both experience and research have provided to improve our nation's ability to manage an event of this magnitude. One example of this learning is reflected in changes in our national response to disaster after the Oklahoma City bombing in 1995. In the wake of that incident, the Federal Emergency Management Agency stepped forward and worked diligently to prepare for future terrorism. It reached out to many other federal agencies, such as the FBI and state and local governments, and redeveloped the Federal Response Plan. As a result, the response to the September tragedy was far more effective than it would have been otherwise. But, undoubtedly, there is much we did not anticipate or plan for.

During recovery, lessons from past disasters can also help communities—including New York City—rebuild in a way that makes them stronger and more resilient. For example, we know:

- There will be substantial economic hardships in disaster areas, requiring not only financial assistance, but also creative efforts by government, private businesses, and nonprofit organizations to restore community vitality.
- Lessons from the past about emergency medical response, debris removal, mental health (including that of first responders and children), morgue operations, communications, building inspection and code enforcement, and other problems can also aid recovery and reconstruction.
- The success of any disaster recovery program is enhanced when the public is made aware of rebuilding priorities and kept informed of progress.
- The recovery period is an ideal time to initiate broad-based mitigation and sustainable development. In addressing short-term needs it is important to remember that disaster relief must simultaneously contribute to broader sustainable development goals and the reduction of long-term exposure to natural and human-caused hazards.
- Our communities can be rebuilt better. Specifically, research tells us that reconstruction following disaster is an opportunity to replace aging, damaged buildings with new structures; restore the local tax base and boost the economy with new jobs; change the character of local businesses to better meet the community's needs; and restore infrastructure so that the danger of further damage is eliminated or reduced.

### What There is to Learn

Despite our nation's extensive knowledge about preparing for, responding to, and recovering from disasters, there is still much that we have to learn about these activities. While keeping in mind the enormous loss and suffering of September 11, we at the Natural Hazards Center recognize that the event provides an opportunity for the hazards research community to contribute its skills and expertise to better understand what happened (and continues to happen) and thus to contribute to better response and recovery in any future disaster.

Following the attacks on September 11, the Natural Hazards Center, in cooperation with the National Science Foundation, reached out to the hazards research community and encouraged them to help our country document what was happening and to investigate things that have never happened before in order to improve our nation's readiness to deal with future catastrophic events, whether they are similar terrorist attacks, a great urban earthquake, or the direct hit of a major hurricane on a large metropolitan area. The response to this call was tremendous (for a list of the many Quick Response (QR) studies funded through

this program, see [www.colorado.edu/hazards/qrsept.html](http://www.colorado.edu/hazards/qrsept.html)). I want to thank those people who interrupted their lives and stepped forward in the days, weeks, and months after September 11 to bring their research skills—accumulated from decades of study of natural hazards—to deal with the results of terrorism.

The list of research questions being investigated regarding this disaster, and that could be studied, is endless. A few examples include:

- How can businesses recover when many employees are lost?
- How do emergency management organizations respond when many of their members are among the victims?
- What are the issues involved in removing such large amounts of urban debris?
- What are the economic effects of shutting down the nation's air transportation system?
- How can diverse religious organizations contribute during such distressing times?
- What are the policy implications presented by this event—especially in terms of trade-offs between civil liberties and security?
- What ethnic issues arise following an act of terrorism?
- How do public and private organizations communicate and cooperate after an event of this magnitude?

The Natural Hazards Center will do its best to collect and synthesize the results of the research being undertaken now and to disseminate it to both policy makers and practitioners.

On September 11, 2001, the men and women involved in all aspects of our emergency management community were called on to show leadership and vision. As has been the case in the face of past catastrophic disasters, these people once again rose to the occasion. The attacks on the World Trade Center and the Pentagon will have a sweeping, permanent impact on the way our nation copes with such disasters in the future. We can find comfort in knowing we have the skills and abilities to deal with those impacts.

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University of Colorado

## The Hazards Center's Response to the Events of September 11

On the Center's web site [www.colorado.edu/hazards/qrsept.html](http://www.colorado.edu/hazards/qrsept.html)—are the names and contact information for the Quick Response program researchers who have been funded to date, along with the titles of their research projects. Additionally, a downloadable list of other research projects related to this event and supported by the National Science Foundation is also available from that web page.

Beyond this work, and far more importantly, the staff here at the Natural Hazards Center extends its sympathy and support to all those affected by these events—which means, sadly, to our nation.

## 2001 Hazards Workshop Session Summaries Now On-Line

In the previous *Observer* (p. 5), we mentioned that session summaries from the 2001 Hazards Research and Applications Workshop, held in Boulder, Colorado, last July, could be purchased from the Hazards Center in a package that also includes descriptions of the hazards research, projects, and programs discussed at the meeting as well as the agenda, participant list, and workshop notebook.

Thanks to the ever-toiling web workers at the Hazards Center, the session summaries (but not the other materials) are now available free from the Hazards Center web site: [www.colorado.edu/hazards/ss/ss01.html](http://www.colorado.edu/hazards/ss/ss01.html). Take a look to find the latest information about critical questions, programs, and research dealing with hazards management in the 21st century.

Meanwhile, the entire set of workshop materials described above can still be purchased for \$25.00, plus \$6.00 shipping for domestic orders (\$25.00, plus \$10.00 shipping for orders outside the U.S.), from the *Publications Administrator, Natural Hazards Research and Applications Information Center, 482 UCB, University of Colorado, Boulder, CO 80309-0482; (303) 492-6819; fax: (303) 492-2151; e-mail: janet.kroeckel@colorado.edu*. Visa, Mastercard, American Express, and Diner's Club cards are also accepted.

## Project Impact is Only One Step in a Long Process

What saved Seattle during the February 28, 2001, Nisqually earthquake? About 30 miles of dirt and rock, a bit of luck, a decades-long practice of building code adoption and enforcement, and significant community involvement.

While the 1994 Northridge, California, and 2001 Nisqually, Washington, earthquakes had similar magnitudes (6.7 and 6.8, respectively), the greater depth of the Washington shock (52 km) resulted in more moderate surface intensities over a wider area than the shallower (18 km) California event. Had an event of similar magnitude occurred on a shallower fault, closer to Seattle, the consequences would have been an order of magnitude greater than the approximately \$2 billion currently estimated. Had the historic Pioneer Square and Sodo districts (sites of many pre-1950 unreinforced masonry parapet collapses) not been cordoned off following the Mardi Gras riots that had occurred just days earlier, casualties would have been significantly higher as well.

In many ways, Seattle was already a leading example of community earthquake mitigation. Prior to the 1949 magnitude 7.2 Olympia earthquake, few structures had been built to resist

strong seismic forces. The 1949 shock resulted in the strengthening of building ordinances and the adoption of the Pacific Coast Building Officials Code (later replaced by the Uniform Building Code) by the state legislature in 1950. It is important to note that until the 1970s, both California and Washington were classified in the same seismic zone (UBC Zone 3). Changes to the building code brought about by experience in the California earthquakes affected construction practice in both Washington and California. As a result, newer construction performed within the life-safety design specifications given the moderate levels of ground motion experienced last February. Many older, nonresidential structures benefitted from requirements enacted 30 years ago for substantial renovations to include seismic upgrades. Stricter seismic standards for post-1980 bridges, and an active upgrade and repair program by the Washington Department of Transportation, limited the majority of significant damage to a few pre-1980 structures that were scheduled for replacement at the time of the earthquake. All of these examples represent the successes of long-term incremental changes toward seismic safety in the Puget Sound area.

The Nisqually earthquake was both a confirmation and a wake up call. While it served to reinforce many of the lessons learned from prior earthquakes, both here and abroad, and demonstrated the value of mitigation, it also raised some questions. Are we better prepared for the next earthquake? While the building structures performed well given the levels of ground shaking, significant nonstructural damage occurred in buildings of all types and ages—demonstrating our continued vulnerability to these kinds of losses, which run three to four times the structural losses and pose a threat to life safety. What is clearly needed is design, engineering, and construction practices that take into account all aspects of a building's performance, especially the nonstructural elements.

There is no doubt that the Project Impact prototype raised awareness about the earthquake problem in the Puget Sound area, and that many activities, as described in Bob Freitag's article in the May *Observer* (Vol. XXV, No. 5, p. 1) will limit future losses. Community participation is essential in creating an enduring culture of hazards awareness and responsibility. But it is important to remember that Project Impact represents one more step in a long-term process, represented by significant state and local investment in building codes and retrofits.

Robert F. Shea  
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Federal Insurance and Mitigation Administration  
Federal Emergency Management Agency





# WASHINGTON UPDATE

## President Creates Office of Homeland Security

Following the attacks on the World Trade Center and the Pentagon, President Bush created a new Office of Homeland Security. Pennsylvania Governor Tom Ridge was appointed to head the office with cabinet-level status and will report directly to the president. Ridge will develop and oversee a comprehensive national strategy to protect the U.S. from terrorism and to respond to any attacks that may occur. His position has been compared to a domestic version of the National Security Adviser. The new Homeland Defense director will likely form a working group that includes the departments of Justice, Transportation, and Energy; the Central Intelligence Agency; the Federal Emergency Management Agency; and other federal agencies.

The president announced the creation of this new office on September 20. Further details can be obtained from the White House web site: [www.whitehouse.gov](http://www.whitehouse.gov).

## Bush Announces \$3 Billion for Unemployed

The events of September 11 have caused widespread job layoffs throughout the U.S. economy. On October 4, as part of an economic stimulus package, President Bush extended unemployment benefits by 13 weeks in states hardest hit by job losses due to the attacks. He wants the program to be paid entirely by federal dollars and remain in place for 18 months. Bush also provided up to \$11 billion in new health-care assistance to cover emergency health insurance costs.

Under current law, states provide unemployment compensation for 26 weeks. Bush has extended that period to 39 weeks in states where the total unemployment rate increased by 30% over September 11 levels. The benefits would also be made available to states in which the president declared a national emergency or provided a presidential disaster declaration in

connection with the attacks. The \$3 billion in National Emergency Grants, drawn from existing emergency grant funds, may be awarded to any state that experiences plant closings or mass layoffs. The money can be used to support job training, pay for health-care insurance, and provide other assistance. Individuals who were working on September 11 and are not eligible for regular unemployment benefits would qualify, although they would also be required to enroll in government-run training programs. An additional \$6 billion was already available in a variety of job training programs. At least some of the \$3 billion announced by the president will come from the money Congress has already

appropriated for national recovery from the attacks. They passed a \$40 billion emergency spending package and a \$15 billion airline aid plan to help economic recovery from the attacks on September 11.

Further information about this effort can be obtained from the White House web site: [www.whitehouse.gov](http://www.whitehouse.gov).

## President Authorizes 100% Federal Cost Share

In a rare and unusual move, President Bush increased the federal share for some types of disaster assistance to 100% to aid the recovery from the terrorist attacks in New York. Under the Robert T. Stafford Disaster Relief and Emergency



Assistance Act, state and local jurisdictions are usually required to contribute 25% of the costs for such things as debris removal, emergency protective measures, and repair and restoration of public facilities. The law was enacted in 1988 to provide financial and other forms of assistance to state and local governments, certain private nonprofit organizations, and individuals to support response, recovery, and mitigation efforts following presidentially declared disasters and emergencies. On September 19, 2001, the president used his discretionary power under the act to increase the federal share for assistance to New York and New Jersey and thus ease the burden of those responding to the attacks on the World Trade Center.

In a letter to FEMA Director Joe Allbaugh, the chief executive stated:

I have determined that the damage in certain areas of the State of New York resulting from fires and explosions on September 11, 2001, is of sufficient severity and magnitude that the provision of additional Federal assistance to ensure public health and safety is warranted under the . . . Stafford Act. . . . Furthermore, because of the unique nature and magnitude of this event, the federal contribution for the Hazard Mitigation Grant Program is authorized for up to five percent of the estimated aggregate amount of grants (less any associated administrative costs).

In a separate letter, the president noted

These events in New York have [also] had a direct and significant impact on New Jersey, which has provided response services and emergency measures at an extraordinary level due to its immediate proximity to the disaster site in New York, as well as its joint responsibility, through the Port Authority of New York and New Jersey, for facilities such as bridges to New York City.

You are authorized to coordinate all disaster relief efforts that have the purpose of alleviating the hardship and suffering of the local population caused by the emergency and to provide appropriate assistance for required emergency measures, as authorized under Title V of the Stafford Act . . . [You] are further authorized to identify, mobilize, and provide at your discretion equipment and resources necessary to alleviate the impacts of the emergency and such other forms of assistance . . . as you may deem appropriate. Specifically, you are authorized to provide emergency protective measures . . . at 100 percent Federal funding.

In addition, FEMA's disaster housing, unemployment, and crisis counseling programs are funded at 100%. However, by law, FEMA's Individual and Family Grant Program and the Hazard Mitigation Programs allow no more than a 75% federal cost share.

The complete text of both disaster declarations can be found in the Federal Register, Vol. 66, No. 189 (September 28, 2001), p. 49674. Copies can be obtained from any federal repository library or on-line at [www.access.gpo.gov](http://www.access.gpo.gov). For further information about these disaster declarations, contact FEMA, 500 C Street, S.W., Washington, DC 20472; (202) 646-4600; e-mail: [eipa@fema.gov](mailto:eipa@fema.gov); WWW: [www.fema.gov](http://www.fema.gov).



## FEMA Makes Good Progress in Achieving Key Outcomes

According to the General Accounting Office (GAO), FEMA is making progress in achieving three primary "outcomes" identified by Congress as important mission areas for the agency: to minimize human suffering and property losses after natural disasters, to provide timely responses to disaster aid requests, and to prevent or reduce harm and losses in future disasters through mitigation efforts.

In its report, **Federal Emergency Management Agency: Status of Achieving Key Outcomes and Addressing Major Management Challenges** (Report No. GAO-01-832, 28 pp., free), the GAO outlines the criteria used to measure these goals and how the agency performed in meeting them. The GAO concluded that FEMA has made some progress in minimizing human suffering and property losses after natural disasters and that the agency's strategies for meeting these goals are clear and reasonable. For example, FEMA is working to improve disaster response by promoting interagency coordination and improved disaster declaration criteria (see article below). Although FEMA is making limited progress in providing timely responses to disaster aid requests, the agency is making better progress toward preventing or reducing harm and losses from future disasters through mitigation. FEMA met the majority of its disaster loss and prevention goals by entering into agreements with 11 agencies supporting mitigation, implementing building standards that increase the use and effectiveness of mitigation tools, and refining and remeasuring savings achieved from flood-loss reduction efforts (estimated by FEMA to be about \$1 billion in fiscal year 2000).

The GAO report concludes that, "although FEMA has additional work to do on the outcomes we reviewed, its fiscal year 2000 performance report and fiscal year 2002 performance plan reflect continued improvement compared with the prior year's report and plan."

Copies of the report can be obtained from the GAO *at the address below*.

## GAO Says Disaster Declaration Criteria Need Improvement

Over the years, members of Congress have expressed a desire to have more "clear and meaningful" criteria for recommending presidential disaster declarations to states under the Robert T. Stafford Disaster Relief and Emergency Assistance Act. As a result, the General Accounting Office (GAO) took an in-depth look at the issues surrounding disaster assistance to states and recently presented their findings in the report, **Disaster Assistance: Improvement Needed in Disaster Declaration Criteria and Eligibility Assurance Procedures**, Report to the Subcommittee on VA, HUD, and Independent Agencies, Committee on Appropriations, U.S. Senate (Report No. GAO-01-837, 2001, 36 pp., free).

The Stafford Act requires that conditions exceed state and local capability to respond effectively before major disaster assistance from the federal government is granted. The president decides whether these conditions are met, then awards financial disaster assistance under the terms of the act. The

law, however, specifically prohibits FEMA from denying federal assistance “solely by virtue of an arithmetic formula or sliding scale based on income or population.” Factors FEMA uses to recommend a presidential disaster declaration include damage that exceed \$1.04 per capita statewide and \$1 million in total, the heavy impact of a disaster on a particular area, or recent multiple disasters in the same area. However, the GAO believes that problems with the criteria remain, particularly because staff assigned to disaster field offices are temporary and may not have the skills and training needed to make appropriate decisions.

The GAO notes that FEMA has developed a credentialing program to establish qualification and training requirements for these staff, but has not yet implemented it due to budgetary and programmatic limitations. The GAO also believes that FEMA lacks centralized, quantified information needed to effectively manage its Public Assistance Program, which GAO defines as “unreliable and difficult to use.”

The GAO outlines several recommendations in this report to improve FEMA’s assessment of state or local capability to respond to a disaster and to ensure the appropriate application of eligibility criteria within its Public Assistance Program. These actions include:

- Developing criteria that more accurately reflect the affected state and local governments’ capability to respond to a disaster;
- Improving the processes for reviewing proposed disaster projects to better ensure they meet eligibility requirements;
- Assigning a higher budget priority to implementing a credentialing and training program for federal disaster staff, and establishing a plan to identify recurring problems and take appropriate actions.

The GAO has made copies of the report available for free. They can be requested from the *GAO, P.O. Box 37050, Washington, DC 20013; (202) 512-6000; fax: (202) 512-6061; TDD (202) 512-2537; e-mail: info@www.gao.gov*. The complete text of the report is also available on-line at: *www.gao.gov*.

## FEMA Issues Draft Guidelines for Flood Mapping

FEMA recently issued the ***Draft Guidelines and Specifications for Flood Hazard Mapping Partners***, which defines technical requirements, necessary coordination and documentation, and specifications for flood hazard maps and related National Flood Insurance Program products. The guidelines compile requirements from previous FEMA documents and reflect recent changes associated with the implementation of the FEMA Map Modernization Program (see the next article), including the Cooperative Technical Partners Initiative.

The guidelines include sections on flood studies and mapping, map revisions and amendments, and program support. Numerous appendices contain information on topics ranging

from aerial surveying and mapping to evaluating flood protection systems to specifications and format for flood insurance study reports.

To view or download copies of the draft Guidelines, see *www.fema.gov/mit/tsd/dLcgs.htm*. FEMA will accept comments on the draft until November 9, 2001, for incorporation into the final version. The agency emphasizes these ***Guidelines*** are a “living” document that will be updated whenever FEMA determines changes are appropriate. Comments submitted after November 9 will be considered by FEMA for inclusion in a future update.

For more information about this effort, contact the *Hazards Study Branch, Hazard Mapping Division, Federal Insurance and Mitigation Administration, FEMA, 500 C Street, S.W., Washington, DC 20472; fax: (202) 646-4596; e-mail: femacg&s@floodmaps.net; WWW: www.fema.gov/mit/tsd/DL\_cqs.htm*.

## Flood Map Modernization Coalition Established

A score of organizations, representing state and local officials; the nation’s realtors, home builders, and surveyors; and those with a stake in floodplain management, development review, disaster mitigation, emergency response, land-use planning, and environmental protection have formed a coalition to support funding of FEMA’s Map Modernization efforts.

These organizations believe that accurate and useable floodplain maps are the foundation of good local planning and natural disaster mitigation. However, many of the nation’s flood maps are as much as 30 years old, and a full third are over 15 years old. Many of these maps do not reflect current development and as a result do not show changes in flood hazards. Reliance on these outdated flood maps in making decisions about new development can harm both commercial and residential property owners and the taxpayers who ultimately pay for flood damage.

The new consortium recognizes that an aggressive program to update, modernize, and maintain the inventory of flood maps is essential and that FEMA’s Map Modernization Program has laid the framework for this effort. However, with insufficient funding, progress has been slow. Thus, FEMA welcomes the support of the coalition and is looking forward to working with the group to update the nation’s flood map inventory. For information about the coalition’s mission, contact *Susan Gilson, National Association of Flood and Stormwater Management Agencies, (202) 218-4133; or Larry Larson, Association of State Floodplain Managers, 2809 Fish Hatchery Road, Suite 204, Madison, WI 53713; (608) 274-0123; fax: (608) 274-0696; e-mail: asfpm@floods.org; WWW: www.floods.org; or see: www.fema.gov/mit/tsd/MM-main.htm and www.fema.gov/mit/tsd/MM-coa.htm*.

For a copy of ***Modernizing FEMA’s Flood Hazard Mapping Program—A Progress Report*** (May 2001) see *www.fema.gov/mit/tsd/DL\_mpmmod.htm*.



## CONTRACTS AND GRANTS

Below are descriptions of a whole bunch of recently awarded contracts and grants for the study of hazards and disasters. An inventory of contracts and grants awarded from 1995 to the present (primarily those funded by the National Science Foundation) is available on the Natural Hazards Center's web site: [www.colorado.edu/hazards/grants.html](http://www.colorado.edu/hazards/grants.html).

### **Observing and Documenting the Inter-Organizational Response to the September 11, 2001, Terror Attacks.**

Funding: National Science Foundation, \$24,999, six months. Principal Investigators: *John R. Harrald and Joseph Barbera, George Washington University, Institute for Crisis and Disaster Management, Gelman Library, Suite 904, 2130 H Street, N.W., George Washington University, Washington, DC 20052; e-mail: harrald@seas.gwu.edu.*

This research entails collecting, documenting, and analyzing time-sensitive data from the sites of the devastating terrorist attacks on the World Trade Center in New York City and the Pentagon in Washington, D.C. While communication and coordination of emergency management and medical efforts is an active area of research in earthquake and other natural disasters, this event is the first time when, at such a large scale, emergency efforts had to be integrated with law enforcement and military efforts. The researchers will examine information flow among and within response organizations as well as information management problems. The results will be analyzed and published as a summary document for use by emergency planners and researchers.

**Impact of World Trade Center Disaster on Critical Infrastructure Interdependence.** Funding: National Science Foundation, \$70,000, 12 months. Principal Investigators: *William A. Wallace and Joe H. Chow, CII 5117, Rensselaer Polytechnic Institute, Troy, NY 12180-3590; (518) 276-6854; fax: (518) 276-8227; e-mail: wallaw@rpi.edu.*

The objective of this research is to understand and model the interdependencies of critical infrastructure systems, particularly their vulnerabilities to disasters of this type and scale. A systems approach will be used to model infrastructure interdependencies, the impacts of the attack overall and during emergency response, and the effects and needs related to interdependencies during recovery operations. The results of this research will be used to identify opportunities for reducing vulnerabilities and developing countermeasures to mitigate the impacts of disruptions and guide actions for response and recovery.

### **A Test of Flashbulb Memory: Tuesday, September 11, 2001.**

Funding: National Science Foundation, \$48,968, 22 months. Principal Investigator: *Andrew Conway, Department of Psychology (M/C 285), 1009 Behavioral Sciences Building, 1007 West Harrison Street, Chicago, IL 60607; (312) 413-9407; fax: (312) 413-4122; e-mail: aconway@uic.edu.*

September 11 has now joined a small group of tragic, landmark dates in American history, including the attack on Pearl Harbor and the assassination of President Kennedy. Most Americans who witnessed these events remember clearly where they were when they occurred. Cognitive psychologists have referred to the phenomenon of exceptional memory for salient events as "flashbulb memory." The purpose of this project is to assess people's memory of the events of September 11. Memory of the events, confidence in those memories, and emotional reactions were assessed immediately following the attacks and will be assessed again 11 and 23 months later. The question under investigation is whether salient events, which are accompanied by strong affect and emotion, are recalled with accuracy over a long period of time, or whether memory of these events is susceptible to distortion.

### **Digital Data Collection for Damage Assessment at the World Trade Center.**

Funding: National Science Foundation, \$20,000, 12 months. Principal Investigator: *J. David Frost, School of Civil and Environmental Engineering, Geosystems Group, 305 Ferst Drive, Atlanta, GA 30332-0355; (404) 894-2280; fax: (404) 894-2281; e-mail: dfrost@ce.gatech.edu.*

A reconnaissance team, using recently developed handheld technology, has gathered data related to specific structures that were damaged during the terrorist attacks on the World Trade Center. The purpose of the data collection is threefold. First, data from structures that were damaged but not destroyed will aid in the assessment of the structural integrity of these buildings. Second, the data will serve as a resource for future research related to performance of structures subjected to terrorist attack, explosions, and fires, as well as future design of urban structures. Third, this work will support the development of data acquisition and storage protocols for all postdisaster



reconnaissance activities, including those following earthquakes, hurricanes, and other events that cause widespread devastation.

**World Trade Center Post-Disaster Fire Reconnaissance and Perishable Data Collection.** Funding: National Science Foundation, \$15,000, 12 months. Principal Investigator: *Frederick W. Mowrer, Department of Fire Protection Engineering, University of Maryland-College Park, College Park, MD 20742; e-mail: fmowrer@eng.umd.edu.*

The total collapse of both 110-story towers of the World Trade Center (WTC) as a result of the fires caused by the jet collisions raises a number of important scientific questions regarding the performance of high-rise buildings in response to such impacts and their resulting fires. For the fire safety of current and future high-rise buildings, it is important to determine why the WTC towers collapsed in the way they did and in the relatively brief time they did. This project will collect perishable data on the fire protection engineering aspects of the event that may be lost as the material and debris are removed from the site. The investigator is collaborating with Abolhassan Astaneh-Asl of the University of California-Berkeley (see below), who is collecting perishable data on the structural engineering aspects of the collapse. The investigator is also collaborating with David McCallen of the Lawrence Livermore National Laboratory, who is providing expertise in computational mechanics, modeling, and analysis of large structural systems.

**World Trade Center Post-Disaster Reconnaissance and Perishable Structural Engineering Data Collection.** Funding: National Science Foundation, \$15,000, 12 months. Principal Investigator: *Abolhassan Astaneh-Asl, Structural Engineering, Mechanics and Materials, 721 Davis Hall, University of California, Berkeley, Berkeley, CA 94720-1710; (510) 642-4528; fax: (510) 643-5264; e-mail: astaneh@ce.berkeley.edu.*

Careful engineering study of the tragic collapse of the World Trade Center towers will require comprehensive analyses of the structure and reliable data on the mechanical properties of materials used in the towers—actual as-built steel connections and members as well as floor systems. This project will involve postdisaster reconnaissance and collection of perishable data, including samples of material and structural members and connections that later can be used to determine building properties. Of particular interest is the collection of samples of steel from areas that were heavily affected by the heat of the jet fuel fires and/or the impact of the planes.

**Infrastructural Damage Assessment Using Land-Based Laser Swath Mapping Technology.** Funding: National Science Foundation, \$45,000, 12 months. Principal Investigators: *David Bloomquist and Ramesh L. Shrestha, Department of Civil and Coastal Engineering, University of Florida, Gainesville, FL 32611; (352) 392-0914; e-mail: dave@c.e.ufl.edu.*

The terrorist attacks on the World Trade Center and the Pentagon created an infrastructural catastrophe. While the recovery effort is underway, engineers from the Federal Emergency Management Agency and the American Society of Civil Engineers disaster response teams are inspecting adjacent

buildings for damage. The objective of this research is to conduct postdisaster reconnaissance at the affected sites in order to recover ephemeral data for detailed damage assessment. The award will support a team from Florida that will use a new land-based laser system to produce very high resolution three-dimensional maps of both interior and exterior areas of damaged buildings. The system can quickly generate valuable data, especially on damage related to deformations and cracking. The data collection will aid in the assessment of the structural integrity of buildings that were damaged but not destroyed, expedite damage appraisal and subsequent repair or demolition, and serve as a resource for future research into methods to minimize damage from such occurrences.

**How Support Organizations Respond to Crises: Middle Eastern and South Asian American Organizations in the Aftermath of September 11.** Funding: National Science Foundation, \$60,000, 12 months. Principal Investigator: *Mehdi Bozorgmehr, Middle East and Middle Eastern American Center (MEMEAC), City University of New York, New York, NY 10016-4309; e-mail: mbozorgmehr@gc.cuny.edu.*

This research focuses on the backlash targeting Middle Eastern and South Asian (MESA) Americans in the aftermath of the terrorist attacks on America. It is a well-known sociological finding that external hostility leads to internal group solidarity. The investigator proposes to develop a model of inter-ethnic relations, arguing that the main source of host hostility toward Middle Easterners is the anti-American policies of the Middle Eastern and South Asian regimes (or terrorists) rather than the action of the exiles and immigrants themselves. Also, MESA Americans are panethnic and have not created group solidarity, but are instead represented by various national religious and ethnic organizations. The investigator will study the current backlash by examining the role of religious and ethnic MESA organizations in averting, coping with, and responding to such events. The project will improve understanding of under-studied minorities in the U.S. and contribute to general understanding of inter-ethnic group conflict following a large-scale crisis.

**Large-Scale Seismic Performance of Urban Regions.** Funding: National Science Foundation, \$1,199,465, 36 months; Principal Investigators: *Michael L. Stokes, Joerg Meyer, Tomasz Haupt, Jacobo Bielak, and Gregory L. Fenves, Engineering Research Center, Mississippi State University; Mississippi State, MS 39762-9627; (662) 325-2319; e-mail: stokes@erc.msstate.edu.*

This award from NSF's Engineering Research Centers Program will support the synthesis of expertise in large-scale computational simulation and visualization at the Engineering Research Center on Computational Field Simulation at Mississippi State University, with geotechnical and structural response simulation at the Pacific Earthquake Engineering Research Center at the University of California-Berkeley, and advanced computational ground motion and soil-foundation-structure-interaction modeling at Carnegie Mellon University. This advanced computational capability will model the effects of earthquakes on urban infrastructure and simulate the performance of collections of buildings and other structures. The ultimate goal is to forecast the amount and distribution of damage throughout an urban region. The project will investigate the

effects of earthquakes in the Los Angeles area. The deployment of this network will be supported by the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES).

**Analysis of Lifeline Damages and Economic Impacts of an Earthquake: Development of an Integrated Economic-Engineering Assessment Model.** Funding: National Science Foundation, \$259,605, 24 months. Principal Investigator: *Geoffrey J.D. Hewings, Regional Economic Applications Laboratory, University of Illinois, 220 Davenport Hall, 607 S. Mathews #236, Urbana, IL 61801-3671; (217) 333-4740; fax: (217) 244-9339; e-mail: hewings@uiuc.edu.*

With this award, an integrated economic-engineering model will be constructed to estimate the indirect impacts of an earthquake and to simulate recovery activities and their system-wide effects. The project will build on a set of recently completed models, including an engineering model for assessing lifeline damage in an urban area and economic models for estimating the indirect impacts and effects of an earthquake in urban, regional, and interregional contexts. The analysis will focus on policy implications regarding retrofitting lifeline systems, emergency management planning, and life cycle assessment of lifeline facilities against earthquakes. The research will be conducted in the U.S. by colleagues at the University of Illinois and the State University of New York at Buffalo, and in Japan by researchers at the Central Research Institute of Electric Power Industry. The project will integrate different engineering and economic models, compare and contrast experience in two countries, and identify critical links in recovery.

**Developing a Long-Term Research Agenda for the Network for Earthquake Engineering Simulation.** Funding: National Science Foundation, \$420,000, 24 months. Principal Investigator: *Richard Little, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, DC 20418; e-mail: rlittle@nas.edu.*

The National Research Council, through its Division on Engineering and Physical Sciences, will conduct a study to assist the National Science Foundation in the formulation of a comprehensive, long-term agenda for earthquake engineering research that fully utilizes the capabilities of the George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES) (see the **Observer**, Vol. XXV, No. 4, p. 16; Vol. XXV, No. 2, p. 18; and Vol. XXIII, No. 5, p. 2). The result will be a report that articulates a process for determining research needs; identifies the principal issues in earthquake engineering amenable to an integrated research approach that incorporates analysis, computation modeling, simulation, and physical testing; and assesses possible roles of information and communication technologies for collaborative on-site and remote research. It will produce a long-term research plan based on short-, intermediate-, and long-term needs; the general program to address these needs; and the estimated costs and benefits of the research program.

**Performance of Electric Utility Lifelines in Urban Centers for Earthquake Hazards.** Funding: National Science Foundation, \$244,496, 24 months. Principal Investigator: *Dorothy A. Reed, Structural and Geotechnical Engineering and Mechanics, 255 Wilcox, Department of Civil Engineering, University of Washington, Box 352700, Seattle, WA 98195-*

*2180; (206) 543-0351; fax: (206) 685-3836; reed@u.washington.edu.*

The utility infrastructure system in the U.S. is undergoing significant changes due to deregulation. Recently, structural component failures induced by natural hazards previously considered minor have caused widespread blackouts. In particular, shortages due to natural and human-caused impacts have had significant effects on the Pacific Northwest, as compliance with environmental standards places constraints on the generation of power. It has become clear the U.S. lacks a cohesive approach to ensuring electric utility infrastructure reliability and that we must identify the relative importance of system components and ultimately provide guidelines for improved performance. The researchers in this project will focus on the performance of the structural system used to deliver power and its interactions with other critical lifelines, and incorporate the valuable lessons learned from the Kobe, Japan, and Nisqually (Seattle) earthquakes. A major contribution of the project will be to examine the influence of the political climate upon the development of levels of performance.

**Forecasting Change in Hurricane Risk Over Time.** Funding: National Science Foundation, \$274,979, 36 months. Principal Investigators: *Rachel A. Davidson and David V. Rosowsky, College of Engineering, Cornell University, Carpenter Hall, Ithaca, NY 14853-2201; (607) 255-9679; fax: (607) 255-9606; e-mail: rad24@cornell.edu.*

The objectives of this project are to develop a method to quantitatively model how hurricane risk in the U.S. changes over time and how risk management strategies can affect the amount and rate of change. A case study of the coasts of North and South Carolina will measure how hurricane risk changes over time due to population and economic growth, changing construction practices, aging infrastructure, and other forces. Since hurricane risk continuously changes, those who attempt to assess and manage it are chasing a moving target. This new method will reflect the dynamic nature of the urban environment. It will enable risk managers to anticipate how the world will change, estimate what the risk will be in the future when the next hurricane occurs, and plan for that future scenario. By making loss estimation modeling dynamic, the new method will benefit government agencies, insurance companies, and others involved in risk management decision making. By establishing more directly and quantitatively the connection between today's actions and the effects of a hurricane 20 years from now (e.g., a decision to build on the coast today creates structures to be damaged in the next hurricane), these large storms can be better perceived as a present concern, rather than an issue to be addressed at some unspecified future time.

**Hurricane Andrew 10 Years Later: Implications for Disaster Mitigation.** Funding: National Science Foundation, \$240,027; 14 months. Principal Investigators: *Betty H. Morrow and Walter G. Peacock, Department of Sociology and Anthropology/International Hurricane Center, Florida International University, Miami, FL 33199; e-mail: morrowb@fiu.edu.*

Because of the extensive losses it caused, Hurricane Andrew is widely recognized as a watershed event that placed disaster resistance and mitigation on the political agenda. The ultimate goal of this project is to inform national mitigation

efforts through an assessment of the extent to which vulnerabilities evident prior to or emerging after this major disaster remain 10 years later. It will focus on several aspects of communities and households relating to vulnerability and resilience. It will document changes in demographics, economic and business bases, and political structure, particularly those directly impacted by the storm, as they compare to the rest of Miami-Dade County. It will determine the extent to which the policies and practices instituted during reconstruction resulted in increased disaster resilience in the effected communities, analyze whether there have been any lasting improvements in the political power of previously marginalized groups, and compare recovery levels of various sectors within the impacted region. It will also assess the current vulnerability of victims of Andrew and evaluate the disaster resistance of households.

**Urban Containment Programs and the Vulnerability of Infrastructure to Hazards: Are Cities Being Engineered to be Safe as Well as Smart?** Funding: National Science Foundation, \$149,995, 24 months. Principal Investigator: *Raymond J. Burby, Department of City and Regional Planning, Campus Box 3140, New East Hall, University of North Carolina-Chapel Hill, Chapel Hill, NC 27599-3140; e-mail: rburby@chapel.unc.edu.*

“Smart Growth” is now being advocated in the U.S. by federal agencies, industry, and professional associations in order to bring about more efficient, environmentally sensitive, and livable urban communities. One key tenet of smart growth is containment of urban sprawl through the use of regulatory growth boundaries, greenbelts, and curtailment of water and sewer extensions. These tools, however, have serious unintended consequences, including increased vulnerability of urban development and related civil infrastructure systems to natural hazards due to increased development pressures. In this interdisciplinary research project, involving both civil engineering and urban planning, researchers will document the dimensions of this threat and identify engineering and other measures that can be used to counter it. The study will focus on a paired sample of four metropolitan areas: Portland, Oregon, and San Diego, California, which have had urban containment programs in place for 20 years; and Vancouver/Clark County, Washington, and Orange County, California, which do not have containment policies. Data will also be gathered on other factors that affect development, including hazard mitigation and other regulations, parcel size, soils and slopes, accessibility, public services, and nearby development trends. The implications of the study for urban growth will help to ensure that smart growth now being advocated widely will also be safe growth.

**Sustaining Multiple Functions for Urban Wetlands.** Funding: National Science Foundation, \$69,944, 12 months. Principal Investigators: *Mary V. Santelmann, Denise H. Lach, James A. Moore, Wayne C. Huber, and Kenneth J. Williamson, Oregon State University, Corvallis, OR 97331; e-mail: santelmm@ucs.orst.edu.*

Ecologically healthy urban landscapes, including wetlands and natural areas, can help maintain water quality and quantity, provide flood control, and meet social and aesthetic needs. However, some of the functions we desire urban wetlands to perform can impair the ability of the areas to perform other

desired functions. This project will establish partnerships among public agencies, educators, and interdisciplinary teams of scientists from three regions of the U.S. to summarize the state of knowledge of wetlands in the urban landscape and to propose directions for future research, particularly an improved understanding of complex relationships among wetland functions as well as the social systems and community characteristics of urban areas in which wetlands are included and valued in the urban landscape.

**Pervasive Monitoring and Control of Water Lifeline Systems for Disaster Recovery.** Funding: National Science Foundation, \$400,000, 36 months. Principal Investigators: *Masanobu Shinosuka and John S. Heidemann, University of California-Irvine, Irvine, CA 92697; e-mail: shino@uci.edu.*

This research involves applying networks of sensors and control devices to enhance the performance of civil infrastructure systems, particularly utility lifelines, under both emergency and daily operational conditions.

**Interactions of Riparian Pattern, Policy, and Biocomplexity in Coupled Human/Riverine Systems.** Funding: National Science Foundation, \$1,950,000, 48 months. Principal Investigators: *Stanley V. Gregory, John P. Bolte, and David W. Hulse, Oregon State University, Corvallis, OR; e-mail: stanley.gregory@orst.edu.*

This project focuses on lowland rivers of the Pacific Northwest and is expected to result in a set of transferable models of ecological and human interactions in river floodplains. The investigators hypothesize that as biotic resources become scarce or impaired, a human/riverine ecosystem becomes more tightly coupled. The project will examine the ecological vulnerability of these systems under different public policies and explore the co-evolution of policies and landscape patterns, building on relationships identified through field studies of biotic complexity in large rivers and their floodplains.

**Alternatives to Crisis: Constructing Models of Resilience in the Red River Valley of the North** Funding: National Science Foundation, \$70,000, 12 months. Principal Investigator: *Dennis R. Keeney, IATP, 2105 First Avenue South, Minneapolis, MN 55405-2505; (612) 870-3404; e-mail: drkeeney@iastate.edu.*

The Red River of the North (forming the border of Minnesota and North Dakota and flowing north into Manitoba and Hudson Bay in Canada), is an area of intensive, industrialized agriculture that has long been considered one of the most fertile farming regions in the world. Crop disease, abnormally wet climate patterns, and low commodity prices have combined with long-term economic, social, and ecological declines to generate an increasingly severe regional crisis. This project will develop a simple systems model of the natural, economic, and social dynamics in the valley to explore public policy choices available to stakeholders and decision makers in the region.

**Better Safe than Sorry: Precautionary Reasoning, Utility Reversals, and the Creation of Dominance.** Funding: National Science Foundation, \$190,000, 12 months. Principal Investigators: *Michael L. DeKay and Paul Fischbeck, Department of Engineering and Public Policy, Carnegie Mellon*

University, 5000 Forbes Avenue, Pittsburgh, PA 15213; (412) 268-1877; e-mail: [dekay@andrew.cmu.edu](mailto:dekay@andrew.cmu.edu).

How do people evaluate the possible outcomes of risky situations? Do these evaluations guide decision making? Although most theories of rational decision making hold that people's choices are based on what they think might happen, how desirable or undesirable those outcomes may be, and how likely they are to occur, sometimes people jump to conclusions before careful consideration of all outcomes. The investigators believe that this leap is particularly likely when one of the possible outcomes is bad—such as when people are killed when a dam fails and a warning was not issued soon enough. Also, in this scenario, when a dam-failure warning is issued, it may affect the way people think about other possible outcomes, such as issuing a warning that leads to an unnecessary evacuation when the dam did not fail. The investigators will use three computer-based experiments to evaluate these processes. The first will try to determine whether putting someone in the role of decision maker increases the chances of jumping to conclusions and evaluating outcomes after decisions are made. The second will explore how individuals seek information about possible outcomes, how participants form their initial preferences among decision alternatives, and how these emergency preferences affect participants' evaluations and use of additional information. The third will evaluate the effect of uncertainty about possible outcomes.

**Necessary Uncertainty: The Scientific Controversy Over Fallout Hazards in the United States, 1954-1963.** Funding: National Science Foundation, \$8,000. Principal Investigator: *Mary Jo Nye, Oregon State University, Corvallis, OR 97331; e-mail: [nyem@ucs.orst.edu](mailto:nyem@ucs.orst.edu)*.

This dissertation research project examines how scientists involved in the debate over radioactive fallout hazards managed the necessary uncertainties in the scientific, ideological, and ethical issues of the controversy. Political and public demands for a resolution to the debate over fallout hazards placed scientists in an uncomfortable position because they were asked questions about risk for which they had no conclusive answers then or in the foreseeable future. The multitude of disciplinary and institutional affiliations of the scientists involved exacerbated uncertainties in the interpretation of data by introducing numerous different conceptual and experimental approaches, and the public nature of the debate added to the uncertainties that confronted scientists. The fallout controversy is a prototype of future controversies over environmental and health hazards, such as those associated with nuclear power and global warming.

**Highly Detailed Reconstructions of New England Weather Over the Past Few Centuries and Their Climatic Implications.** Funding: National Science Foundation, \$326,329, 36 months. Principal Investigators: *Gregory A Zielinski and Kirk A. Maasch, University of Maine, Orono, ME 044695; e-mail: [gzielinski@maine.edu](mailto:gzielinski@maine.edu)*.

This award will enable the investigators to reconstruct daily weather conditions for New England over the past 300 years by compiling and analyzing written archives, such as diaries, journals, agricultural records, and marine logs. These data will be used to reconstruct daily weather maps that will be compared with recent climatic conditions. They will help to inform soci-

ety about the range of climatic change in the lives of individuals and to evaluate how the number and magnitude of extreme climatic events (i.e., Nor' Easters, hurricanes, tornadoes, and ice storms) have changed with time.

**Evacuation and Vulnerability in Mexico.** Funding: National Science Foundation, \$73,540, 12 months. Principal Investigator: *Benigno E. Aguirre, Disaster Research Center Newark, DE 19716-2581; (302) 831-6618; fax: (302) 831-2091; e-mail: [aguirre@udel.edu](mailto:aguirre@udel.edu)*.

This project will be conducted in Veracruz and Puebla, Mexico, in collaboration with researchers from Mexico City. Its objectives are to better understand the societal reactions to the extensive flooding that occurred in the two Mexican states in 1999, the systems of warning and evacuation that took place during these floods, and the extent to which established empirical generalizations in the social science of disasters regarding warnings and evacuations are applicable to a developing country.

**Geotechnical Earthquake Engineering Reconnaissance of the June 23, 2001, Arequipa Earthquake.** Funding: National Science Foundation, \$29,671, six months. Principal Investigators: *Adrian Rodrigues-Marek, Pedro C. Repetto, and Joseph Wartman, Department of Civil and Environmental Engineering, P.O. Box 642910; Washington State University, Pullman, WA 99164; (509) 335-7088; fax: (509) 335-7632; e-mail: [adrian@wsu.edu](mailto:adrian@wsu.edu)*.

This award will support a field survey of the magnitude 8.1 earthquake that occurred in June near the coast of southern Peru.

**The Earthquake Research Plan: Research Needs and Opportunities for Earthquake Engineering.** Funding: National Science Foundation, \$100,000, 12 months. Principal Investigators: *Susan K. Tubbesing and Paul G. Somerville, Earthquake Engineering Research Institute (EERI), 499 14th Street, Suite 320, Oakland, CA 94612; e-mail: [skt@eeri.org](mailto:skt@eeri.org)*.

This project will result in a long-term research plan that will identify needs and opportunities to advance earthquake engineering and loss reduction.

**Household Impacts of the Nisqually Earthquake.** Funding: National Science Foundation, \$74,511, 12 months. Principal Investigators: *William B. Beyers and Stephanie E. Chang, Department of Geography, 426 Smith, University of Washington, Seattle, WA 98106; fax: (206) 543-3313; [beyers@u.washington.edu](mailto:beyers@u.washington.edu)*.

The moderate Nisqually earthquake, magnitude 6.8, that occurred on February 28 in Washington state, provides a unique opportunity to measure the economic impacts of such an event. These researchers will gather data via a telephone survey regarding the economic impacts of the quake in zones defined by ground motion levels. The data will cover: dwelling damage, financing for repairs, changes in economic behavior as a result of the quake, changes in mitigation and preparedness, and baseline economic and demographic information. The resulting database will test the hypothesis that actual losses exceeded official estimates because many categories of loss were not reported. Insights into the nature and extent of unreported losses may help public agencies better respond to future

disasters as well as better evaluate the benefits of predisaster mitigation investments. The research will also provide a reliable estimate of the total amount of loss incurred by households in the region.

**Reconnaissance of the Geotechnical Aspects of the February 28, 2001, Nisqually Earthquake.** Funding: National Science Foundation, \$20,000, 12 months. Principal Investigator: *Jonathan D. Bray, Department of Civil and Environmental Engineering, 437 Davis Hall, MC 1710, University of California, Berkeley, Berkeley, CA 94720-1710; (510) 642-9843; e-mail: bray@ce.berkeley.edu.*

This study will complete a post-earthquake reconnaissance effort begun the day after the quake and further document ground failure and building damage from this event.

**Collection of Perishable Data from the Nisqually Earthquake for Improving Casualty Loss Estimation Methodologies.** Funding: National Science Foundation, \$94,548, 12 months. Principal Investigators: *Kimberley I. Shoaf and Hope Seligson, Center for Public Health and Disaster Relief, 10911 Weyburn Avenue, Room 209, University of California-Los Angeles, Los Angeles, CA 90024; e-mail: kshoaf@ucla.edu.*

The data collected under this project will enhance existing injury and damage databases compiled for recent U.S. earthquakes and will build on current NSF-funded research to establish a standardized earthquake injury categorization scheme, intended to help refine casualty estimation models for earthquake response and mitigation. Injury data will be collected from hospital emergency department logs and abstracted from hospital patient records. Because information on building damage and repair cost is collected by various local jurisdictions and is often aggregated at the county and state level, detailed data may be available from a number of communities, and this information will be added to existing data on earthquake-related injuries.

**National Mass Fatalities Training and Response Center.** Funding: Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), \$376,856, 12 months. Recipient: *Kirkwood Community College, 6301 Kirkwood Boulevard, S.W., Cedar Rapids, IA 52404; (319) 398-5517; (800) 363-2220; info@kirkwood.cc.ia.us.* For program technical information, contact *Edwin Kent Gray, Chief, Emergency Preparedness and Response Branch, National Center for Environmental Health, CDC, 4770 Buford Highway, Mailstop F38, Atlanta, GA 30341; (770) 488-7100; e-mail: keg1@cdc.gov.*

This award will provide funding solely to Kirkwood Community College, as appropriated by Congress for fiscal year 2001, to develop the National Mass Fatalities Training and Response Center. This national training center will prepare and support communities, businesses, industry, government, and disaster response agencies nationwide for the proper handling of incidents involving mass fatalities and for responding to the needs of families and communities in the aftermath of such incidents.

**Digital Government: A Geospatial Decision Support System for Drought.** Funding: National Science Foundation, \$1,517,475, 36 months. Principal Investigators: *Stephen E.*

*Reichenback, Peter Z. Revesz, Jitender S. Deogun, Stephen M. Goddard, and William J. Waltman, Computer Science and Engineering Department, University of Nebraska-Lincoln, Lincoln NE 68588-0115; (402) 472-2401; fax: (402) 472-7767; e-mail: reich@unl.edu.*

This project will develop and integrate new information technologies to improve government services of the U.S. Department of Agriculture (USDA) Risk Management Agency, whose mission is to protect U.S. agriculture through sound risk management programs and education. The researchers hope to enhance the speed and resolution of drought risk assessment and to extend risk assessment to forecasts and economic analyses.

**Space Weather Impacts and National Policy.** Funding: National Science Foundation, \$55,000, 12 months. Principal Investigators: *William Hooke and Gene M. Fisher, American Meteorological Society, 45 Beacon Street, Boston, MA 02108; e-mail: hooke@dc.ametsoc.org.*

Hooke and Fisher will extend existing assessments of the technological, social, and economic impacts of space weather on our society and will identify means for accelerating the improvement and benefits of space weather services.

## Announcing the Consortium of Universities for the Advancement of Hydrologic Science

A number of recent studies by the National Academy of Sciences and other groups have articulated critical needs for vigorous new interdisciplinary programs of research and education in hydrologic science to provide the basis for sound, informed decisions at local, regional, national, and international levels. Science infrastructure in hydrology and related sciences is currently inadequate to meet many priority science questions and societal needs. Specifically, coordinated investments in instrumentation, field measurement strategies, and analytical tools are critically needed to gain greater understanding of hydrologic processes. In response to this need, the National Science Foundation granted \$1,212,447 over three years to establish the Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI) to facilitate such research.

During its first two years, the consortium will undertake science and implementation planning aimed at establishing a research infrastructure for long-term hydrologic observations, information systems, and hydrologic measurement technology. In the second year, plans and proposals for programs in education and technology transfer will also be developed.

For more information on this undertaking, contact the principal investigators: *Roger C. Bales, John S. Selker, Upmanu Lall, Marc B. Parlange, Mark W. Williams, and Christopher J. Duffy, American Geophysical Union, 2000 Florida Avenue, N.W., Washington, DC 20009; (202) 462-6900.*

# The Need for Sustained Drought Preparedness on a National Basis

## The Need

The very high costs of drought to the nation are well known. The need for an adequate and sustainable water supply for the nation is also well known. Studies have shown that the federal government alone spent \$3.3 billion during the 1953-1956 drought; \$6.5 billion again in the 1976-1977 drought, and about \$6 billion in 1988-1989. Generally, there is a costly drought somewhere in the U.S. each year. Moreover, the occurrence of significant water and power shortages and devastating wildfires are, of course, deeply interrelated with drought. Demands for water by a growing population and a dynamic economic system will only intensify.

The need to develop a sustainable strategy to deal with these problems is self-evident, as is the need to create a viable national structure to manage this strategy over the long term. These needs have been acknowledged at the national level for many years and have been more clearly defined in recent years, but a national drought strategy and structure still do not exist.

## Positive Action thus Far

Governments are addressing these problems and many state plans now exist that include a wide range of drought response and mitigation components. States and other water users have also developed water resources and conservation plans. A multi-state regional drought coordination council has been created in the western U.S. and has functioned well. But these actions by themselves are not adequate without a sustainable national strategy that provides direction, coordination, and momentum to planning and action by all levels of government and the public.

A national drought mitigation center has been established at the University of Nebraska to provide a focus for drought awareness, education, and preparedness activities. Although the center is efficient and effective, this activity should be funded through a federal agency rather than through congressional appropriations.

In addition, a national drought policy commission has been established by Congress and has submitted a report to the President and Congress with recommendations for action, stressing adoption and implementation of a national drought policy with preparedness and mitigation as its cornerstones. Although this was accomplished over a year ago, no further action has been taken. Informally, a federal interagency coordinating council has been established under the leadership of the Department of Agriculture.

## The Urgency

There are several reasons for the urgent need for Congressional action.

- The growing demand for energy increases the need for hydroelectric power as an important supplement to other forms of energy production. A multi-year and even a single-year drought in the West now will heavily impact national power supplies and the national economy as a whole. Such events are likely; Texas, California, and most other Western states have undergone many short-term droughts and at least three multi-

year droughts in the last century. However, drought is not purely a western or occasional event, as Florida and most other states can attest.

- In recent years there have been massive population shifts and growth that have sharply increased demand for water in many states.
- Changing agriculture and related businesses, including large-scale irrigation as well as other commercial and municipal needs for water, have all contributed to increased demand. Water needs along rivers in the West like the Colorado and the Columbia are consistently very high.

Rapidly rising demand and relatively constant supply require better drought preparedness and management at the federal level. This includes a firm strategy and an actively operating management structure. We cannot delay without incurring heavy future economic setbacks.

## Sustained National Drought Preparedness

There are many steps that should be taken at the national level to ensure effective and sustained national drought preparedness, including:

- Enactment of a national drought policy through passage of a National Drought Preparedness Act by Congress;
- Formal establishment by congressional action of a national drought council supported by inter-state regional councils;
- Designation of a lead federal agency for drought management. The authors believe that no matter how leadership is designated (single agency or joint agency), the Federal Emergency Management Agency (FEMA) should play a major role in drought policy implementation. Its crisis management skills and capabilities are crucially important to successful interagency response and mitigation;
- Continued improvement of the national drought monitoring system, its products, and means of information dissemination;
- Enhancement and institutionalization of funding for the National Drought Mitigation Center so that it might expand its monitoring, public information, and awareness and mitigation programs.

Without these actions the nation will continue to spend billions on drought relief that does not meet current needs and is usually slow in reaching the public. Again, there is an urgent need for Congress to formalize drought preparedness and to integrate this with other power and economic initiatives currently being considered. Savings over the long run will be substantial.

Jack Truby and Len Boulas  
Members, Colorado Drought Task Force  
and Western Governors Drought Council  
Response Working Group

*Both authors have been involved with drought preparedness for the past 24 years. They invite your comments regarding this article and can be contacted at 3408 East Virginia Avenue, Denver, CO 80209; (303) 733-0892; e-mail: YoYoT@aol.com.*

## A Global Drought Preparedness Network Creating a Network of Regional Networks

Drought is a creeping, slow-onset natural hazard that is a normal part of climate for virtually all regions of the world; however, it can result in serious economic, social, and environmental impacts. Its onset and end are often difficult to determine, as is its severity.

Drought affects more people than any other natural hazard.

The impacts of drought, like those of other natural hazards, can be reduced through mitigation and preparedness. All drought-prone nations should develop national drought policies and preparedness plans, that emphasize risk management rather than follow the traditional ad hoc approach of crisis management, where the emphasis is on reactive emergency response. Crisis management decreases self-reliance and increases dependence on government and donors. It is critical for

drought-prone regions to better understand the drought climatology of their region and establish comprehensive and integrated early warning systems, which can provide timely and reliable information to decision makers at all levels. Governments must also understand how other issues—increasing and shifting population, technology, government policies, land use and other natural resource management practices, desertification processes, and water use trends—affect their nation's vulnerability to drought.

Because of increasing concern over the escalating impacts of drought and society's inability to effectively respond to these events, developing and developed countries are now placing more emphasis on the adoption of more proactive approaches to drought management. A major constraint to development of a more risk-based drought management approach is the lack of information and experience necessary to accomplish this objective. A Global Drought Preparedness Network (GDPN) could provide the opportunity for nations and regions to share experiences and lessons learned (successes and failures) through a virtual network of regional networks. This network could provide its participants with critically needed information on drought policies, emergency response measures, mitigation actions, planning methodologies, stakeholder involvement, seasonal climate forecasts, early warning systems, automated weather networks, climate

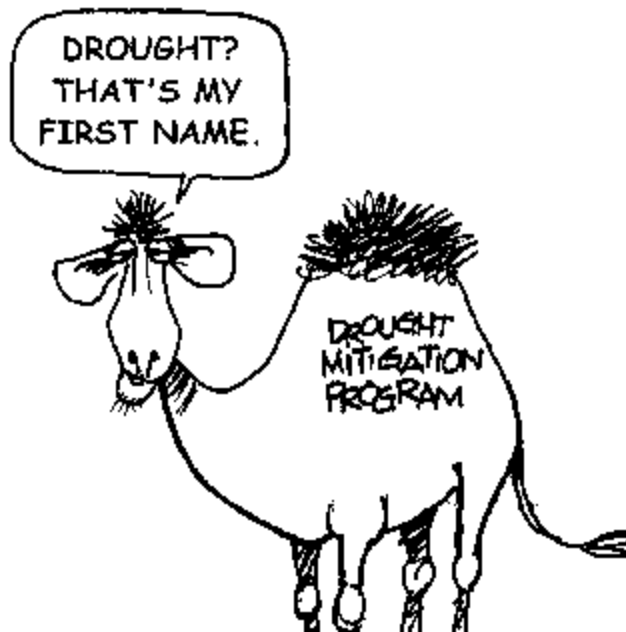
indices, impact assessment methodologies, demand reduction and water supply augmentation programs and technologies, and procedures for addressing environmental conflicts.

The GDPN could build on the existing network of scientists, policy makers, and others maintained by the National Drought Mitigation Center (NDMC) and the International Drought Information Center at the University of Nebraska. The NDMC's drought information clearinghouse web site could be enhanced to provide more information on drought monitoring, mitigation, and preparedness techniques and methodologies and linkages to the principal institutions in each region. The GDPN could also assist regional networks in the development of comprehensive drought-related web sites that link the principal national and regional institutions. To date, the concept of regional networks has been discussed with officials in the Mediterranean region, South America, North America, Sub-Saharan Africa, eastern and central Europe, and Asia and the Pacific region.

With increasing pressure on water and other natural resources because of increasing and shifting populations, it is imperative for all nations to improve their capacity to manage water supplies during water-short years. Working individually, many nations and regions will be unable to improve drought coping capacity. Collectively, working through global and regional partnerships, we can achieve the goal of reducing the magnitude of economic, environmental, and social impacts associated with drought in the 21st century. A challenge for national, regional, and international institutions is to collaborate on drought preparedness and mitigation issues and share information to improve societal capacity to reduce the risks associated with drought.

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School of Natural Resource Science and  
National Drought Mitigation Center  
International Drought Information Center  
University of Nebraska

Readers interested in obtaining further information about drought and the Global Drought Preparedness Network can contact the author at the *National Drought Mitigation Center, International Drought Information Center, 239 L.W. Chase Hall, University of Nebraska, Lincoln, NE 68583-0749; (402) 472-4270 or (402) 472-6707; fax: (402) 472-6614; e-mail: dwilhite1@unl.edu; WWW: enso.unl.edu/ndmc.*



# NEES News

## NEES Design Award Goes to Illinois

Development of a national cyber-network for earthquake engineering research is now underway, thanks to the \$10 million research grant awarded to the University of Illinois-Urbana Champaign by the National Science Foundation (NSF). The funding launches the design and implementation of the George E. Brown, Jr., Network for Earthquake Engineering Simulation (NEES), which, when completed in 2004, will allow multiple researchers to share facilities, equipment, and data via a high-speed internet grid.

The university's National Center for Supercomputing Applications is collaborating with Argonne National Laboratory, the University of Michigan, the University of Southern California, and TeraScale, LLC. The team recently completed a six-month study to prepare for the design phase.

NEES will allow researchers to share and remotely operate experimental equipment at more than 20 advanced earthquake engineering facilities linked to the network. The equip-

ment, including shake tables, geotechnical centrifuges, a tsunami wave basin, and laboratory and field stations, will model and analyze earthquake forces and help engineers design buildings and infrastructure to withstand those hazards. Earlier, NSF awarded \$45 million to 10 institutions to build and upgrade equipment in anticipation of the shared-use network.

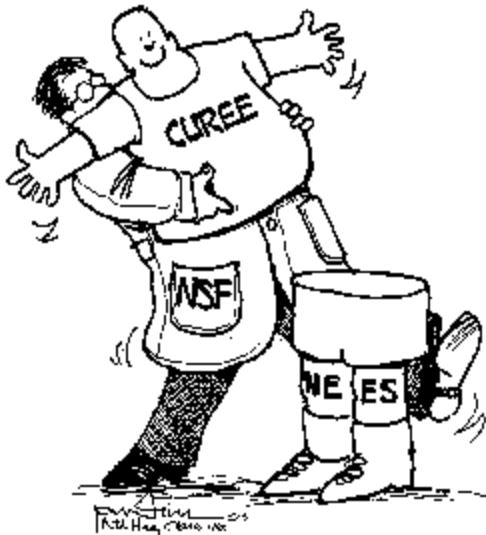
For more information about NEES, see the NSF web site: [www.eng.nsf.gov/nees](http://www.eng.nsf.gov/nees).

## CUREE Selected to Form NEES Consortium

The National Science Foundation (NSF) has announced that the Consortium of Universities for Research in Earthquake Engineering (CUREE) has been selected to develop the new organization that will manage the NSF-funded Network for Earthquake Engineering Simulation (NEES) during the 2004-2014 decade (see the *Observer*, Vol. XXV, No. 4, p. 16; Vol. XXV, No. 2 p. 18; and Vol. XXIII, No. 5, p. 2).

Using Internet technology to integrate geographically distributed national facilities, the NEES project will transform earthquake engineering research from its current reliance on physical experiments to investigations based on integrated models, databases, and model-based simulation. The NEES System Integration project, along with the individual equipment sites and the new NEES Consortium, will all be operational by the fall of 2004. At that point, the earthquake engineering research community will be able to function as a single virtual laboratory—a “collaboratory”—even though the facilities and individuals will be geographically distributed.

Further information about this project can be obtained from the CUREE web site: [www.curee.org](http://www.curee.org); or from the new site CUREE has established for NEES program-wide projects: [www.nees.org](http://www.nees.org). Interested persons can also contact CUREE, 1301 South 46th Street, Richmond, CA 94804; (510) 231-9557; fax: (510) 231-5664; e-mail: [curee@curee.org](mailto:curee@curee.org).



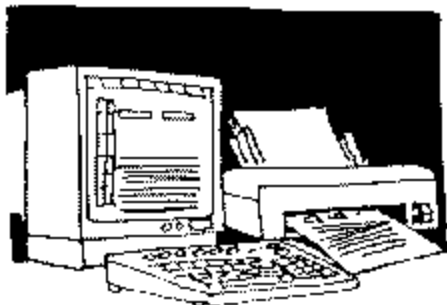
## A Birthday of Note

Nearly 90 years ago in Chicago, Mr. and Mrs. White celebrated the arrival of a son who would grow up to become a renowned geographer, scientist, and citizen of the earth, as well as one of the principal framers of natural hazards research and public policy in the United States and around the world. Among his many accomplishments, Gilbert White founded the Natural Hazards Center in 1976 and has remained its mentor ever since.

On November 26, 2001, Gilbert will celebrate his 90th birthday. To mark this milestone and Gilbert's many contributions to humankind, friends are invited to send cards, letters, and other missives honoring Gilbert and/or reflecting on his work and contributions. These cards will be shared with him at a party in his honor on December 3 on the campus of the University of Colorado in Boulder.

Correspondence should be sent to *Gilbert F. White, Natural Hazards Research and Applications Information Center, 482 UCB, University of Colorado, Boulder, CO 80309-0482; e-mail: [hazctr@colorado.edu](mailto:hazctr@colorado.edu)*.





## INTERNET PAGES

Below are new or updated Internet resources the Hazards Center staff has found useful. For a more complete list of some of the better sites dealing with hazards and disasters, see [www.colorado.edu/hazards/sites/sites.html](http://www.colorado.edu/hazards/sites/sites.html).

### September 11

[www.firstgov.gov/featured/usgresponse.html](http://www.firstgov.gov/featured/usgresponse.html)

The U.S. government's comprehensive "FirstGov" web site provides a compendium of federal government information and resources available on the web that address the many aspects of the September 11 disaster—including response and recovery.

[www.redcross.org/services/disaster/keepsafe/unexpected.html](http://www.redcross.org/services/disaster/keepsafe/unexpected.html)

The American Red Cross has developed a brochure that lists many of the things people can do to prepare for a terrorism attack. Entitled **Terrorism—Preparing for the Unexpected** the brochure addresses common questions that the Red Cross has been asked and that the agency feels it can knowledgeably address. It is intended to be informative, nonalarmist, but factual and forthright and covers shelter-in-place and evacuation instructions, as well as other useful information. The brochure will soon be available in downloadable PDF format from the same web site and will also be printed in hard-copy as a brochure that local Red Cross chapters can order. It will also be produced in Spanish electronically and in print form.

[www.ibhs.org](http://www.ibhs.org)

[www.ibhs.net/ibhsdocuments/pdf/recovery.pdf](http://www.ibhs.net/ibhsdocuments/pdf/recovery.pdf)

To aid small and mid-size businesses affected by the events of September 11th, the Institute for Business and Home Safety (IBHS) is providing a new brochure, **Getting Back to Business . . . A Guide for the Small Business Owner Following Disaster**, both through its member companies in New York and on-line. The guide is an overview of what business owners need to know—especially about working with their insurer—following a disaster. Individuals interested in distributing the brochure should contact *Hilary Thompson, IBHS, 1408 North Westshore Boulevard, Suite 208, Tampa, FL 33607; (813) 286-3400, ext. 223; fax: (813) 286-9960.*

[www.disaster-central.com](http://www.disaster-central.com)

Disaster Central, a new prototype, web-based knowledge portal, is now available from the URL above. This educational site features substantive digital resources organized by topic and should be of interest to researchers, educators, and practitioners. The site now includes a list of useful sites and documents regarding terrorism. Suggestions and comments are invited, and potential sponsors and partners are actively being sought. For more information, or to offer ideas or resources, contact the site's creator, *Claire B. Rubin, Claire B. Rubin and Associates, e-mail: cbrubin@mindspring.com.*

[www.disaster-resource.com](http://www.disaster-resource.com)

[www.disaster-resource.com/cgi-bin/template.cgi?content\\_page=resources.htm](http://www.disaster-resource.com/cgi-bin/template.cgi?content_page=resources.htm)

The people that bring you the on-line **Disaster Resource Guide** have created a web page focusing on the September 11th tragedy. "September 11th: Resources for Recovery" lists resources in eight categories:

- 1) Free Response and Recovery Resources from the Private Sector
- 2) Additional Response and Recovery Resources from the Private Sector
- 3) Response and Recovery Resources from the Public Sector
- 4) Articles for Disaster Response and Human Concerns
- 5) Information Updates
- 6) Victim Information
- 7) How You Can Help
- 8) How to Report Tips for the Investigation

## All Hazards

[www.riskinstitute.org](http://www.riskinstitute.org)

The Public Entity Risk Institute (PERI) has published a new guide that provides small public entities with a user-friendly process to identify and analyze their risks across the entire organization and all activities. Available from the PERI web site above, **Risk Identification and Analysis: A Guide for Small Public Entities**, includes ready-to-use forms and potential loss and impact summaries to aid the risk identification process, particularly among public entities too small to support a full-time risk manager.

[www.fema.gov/emi/edu](http://www.fema.gov/emi/edu)

[www.fema.gov/emi/edu/hec2001.htm](http://www.fema.gov/emi/edu/hec2001.htm)

On its web site, the Federal Emergency Management Agency's Higher Education Project has posted a report on the Emergency Management Higher Education Conference held in early June. Included are copies of slide presentations given as well as an annotated transcript of a presentation by the project's director, Wayne Blanchard.

[visibleearth.nasa.gov](http://visibleearth.nasa.gov)

Visible Earth is a searchable directory, produced by the National Aeronautics and Space Administration (NASA), of high tech images, visualizations, and animations of the earth. The directory is intended to provide a consistently updated central catalog of earth-science-related visualizations and images. Designed to aid the public, as well as the media, scientists, and educators, the Visible Earth includes images depicting earthquake dynamics, earthquake occurrences, earthquake predictions, and seismic profiles. Additional categories include continental tectonics, crustal motion, and faults.

[www.paho.org/disasters](http://www.paho.org/disasters) (Click on "Disaster Management Tools")

[www.paho.org/english/ped/supplies.htm](http://www.paho.org/english/ped/supplies.htm)

The Pan American Health Organization/World Health Organization (PAHO/WHO) has prepared a new brochure, **Humanitarian Assistance in Disaster Situations: A Quick Guide for Effective Donations**, available from the first web site above, (along with a half dozen other publications on emergency and disaster management) and a new book, **Humanitarian Supply Management and Logistics in the Health Sector**, available from the second URL, in both English and Spanish.

[www.redr.org](http://www.redr.org)

[www.redr.org/training/index.htm](http://www.redr.org/training/index.htm)

RedR is an international charity with offices around the globe working to relieve suffering in disasters by selecting, training, and providing competent and effective relief personnel to humanitarian aid agencies world-wide. The RedR web site provides complete information about the agency, newsletters and other publications, access to the RedR library, and, at the second URL above, a comprehensive list of upcoming RedR training programs and other training resources.

[www.disaster.info.desastres.net/andino/](http://www.disaster.info.desastres.net/andino/)

This Spanish-language web site is intended to support institutions working on disaster management in Andean countries—Bolivia, Colombia, Ecuador, Peru, and Venezuela. It both provides useful information on disasters and disaster management in the region and promotes information exchange among the various institutions dealing with these risks.

## Earthquakes

[www.eeri.org/earthquakes/Reconn/Arequipa\\_Peru/Arequipa.html](http://www.eeri.org/earthquakes/Reconn/Arequipa_Peru/Arequipa.html)

[www.eqnet.org](http://www.eqnet.org)

As part of its "Learning from Earthquakes Project," the Earthquake Engineering Research Institute (EERI) sends reconnaissance teams to the sites of major earthquakes and publishes the resulting field reports in both hard copy and on the web. The institute's latest offering, by Eduardo Fierro, is on the Arequipa, Peru, earthquake of June 23, 2001. For those interested in the Arequipa event, as well as other significant recent earthquakes, comprehensive listings of the reports generated by these events are available from the Earthquake Information Network (EQNET) web site at the second URL above.

[geohaz.org/project/gesi/GesiIntro.htm](http://geohaz.org/project/gesi/GesiIntro.htm)

As the world economy grows, urban areas are rapidly increasing in size, especially in developing nations. These cities are in a unique position to make decisions that can greatly affect their vulnerability to future risks. To implement successful development plans, cities must be able to assess their risk from natural disasters, predict future risk patterns with and without mitigation, and track the long-term success of efforts that have been undertaken. The Global Earthquake Safety Initiative (GESI) was developed to meet these needs, offering cities access to information that is necessary to begin the process of addressing urban earthquake safety. In many ways GESI builds on the highly successful RADIUS (Risk Assessment Tools for the Diagnosis of Urban Areas against Seismic Disasters) Project launched as part of the International Decade for Natural Disaster Reduction (IDNDR).

[www.whfreeman.com/bolt/content.htm](http://www.whfreeman.com/bolt/content.htm)

This web site was created to complement the classic text **Earthquakes**, by Bruce A. Bolt (now in its fourth edition). The site is a free resource for students and instructors and offers a variety of electronic instructional and learning tools designed to support the textbook and provide additional insights into earthquakes. Resources are organized by textbook chapter and by content type, and include web links, flash cards, animations and images, and news about recent earthquakes and earthquake-related happenings.

[www.edm.bosai.go.jp/english.htm](http://www.edm.bosai.go.jp/english.htm)

[www.edm.bosai.go.jp/team3/pamph3\\_e.html](http://www.edm.bosai.go.jp/team3/pamph3_e.html)

The main purpose of the Earthquake Disaster Mitigation Center (EDM), part of the National Research Institute for Earthquake Science and Disaster Prevention (NIED) in Japan, is to produce “frontier research on earthquake disaster mitigation for urban regions.” EDM’s web site provides information about the center’s “Development of Earthquake and Tsunami Disaster Mitigation Technologies and their Integration for the Asia-Pacific Region” (EQTAP) project, and the center’s three research teams: the Disaster Process Simulation Team, the Disaster Information System Team, and the Structural Performance Team. The center has recently released two reports:

- **Simulation and Prediction of Earthquake Ground Motion and Structural Performance**, available in PDF format at the second URL above; and,
- **The Report on the Chi-Chi, Taiwan, Earthquake of September 21, 1999**, available on CD-ROM and including material also available from the EDM web site.

Additional field reports and other documents are available from this site. To order publications or obtain more information about the center, contact EDM, NIED, 2465-1 Mikiyama, Miki, Hyogo 673-0433, Japan; tel: + 81-794-83-6651; fax: + 81-794-83-6685; e-mail: [webmaster@edm.bosai.go.jp](mailto:webmaster@edm.bosai.go.jp).

## Extraterrestrial Hazards

[www.sec.noaa.gov](http://www.sec.noaa.gov)

[www.sec.noaa.gov/SWN](http://www.sec.noaa.gov/SWN)

The web site of NOAA’s Space Environment Center (SEC) is the “Official Source of Space Weather Alerts, Warnings, and Forecasts.” It provides on-line data, educational materials about space weather hazards, descriptions of SEC projects and services, and a “Space Weather Now” page at the second URL above with information on imminent or ongoing solar radiation storms, geomagnetic storms, and radio blackouts, as well as real-time information about solar and auroral activity. The page also links to separate pages for SEC user groups (navigation, radio, electric power, satellite operators, and the media).

## Climatological Hazards

[www.climatehotmap.org](http://www.climatehotmap.org)

This site provides a remarkable map that illustrates the local consequences of global warming. Developed by the World Resources Institute, Union of Concerned Scientists, Environmental Defense Fund, Natural Resources Defense Council, Sierra Club, U.S. Public Interest Research Group, and World Wildlife Fund, the map categorizes local events into “fingerprints” and “harbingers.” Clicking on any of the indicated local sites around the world provides information about what is happening and what could happen at that location due to global warming.

[www.clivar.org](http://www.clivar.org)

[clivar-search.cms.udel.edu/projects](http://clivar-search.cms.udel.edu/projects)

CLIVAR is an international research program on CLimate VARIability and predictability addressing such questions as: Will there be an El Niño next year? Will the next monsoon cause drought or flooding? What will the next European winter be like? Should we expect more extreme weather events? and How much will sea level rise? It is part of the wider World Climate Research Programme (WCRP). The CLIVAR web site provides background information about the program, recent news, descriptions of ongoing projects, publications, and much other information about the hazards associated with climate variability and change.

CLIVAR has recently implemented its SPRINT (Searchable Program Information Network) database at the second URL above to provide an overview of the status of the program’s major projects, along with objectives, timelines, contacts, web sites, and data.

## Floods

[reports.eea.eu.int/Environmental\\_Issues\\_No\\_21/en/enviissue21.pdf](http://reports.eea.eu.int/Environmental_Issues_No_21/en/enviissue21.pdf)

As part of its assessment of the sustainable use of water in Europe, the European Environment Agency (EEA) has produced this report, **Sustainable Water Use in Europe — Part 3: Extreme Hydrological Events: Floods and Droughts**. The document presents an overview of the main causes and impacts of these extreme events in Europe and provides an overview of policy

responses to prevent such disasters or reduce resultant damage. It also describes some of the major recent disasters in the region, and thus provides a comprehensive survey of flood and drought hazards in Europe.

[www.panda.org/news/press/news.cfm?id=2386](http://www.panda.org/news/press/news.cfm?id=2386)

New research commissioned by the World Wildlife Federation (WWF) has warned that dams built with the promise of reducing flooding can often exacerbate the problem with catastrophic consequences, as some recent floods have shown. The research paper, **Dams and Floods** shows that dams are often designed with poor knowledge of the potential for extreme floods. Where data does exist, it may fail to consider such current risks as increased deforestation or the drainage of wetlands. The loss of these natural sponges for floodwaters can increase the risk of extreme floods. The paper argues that many of these problems could be avoided if the recommendations of the World Commission on Dams were applied to future dam projects. The WWF web site above not only provides a news release about these findings, but also the complete paper in Microsoft Word format.

## Lightning and Other Severe Weather

[www.vdem.state.va.us/01light/](http://www.vdem.state.va.us/01light/)

The Virginia Department of Emergency Management (VDEM) maintains this “Lightning Safety 2001 Homepage” with pages covering lightning hazards, lightning facts, lightning statistics, preparing for a thunderstorm, and public service announcements. It also provides eye-opening survivor stories and other accounts, as well as policy documents and medical handbooks. It includes an excellent list of related Internet resources, some of which are listed below.

[205.156.54.206/om/wcm/lightning/index.htm](http://205.156.54.206/om/wcm/lightning/index.htm)

[205.156.54.206/om/ttl.pdf](http://205.156.54.206/om/ttl.pdf)

The first URL is the home page for a National Weather Service campaign on lightning awareness and safety entitled “Lightning Kills, Play It Safe.” The site notes that an average of 73 people are killed by lightning annually in the U.S.—more than the number killed by tornadoes or hurricanes. The site includes quick facts about lightning, survivor stories, success stories, photos, and other information.

From the second URL, those interested can download the complete text of **Thunderstorms, Tornadoes, Lightning—Nature’s Most Violent Storms**, a 16-page preparedness guide that includes tornado safety information for schools.

[www.srh.noaa.gov/mlb/ltgcenter/intro.html](http://www.srh.noaa.gov/mlb/ltgcenter/intro.html)

Through its Southern Region Office in Melbourne, Florida, the National Weather Service also offers this “Lightning Information Center” web site, which includes presentations on lightning safety, basic lightning information, details about the latest lightning research, and even a lightning quiz.

[www.weather.com/safeside/lightning/index.html](http://www.weather.com/safeside/lightning/index.html)

Project Safeside is a joint program of the American Red Cross and the Weather Channel to educate individuals and families about meteorological hazards and to increase their recognition of the importance of preparing for natural disasters. This Safeside web page describes when and where people are at risk due to lightning, what to do if a warning is issued, and what to do before and after lightning strikes or a thunderstorm passes by.

## Wildfire

[www.ibhs.org](http://www.ibhs.org)

The Institute for Business and Home Safety (IBHS) has prepared a **Homeowners Guide to Wildfire Retrofit**, now available from the institute’s web site above.

[www.nap.edu/catalog/10173.html](http://www.nap.edu/catalog/10173.html)

The Natural Disasters Roundtable (NDR) was established by the U.S. National Academies in 2000 to facilitate and enhance communication and the exchange of ideas among scientists, practitioners, and policy makers concerned with natural disasters. The first roundtable, held in January 2001 in Washington, D.C., examined urban/wildland fire. This topic was selected in response to the outbreak of tens of thousands of fires during the 2000 season that scorched 7.2 million acres and destroyed more than 850 structures across the West and southeastern U.S. The most publicized, though not the largest of these, was the Cerro Grande Fire in Los Alamos, New Mexico, in May and June.

The one-day forum sought to identify a number of key issues for science and policy that may be addressed in more comprehensive studies in the future. A nine-page summary of that roundtable, **To Burn or Not to Burn: Summary of the Forum on Urban/Wildland Fire, January 26, 2001, Washington, DC**, is now available from the National Academy Press web site above. The summary—available only on-line—provides an overview of the problem, a discussion of the role of government in addressing wildfire problems, a brief summary of mitigation options, a review of the National Fire Plan, and a list of recommendations from roundtable participants concerning policy, insurance, and research options.

## Hazardous Materials/Disaster Medicine

[www.atsdr.cdc.gov/mhmi.html](http://www.atsdr.cdc.gov/mhmi.html)

The U.S. Centers for Disease Control (CDC) Agency for Toxic Substances and Disease Registry has placed its "Managing Hazardous Material Incidents" series on the web. The series comprises three volumes:

- **Volume I — Emergency Medical Services: A Planning Guide for the Management of Contaminated Patients**
- **Volume II — Hospital Emergency Departments: A Planning Guide for the Management of Contaminated Patients**
- **Volume III — Medical Management Guidelines (MMGs) for Acute Chemical Exposures**

A training video for volumes I and II, **Community Challenge: Hazardous Materials Response and the Emergency Medical System**, is also available.

## Hurricanes

[www.csc.noaa.gov/hfloyd](http://www.csc.noaa.gov/hfloyd)

The National Oceanic and Atmospheric Administration (NOAA) Coastal Services Center now offers the 50-page volume, **Lessons Learned Regarding the Use of Spatial Data and Geographic Information Systems (GIS) During Hurricane Floyd** free from its web site at the URL above. The report assesses both the positive and problematic aspects of using spatial data and geographic information systems (GIS) in response and recovery following Hurricane Floyd.

### Free Publications Available on How to Deal with Trauma

Because of the nation's national tragedy, the American Academy of Experts in Traumatic Stress (AAETS) has updated its web site and made several documents concerning traumatic stress available for free. The documents include:

- **Parent Guidelines for Crisis Response**
- **Teacher Guidelines for Crisis Response**
- **The 10 Stages of Acute Traumatic Stress Management**
- **Indicators Suggestive of a Greater Likelihood of Self-Destructive Potential**
- **"High-Risk" Indicators for Posttraumatic Stress Disorder**
- **How Do People Respond During Traumatic Exposure?**
- **How Can Emergency Responders Help Grieving Individuals?**
- **What Specific Strategies Can Emergency Responders Utilize to Connect with Particularly Challenging Individuals?**
- **How Can Emergency Responders Manage Their Own Response to a Traumatic Event?**
- **The ATSM Field Pack**

To obtain these documents, on the World Wide Web see [www.aaets.org](http://www.aaets.org).

## An On-Line Course for Emergency Managers

The FEMA Higher Education Project offers an on-line course entitled "Terrorism and Emergency Management," developed by William Waugh Jr., of the Department of Public Administration and Urban Studies, Andrew Young School of Policy Studies, Georgia State University. It is available for download from FEMA's web site: [www.fema.gov/emi/edu](http://www.fema.gov/emi/edu).

While this 374-page upper division college course was developed for academics who teach in emergency management bachelor degree programs, it can be downloaded and read for its informational content. Topics include the history of terrorism in the U.S., domestic and international terrorism, law enforcement and national security aspects, applying the emergency management framework to terrorism, terrorism hazard analysis and risk assessment, structural and nonstructural terrorism mitigation strategies, preparedness for major and special events, and responding to terrorist-sponsored disasters.

The material includes numerous references to government and academic sources, web sites, and publications for additional reading and research.

To obtain the "Terrorism and Emergency Management" course, go to the web site noted above, click on "Academic Emergency Management Higher Education Courses" on the left side of the screen (third item down), and then on the course title.

Anyone using this material is welcome to send recommendations and comments; because of recent events, FEMA/EMI intends to redo the course, perhaps introducing a broader multidisciplinary perspective. Comments and suggestions can be addressed to *Wayne Blanchard, FEMA Emergency Management Higher Education Project Manager*, e-mail: [wayne.blanchard@fema.gov](mailto:wayne.blanchard@fema.gov).



## CONFERENCES AND TRAINING

*International Conference on Disaster Management Rehabilitation, Reconstruction, and Long-Term Development.* Sponsors: State University of New York at Binghamton, USA; and York University, Toronto, Canada. Host: Indian Institute of Management. Ahmedabad, Gujarat, India: January 25-27, 2002. January 26, 2002, will mark the anniversary of the devastating Gujarat earthquake in India. To recognize that anniversary, this conference will bring together officials from government, aid and relief organizations, multinational corporations, international finance and development bodies, nongovernmental organizations, the media, academia, and private enterprise to discuss and appraise the disaster management strategies immediately following the Gujarat quake. However, the conference will also address broader issues that arose as indirect consequences of the quake, such as: the international efficacy of immediate disaster response in general, in an era of globalization; perceptions of what constitutes an international disaster deserving of international attention and aid; the role of different actors, such as nongovernmental organizations and various media, in creating and maintaining such perceptions; the degree of harmonization between long-term redevelopment, reconstruction, and rehabilitation strategies developed by the domestic and international communities and their institutions not just for Gujarat, but for other recent natural disaster areas such as Turkey, El Salvador, and Bangladesh, and for El Niño-affected areas; contrasts among strategies adopted to remediate social disaster areas, such as the Congo and the Balkans; and monitoring and evaluations processes for short-term relief and longer-term redevelopment strategies. Papers addressing these and any other areas of disaster management are welcome. In particular, given the events of September 11, papers on issues concerned with terrorism and war-related disasters including discussions of refugee administration are welcome. The meeting organizers hope that information will be shared across disciplines, and therefore the conference is open to specialists from all fields. Abstracts of no more than 150 words should be submitted by November 30, to Keith Lehrer, 282 Atkinson College, York University, 4700 Keele Street, North York, Ontario, Canada M3J 1P3; fax: (416) 736-5963; e-mail: klehrer@yorku.ca.

*Disaster Management 2002.* Host: National Institute for Government Innovation (NIGI) and George Washington University. Las Vegas, Nevada: January 28-29, 2002. This conference will bring together the many disciplines involved in dealing with both natural and human-caused disasters. It will address issues faced by professionals in emergency manage-

ment, law enforcement, fire, emergency medicine, small and large businesses, and insurance. Details are available by contacting NIGI, (888) 670-8200; fax: (941) 365-2507; e-mail: register@iirusa.com; WWW: www.nigi.org.

*Symposium on Best Practices in Humanitarian Information Exchange.* Organizers: United Nations ReliefWeb Project, in collaboration with the Field Information Support Project of the U.N. Office for the Coordination of Humanitarian Affairs. Geneva, Switzerland: February 4-7, 2002. Additional information on this rescheduled meeting is available on the World Wide Web: www.reliefweb.int/symposium.

*Sixth Asia-Pacific Conference on Disaster Medicine.* Sponsors: Ministry of Health, Government of Japan, and many others. Fukuoka, Japan: February 19-22, 2002. The chair of this congress has stated, "We should examine the fundamental issues surrounding new disasters [resulting from] environmental changes in the earth, the biological and chemical hazards caused by scientific development and progress, as well, natural disasters related to increasing size of . . . cities. Our task is to establish effective countermeasures against all kinds of disasters making full use of the latest scientific and academic approaches." A call for papers has been issued. The conference will be conducted in English. For information about the program and scientific content, contact the Congress Organizing Committee, Department of Traumatology and Critical Care Medicine, Kurume, University School of Medicine, Attn: Takahisa Kawashima, 67, Asahi-machi, Kurume, Fukuoka, 830-0011, Japan; tel: + 81-942-35-3311 ext: 3553; fax: + 81-942-35-3920; e-mail: deptccm@med.kurume-u.ac.jp; WWW: www.trip.co.jp/6thapcdm. For registration information, contact KJ Planning Inc., 1F Shin KBC Building, 1-1-35, Nagahama, Chuo-ku, Fukuoka, 810-0072, Japan; tel: + 81-92-751-3244; fax: + 81-92-726-2384; e-mail: 6thapcdm@trip.co.jp; WWW: www.trip.co.jp/6thapcdm.

*Regional LIDERES 2002 Course on Disaster Management.* Hosted by: Pan American Health Organization (PAHO). Buenos Aires, Argentina: March 25 - April 11, 2002. PAHO's LIDERES course is intended for top-level professionals with broad experience in disaster situations from a wide variety of organizations and sectors (health ministries, national disaster offices, the Red Cross, financing institutions, U.N. and other cooperating agencies). The course will be conducted in Spanish. For details, contact PAHO, Emergency Preparedness

and Disaster Relief Coordination Program, 525 Twenty-third Street, N.W., Washington, DC 20037-2895; fax: (202) 775-4578; e-mail: [curso-lideres@paho.org](mailto:curso-lideres@paho.org); WWW: [www.disaster.info.desastres.net/LIDERES](http://www.disaster.info.desastres.net/LIDERES).

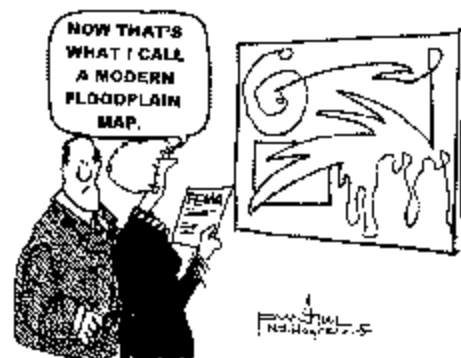
*National Floodproofing Conference II. Sponsors: Association of State Floodplain Managers (ASFPM) and others. Tampa, Florida: March 25-28, 2002.* The Second National Floodproofing Conference will showcase various approaches to floodproofing, particularly methods, products, and programs that have been developed since the first National Floodproofing Conference in 1998. The conference is intended for engineers, architects, representatives from all levels of government (with special focus on local government), building officials, floodplain managers, mitigation officers, floodproofing materials suppliers and manufacturers, floodproofing service providers, as well as representatives from the banking, insurance, and real estate industries. The program will include a flood insurance forum, workshops, short courses, poster presentations, product exhibits, and seminars on all aspects of floodproofing from government regulation to project design and financing. More information is available from the ASFPM web site: [www.floods.org](http://www.floods.org); or by contacting Diane Brown, ASFPM, 2809 Fish Hatchery Road, Suite 204, Madison, WI 53713; (608) 274-0123; fax: (608) 274-0696; e-mail: [asfpm@floods.org](mailto:asfpm@floods.org); WWW: [www.floods.org](http://www.floods.org).

*Improving Post-Disaster Reconstruction in Developing Countries. Sponsor: IF Research Group, University of Montreal. Montreal, Canada: May 25-27, 2002.* As populations in developing countries become increasingly vulnerable to natural catastrophes, improved strategies for postdisaster reconstruction are needed more than ever. This conference will promote a pluralistic approach in which building design is coupled to organizational design, and local and imported technologies and approaches are merged. The meeting will include both plenary meetings and parallel workshops. A call for papers has been issued, and abstracts are due December 1, 2001. For more information, contact Colin H. Davidson; *Faculté de l'aménagement, Université de Montréal, P.O. Box 6128, Main Post Office, Montreal, Québec H3C 3J7, Canada*; tel: (514) 343-2108; fax: (514) 343-2455; e-mail: [dav0528@attglobal.net](mailto:dav0528@attglobal.net) or [gonzalo.lizarrande@umontreal.ca](mailto:gonzalo.lizarrande@umontreal.ca).

*Volcanism and the Earth's Atmosphere. Sponsor: American Geophysical Union (AGU) Chapman Conference Series. Thera, Greece: June 17-21, 2002.* Volcanic eruptions can have a profound effect on the earth's atmosphere and environment on all time scales. From determining the composition of atmospheric gases to endangering aviation, volcanic activity can alter the atmosphere in ways that both govern and alter human activities. To better understand these phenomena, the International Association of Volcanism and Chemistry of the Earth's Interior (IAVCEI) and the International Association of Meteorology and Atmospheric Science (IAMAS) formed the Commission on Volcanism and the Earth's Atmosphere at an AGU Chapman Conference on Climate, Volcanism, and Global Change held in 1992 following the massive eruption of Mt. Pinatubo in 1991. This 10-year anniversary conference will bring together interested volcanologists and climatologists

to review progress made since that earlier meeting and to formulate the agenda for future research. Abstracts are due February 1, 2002. For details, contact Alan Robock, Environmental Science, Rutgers University, 14 College Farm Road, New Brunswick, NJ 08901; e-mail: [roboc@envsci.rutgers.edu](mailto:roboc@envsci.rutgers.edu). As the conference program is developed, additional information will be available from [www.agu.org/meetings/chapman.html](http://www.agu.org/meetings/chapman.html). To be placed on a mailing list, send an e-mail to [meetinginfo@agu.org](mailto:meetinginfo@agu.org).

*Association of State Floodplain Managers (ASFPM) Annual Conference: Breaking the Cycle of Repetitive Flood Loss. Phoenix, Arizona: June 23-28, 2002.* For information about this conference, contact Diane Brown, ASFPM, 2809 Fish Hatchery Road, Suite 204, Madison, WI 53713; (608) 274-0123; fax: (608) 274-0696; e-mail: [asfpm@floods.org](mailto:asfpm@floods.org); WWW: [www.floods.org](http://www.floods.org).



*Defending the Integrity of Ground Water: The Impact of Natural and Manmade Disasters. Sponsor: National Ground Water Association (NGWA). Washington, D.C.: July 10-12, 2002.* This conference will address how drought, floods, earthquakes, tornadoes, hurricanes, volcanoes, and global change, as well as human-caused calamities, can affect ground water supplies. It will also allow participants to explore actions to minimize such damage and restore the quality of this resource in a timely manner. Abstracts are due February 15, 2002. More information is available from Julie Bullock, NGWA, 601 Dempsey Road, Westerville, OH 43081-8978; (800) 551-7379, ext. 530; (614) 898-7791; fax: (614) 898-7786; e-mail: [ngwa@ngwa.org](mailto:ngwa@ngwa.org); WWW: [www.ngwa.org](http://www.ngwa.org).

*Eleventh International Conference on Wind Engineering (ICWE). Lubbock, Texas: June 2-5, 2003.* The ICWE is a world-wide forum for the discussion of recent developments in, and applications of, wind engineering. It will include both discussion and poster sessions, and all papers presented will be published in a proceedings volume to be available at the conference. Session proposals are due January 15, 2002; abstracts, August 2002. Interested persons should join the conference mailing list by sending their name, e-mail address, and mailing address to *Eleventh International Conference on Wind Engineering, Wind Science and Engineering Research Center, Texas Tech University, Box 41023, Lubbock, TX 79409-1023*; (806) 742-3476; fax: (806) 742-3446; e-mail: [llicwe@wind.ttu.edu](mailto:llicwe@wind.ttu.edu); WWW: [www.icwe.ttu.edu](http://www.icwe.ttu.edu). Sign-up is available by e-mail or through the web.

# WAPMERR

## A New Approach to World-Wide Earthquake Risk Reduction

The World Agency of Planetary Monitoring and Earthquake Risk Reduction (WAPMERR) was created at a founding conference attended by approximately 60 scientists, engineers, functionaries, and diplomats in May of this year. The purpose of this nonprofit organization, headquartered in Geneva, Switzerland, is to reduce natural and anthropogenic risks. The charter, membership of the steering committee, and other information about the agency can be found at [www.wapmerr.org](http://www.wapmerr.org).

Any person or organization may become a member of the General Assembly by filling out the application form on the web page. Under the guidance of its director Max Wyss, a seismologist, WAPMERR will at first focus on projects testing hypotheses on earthquake prediction, evaluating regional and local seismic hazards, and estimating the number of casualties that may result from future earthquakes and volcanic eruptions.

These latter calculations can be completed immediately after a potentially disastrous earthquake, or they can be based on scenarios of earthquakes likely to occur near a population center. Such estimates can be obtained for any location on the planet, since, according to Wyss, the WAPMERR database contains the size and seismic fragility of most buildings in one million settlements. The computer program for these calculations is operational, but its results continue to be tested regionally by comparing modeled outcomes to disastrous earthquakes of the past. Also, more advanced models of earthquake sources and attenuation laws are being developed to increase the reliability of the estimates.

In addition to deterministic estimates, it is possible to calculate expected losses on the basis of probabilistic hazard maps.

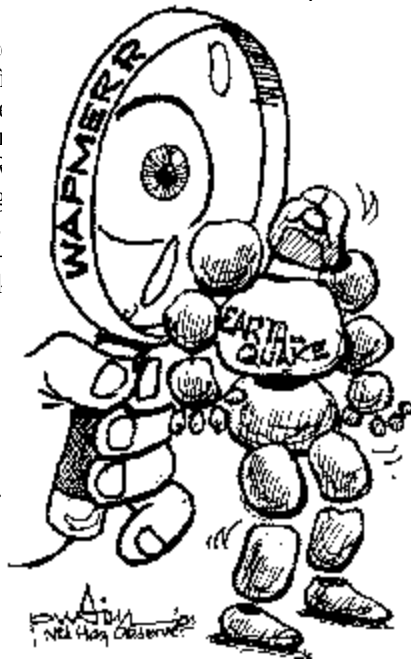
Based on the same world-wide data set, WAPMERR is developing a method to estimate the number of persons likely to be displaced in case of volcanic eruptions similar to past eruptions, as estimated from mapped ash layers.

Because earthquake prediction research is not conducted on a professional level in many countries, WAPMERR seeks to focus on quantitative, high-quality investigations of physical processes of earthquakes. A first target is the hypothesis that seismic quiescence may not only major earthquakes, but also precede some of them.

WAPMERR has a branch office in Moscow and plans to open offices in France and the United States. In most projects, WAPMERR wishes to collaborate with research institutions and government agencies to solve local and regional risk problems. Suggestions for projects that could be developed in partnership, as well as potential sources of funding, are welcome.

WAPMERR is also planning to organize workshops and conferences to focus the attention of the world-wide scientific community on problems of current interest. In its collaboration with research institutions, WAPMERR will host visiting scientists and students for short as well as extended research visits. The WAPMERR staff understands that the goals outlined in its charter are bold, and likely not all of them can

be reached. Nevertheless, much good may spring from its activities, even if only a part of the plan can be realized. For more information, contact Max Wyss, P.O. Box 104, CH-1211 Geneva 17, Switzerland; tel: +41 (79) 749-4894; e-mail: [m-wyss@wapmerr.org](mailto:m-wyss@wapmerr.org); WWW: [www.wapmerr.org](http://www.wapmerr.org).



## Introducing the European Crisis Management Academy



Established in June 2000, the European Crisis Management Academy (ECMA) is a joint initiative of the Leiden University Crisis Research Centre and the Centre for Crisis Management Research and Training (CRISMART), Swedish National Defence College. ECMA is a European network for crisis managers and academics with an interest in research, training, and development of this field of study and practice. By facilitating the exchange of ideas and best practices among practitioners and academics, the academy seeks to improve the knowledge and understanding needed to enhance the management of serious national and transnational crises in Europe. ECMA aims to strengthen European security by assisting in the development of safe, robust, and sustainable societies and policies.

ECMA organizes study projects, conferences, training, and other activities and is holding its first major conference in Stockholm this month. ECMA also maintains an exclusive link with the **Journal of Contingencies and Crisis Management**, and ECMA membership includes a subscription to this journal. For more information about the academy, see the ECMA web site: [www.ecm-academy.nl](http://www.ecm-academy.nl).





## RECENT PUBLICATIONS

Below are summaries of some of the recent, most useful publications on hazards and disasters received by the Natural Hazards Center. Due to space limitations, we have provided descriptions of only a few key publications or those with a title that may not indicate content. All items contain information on how to obtain a copy. A complete bibliography of publications received from 1995 through 2001 is post on our web site: [www.colorado.edu/hazards/bib/bib.html](http://www.colorado.edu/hazards/bib/bib.html)

### All Hazards

**Public Health Management of Disasters: The Practice Guide.** Linda Young Landesman. 2001. 250 pp. \$28.50, APHA members; \$37.95, nonmembers. Copies can be purchased from the American Public Health Association (APHA), 800 I Street, N.W., Washington, DC 20001-3710; (202) 777-2742; fax: (202) 777-2534; WWW: [www.apha.org](http://www.apha.org).

Because of the tragic events of September 11, 2001, as well as the increasing number of natural disasters that have struck the United States in recent years, many individuals are concerned that the public health infrastructure may not be able to address the threat of bioterrorism or weapons of mass destruction. **Public Health Management of Disasters** is a comprehensive text for public health practitioners that provides guidance on integrating health departments into community plans. It can serve as a quick reference for either public health practitioners or public safety personnel who need information about disaster response for natural, human-made, and weapons of mass destruction emergencies, including bioterrorism. In addition, it identifies the public health role in each aspect of disaster management and organizes morbidity and mortality concerns by disaster so that these potentially negative consequences can be determined quickly.

**ISDR Informs**, Issue 3. 2001. Free. To subscribe, send complete name, institution, organization, and mailing address to [isdr@crid.or.cr](mailto:isdr@crid.or.cr).

The theme of this issue of **ISDR Informs**, as well as the United Nations world disaster reduction campaign this year, is "Countering Disaster, Targeting Vulnerability: Mobilizing Local Communities in Reducing Disaster." The magazine includes a set of articles describing different experiences in disaster reduction at the local level in Latin America and the Caribbean, as well as guidelines for creating community risk maps. Articles also discuss the results of the third meeting of the Inter-Agency Task Force on Disaster Reduction, the growing loss potentials of megacities, an earthquake early warning system for vulnerable facilities, public information and communication, forest fires in Cuba, and numerous risk reduction efforts.

**Risk Analysis II.** C.A. Brebbia, editor. 2001. 567 pp. \$299.00. To purchase a copy, contact Computational Mechanics, Inc., 25

Bridge Street, Billerica, MA 01821; (978) 667-5841; fax: (978) 667-7582; e-mail: [info@compmech.com](mailto:info@compmech.com); WWW: [www.compmech.com](http://www.compmech.com).

This book contains the papers presented at the Second International Conference on Computer Simulation in Risk Analysis and Hazard Mitigation, held in Bologna, Italy, October 11-13, 2000. Contributed by experts from around the world, the papers cover the latest research into computational methods used in all aspects of risk analysis and hazard mitigation. They also discuss issues related to method development and the efficient use of sources. Section topics include: hazard prevention, estimation of risks, emergency response, data collection and analysis, hazardous materials in transit, water resources modeling and management, landslides, earthquakes, soil and water contamination, air quality studies, and case studies.

**Risk, Uncertainty, and Rational Action.** Carlo C. Jaeger, Ortwin Renn, Eugene A. Rosa, and Thomas Webler. 2001. 320 pp. \$32.50. To purchase a copy, contact Stylus Publishing, LLC, P.O. Box 605, Herndon, VA 20172-0605; (800) 232-0223 or (703) 661-1581; fax: (703) 661-1501.

In this volume, four risk researchers present a fundamental critique of the prevailing approach to understanding and managing risk—the "rational actor paradigm." They show how risk studies must incorporate the competing interests, values, and rationalities of those involved and find a balance of trust and acceptable risk. The authors also provide a general overview of risk and current theory, a detailed discussion of the rational action theories, an exploration of the risk decisions of a single agent (which often deal with natural hazards), and an examination of the risk decisions of interacting agents. They move on to consider the challenges and alternatives to the rational actor paradigm and their implications for understanding and coping with risk.

**Mission Improbable: Using Fantasy Documents to Tame Disaster.** Lee Clarke. 1999. 217 pp. \$25.00, clothbound; \$16.00, paperback. Copies can be purchased through most booksellers or from the University of Chicago Press; WWW: [www.press.uchicago.edu](http://www.press.uchicago.edu).

This book's theme is that "organizations and experts use plans as forms of rhetoric, tools designed to convince audiences that they

have so little instrumental utility in them that they warrant the label 'fantasy document'." Clarke believes that fantasy documents, such as emergency plans and nuclear war scenarios, are symbols organizations use to signal they are in control of danger, whether they really are or not. His examination of planning as an organizational activity—how plans come about, why they don't work, and the often disastrous inability of an organization to carry them out—offers substantive questions for those who must plan for catastrophic events.

**Disasters: The Journal of Disaster Studies, Policy and Management.** Vol. 25, No. 3 (September 2001). Annual subscriptions: \$50.00, individuals; \$256.00, institutions. To subscribe, contact Blackwell Publishers, 350 Main Street, Malden, MA 02148; e-mail: jnl.samples@blackwellpublishers.co.uk.

The theme of this special issue of **Disasters** is "Emerging Perspectives on Disaster Mitigation and Preparedness." Its articles discuss the changing context of disaster management, non-governmental organization initiatives in risk reduction, the changing emphasis in disaster management in Bangladesh, disaster mitigation and preparedness in Nicaragua after Hurricane Mitch, and risk and the neo-liberal state.

## Climate Change

**Climate Change 2001: Impacts, Adaptation, and Vulnerability.** Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. James J. McCarthy, Osvaldo F. Canziani, Neil A. Leary, David J. Dokken, and Kasey S. White, editors. 2001. 1,042 pp. \$130.00, hardbound; \$49.95, paperback. Copies are available for purchase from Cambridge University Press; WWW: www.cambridge.org.

**Climate Change 2001** presents evidence that recent observed changes in climate have already affected a variety of physical and bio-

logical systems. It also presents studies of the vulnerabilities of human populations to future climate change, including associated sea-level rise and changes in the frequency and intensity of climate extremes such as floods, droughts, heat waves, and windstorms. The volume contains papers that assess the potential responses of natural environments and wildlife to future climate change and identify environments at particular risk. It considers how adaptation to climate change might lessen adverse impacts or enhance beneficial impacts and provides an overview of the vulnerabilities and adaptation possibilities by major regions of the world. Finally, it contrasts the different vulnerabilities of the developed and developing parts of the world and explores the implications for sustainable development and equity.

## Hurricanes

**Facing Our Future: Hurricane Floyd and Recovery in the Coastal Plain.** John R. Maiolo, John C. Whitehead, Monica McGee, Lauriston King, Jeffrey Johnson, and Harold Stone, editors. 2001. 312 pp. \$24.95. Copies are available from the Coastal Carolina Press; 2231 Wrightsville Avenue, Wilmington, NC 28403; (910) 362-9298; fax: (910) 362-9497; WWW: www.coastalcarolinapress.org.

## Earthquakes

**The 921 Chi-Chi Taiwan Earthquake of 1999 Collection.** Special Publication MCEER-00-SP03. 2000. CD-ROM. \$50.00.  
**Advanced Technologies for Loss Estimation.** David Tralli. MCEER-00-SP02. 2001. CD-ROM. \$25.00.  
To order copies, contact the Multidisciplinary Center for Earthquake Engineering Research (MCEER), University at Buffalo, Red Jacket Quadrangle, Buffalo, NY 14261; (716) 645-3391; fax: (716) 645-3399; e-mail: mceer@acsu.buffalo.edu; WWW: mceer.buffalo.edu.

## Recent GAO Reports of Interest to the Hazards and Emergency Management Community

**Combating Terrorism: Selected Challenges and Related Recommendations.** Report No. GAO-01-822. 2001. 209 pp. Free.

**Bioterrorism: Coordination and Preparedness.** Testimony by Janet Heinrich, Director, Health Care-Public Health Issues, before the Subcommittee on Government Efficiency, Financial Management, and Intergovernmental Relations, House Committee on Government Reform. Report No GAO-02-129T. 25 pp. Free.

**Bioterrorism: Public Health and Medical Preparedness.** Testimony by Janet Heinrich, Director, Health Care-Public Health Issues, before the Subcommittee on Government Efficiency, Financial Management, and Intergovernmental Relations, House Committee on Government Reform. Report No. GAO-02-141T. 26 pp. Free.

**Bioterrorism: Review of Public Health Preparedness Programs.** Statement of Janet Heinrich, Director, Health Care-Public Health Issues, before the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives. Report No. GAO-02-149T. Free.

**Bioterrorism: Federal Research and Preparedness Activities.** Report No. GAO-01-915. 100 pp. Free.

**Chemical Weapons: FEMA and Army Must Be Proactive in Preparing States for Emergencies.** Report No. GAO-01-850. 2001. 68 pp. Free.

Millions of people live and work near eight Army storage facilities containing nearly 30,000 tons of chemical agents. In 1988, the Army established the Chemical Stockpile Emergency Preparedness Program (CSEPP) to help the 10 states with communities near the storage facilities obtain the necessary equipment and training they need to protect the public, the facilities' workforce, and the environment in the event of a chemical stockpile accident. The Army and the Federal Emergency Management Agency share responsibility for program funding and execution. This report reviews the current status of the CSEPP and recommends steps for improvements.

**Federal Emergency Management Agency: Weaknesses Exist in the Cerro Grande Fire Assistance Claim Validation Process.** Report No. GAO-01-848. 2001. 23 pp. Free.

Copies of each of these reports can be requested from the General Accounting Office, P.O. Box 37050, Washington, DC 20013; (202) 512-6000; fax: (202) 512-6061; TDD (202) 512-2537; e-mail: info@www.gao.gov. The complete text of each report is also available on-line at: www.gao.gov.

The first CD contains a reconnaissance report and an extensive photograph collection from the 921 Chi-Chi Taiwan earthquake. Over 450 images are included.

The second describes the current state of advanced airborne and space-borne remote sensing and ground-based technologies applicable to earthquake hazard mitigation. It also includes links to many internet sites, numerous references to additional resources on the topic, and recommendations for future research.

**1999 Chi-Chi, Taiwan, Earthquake Reconnaissance Report CD-ROM.** 2001. \$50.00, members; \$65.00, non-members. Available from the Earthquake Engineering Research Institute (EERI), 499 14th Street, Suite 320, Oakland, CA 94612-1934; (510) 451-0905; fax: (510) 451-5411; e-mail: eeri@eeri.org; WWW: www.eeri.org.

A disastrous 7.6 magnitude earthquake occurred near the village of Chi-Chi in central Taiwan on September 21, 1999. This reconnaissance report covers strong motion instrumentation and data, fault-related surface deformation, soil liquefaction, landslides, performance of structures, lifeline performance, and emergency response and recovery.



**Tsunamis**

**Proceedings of the International Tsunami Symposium 2001 and Review of the U.S. National Tsunami Hazard Mitigation Program, Seattle, Washington, August 7-10, 2001.** 2001. CD-ROM. Free. Papers contained on the CD (all 967 pages of them!) are available in PDF format on the World Wide Web at [www.pmel.noaa.gov/its2001](http://www.pmel.noaa.gov/its2001). Copies of the CD may also be requested from Ryan Layne Whitney via e-mail: [ryan@pmel.noaa.gov](mailto:ryan@pmel.noaa.gov).

If ever there was a definitive collection of the latest research and public policy on tsunamis, this is it. These proceedings contain papers from contributors from around the world and are organized into the following topics: the U.S. National Tsunami Hazard Mitigation Program Review, risk assessment, recent tsunamis, geology and paleo-tsunamis, Atlantic and Mediterranean tsunamis, measurement and data analysis, landslides and other sources, and advances in modeling applications.

**Designing for Tsunamis: Seven Principles for Planning and Designing for Tsunami Hazards.** 2001. 70 pp. Free. Copies can be downloaded from [www.pmel.noaa.gov/tsunami-hazards/Designing\\_for\\_Tsunamis.pdf](http://www.pmel.noaa.gov/tsunami-hazards/Designing_for_Tsunamis.pdf).

Tsunami waves generated by earthquakes, volcanic eruptions, or underwater landslides can reach 50 feet or more in height and devastate coastal communities many miles inland. Since 1946, six tsunamis have killed nearly 500 people and damaged hundreds of millions of dollars of property along America's Pacific shoreline. Tsunamis are infrequent but extremely destructive events, and many communities in the Pacific region have a false sense of security regarding this hazard. Beyond preparing for evacuation and emergency response, communities can reduce their tsunami risk by modifying their land-use planning and development approval practices. The purpose of these guidelines is to help communities understand their vulnerability and to mitigate the risk through land-use planning, site planning, and building design. They are organized according to seven basic principles: knowledge of a community's risk, avoidance of development in run-up areas, location of new development that minimizes future losses in tsunami run-up areas, design and construction of new buildings to minimize damage, protection of existing development, location of infrastructure and critical facilities to minimize damage and disruption, and planning for evacuation.

**Tsunami Curriculum: Grades K-6.** 2001. 68 pp. Free. **Surviving Great Waves of Destruction: Tsunami Curriculum—Grades 7-12.** 2001. 52 pp. Free.

Both items can be obtained from the Washington State Emergency Management Division, Plans, Exercises, Education, and Training Unit, Building 20, Camp Murray, WA 98430-5122; (253) 512-7047; fax: (253) 512-7206.

These publications contain all sorts of age-appropriate educational information and activities to teach students about tsunamis.

## Farewell, Adios, Adieux, So Long

After two years of dedication and hard work, the Natural Hazards Center's self-declared "Information Architect" is moving on to a new position in academia. Sarah Michaels devoted her time here to modernizing the Natural Hazards Center's extensive library collection on research and public policy related to natural hazards, making the information more readily available to scholars, and bringing the library data base up to date. We thank her for her contributions and wish her well as she heads to the University of Waterloo, in Ontario, Canada, to pursue her academic career as a member of the faculty in the Department of Planning.

## Hello, Buenos Dias, Bonjour, Howdy, Welcome

Fortunately, the Natural Hazards Center has retained an able replacement for Sarah. Wanda Headley is our new Library Manager, and she brings ample experience to her job, having assisted Sarah Michaels for two years. Wanda hopes to modernize the center's electronic data base, improve web access to the library, and continue to maintain one of the premier collections in the United States on the social and behavioral science aspects of natural hazards. Welcome, Wanda.

## THE HAZARDS CENTER

The NATURAL HAZARDS RESEARCH AND APPLICATIONS INFORMATION CENTER was founded to strengthen communication among researchers and the individuals and organizations concerned with mitigating natural disasters. The center is funded by the National Science Foundation, Federal Emergency Management Agency, National Oceanic and Atmospheric Administration, U.S. Geological Survey, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Department of Transportation, U.S. Bureau of Reclamation, National Aeronautics and Space Administration, the Institute for Business and Home Safety, and the Public Entity Risk Institute. Please send information of potential interest to the readers of this newsletter to the address below. The deadline for the next Observer is *November 16, 2001*.

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Copies of the **Observer** and the Hazards Center's e-mail newsletter, **Disaster Research**, are also available from the Natural Hazards Center's World Wide Web site:

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