Natural Hazards Observer

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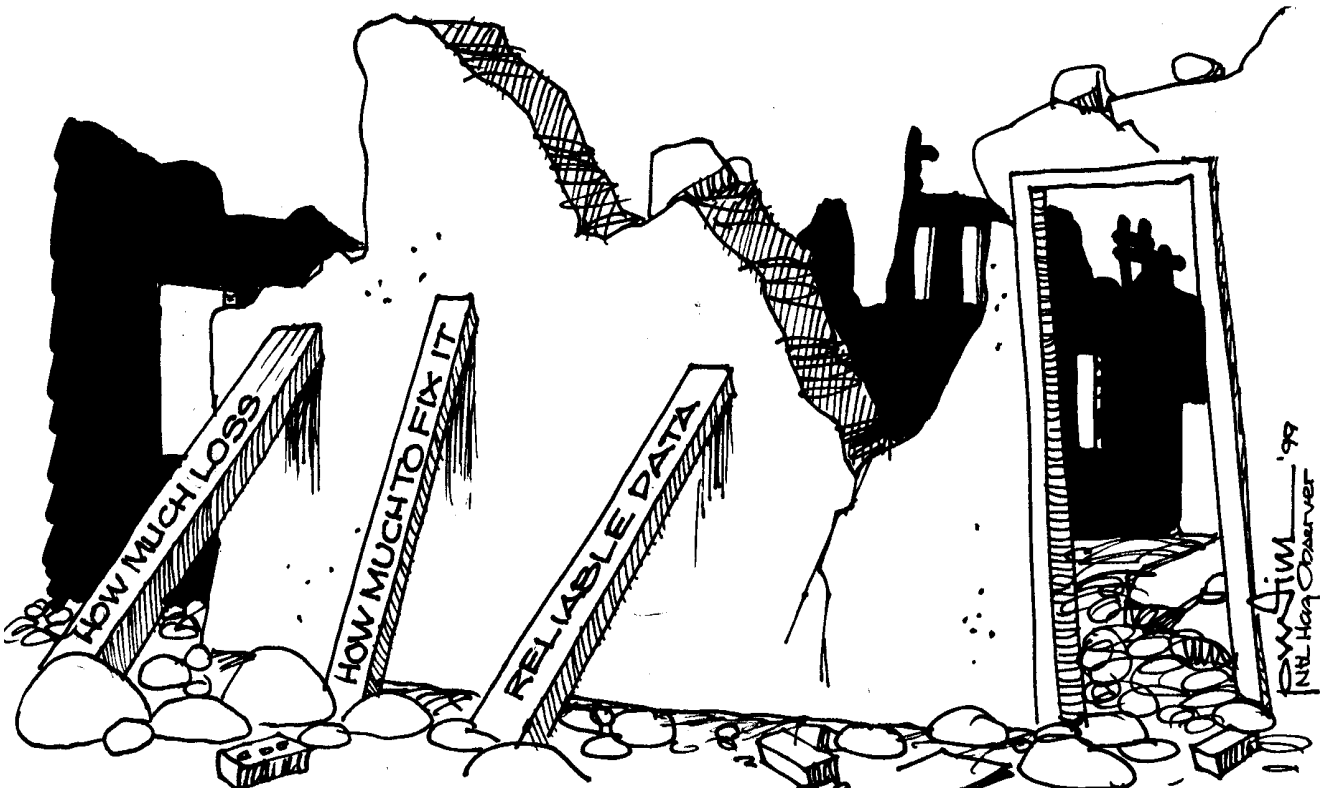

Reflections on 50 Years of Earthquake Hazard Mitigation: Challenges for the Future

--an invited comment

The challenges that face U.S. cities in seismically active areas are substantial and daunting. Cities have large inventories of unsafe structures, built with materials and techniques that are no longer acceptable. After an urban earthquake, thousands of people will need immediate shelter and replacement housing. Urban lifeline systems--highways; bridges; sewer, gas, and water lines--traverse faults or lie in liquefaction zones. They are old, in need of repair, and will fail. Often, local governments are aware of their vulnerabilities, but do not have the knowledge or funds to fix them. Emergency response practices are not well integrated into procedures of municipal departments and are untested in earthquakes. As if all this were not enough, it is rare to find a city that plans before a disaster for recovery and reconstruction afterward.

As recently as 10 years ago in California, we worried about the Big One. A decade of moderate tremors has shown us what else we should worry about. Moderate quakes--both in the U.S. and abroad--have wreaked havoc with economies and infrastructure and killed thousands of people. The Loma Prieta earthquake (magnitude 7.1) near San Francisco in 1989 and the Northridge earthquake (magnitude 6.7)

in Los Angeles in 1994 claimed 62 and 58 lives respectively. By contrast, the Kobe earthquake (magnitude 6.8) in 1995 killed over 5,000 people--most in older, vulnerable wood-frame houses.

All earthquakes--in both developing and developed countries--hit those who are most vulnerable. Poorly built houses, those on steep slopes, those in blighted inner city areas, and those generally occupied by the poorest inhabitants, are destroyed or seriously damaged. Older commercial buildings, bridges, and lifelines fare as badly. In the U.S., we have learned to build new single-family homes and commercial structures so they are unlikely to become death traps. However, when an earthquake is near enough, long enough, or direct enough, older structures will be damaged, displacing thousands from their homes and businesses.

While the loss of life in the U.S. has been low compared to other countries, economic losses have escalated--from $7 billion in the Loma Prieta quake to over $30 billion in the Northridge earthquake. In Kobe the economic losses have been estimated at nearly $100 billion. This points up one of the major challenges facing the earthquake community: we must look to the future and identify techniques that make new buildings and structures better, while not losing sight of the old buildings and unsafe bridges, highways, and aging infrastructure at risk.

Where Are We?

In 1977, the National Earthquake Hazards Reduction Program (NEHRP) was created by Congress to reduce the nation's risk from earthquakes. Four primary agencies--the Federal Emergency Management Agency (FEMA), the National Institute for Standards and Technology (NIST), the National Science Foundation (NSF), and the U.S. Geological Survey (USGS)--were charged with carrying out scientific and engineering research and transmitting that information to the professional community and ultimately to the public. FEMA has served throughout as the lead agency. Over the years, many valuable research projects have been completed, reports and other materials produced, workshops and conferences held, and training conducted.

For nearly 50 years, researchers have carried out post-earthquake investigations to gain a better understanding of what worked, what did not, and why. Many were supported by the Earthquake Engineering Research Institute's (EERI's) Learning From Earthquakes Program, funded by NSF, but others worked on their own time and dime. We have all learned many lessons from post-quake reconnaissance.

For example, recent earthquakes taught the engineering community to be wary of the two building types assumed to be most trustworthy: high-rise steel and multi-unit wood-frame structures. The performance of steel-frame buildings was called into question in both the Northridge and Kobe quakes, when many were found to have cracks in their welded connections. Similarly, wood-frame commercial and multifamily residential buildings were found to have numerous design and construction deficiencies. FEMA is currently funding major projects in both areas to support research and transmit findings to the design and construction communities.

New Tools and Practices

In many ways, this is an exhilarating time. Thanks in large measure to the NEHRP, we have witnessed an exciting growth of knowledge and education in the technical community and improved understanding by many decision makers in the highest risk areas. Research has led to a better understanding of earthquake dynamics; new design and analytical tools; innovative technologies, such as base isolation and energy dissipation; and improved building codes.

The U.S. Geological Survey and programs it has supported have recorded both ground motion and structural response in several earthquakes over the last few decades, also enabling remarkable progress in earthquake engineering and hazard assessment.

Building codes have been continuously modified over the years, reflecting knowledge gained in both field observation and laboratory research. NSF studies and information from FEMA have produced national provisions for the design of new buildings, which have already been incorporated into all the major codes and will form the basis of the new International Building Code in the year 2000. In areas where these codes have been adopted and enforced, new buildings are expected to perform quite well. Unfortunately codes only affect new buildings, and by the time they are adopted they may be as much as a decade behind the development of the newest ideas.

Focusing on the country's most significant risk--the existing building stock--in 1985 FEMA's Existing Buildings Program began to fund the research necessary to improve the evaluation and rehabilitation of such buildings. The program has produced a large set of reports, known affectionately as the yellow book series, which culminated in the 1998 release of FEMA 273, ***National Earthquake Hazards Reduction Program Guidelines for Seismic Rehabilitation of Buildings*** (see the ***Observer***, Vol. XXII, No. 3, p. 12). This document presents performance-based design methods that will enable an engineer and an owner to work together to determine how much disruption the owner and her or his tenants or business can tolerate, balanced against how much she or he can afford to pay to improve the performance of the structure.

For example, a hospital or high-tech company may require that all their buildings remain in continuous operation after a projected earthquake on a known fault. In this case, the owner and engineer will work together to identify the steps that need to be taken to assure the highest performance under those conditions. Another owner may be not be willing to accept the economic loss that would result from a building built only to code. After all, codes are designed to prevent loss of life, not to reduce damage. However, this owner may not be able to pay for a building designed for continuous operation. In this case the building owner and engineer must work together to determine the intermediate level of performance the owner can accept and afford.

While some engineering firms in high seismic areas are already working with their clients to achieve performance-based design (PBD), it will likely be some time before this approach is adopted into general practice. Many technical, social, political, legal, and economic questions remain to be answered

more fully. EERI recently developed an organizational action plan to help FEMA identify the research and products that must be developed over the next several years in order to make PBD standard practice. Meanwhile, NSF has funded a number of research projects that will enable engineers to create structures with predictable behavior and acceptable performance.

In order to better focus NEHRP resources, NSF has recently created three centers for earthquake engineering research, one based at the State University of New York at Buffalo, a second at the University of Illinois, and the third at the University of California, Berkeley (see page 4 of this ***Observer***). The establishment of these centers demonstrates NSF's commitment to multidisciplinary research and outreach.

NSF has also recently taken the lead in proposing a visionary new program to establish a national Network for Earthquake Engineering Simulation.[1] NEES will link all the seismic testing facilities in the U.S. and expand access to researchers and students, enabling them to conduct both actual and virtual tests from universities nationwide.

At the same time, dramatic improvements in the quality of seismic hazard maps in the past few years reflect improved interpretations of seismic source zones, better analytical procedures, and an increased understanding of attenuation relations. Joint work by the USGS and the California Division of Mines and Geology has resulted in a new series of seismic hazard maps for the state of California that will help design and construction professionals, as well as the public, in making decisions about building construction and land use.

Other new tools have emerged from expansion of geographically based computer technologies. HAZUS, a GIS software program created by FEMA to estimate earthquake losses on a community basis, is now available to emergency managers in seismic risk areas throughout the U.S. (see the ***Observer***, Vol. XXII, No. 6, p. 7). Such tools hold promise for improved planning and emergency response.

Challenges and Opportunities Ahead

Extremely sophisticated models are now being used by the insurance and financial industries to estimate potential losses and establish rating structures. The models attempt to predict the extent of damage to various types of buildings, located on various soils, for a wide range of earthquakes. Now that these industries are beginning to recognize the risks they face, the hazards community can encourage them to develop programs that will motivate mortgagees and policyholders to reduce risk.

An enduring task is to transmit new knowledge and tools to the professional community, but the real challenge now is to involve the policy community in the development of effective solutions that combine technical knowledge with social, political, and economic realities. Over the years, work carried out by social and political scientists on policy adoption has been critical to the implementation of effective seismic policies at the local, state, and national levels. Policy makers need to be involved in the generation and interpretation of new knowledge that will allow them to adopt more effective seismic

building codes, use new maps for planning, and create incentive programs for seismic retrofit programs. As the policy and technical communities learn from each other, stronger and more effective mitigation approaches will be developed.

In the last two decades, we have gathered data on post-earthquake response and recovery costs, but it has been notoriously unreliable--a result of inconsistent damage definitions and data collection procedures. Compounding the problem is the lack of reliable figures on the costs of various mitigation techniques. If we cannot tell how much loss we have had and we do not know how much it will cost to prevent it, how can we hope to develop an aggressive mitigation strategy? We need more consistent and reliable loss data and better quantification of mitigation techniques. Better data will enable individuals from the public and private sector to work together to craft programs that use realistic strategies to reduce future losses.

These are big challenges for the earthquake community, but the current growth of knowledge is unprecedented. The establishment of FEMA's Project Impact (see the ***Observer***, Vol. XXIII, No. 1, p. 15) offers opportunities to measure mitigation costs in communities attempting to improve the performance of their existing building stock. Of course, once we agree on the costs of mitigation, we must face the obvious question,Who should pay?(And that could be the subject of many future *Invited Comments*.)

Susan K. Tubbesing, Executive Director, Earthquake Engineering Research Institute

The Earthquake Engineering Research Institute recently celebrated its 50th anniversary. Information about the institute can be obtained from *EERI, 499 14th Street, Suite 320, Oakland, CA 94612-1902; (510) 451-0905; fax: (510) 451-5411; e-mail: eeri@eeri.org; WWW: http://www.eeri.org.*

1. For more information about NEES, contact *Priscilla Nelson, National Science Foundation, 4201 Wilson Boulevard, Arlington, VA 22230; (703) 306-1361; e-mail: pnelson@nsf.gov.*

IDNDR Secretariat Launches 1999 Campaign

The United Nations International Decade for Natural Disaster Reduction (IDNDR) Secretariat has announced its 1999 World Disaster Reduction Campaign, based on the slogan Prevention Pays. To celebrate the final year of the IDNDR, the secretariat is inviting all interested persons and organizations to provide examples of successful disaster prevention at the international, national, and local level. The Promotion and Public Awareness Unit of the secretariat will then assemble an exhibition of achievements of the Decade to share globally.

Among other activities, the secretariat is also organizing an international contest of photos illustrating effective disaster prevention. The campaign will culminate on October 13 with World Disaster

Reduction Day, during which the 1999 United Nations Sasakawa Disaster Prevention Award and the 1999 IDNDR International Photo Contest Award will be presented.

Based on last year's campaign, the IDNDR Secretariat has recently published a practical ***Manual for Social Communication and Disaster Prevention*** (currently available only in Spanish). This manual should soon be available on the Internet and can also be requested from the *IDNDR Regional Office for Latin America and the Caribbean, P.O. Box 3745-1000, San José, Costa Rica; tel: (506) 257-2141/255-1962; fax: (506) 257-2139; e-mail: hmolin@undpcos.nu.or.cr; WWW: http://www.disaster.info.desastres.net/crid/eng/index.htm*.

For more information, see: *http://www.idndr.org/* and *http://www.netsalud.sa.cr/crid*; or contact *Madeleine Moulin-Acevedo, IDNDR Secretariat, Un ited Nations, Palais des Nations, CH-1211 Geneva 10, Switzerland; tel: (41-22) 917-9709; e-mail: madeleine.moulin-acevedo@dha.unicc.org*.

The Three Centers, Part 3 . . .

MCEER -- The Multidisciplinary Center for Earthquake Engineering Research

The Multidisciplinary Center for Earthquake Engineering Research (MCEER) is a national center that develops and applies knowledge and advanced technologies to reduce earthquake losses. Headquartered at the State University of New York at Buffalo, the center was established in 1986 by the National Science Foundation (NSF) as the National Center for Earthquake Engineering Research (NCEER). Today, MCEER is one of three earthquake centers funded by NSF in 1997 (see the ***Observer***, Vol. XXII, No. 2, p. 9). (The Mid-America Earthquake (MAE) Center was featured in the January 1999 issue of the ***Observer***; the Pacific Earthquake Engineering Research (PEER) Center, in the March 1999 issue.)

MCEER brings together a group of leading researchers from numerous disciplines and institutions throughout the U.S. to integrate knowledge, expertise, and interdisciplinary perspectives with state-of-the-art experimental and computational facilities in both earthquake engineering and socioeconomic studies of seismic hazards.

Sponsored principally by NSF, New York State, and the Federal Highway Administration, MCEER receives additional support from the Federal Emergency Management Agency, other state governments, academic institutions, foreign governments, and private industry.

The center's mission is to reduce earthquake losses through research, development, and application of knowledge and advanced technologies that improve engineering, pre-earthquake planning, and post-earthquake response and recovery. In pursuit of this goal, MCEER coordinates a nationwide program of

problem-focused, multidisciplinary team research, education, and outreach activities that include collaboration with business, industry, consultants, and government.

Research

The center's research program is grounded in the belief that the future of earthquake engineering and loss reduction lies in advanced and emerging technologies. Its studies aim to improve seismic assessment and performance of buildings, highways, and other infrastructure, as well as emergency response and recovery systems. Basic and applied research is carried out by integrated multidisciplinary teams with expertise in:

- Seismology
- Geotechnical Engineering
- Structural Engineering
- Risk Engineering
- Architecture and Urban Planning
- Structural Control and Technologies
- Materials Science
- Sociology
- Economics
- Public Policy

Center investigators seek innovative approaches to advance the state-of-the-art in structural control, condition assessment, and site remediation. They also explore the potential of high-performance materials, advanced computer environments, and decision support systems to improve seismic behavior of engineered structures and the efficiency of emergency preparedness, management, and decision-making.

Research Facilities

Through its institutional consortium, MCEER brings together a network of state-of-the-art experimental and computational facilities located across the nation. Remote access links multidisciplinary research teams, government, and industry partners with laboratories for large-scale testing and computation. The combined facilities support the study of seismic and geotechnical hazards, structural control and simulation, rehabilitation strategies for buildings and lifelines, and advanced technology and materials testing.

Outreach

Center outreach includes broad-based dissemination of information and technology through research reports, national and international conferences and workshops, and the internationally acclaimed MCEER Information Service. Collaboration with institutions in Japan, the People's Republic of China,

Mexico, Taiwan, and other nations promotes global cooperation, joint experimental research, and information exchange that advances earthquake engineering and loss mitigation worldwide. External partnerships include alliances with manufacturers, consultants, other public- and private-sector stakeholders and end users to develop, adapt, test, and implement new earthquake mitigation technologies.

Education

MCEER's education initiatives provide opportunities for students and educators at the K-12 and university undergraduate and graduate levels, as well as practitioners seeking specialized training through continuing education. These educational activities are intended to stimulate interest in engineering and sciences at the earliest levels, develop future leaders in earthquake engineering and hazards mitigation at the undergraduate and graduate levels, and help today's engineering and emergency management practitioners keep pace with the newest developments, current issues, and changes in their respective fields.

Recent Highlights

Some highlights of MCEER's recent work include the receipt of a $10.8 million six-year contract from the Federal Highway Administration to conduct research on the seismic vulnerability of the national highway system; the development of several projects to demonstrate the use of advanced technologies in earthquake loss reduction; the publication of a monograph entitled ***Engineering and Socioeconomic Impacts: An Analysis of Electricity Lifeline Disruptions in the New Madrid Area*** (see the ***Observer***, Vol. XXIII, No. 2, p. 25); organization of the Fifth U.S. Conference on Lifeline Earthquake Engineering to be held in Seattle in August (see page 20 of this ***Observer***); and coordination of a study funded by the Federal Emergency Management Agency to establish a New York City area consortium for earthquake loss mitigation (NYCEM) (see the ***Observer***, Vol. XXIII, No. 3, p. 4).

For more information on MCEER's current projects, information services, newsletters, and other publications visit the center's Web site: *http://mceer.buffalo.edu*, or contact *MCEER, University at Buffalo, Red Jacket Quadrangle, Buffalo, NY 14261-0025; (716) 645-3391; fax: (716) 645-3399; e-mail: mceer@acsu.buffalo.edu*.

Introducing MAP

The Mid-America Partnership

In March, representatives of several central U.S. organizations and agencies established the Mid-America Partnership (MAP)--a group dedicated to helping one another in dealing with the hazards affecting the region. The partnership, which currently includes the Central United States Earthquake

Consortium (CUSEC), CUSEC state geologists, the U.S. Department of Transportation, the Institute for Business and Home Safety, the Mid-America Earthquake Center (see the ***Observer***, Vol. XXIII, No. 3, p. 4), the Disaster Recovery Business Alliance, the Association of Contingency Planners, the Extreme Information Infrastructure, the Institute of Gas Technology, the American Society of Civil Engineers, and the U.S. Geological Survey, will focus primarily on the central U.S. seismic hazard. As initial projects, it has identified the creation of a document entitled ***Mid-America at Risk*** and the creation of an entity that would function as a "Mid-America Seismic Safety Commission" to implement a plan to reduce losses from earthquakes that would be developed in conjunction with ***Mid-America at Risk***. For more information about this nascent organization, contact *Walter Hays, U.S. Geological Survey, Mail Stop 955, 905 National Center, Reston, VA 20192; (703) 648-6711; fax: (703) 648-6747; e-mail: whays@usgs.gov*.

On the Line

Rumors, Disease, and Donations: Lessons from Hurricane Mitch

There will never be another hurricane named Mitch. That's not to say that another storm, another year, won't wreak its own brand of havoc. But for now, the name Mitch joins that infamous group of hurricanes whose names have been retired.

Mitch took an enormous toll on Central America. Damage to all sectors was staggering, and the health sector was no exception. In Honduras alone, the water distribution system in 23 of the country's 30 hospitals was partially or totally destroyed. Sixty-eight of the 123 health centers that were seriously damaged were unable to function precisely when 100,000 persons needed urgent medical care. Equally important, routine epidemiological reporting, which traditionally covers about 70% of the population, fell to a mere 30% after the hurricane because of breakdowns in communication, the isolation of communities, and a shortage of epidemiologists.

As devastating as Mitch was, this multicountry disaster yielded some important lessons for the health sector:

- **Accurate and timely information is one of the most important needs following major disasters, yet it can be one of the most difficult commodities to obtain.**

The Internet played a significant role in the way information was circulated following Hurricane Mitch, more so than in previous disasters. All kinds of information from a wide range of expert sources was available almost instantaneously. In fact, international agencies and nongovernmental organizations with a strong field presence in the affected countries, and even the national authorities themselves, were surprised to read breaking news on the Internet before their own teams could complete their assessments.

While speed may be positive, consumers had to carefully evaluate the validity of much of the early information. For example, within days, unsubstantiated reports of outbreaks of diseases, ranging from cholera to malaria, raced around the globe. But when epidemiological surveillance returned to its predisaster level, not only was an absence of epidemics reported during the emergency, but in some countries where cholera was present before Mitch, the number of cases in the weeks immediately following the disaster tended to diminish.

This is not to say that there were no positive experiences with regard to the Internet in the wake of Hurricane Mitch. Indeed, its contributions to the management of this disaster were invaluable. Listservs were used to quickly distribute information about genuine health sector needs to the donor community, which responded immediately and generously. Discussion groups of Central American disaster managers exchanged expertise and offers of assistance. Daily epidemiological reports and public health

guidelines on topics ranging from household water quality to the prevention of outbreaks of measles were posted on World Wide Web sites. Latin America has turned the corner when it comes to using the Internet for disaster preparedness and response. The health sector's challenge will be to ensure that timely and accurate information is available to couteract equally fast-spreading rumors.

- **Accountability and transparency in postdisaster operations make for good governance.**

Donor countries are demanding accountability, most disaster-stricken countries are striving to demonstrate it, and the Pan American Health Organization's SUMA (supply management) system offers a much-needed tool for achieving it. Because tools such as SUMA for monitoring international relief are readily available, and because information can be delivered quickly over the Internet, a shortage of information on the arrival, destination, and use of humanitarian supplies is viewed suspiciously--a serious handicap in today's competitive world of foreign aid!

FUNDESUMA, an NGO that specializes in the management of humanitarian supplies, mobilized more than 60 volunteers following Mitch to sort and classify all the essential relief items that were buried among the flood of unsolicited donations. SUMA's operational achievements helped to confirm the global potential of this regional response tool. (For more information on SUMA, see *http://www.disaster.info.desastres.net/SUMA*)

- **Old habits die hard.**

Following Mitch, good governance by the recipient countries was not always matched by good management on the donor side. The flow of unsolicited and wasteful supplies--bottled water, food, old clothing, and other items of questionable value--continue to clog the system. Perhaps the time has come for all humanitarian agencies to join forces in an educational campaign on the do's and don't's of private response to disasters.

Hurricane Mitch has left physical scars and a weakened infrastructure in Central America that will require years to mend. However, with the tools and knowledge at hand, it should be easier to build on the lessons learned for the next disaster.

Patricia Bittner, Pan American Health Organization, Emergency Preparedness and Disaster Relief Coordination Program

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The PAHO Web Site and Hurricane Mitch

For more information on the response to Hurricane Mitch, see:

http://www.paho.org/english/ped/pedeval.htm

The summary conclusions from the meeting *Evaluation of the Preparedness for and Response to Hurricanes Georges and Mitch*, held February 16-19, 1999, in Santo Domingo, Dominican Republic, are now available on the conference Web site above. This meeting convened more than 400 participants from 48 countries who took part in daily working groups on 20 different topics. Also available from this site are draft reports from the countries affected by hurricanes Georges and Mitch, the final list of participants from the meeting, the program, and the related press releases. The ***Final Document*** (a comprehensive report of the findings of the working groups) is currently in the works and will also be available from the Web site soon. Any comments or questions can be directed to *disaster-meeting@paho.org*.

http://www.paho.org/english/ped/pedmitch.htm

This site contains daily situation updates prepared by PAHO staff as they monitored international health response. This was the first time PAHO and other health organizations intensively used the Internet to rapidly exchange information among health and disaster personnel in the Americas.

Munich Re and Disasters

Münchener Rückversicherungs-Gesellschaft (Munich Re for short) is a leading international reinsurance company that has studied and documented the world's natural disasters for many years. The company recently issued a third, completely revised, edition of its ***World Map of Natural Hazards***, which shows the distribution of earthquake, volcanic, tsunami and storm surge, tropical storm and cyclone, winter storm, and other natural hazards around the globe. This latest version also includes maps showing world tectonics, as well as global distribution of severe rainfall and lightning; regional storms, monsoon storms, tornadoes, and hail storms; and climate change/El Niño effects. The ***World Map of Natural Hazards*** is available as a wall map or as a folded map, each accompanied by a special publication that discusses relevant insurance aspects and includes a comprehensive catalog of historical world natural catastrophes. It is presently available in five languages--German, English, French, Italian, and Spanish--

and other versions are being prepared. Additionally, a ***Globe of Natural Hazards*** has been developed, and a CD-ROM version is being prepared that will include additional information.

The wall map and special publication (order number 2665-V-e) cost 50 DM; the folded version with special publication (order number 2658-V-e), 20 DM; the globe with special publication (order number 2740-V-e), 250 DM. Orders should be addressed to *Munich Re, D-80791 Munich, Germany; tel: +49 89 3891-5291; fax: +49 89 3891-5696; e-mail: info@munichre.com; WWW: http://www.munichre.com.* For additional d etails about the map and to sample the wide range of disaster information available from Munich Re, see *http://www.munichre.com/press/press/990315_eng.htm* on the World Wide Web.

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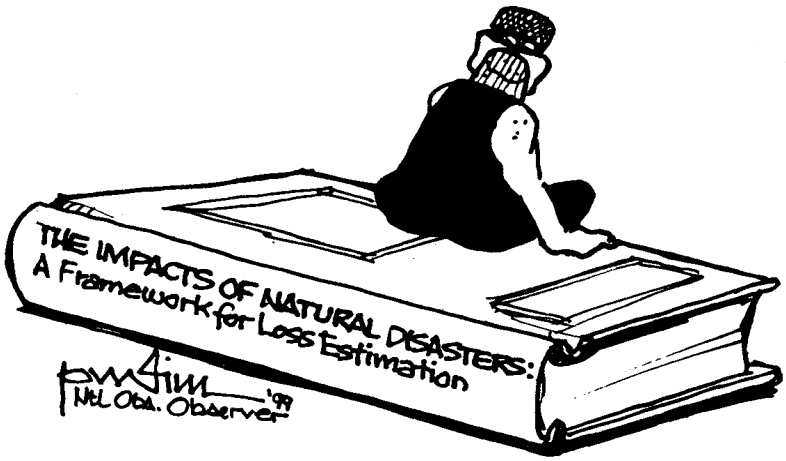
Washington Update

NRC Recommends Framework for Estimating Losses

How much economic damage do natural disasters cause in the United States each year? What types of loss data are included in estimates of economic damage? How do different levels of government arrange for the collection of these data? There are no clear answers to these questions, and there is currently no method or set of data consistently used to capture losses due to natural disasters. To address these questions, the Federal Emergency Management Agency (FEMA) recently asked the National Research Council's (NRC's) Board on Natural Disasters (BOND) to appoint an expert committee to provide advice on compiling loss estimates.



That committee recently released its report, ***The Impacts of Natural Disasters: A Framework for Loss Estimation***. The report examines natural disaster losses, including direct losses, such as economic impacts, lives losts, and injuries, as well as indirect losses, such as temporary unemployment and lost business. In the report, the committee recommends that the Bureau of Economic Analysis (BEA) in the Department of Commerce compile a comprehensive database on natural disaster loss. The BEA should work closely with FEMA and other agencies involved in disaster planning, preparedness, and response.

The report also recommends that data collection initially focus on who bears disaster losses (e.g., insurers, government, businesses, nonprofit organizations, or individuals); and types of loss (property, agricultural, human, recovery, response, and assistance). The report recommends these data be gathered according to type of hazard and that the Office of Management and Budget develop annual comprehensive estimates of the payouts for disaster losses incurred by federal agencies.

The report also provides a list of recommendations regarding further development of an indirect loss database and a model to estimate indirect losses.

Copies of the report can be ordered from the *National Academy Press, 2101 Constitution Avenue, N.W., Lockbox 285, Washington, DC 20055; (800) 624-6242 or (202) 334-3313; WWW: http://www.nap.edu.* The full text of the report can also be viewed online at *http://www.nap.edu/readingroom*.

GAO Looks at Cost Effectiveness of Hazard Mitigation

One of the biggest frustrations for hazards researchers and managers is the lack of data on the cost effectiveness of hazard mitigation activities. Moreover, for a number of years, Congress has been concerned with the increasing cost of federal disaster assistance. One of FEMA's primary approaches toward reducing these costs is to promote mitigation measures that will reduce future damage in a community, potentially decreasing future federal disaster expenditures. Recently, the General Accounting Office (GAO) testified before the Senate's Subcommittee on VA, HUD, and Independent Agencies of the Committee on Appropriations regarding the cost effectiveness of hazard mitigation. That testimony is available in the recently released report, ***Disaster Assistance: Information on the Cost-Effectiveness of Hazard Mitigation Projects*** (GAO/T-RCED-99-106, 1999, 20 pp., free).

Conducted at the request of Congress, the report provides the GAO's preliminary evaluation of how FEMA ensures the cost-effectiveness of projects funded under its Hazard Mitigation Grant Program. It describes the increases in disaster assistance costs as well as the mitigation programs designed to reduce costs and presents initial views on the approaches FEMA uses to ensure that funding under the programs is targeted to cost-effective mitigation measures. GAO found that, although FEMA uses benefit-cost analyses, it excludes certain types of projects from analysis, including projects that fund the removal of certain structures from floodways, research for new building codes, and planning efforts. GAO concludes that these exclusions limit the agency's ability to demonstrate that the funded mitigation measures are cost-effective.

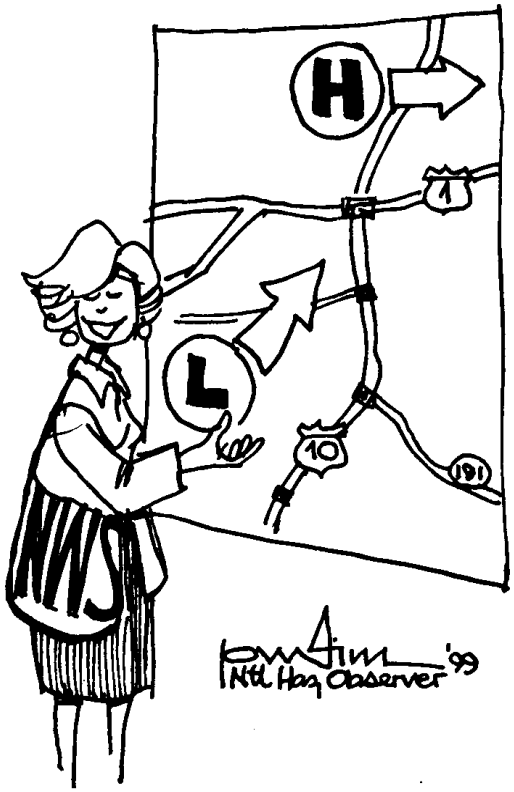
GAO is working with FEMA to quantify the number and dollar amount of the Hazard Mitigation Grant Program measures exempted from benefit-cost analysis. The report describes difficulties with obtaining these data and problems found in the types of data used by FEMA for calculating costs and benefits.

To obtain a copy of the report, contact the *U.S. General Accounting Office, P.O. Box 37050, Washington, DC 20013; (202) 512-6000; fax: (202) 512-6061; e-mail: info@www.gao.gov; WWW: http://www.gao.gov*.

Research Council Provides Weather Service with Road Map for the Future

As the National Weather Service (NWS) modernization and restructuring proceeded toward completion,

the National Oceanic and Atmospheric Administration (NOAA) asked the National Research Council (NRC) to look at what lies ahead for the agency. Specifically, NOAA requested that the NRC's National Weather Service Modernization Committee provide guidelines for the NWS to use emerging science and technology, incorporate modernization practices into operations, and continue to improve weather forecasting for the U.S. into the 21st century. The results of that project are contained in the recently released report, ***A Vision for the National Weather Service: Road Map for the Future*** (1999, 88 pp., $18.00).



By the target year of 2025, the report predicts that vastly improved weather products and services will be substantially more useful to society than they are today, and it recommends that NOAA and NWS more aggressively support and capitalize on advances in science and technology in order to make that happen. Further, the NWS should be an active participant in national and international research activities in weather, hydrology, climate, and environmental sciences. In addition, the NWS should commit to and plan for timely incorporation of scientific and technical advances in weather observation, analysis, and prediction. Finally, Congress and the administrative arm of government should provide the necessary resources for the NWS to regain and maintain state-of-the-art supercomputing capability to support the advanced analysis and modeling systems fundamental to today's and future weather and climate forecast systems.

The complete report can be viewed on-line at the National Academy Press Readingroom: *http://pompeii.nap.edu/catalog/catalog.cfm?record_id=6434*. Printed copies ordered from that site receive a 20% discount. Otherwise, to obtain a copy, contact the *National Academy Press, 2101 Constitution Avenue, N. W., Lockbox 285, Washington, DC 20055; (800) 624-6242 or (202) 334-3313; fax: (202) 334-2451; e-mail: amerchan@nas.edu.*

NFIP Raises Rates for V Zones

In an effort to bring flood insurance rates more in line with the risks they cover, FEMA recently increased the rates they charge owners of older buildings in high-risk coastal zones. Buildings constructed before January 1, 1975, or the effective date of a community's flood insurance rate map (FIRM) are designated as pre-FIRM structures under the National Flood Insurance Program. Buildings in coastal areas subject to high velocity waters, such as storm surges and wind-driven waves, are located in V zones under the NFIP designation.

In a final rule contained in the ***Federal Register*** on Wednesday, March 17, 1999 (Vol. 64, No. 51, pp. 13115-13116), FEMA states that the agency is increasing rates for pre-FIRM, V-zone properties to recognize the inherently greater flood risk of these properties. Although these structures have always received subsidized rates under the NFIP, this ruling reduces the amount of subsidy by about 7%. FEMA believes this action targets a particularly risky class of properties, supports FEMA's overall loss reduction program, more accurately reflects the loss exposure, and helps make policyholders aware of the danger to their properties.

For further information on this policy, contact *Charles M. Plaxico, Jr., FEMA, Federal Insurance Administration, 500 C Street, S.W., Washington, DC 20472; (202) 646-3422; fax: (202) 646-4327; e-mail: charles.plaxico@fema.gov*. Copies of the final rule can be found at your *federal depository library* or via the Internet at *http://www.access.gpo.gov*.

IRS and SBA Offer Disaster Help

Losing everything in a disaster is bad enough, but having to pay the tax collector after all your records are destroyed is even worse. Never fear. In its attempts to reinvent itself as a kinder, gentler agency, the Internal Revenue Service has created a brochure that guides individuals affected by a presidentially declared disaster through the government red tape to receive a tax refund. The new brochure, ***Disaster Losses: Help from the IRS***, describes the recent tax law changes that apply to disaster victims, defines casualty loss for tax purposes, provides tips on determining the amount of casualty loss, and explains how insurance may affect your loss, how to handle losses that are greater than your insurance coverage, how to obtain financial records and other documents that were destroyed, and where to obtain more information on casualty loss. For more information, contact the *IRS, (800) 829-1040; WWW: http://www.irs.ustreas.gov*.

After the tax collector has emptied your pockets, you can always apply for a disaster assistance loan

from the Small Business Administration (SBA). In its new brochure, ***The Facts About Disaster Assistance Loans for Homes and Personal Property***, the SBA outlines the types of government assistance available to presidentially declared disaster victims. It also lists frequently asked questions about SBA loans, including How much can I borrow? Can SBA refinance my mortgage? Will the SBA check the losses I claim? How soon can I expect the money? and Do I need flood insurance to get a loan? For more information, contact the *SBA, Disaster Assistance Division, Office of Disaster Assistance, 409 Third Street, S.W., Washington, DC 20416; (202) 205-6734; fax: (202) 205-7728; WWW: http://www.sbaonline.sba.gov/disaster/.*

FEMA and EDA Reach an Understanding

Emergency management and economic development have joined forces to reduce the impacts of natural disasters. In a ***Memorandum of Understanding Between the Federal Emergency Management Agency and the Economic Development Administration***, the two agencies agreed to provide support and cooperation to advance mutual objectives through FEMA's Project Impact and other mitigation objectives, and the Department of Commerce's Natural Disaster Reduction Initiative.

Under this agreement, the two agencies will:

- enhance policy coordination;
- enhance coordination of mitigation activities and initiatives;
- provide state and local technical assistance and planning support;
- work with Project Impact community officials to provide services and assistance;
- improve resource management through joint efforts;
- conduct public outreach and education activities;
- and provide training on how economic development planning activities can better incorporate issues associated with natural hazard risk and mitigation.

For more information on this effort, contact *Drew Sachs, FEMA, 500 C Street, S.W., Washington, DC 20472; (202) 646-3842.*

Looking at Long-Term Issues in Recovery

In the past year, President Clinton has activated the Long-Term Recovery Task Force, under the direction of James Lee Witt, director of the Federal Emergency Management Agency, on four occasions. The action plans recommended by the task force for those four events are now available from FEMA. They include:

- ***The President's Long-Term Recovery Action Plan: 1997-1998 Winter Storms--Florida*** (1998, 40 pp., free), which outlines a long-term recovery strategy, a long-term community action plan, local mitigation strategies, and mitigation successes;
- ***The President's Long-Term Recovery Action Plan for the March 1998 Alabama Floods*** (1998, 36 pp., free), which addresses improvement of the levee system for Elba, Alabama; assistance to individuals; repair of public facilities; mitigation; recovery from the prior 1994 floods; economic losses; and environmental health;
- ***The President's Long-Term Recovery Action Plan for the March 1998 Georgia Floods*** (1998, 36 pp., free), which discusses flood damage reduction improvements for the city of Albany, Georgia; assistance to individuals; repair of public facilities; mitigation; recovery from the 1994 floods; economic losses; and environmental health; and
- ***The President's Long-Term Recovery Action Plan: Puerto Rico--Hurricane Georges, September 1998*** (1999, 78 pp., free), which addresses five primary recovery areas--mitigation, housing, economic revitalization and sustainability, energy, and transportation--and provides recommendations for addressing them.

All four reports can be obtained from the *FEMA Publications Distribution Facility, P.O. Box 2012, Jessup, MD 20794-2012; (800) 480-2520.*

Corps Readies for the Next Millennium

The U.S. Army Corps of Engineers (USACE) has an active role in civil disaster response, working with FEMA and other federal agencies, the American Red Cross, and other organizations under the Federal Response Plan to handle public works and engineering issues. In an effort to make these efforts more efficient, USACE recently announced the creation of Readiness 2000 (R2K), a program that outlines the Corps disaster management strategy for the 21st century.

As part of the national strategy, R2K organizes and manages resources, creates a USACE team that shares planning responsibilities and response duties to standardize procedures and decrease response time, and focuses on five response strategies:

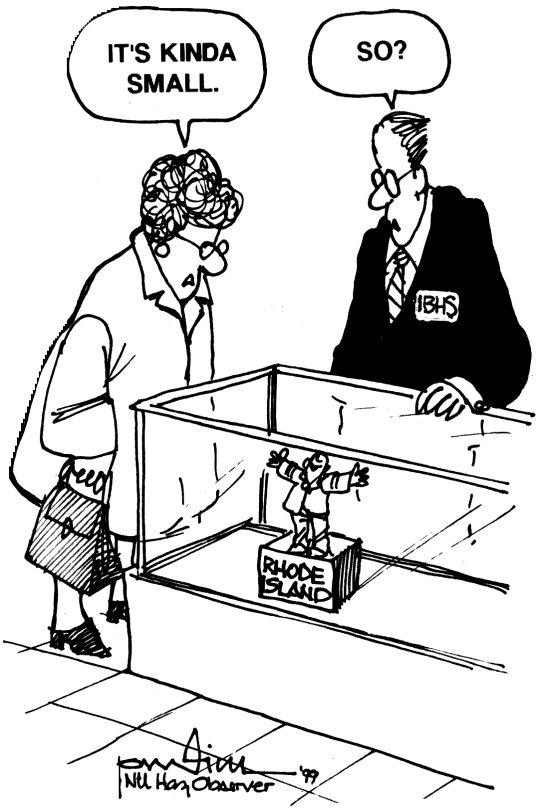
- threat/history-based resource allocation;
- specialized planning and response teams that will deal with such issues as ice, water, emergency power, emergency access, debris removal, temporary sheltering, structural safety assessment, and structural rehabilitation;
- deployable tactical operations systems, including vehicles, that provide response support equipment and personnel;
- redirection of the Earthquake Center of Expertise to become the Corps of Engineers Readiness Support Center--a dedicated center for all-hazards training, exercises, and evaluation of response activities; and

- a centralized all-hazards mission, including response support templates and a national database, which will provide information on current situations, flood response, personnel, and other data.

For more information on this effort, contact *Edward J. Hecker, Readiness Branch/CECW-OE, #6215, 20 Massachusetts Avenue, N.W., Washington, DC 20314-1000; (202) 761-0409; fax: (202) 761-4150; e-mail: edward.j.hecker@HQO2.usace.army.mil*.

Rhode Island Becomes First IBHS Showcase State

On December 18, 1998, Governor Lincoln Almond issued an executive order implementing the Rhode Island Showcase State Initiative for natural disaster reduction and resilience. Under this initiative--promoted by the Institute for Business and Home Safety (IBHS)--Rhode Island will work with public and private partners in 14 areas to demonstrate the benefits of taking specific, creative steps to help . . . communities reduce deaths, injuries, property damage, economic losses and human suffering caused by natural disasters.



Under the leadership of the Rhode Island Emergency Management Agency, the state will

- develop and implement plans for various mitigation actions;
- complete a statewide hazard analysis and risk assessment, as well as provide assistance to municipalities to identify their risks;
- develop partnerships with businesses to coordinate mitigation, preparedness, response, and

recovery;
- promote enforcement of model building codes;
- address specific hazards in state-level land-use decisions, including state-owned property development, as well as encourage the adoption of land-use plans that consider hazards in decision making;
- develop public awareness programs on the importance of hazard mitigation;
- conduct mitigation training for building, design, and construction professionals; and
- develop public sector initiatives, programs, and policies for implementing mitigation measures, such as tax incentives and regulatory streamlining.

At the same time, IBHS has created a Business Recovery Disaster Alliance (BRDA), in which businesses cooperate with other businesses as well as suppliers, customers, and the public sector, to speed recovery. IBHS, state officials, and the BRDA have met with representatives of all Rhode Island Chambers of Commerce to discuss the initiative and businesses' role in mitigation and recovery.

For more information on this initiative, contact *Diana McClure, IBHS, 175 Federal Street, Suite 500, Boston, MA 02110-2222; (617) 292-2003; fax: (617) 292-2002; WWW: http://www.ibhs.org.*

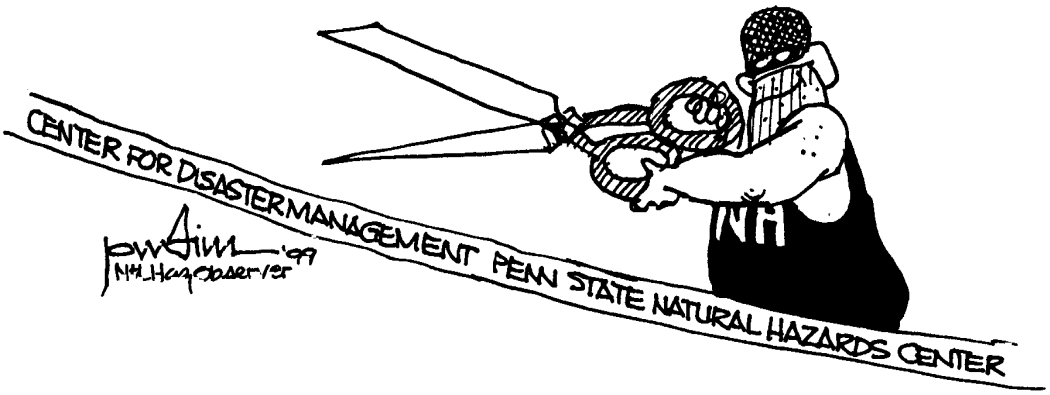
Two New Disaster Centers

The Center for Disaster Management and Humanitarian Assistance

The Center for Disaster Management and Humanitarian Assistance (CDMHA) is a joint project of Tulane University and the University of South Florida, in partnership with the United States Southern Command. The center has been established to promote collaborative training, research, education, and communication services with civil-military agencies throughout the western hemisphere to ensure operational readiness in humanitarian and consequence management missions. Its focus is on hazards and disaster management in the Caribbean and Latin America.

The center will concentrate on predisaster activities, such as training, exercise, research, evaluation, and communications. Specifically, it will develop training materials using distance technology; databases on complex human emergencies and their outcomes; networks of organizations and agencies that carry out disaster mitigation; and research to improve disaster mitigation and management.

More information about the new CDMHA and its initial projects is available from the *Payson Center for International Development and Technology Transfer, 300 Herbert Hall, Tulane University, New Orleans, LA 70118-5687; (504) 865-5240; fax: (504) 865-5241*; or the *University of South Florida, Latin American and Caribbean Studies, CPR-107, 4202 East Fowler Avenue, Tampa, FL 33620-5650; (813) 974-8130; fax: (813) 974-8138*. Interested persons should also consult the new CDMHA Web site: *http://www.payson.tulane.edu/cdmha/.*



Penn State's Natural Hazards Center

Penn State University has established its own Natural Hazards Center. Founded under the premise that natural hazards cut across social, cultural, and economic barriers to profoundly affect life on this planet, the center is bringing together a diverse group of scholars and professionals to develop and implement cross-disciplinary studies in hazard evaluation, forecasting, and mitigation. More information on this new center is available from the center Web site: *http://www.essc.psu.edu/hazards*, which includes historical regional disaster information as well as lists of upcoming center colloquia and university disaster courses. Interested persons can also contact the center director, *Kevin Furlong, Geosciences Department, 210 Research West Building (Mail 540 DK), University Park, PA 16802; (814) 863-0567; fax: (814) 863-7823; e-mail: kevin@geodyn.psu.edu.*

Philippines to Launch Emergency Management Institute

Some organizations have estimated the global economic costs of disasters for 1998 to be $89 billion, with 32,000 lives lost. On average, 60% of the economic losses, deaths, injuries, and displacements take place in Asia, and within that continent, the Philippines sustains a major share of typhoons and other disasters.

To address this problem, under the Philippines National Disaster Coordinating Council (NDCC), and through the Office of Civil Defense, an innovative approach is being implemented that could greatly benefit not only the Philippines, but the entire Southeast Asia region as well. In mid-February, the Philippine Secretary of National Defense approved a Memorandum of Cooperation in Disaster and Risk Management to establish the Emergency Management Institute of the Philippines (EMIP). EMIP is an initiative of the NDCC, the National Defense College of the Philippines, where it will be located, and the Asia Pacific Disaster Management Centre (see the ***Observer***, Vol. XXIII, No. 4, p. 5), a nongovernmental organization.

In addition to providing disaster and risk management training and information for community- and local-level disaster management, EMIP will also promote cooperation in disaster reduction among the

Philippines and other Association of South East Asian Nations (ASEAN) countries. In EMIP the Philippines will also establish a comprehensive emergency and risk management facility that can serve as a model for other ASEAN members and thus promote a self-help approach to national capacity building in the region. The institute also intends to further regional cooperation and coordination, especially in respect to transboundary issues such as the regional haze disaster that accompanied severe wildfires last year. It also intends to create forums for networking, for sharing information and expertise, and for reaching consensus on key areas of regional concern. In that regard, the Philippines has offered to host a seminar on Information Sharing for Early Warning for the ASEAN Regional Forum later this year. The seminar will be the first in a series of such policy meetings that NDCC plans to organize to further cooperation and disaster reduction within countries of the region.

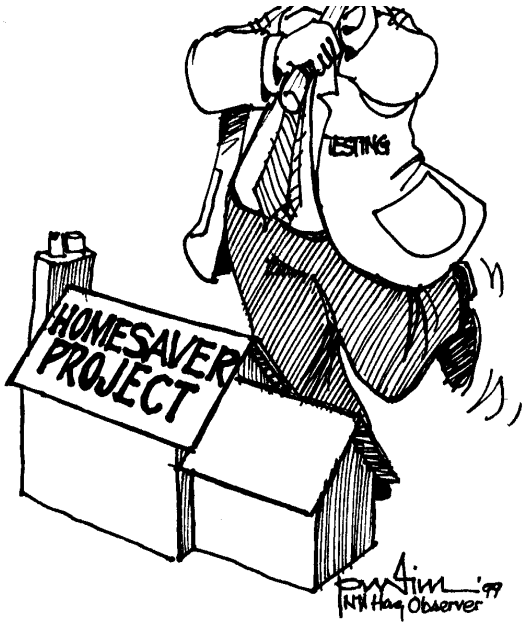
For more information on the new Philippine Emergency Management Institute, contact *John W. Barrett, Asia Pacific Disaster Management Centre, P.O. Box 1005 Makati Central Post Office, 1250 Makati City, Philippines; fax: (632) 826-0389; e-mail: apdmc@nsclub.net.*

Introducing the Partnership for Natural Disaster Reduction HomeSaver Project

On average, hurricanes, tornadoes, and cyclones take 350 lives every year in the U.S., and, in this decade, property losses due to severe winds have increased dramatically, amounting to billions of dollars. Moreover, many scientists are predicting increased hurricane activity in coming years.

The Partnership for Natural Disaster Reduction and its current principle effort--the HomeSaver Project, supported by the Federal Emergency Management Agency and the U.S. Department of Energy--represent one effort to deal with these losses. The partnership, a cooperative undertaking among government, universities, and industry, is working to determine affordable measures that can make homes and businesses safer in hazardous areas, particularly higher-risk ocean or inland coastal regions.

To achieve this goal, the partnership has completed the conceptual design and created models for a national test facility--the Windstorm Center at the Idaho National Engineering and Environmental Laboratory (INEEL). That facility will be used to generate hurricane-force winds on one- to two-story homes and other structures to determine what construction practices and retrofit options are effective in keeping homes safe in severe windstorms. The partnership provides advice and direction to the HomeSaver Project concerning the types of tests the center should conduct and will actively promote the mitigation options identified by the research.



In its first phase, the HomeSaver Project will test real homes in simulated storms of hurricane intensity. One-story homes will be tested at turbulent wind gusts as high as 120 mph intermixed with rain--typical of severe storms at the earth's surface. Before homes are tested at the Windstorm Center, they will be built as they are today according to various building codes, and with new technologies and different types of materials. The tests should help determine low-cost retrofit options for existing homes, wind- and water-resistant construction techniques, improved building methods and materials, cost-effective design codes, and better simulation tools.

In the second phase of the project, two-story buildings will be tested in gusts up to 200 mph. The first hurricane test for the HomeSaver Project is planned for 2003.

For more information about this partnership and project, contact *Cheryl O'Brien, Program Manager, Partnership for Natural Disaster Reduction, Idaho National Engineering and Environmental Laboratory, P.O. Box 1625, Idaho Falls, ID 83415-3605; (208) 526-4105; fax: (208) 526-4017; e-mail: cco@inel.gov; WWW: http://www.inel.gov/homesaver.*

The Latest in Flood Mitigation

As the new millennium approaches, technology seems to promise a new era in reducing the impacts of flooding in the U.S. At the same time, many in local, state, and federal government are gaining new insights into programs that work in reducing losses due to floods. In May 1998, the Association of State Floodplain Managers held their 22nd annual conference in Milwaukee, Wisconsin, to demonstrate and learn about the latest advances in technology, public policy, engineering, and other flood-related activities. The proceedings of that meeting are contained in the latest publication from the Natural Hazards Center, ***Times are Changing: Flood Mitigation Technology*** *(Special Publication #35, 1999, 480 pp., $20.00).*

The papers in the volume cover every aspect of flood loss reduction, including national policies, state and local efforts, mapping technology, coastal issues, mapping program issues, property acquisition, stream protection and restoration, flood damage estimation, post-flood issues, building performance and standards, policy assessment, professional activities in floodplain management, stormwater and watershed management, and hydrology and hydraulics.

Copies of ***Times are Changing*** *can be purchased from the Publications Clerk, Natural Hazards Center, Campus Box 482, University of Colorado, Boulder, CO 80309-0482; (303) 492-6819; fax: (303) 492-2151; e-mail: jclark@spot.colorado.edu; WWW: http://www.colorado.edu/hazards. Prepayment is required. Be sure to add $5.00 for shipping.*

 ***Next Page***

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 ***Return to the Natural Hazards Center Home Page***

The Internet Page(s)

These are only the latest disaster Internet resources we've encountered. For a comprehensive list of selected Internet/Web sites dealing with hazards and disasters, see *http://www.colorado.edu/hazards/sites/sites.html*.

All Hazards

http://www.colorado.edu/hazards/o/oquery.html
http://www.colorado.edu/hazards/dr/drquery.html
Last year, the Hazards Center added two search engines to its Web site to help users locate information either within the entire site (*http://www.colorado.edu/hazards/query2.html*) or within the Hazard Center's bibliographic database, ***HazLit*** (*http://www.colorado.edu/hazards/litbase/hazlit.htm*). Recently, we added two more search facilities to enable netsurfers to search back issues of either the ***Natural Hazards Observer*** (the supermarket tabloid you're perusing right now) or ***Disaster Research*** (our e-mail rag).

http://www.ibhs.org
http://www.ibhs.org/ibhs1197/html/informationcenter.htm
The Institute for Business and Home Safety (IBHS) Information Center has a large collection of books, periodicals, videos, slides, and other resources regarding the mitigation of natural hazard damage to structures. These materials are available on loan to members, associate members, and the general public. The subject areas of the IBHS collection include: Insurance and Natural Disasters, Business Interruption, Disaster Preparedness, Retrofitting Structures, Building Codes, and Emergency Management. The information center can also research questions concerning all of these areas and provide information via e-mail, phone, fax, or postal mail. The IBHS Web site now includes a searchable ***Annotated Planning and Hazards Bibliography*** at the second URL above. For more information about IBHS services, contact *Karen Gahagan, IBHS Assistant Vice President-Information Services, e-mail: kgahagan@ibhs.org* or *Patricia Hatch, Librarian, e-mail: phatch@ibhs.org*. The information center can also be reached at *IBHS, 175 Federal Street, Suite 500, Boston, MA 02110-2222; (617) 292-2003; fax: (617) 292-2022*.

http://www.oas.org/en/prog/nhp

The Natural Hazards Project (NHP) of the Unit for Sustainable Development and Environment of the Organization of American States (OAS) recently announced its new Web page at the URL above. The page contains information, in Spanish and English, about the project's various natural hazard mitigation activities--including projects in the areas of transportation vulnerability reduction, educational sector vulnerability reduction, and floodplain management--as well as announcements about upcoming activities, the project's internship program (see the ***Observer***, Vol. XXIII, No. 4, p. 16), and contact information.

As a response to hurricanes Georges and Mitch, the Natural Hazards Project is developing a school building construction and maintenance resource Web page within the education section of the NHP site. The resource page will include technical documents, contact information for groups and individuals working on school reconstruction and retrofitting, and links to relevant Web sites. The objective is to provide information that will facilitate the rebuilding of schools so that they are hazard-resistant. The project is open to suggestions regarding Web links and other information that should be added to the site and is looking for technical documents in electronic form about school building reconstruction, retrofitting, site selection, or related materials. The project is also seeking information about any individuals, organizations, or networks of groups that are, or might potentially become, involved in school reconstruction. Comments should be directed to the *Natural Hazards Project, Unit for Sustainable Development and Environment, Organization of American States, 1889 F Street, N.W., Washington, DC 20008; (202) 458-6803; fax: (202) 458-3560; e-mail: natural-hazards-project@oas.org*.

http://www.alertnet.org

AlertNet is an on-line news and communication service for the international disaster relief community. The public pages, accessible to any Internet user, feature news from Reuters, press releases from relief organizations, and emergency information for disaster victims and their families. The private area, the password-protected core of the service, is open only to members, primarily voluntary, nongovernmental organizations actively engaged in international relief work. It contains specialist news, relevant reference material, and an area for members to exchange views and share information.

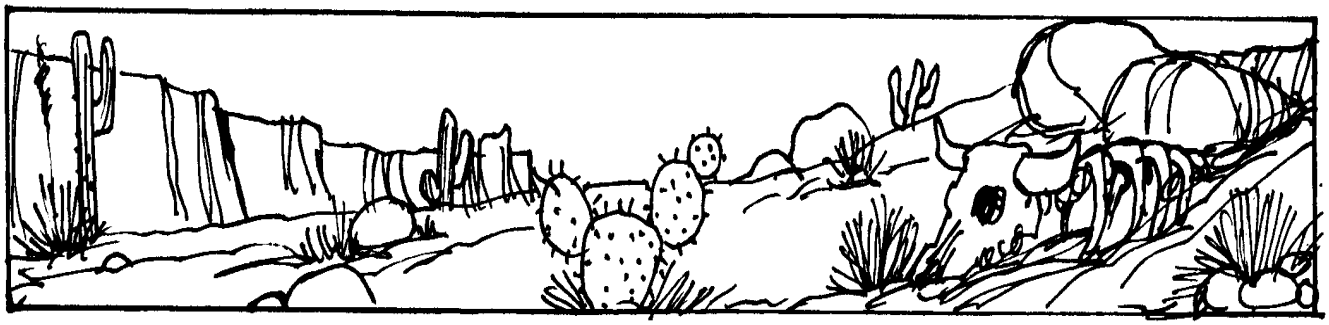
http://www.fema.gov/mit/handbook/index.htm

As we've said before, the mitigation section of the Federal Emergency Managment Agency (FEMA) Web site is a trove of useful information and resources on the reduction of hazards and their impacts. FEMA recently added its ***Property Acquisition Handbook for Local Communities*** (FEMA 317) to this section. This is a "how to" guide to help communities implement one specific mitigation alternative--property acquisitions or "buyouts." It is in four parts, representing the four phases of the property acquisition process: "To Buy or Not to Buy," "Application," "Implementation," and "Open Space Management." An accompanying "Toolkit" contains forms and other tools to aid the acquisition process.

Drought

http://www.cdc.noaa.gov/Drought/

This page, produced by NOAA's Climate Diagnostics Center and entitled "Monitoring Drought Sensitive Regions for 1998/1999," provides information on current and emerging drought situations in the U.S. It includes maps and graphics showing where problems are occurring and much other information and forecasts regarding developing drought.



Severe Weather and El Niño

http://www.dir.ucar.edu/esig/HP_roger/sourcebook

This National Center for Atmospheric Research Web page, entitled ***The Extreme Weather Sourcebook***, reports economic costs of extreme weather--hurricanes, floods, and tornadoes--by state and U.S. territory. The information is in constant 1997 dollars, simplifying comparisons among extreme weather impacts and among states or regions. The site ranks the states and territories in order of economic losses due to each type of hazard and all three hazards combined. A dollar figure for the average annual cost in each category for each state is also provided. Links take the reader to graphs with more detailed information on cost per year for each state and each hazard.

http://www.pbs.org/wgbh/nova/elnino/

Via its Web site, Public Broadcasting's "NOVA Online" offers an excellent section on El Niño/La Niña that provides not only much information about this global weather determinant, but also useful (and fun) interactive links, such as a global map that a person can use (just click on the region in which you are interested) to determine El Niño effects in a given area.

http://ww2010.atmos.uiuc.edu/(Gh)/home.rxml
http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/hurr/home.rxml

The Weather World 2010 Web site, created by the Department of Atmospheric Sciences at the University of Illinois-Urbana-Champaign, hosts a wealth of information on weather, integrating real-time and archived data with instructional resources and using new, interactive technologies. The site includes a multimedia "Online Meteorology Guide," with modules on such specific phenomena as clouds and precipitation, forces and winds, air masses and fronts, weather forecasting, severe storms, El Niño, and, at the second URL above, hurricanes.

http://www.stormdisplay.com

Through a partnership with NASA and FEMA, NBC4 WRC-TV in Washington, DC, has created this Storm Display Web site--a real-time weather display system that shows all of the currently valid National Weather Service watches, warnings, and advisories. The site also includes highly detailed hurricane and tropical storm tracking information taken directly from the Tropical Prediction Center (TPC) in Miami. Earthquakes are also plotted when they occur.

Floods

http://www.fema.gov/mit/tsd

FEMA has initiated a major effort to modernize its Flood Hazard Mapping Program (see the ***Observer***, Vol. XXIII, No. 4, p. 8; and Vol. XXIII, No. 2, p. 12). This site, devoted to that endeavor, offers separate sections with extensive information for homeowners, engineers and surveyors, insurers and lenders, and floodplain managers. In addition, it provides an on-line version of the modernization program's newsletter, ***Work in Progress***, which covers the latest mapping program changes and improvements, as well as the new technologies used to achieve these advancements.

http://www.cira.colostate.edu/fflab/index.htm

The Web page of Colorado State University's Flash Flood Laboratory (see the ***Observer***, Vol. XXII, No. 3, p. 14) provides information about the lab as well as an extensive analysis of the Ft. Collins, Colorado, flash flood of July 28, 1997.

http://www.emforum.org/redriver/

A group of concerned government agencies, private organizations, and individuals recently established the Red River Basin Disaster Information Network "to enhance coordination of information sharing, before, during and after disaster." The network is a direct response to the massive Red River floods of April 1997 that inundated North Dakota and Minnesota in the U.S. and the Canadian province of Manitoba. Although the network's initial focus is flood hazards, its founders intend it to be used in conjunction with all hazards and for all phases of disasters and emergencies. Ultimately, the members of this network plan to use this Web site to develop, maintain, and promote a virtual database, a decision support system, other information resources, and communications media to improve watershed, floodplain, and disaster management in the basin. The site currently offers detailed background information about this project, a directory of participants, a mailing list, a bulletin board and forum for on-line discussion, a "file bank" indexed by author and title, a list of information sources, a calendar of relevant events, a regional map, and other information useful to anyone dealing with watershed or hazard management in the region.

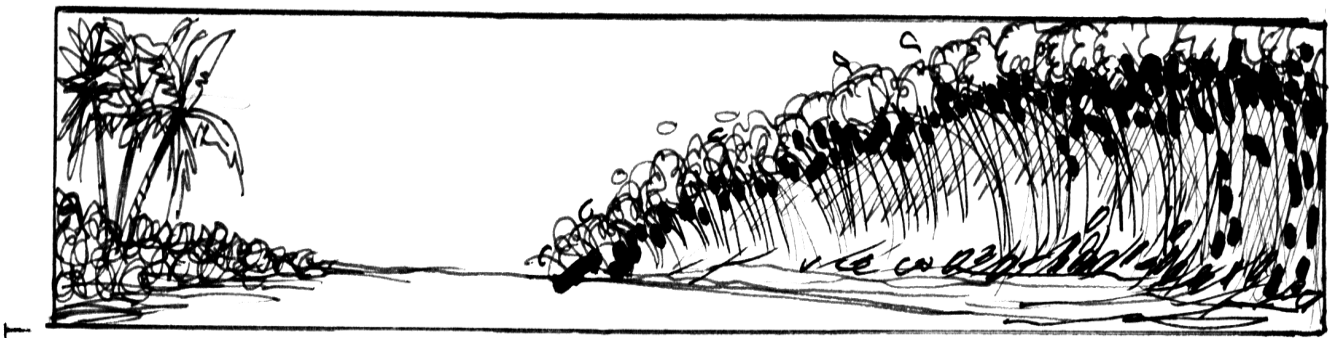
Tsunamis

[We are indebted to ***TsuInfo Alert***, a new newsletter of the National Tsunami Hazard Mitigation Program, for the information about the tsunami sites below. For information on print or e-mail subscriptions to ***TsuInfo Alert***, contact *Connie J. Mason or Lee Walkling, Library, Washington*

Department of Natural Resources, Division of Geology and Earth Resources, P.O. Box 47007, Olympia, WA 98504-7007; (360) 902-1472 or 1473; fax: (360) 902-1785; e-mail: connie.manson@wadnr.gov or lee.walkling@wadnr.gov.]

http://www.ngdc.noaa.gov/seg/hazard/tsu.shtml

This page, "Tsunami Data at NGDC," provides access to the considerable information on tsunamis available from the National Geophysical Data Center (NGDC), including NGDC's Tsunami Database, which encompasses about 6,600 records of tsunami events from 49 B.C. to the present, tide gauge records for over 3,000 tsunamis in the last 150 years, tsunami slide sets, and tsunami publications. (Be sure to check out the cool "Wave of the Future" graphic at the top of the page.)



http://www.alaska.net/~atwc/index.html

The home page of the West Coast and Alaska Tsunami Warning Center provides the most recent press releases, advisories, watches, and warnings from the center; messages from and links to other warning centers around the Pacific; and links to earthquake and tsunami catalogs and other tsunami databases. It also provides background information on the physics of tsunamis, tsunami safety, and the Great Alaskan Earthquake and Tsunami of 1964.

Earthquakes

http://www.eerc.berkeley.edu/library/websites.html

Through this Web page the National Information Service for Earthquake Engineering (NISEE) offers a comprehensive indexed guide to other Internet sources of earthquake information. This resource, updated regularly, currently links to about 200 multidisciplinary earthquake engineering and engineering-related sites by subject and includes a search engine as well as category listings. The main categories are seismology and geophysics; geotechnical engineering; structural engineering; and policy, planning, and economics; and each of these categories includes four or more subcategories. Sites providing educational resources (on-line library databases, etc.) are clearly marked with a special icon.

http://www.curee.org

CUREe, California Universities for Research in Earthquake Engineering, is a nonprofit corporation formed by a consortium of schools devoted to the advancement of earthquake engineering research, education, and implementation. The new CUREe Web site describes the organization; its projects,

conferences, and symposia; and publications. For more information about the organization, contact *CUREe, 1301 South 46th Street, Building 420, Richmond, CA 94804; (510) 231-9557; fax: (510) 231-5664; e-mail: curee@curee.org*.

Y2K

http://www.gao.gov
In November 1998, the United States General Accounting Office (GAO) published ***Year 2000 Computing Crisis: A Testing Guide***, a structured, step-by-step framework for managing all testing activities related to the Y2K problem. The booklet is available in hard copy (single copies are free, additional copies cost $2) from the *U.S. General Accounting Office, P.O. Box 37050, Washington, DC 20013; (202) 512-6000; fax: (202) 512-6061; TDD; (202) 512-2537*. It is also available from the GAO Web site above. Additional information on accessing GAO reports via the Internet is available by sending e-mail, with "info" in the body of the message, to *info@www.gao.gov*.

http://y2khelp.nist.gov
Small businesses looking for help dealing with the Y2K computer problem can contact the recently opened Y2K Help Center for Small Business located at the Commerce Department's National Institute of Standards and Technology (NIST). Open from 8:00 a.m. to 8:00 p.m. (eastern time) Monday through Friday, the Y2K Help Center provides information and technical support, including details about manufacturers' and vendors' databases containing Y2K compliance information. The center can be contacted by phone: *(800) Y2K-7557 ([800] 925-7557)*; e-mail: *y2khelp@nist.gov*; or the World Wide Web at the address above.

The center has recently released a ***Y2K Jumpstart Kit*** for small businesses and manufacturers, which includes a "Conversion 2000: Y2K Self-Help Tool." Using the tool, small businesses can conduct an inventory of equipment, including hardware, software, and embedded systems; identify core business systems and rate their importance to the survival of the business; develop contingency plans; and plan and manage remediation projects. The Y2K Jumpstart Kit also includes a quick start guide, a detailed user's guide for the software, and a self-assessment checklist to help a company determine whether its or its suppliers' computer systems and equipment may have Y2K problems. The Y2K Jumpstart Kit is available on the Y2K Help Center Web site (see above) or by calling *(800) 637-4634*.

http://www.fema.gov/y2k/ccmp.htm
Via this Web page, the Federal Emergency Management Agency now offers, in PDF format, a guide entitled ***Contingency and Consequence Management Planning for Year 2000 Conversion: A Guide for State and Local Emergency Managers***. As FEMA director James Witt says in his introduction, "Year 2000 (Y2K) conversion presents the emergency management community with a unique challenge. . . . Based on current assessments, Y2K need not result in major disruptions. . . . Yet, the complexity and inter-relationships of the automated systems supporting our daily life, the global reach of some systems, and the varying rates at which Y2K repairs are being made, make it difficult to accurately predict all the possible Y2K situations we may encounter. . . . The emergency management community

must prepare to minimize the potential impacts of Y2K problems on public safety and health. This Guide is intended to assist in that effort." The guide provides information on identifying potential problems and risk assessment; keeping an emergency management organization operational; informing and assisting the public; and developing and implementing Y2K consequence management plans.

http://www.fema.gov/y2k/bltn00.htm
FEMA has also begun issuing a consumer guide on preparing for Y2K--the ***Y2K Bulletin***. The bulletin contains answers to questions most commonly asked about Y2K, information concerning what to do about consumer electronic products, including your personal computer, and steps for small-business owners to take, as well as other topics. Besides being available on-line, single and multiple copies of the four-page newsletter are available at no cost from FEMA. To place an order, call *(888) 261-6214*.

http://www.metrokc.gov/prepare/y2k-1.htm
This site provides a brochure put together by the King County (Washington) Office of Emergency Management. Along with general preparedness information, it presents basic information for the public about Y2K and its potential consequences in various sectors and about the county's efforts to mitigate those problems.

More Talk

natural-hazards-disasters@mailbase.ac.uk
Natural-hazards-disasters is an e-mail discussion list and network for anybody with an interest in disasters and natural hazards. It provides a forum for sharing information and debating ideas; a member can use the network to inform others about useful publications and Web sites, to give notice of forthcoming events, to ask for advice, or to raise issues for discussion. Natural-hazards-disasters is multidisciplinary, and all natural hazards are covered, as are technological hazards. However, as the network's name suggests, the focus is as much on disasters as on the hazards that trigger them. This includes looking at the socioeconomic factors that make people vulnerable to disasters and at the capacities of communities and disaster management organizations to protect against disasters.

This e-mail discussion list is not moderated; messages are not edited before they are distributed to the members, but the coordinator can remove members if they abuse this service. To join, send a message to *mailbase@mailbase.ac.uk*. Leave the subject box blank and send the message "join natural-hazards-disasters [your first name, your last name]." You will receive an automatic reply telling you how to send messages and giving information on other utilities. The natural-hazards-disasters network is currently being coordinated by John Twigg (*j.twigg@ucl.ac.uk*) of the Benfield Greig Hazard Research Centre, University College London, U.K.

http://www.egroups.com/group/flood_haz_mit/
http://www.egroups.com/group/ice-snow-hail_haz_mit/
http://www.egroups.com/group/response_recovery/

In the previous ***Observer*** (March 1999--Vol. XXIII, No. 4, p. 11) we mentioned a new discussion list for persons interested in wind hazard mitigation and engineering. Well, the same folks that brought you that service have instituted additional new e-mail groups for flood hazards, ice/snow/hail hazards, and response and recovery issues. Members are welcome from all concerned disciplines. To join, a person should either enter his or her e-mail address into the membership form found at *http://www.egroups.com*, or send an e-mail message to *flood_haz_mit-subscribe@egroups.com*; *ice-snow-hail_haz_mit-subscribe@egroups.com*; or *response_recovery-subscribe@egroups.com*. The messages of the groups and other information can be found at *http://www.egroups.com/list/flood_haz_mit/*; *http://www.egroups.com/list/ice-snow-hail_haz_ mit/*; and *http://www.egroups.com/list/response_recovery/*. Comments and suggestions regarding this service are welcome and should be sent to *James Cohen, James Cohen Consulting, P.C., P.O. Box 130, Pennington, NJ 08534; (609) 730-0510; fax: (609) 730-0511; e-mail: jccpc@email.msn.com; WWW: http://expertpages.com/~jccpc*.

Conferences And Training

Below are recent conference announcements received by the Hazards Center. A comprehensive list of hazard/disaster meetings is posted on our World Wide Web site: *http://www.colorado.edu/hazards/conf.html*.

Disaster Recovery: Maximizing Federal Aid. Presented by: Management Concepts, Inc. This two-day seminar covering FEMA's redesigned Public Assistance Program is being offered in 14 different sites around the nation, March through July 1999. For a seminar brochure, contact *Management Concepts, Inc., 8230 Leesburg Pike, Suite 800, Vienna, VA 22182; (703) 790-9595; fax: (703) 790-1371; WWW: http://www.mgmtconcepts.com*.

Working Group on Emergency Telecommunications (WGET) Eighth Plenary Meeting. Washington, D. C.: June 7-8, 1999. The WGET, convened by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), includes all partners in international humanitarian assistance, such as U. N. agencies, national and international governmental and nongovernmental organizations, the International Committee of the Red Cross, and the academic world. Participants from the private/commercial sector are welcome as individual experts. The WGET facilitates the coordination of

regulatory, operational, and technical aspects of communications in humanitarian assistance. For details, contact *Hans Zimmermann, United Nations Office for the Coordination of Humanitarian Affairs (OCHA), Palais des Nations, CH-1211 Geneva 10, Switzerland; tel: +41 22 917-3516; fax: +41 22 917-0208; e-mail: hans.zimmermann@ties.itu.int*.

13th Annual [Florida] Governor's Hurricane Conference. Tampa, Florida: June 7-11, 1999. The 20th century opened with the deadliest hurricane in United States history striking Galveston, Texas. Since that time, emergency planners and managers have made numerous advances in hurricane preparedness, significantly reducing loss of life due to these deadly storms. In its final decade, however, the century closed with several hurricanes that were the most devastating to property. Because the nation is now focusing on mitigation as the cornerstone of all phases of emergency management, this year's Florida Governor's Conference theme is "Mitigate for the Millennium," reflecting the belief that mitigation is a necessary part of successful hurricane preparedness, planning, response, and recovery. The conference will offer training sessions and workshops covering virtually all areas of hurricane disaster management and mitigation. It will provide essential basic information for persons new to emergency management as well as sessions that delve deeper into more complex issues. It will also present "lessons learned" from recent hurricanes and allow disaster professionals to meet and share knowledge with their colleagues. A conference brochure is available from the *Governor's Hurricane Conference, P.O. Box 279, Tarpon Springs, FL 34688-0279; (727) 944-2724 or (800) 544-5678; fax: (727) 944-2687; e-mail: lynn.daines@flghc.org; WWW: http://www.flghc.org*.

Association of Contingency Planners (ACP) 1999 Symposium: "Setting the Trend for the Next Millennium." Los Angeles, California: June 13-16, 1999. The Association of Contingency Planners is a national professional organization of contingency planners, business continuity professionals, and emergency managers. The association's symposium is intended to educate members of the contingency planning industry through a wide array of presentations geared for all levels and aspects of the business. The subject matter ranges from protecting employees and customers to planning response, recovery, and mitigation to maintain continuity of business. More information is available from *ACP, P.O. Box 16861, Irvine, CA 92623-6861; (414) 768-8000, ext. 134; e-mail: acp1999@excite.com; WWW: http://www.ACP-International.com*.

Natural Disaster Prevention, Land-Use Planning, and Sustainable Development. Sponsors: United Nations International Decade for Natural Disaster Reduction (IDNDR) Secretariat, French Ministry of the Environment, and others. Paris, France: June 17-19, 1999. One of the concluding events of the IDNDR, this conference will focus on sustainable land management and land-use planning, which have emerged as essential underlying elements of disaster prevention. The organizers recognize that disaster prevention still faces many obstacles, particularly in developing areas: lack of physical planning, ignorance of the impact of natural hazards on economic and social development, conflicts among various concerned agencies and organizations involved in disaster management, lack of consideration of local culture and society in disaster prevention decision making, and lack of both resources and knowledge about effective measures.

This meeting will focus on four main issues: natural hazard prevention, land-use and land management, sustainable development, and international assistance. These issues will be discussed within three thematic areas: "Sustainable Development and Land Management: Current Models and Consideration of Natural Disaster Reduction"; "Actions at the National and Local Levels"; and "International Action." The conference will *not* address issues concerning warning and emergency response. The needs and experiences of different countries and different areas (cities, coastal regions, islands, etc.) will be analyzed with particular attention to the implications for elected officials and other decision makers. For a complete conference announcement, contact *Secrétariat général de la Conférence de Paris, DIPCN/ MATE/MISE, 100 Avenue de Suffren, 75015 Paris, France; tel: (33)-(0) 1.42.19.13.48; fax: (33)-(0) 1.42.19.13.45; e-mail: jean-noel.boutin@environnement.gouv.fr*.

National Environmental Health Association (NEHA) Hazardous Materials and Waste Conference. Nashville, Tennessee: July 6-8, 1999. This meeting will cover the current state of Superfund and Resource Conservation and Recovery Act (RCRA) regulations; planning and implementation of pollution prevention strategies; evaluation of pollutant generation sources; GIS use in hazardous materials and waste management; hazardous materials and waste emergencies; and risk communication. For more information, see the conference Web site: *http://www.neha.org*, or contact *NEHA, 720 South Colorado Boulevard, South Tower 970, Denver, CO 80246-1925; (303) 756-9090; fax: (303) 691-9490*.

Community and Family Preparedness Conference. Host: Federal Emergency Management Agency (FEMA) Community and Family Preparedness Program (CFP) and the American Red Cross Community Disaster Education Program. Mt. Weather, Virginia: June 8-11, 1999. The CFP program and conference focuses on public education about disasters. Conference participants include emergency managers and representatives from voluntary organizations, community groups, and businesses and industries. The conference will stress the building of broad coalitions to reach the public with information on how to protect themselves, their families, homes, and livelihoods from disasters. The new Red Cross/FEMA "Disaster Education Organizer's Course," intended for persons responsible for building such coalitions, will be offered preceding the conference, June 5-6. Both the conference and the course are by invitation only, and admission to the training course is limited to persons also attending the conference.
The theme of the conference is "Living Disaster Preparedness," and it will emphasize expanding the network that comprises the public disaster education community, getting the public to invest in comprehensive preparedness and mitigation, and reaching children more effectively with disaster education. Details are available from *Ralph Swisher, FEMA, 500 C Street, S.W., Washington, DC 20472; (202) 646-3561; e-mail: ralph.swisher@fema.gov*.

First Inter-American Institute for Global Change Research Summer Institute on Interdisciplinary Science in the Americas: "Interactions Between Seasonal to Inter-Annual Climate Variability and Human Systems." Miami, Florida: July 11-30, 1999. To foster effective communication and collaboration among early-career natural and social scientists from the Americas, the Inter-American Institute for Global Change Research (IAI) and the University of Miami (UM), with support from the National Science Foundation, are implementing a Summer Institute on Interdisciplinary Science in the

Americas. The theme of the first institute is "Interactions Between Seasonal to Inter-Annual Climate Variability and Human Systems." The institute will explore links between climate variability associated mainly with the El Niño-Southern Oscillation (ENSO) phenomenon and important socioeconomic sectors (e.g., agriculture, water resources, etc.). In particular, it will explore the implications of the emerging capability to forecast ENSO events with lead time of several months and the feasibility of incorporating this information into decision-making or policy-making processes. Complete information is available from the institute Web site: *http://www.rsmas.miami.edu/IAIUM*. Interested persons can also contact the *IAI/UM Summer Institute, c/o Guillermo Podesta, University of Miami RSMAS/MPO, 4600 Rickenbacker Causeway, Miami, FL 33149-1098; fax: (305) 361-4622; e-mail: gpodesta@rsmas.miami.edu*.

H.E.L.P.--Health Emergencies in Large Populations. Offered by: International Committee of the Red Cross and World Health Organization. Provisional schedule:

Geneva, Switzerland: June 21-July 9, 1999
Baltimore, Maryland: July 12-July 30, 1999
Honolulu, Hawaii: July 19-August 6, 1999
Pretoria, South Africa: November 1999.

This training course is "designed to develop and improve the skills of persons and organizations providing emergency health services in humanitarian emergencies." More information is available from *Pierre Perrin, International Committee of the Red Cross, 19 Avenue de la Paix, 1202 Geneva, Switzerland; tel: +41 22 730 2810; fax: +41 22 733 9674; e-mail: pperrin.gva@icr.org*.

National Emergency Management Association (NEMA) Annual Conference. Des Moines, Iowa: August 11-16, 1999 (note date change). The NEMA conference features updates on current programs and policies from the Federal Emergency Management Agency and other relevant governmental organizations, as well as opportunities for state emergency managers to discuss the latest developments in their discipline. For details, contact *NEMA, P.O. Box 11910, Lexington, KY 40578-1910; fax: (606) 244-8239; e-mail: thembree@csg.com; WWW: http://www.nemaweb.org*.

Fifth U.S. Conference on Lifeline Earthquake Engineering. Sponsors: American Society of Civil Engineers, Technical Council on Lifeline Earthquake Engineering. Seattle, Washington: August 12-14, 1999. The theme of this meeting is "Optimizing Post-Earthquake Lifeline System Reliability," and it will serve as a forum for discussion on the latest research, practice, investigations, and public policy in lifeline earthquake engineering that can contribute to improved postearthquake lifeline reliability. It will focus on progress made since the Fourth U.S. Conference, held in San Francisco in 1995. Transportation issues, electric power problems, pipeline performance, water and waste water issues, earthquake seismic risk, socioeconomic considerations, and multihazard risk assessment will all be explored. For conference registration or exhibitor information contact *Andrea Dargush, Multidisciplinary Center for Earthquake Engineering Research, University at Buffalo, Red Jacket Quadrangle, Buffalo, NY 14261-0025; (716) 645-3391, ext. 106; fax: (716) 645-3399; e-mail: dargush@acsu.buffalo.edu; WWW: http://mceer.*

buffalo.edu.

Fifth International Congress on Disasters. Sponsors: Pan American Health Organization, United Nations International Decade for Natural Disaster Reduction, and others. Havana, Cuba: September 7-10, 1999. This congress will bring together environmental, economic, and development specialists to exchange information and strengthen relationships to further international cooperation in the management and mitigation of both natural and technological disasters. More information is available from *Migdalia Luna Cisneros, Palacio de Convenciones de La Habana, Apartado Postal 16046, Ciudad de La Habana, Cuba; tel: (537) 22-6011, ext. 1512, or 21-9376; fax: (537) 21-8382 or 21-9496; e-mail: migdalia@palco.get.cma.net*; or *José Llanes Guerra, Oficina Nacional para Caso de Desastres, Defensa Civil, Calle 18 esq. a 7ma. Avenida, Miramar, Cuba; tel: (537) 23-5085; e-mail: dcncir@infomed.sld.cu*. E-mail or fax communications are preferred.

Short Course: Practical Seismic Design for New and Existing Structures. Offered by: Engineering Seismology and Earthquake Engineering Section, Department of Civil and Environmental Engineering, Imperial College; in collaboration with the Society for Earthquake and Civil Engineering Dynamics; and under the auspices of the European Association for Earthquake Engineering. London, U.K.: September 22-24, 1999. For more information about this course, contact *Julian Bommer, Course Chairman, Department of Civil and Environmental Engineering, Imperial College, London SW7 2BU, U. K.; tel: 0171-594-5984; fax: 0171-225-2716; e-mail: j.bommer@ic.ac.uk; WWW: http://www.ad.ic.ac.uk/cpd/seismic.htm*. To register, contact *Sally Verkaik, Imperial College, Centre for Continuing Education, Sherfield Building, Exhibition Road, Imperial College, London SW7 2AZ, U.K.; tel: 0171-594-6882; fax: 0171-594-6883; e-mail: cpd@ic.ac.uk*.

International Symposium on Earthquake Engineering (ISEE '99). Organizers: Institute of Earthquake Engineering, University of Montenegro; sponsors: United Nations Development Program, and others. Budva, Montenegro, Yugoslavia: September 22-25, 1999. On April 15, 1979, the Montenegro coast experienced a disastrous M7.2 earthquake. After that event, many international seismic risk reduction projects were undertaken in the region. Besides its conventional technical program, this symposium will provide an opportunity to examine that quake and the subsequent 20 years' experience in repair and retrofitting of damaged buildings and lifelines. The objective of ISEE '99 is to share modern experience and scientific and technical knowledge in the area of earthquake engineering, as well as to call society's attention to the need for more consistent protection against earthquake hazards. More information is available from the *ISEE '99 Secretariat, University of Montenegro, Faculty of Civil Engineering, 81000 Podgorica, Cetinjski put bb, Montenegro, Yugoslavia; tel: +381 81 245 510; fax: +381 81 241 903; e-mail: isee99@cg.yu; WWW: http://gf.cg.yu*.

1999 National Association of Flood and Stormwater Management Agencies (NAFSMA) Annual Meeting. Philadelphia, Pennsylvania: November 2-6, 1999. The annual NAFSMA conference addresses such aspects of flood and stormwater control as comprehensive watershed planning, floodplain management, flood inundation mapping, and other tools, techniques, and programs for mitigating hydrologic hazards. More information is available from *NAFSMA, 1299 Pennsylvania Avenue, N.W., Eighth Floor West,*

Washington, DC 20004; (202) 218-4122; fax: (202) 842-0621.

California Association for Fire Ecology (CAFE) 1999 Symposium: "Fire Management: Emerging Policies and New Paradigms." San Diego, California: November 16-19, 1999. This is the third in a series of annual symposia dedicated to fire ecology and fire management. It is intended for land owners, land and resource managers, local decision makers, researchers, fire prevention specialists, and all others interested in fire issues. The symposium will include a plenary session focusing on the integration of research, policy, and fire management, followed by concurrent sessions on such topics as policies and new paradigms; technology and decision support systems; the relationships among research, policy, and management; education and information; planning and use of prescribed fire; physical and biological effects of fire; fire management strategies; public involvement in decision making and project implementation; smoke management; fire ecology and history; and program monitoring and evaluation. For a conference flyer, contact the *Land Use and Natural Resources Office, University Extension, University of California-Davis, 1333 Research Park Drive, Davis, CA 95616-4852; (530) 757-8878; e-mail: lunrinfo@unexmail.ucdavis.edu*.

National Emergency Management Association (NEMA) Mid-Year Conference. Arlington, Virginia: February 25-March 2, 2000. The NEMA Mid-Year conference features updates on current national programs as well as opportunities for state emergency managers to discuss issues with national officials and legislators. For details, contact the *National Emergency Management Association, P.O. Box 11910, Lexington, KY 40578-1910; fax: (606) 244-8239; e-mail: thembree@csg.com; WWW: http://www.nemaweb.org*.

Eighth International Conference of the Natural Hazards Society. Tokushima, Japan: May 21-25, 2000. The International Society for the Prevention and Mitigation of Natural Hazards, better known as the Natural Hazards Society, was formally established in August 1988. Some of its major objectives are to promote research in all aspects of natural hazards, to assist in the distribution of preparedness and emergency response plans for countries around the world, and to assist in the formation and implementation of education programs on hazards prevention and mitigation. The society meets in different parts of the world about every two years; these meetings feature special symposia on topical natural disaster events or natural hazard studies. For information on the Japan meeting, contact the *Natural Hazards Society, P.O. Box 49511, 80 Glen Shields Avenue, Concord, Ontario, Canada L4K 4P6; WWW: http://www.es.mq.edu.au/NHRC/NHS*.

Earthquake Engineering Research Institute 2000 Annual Meeting. St. Louis, Missouri: May 31-June 3, 2000. Among many other topics, the year 2000 EERI meeting will focus on the problems posed by intraplate earthquakes in less seismically active (or at least, less seismically aware) regions of the world. In particular, it will examine issues posed by the New Madrid seismic zone and other central U.S. hazards. More details are available from *EERI, 499 14th Street, Suite 320, Oakland, CA 94612-1934; (510) 451-0905; fax: (510) 451-5411; e-mail: eeri@eeri.org; WWW: http://www.eeri.org*.

Interpraevent 2000: Ninth International Congress of the International Society Interpraevent. Villach,

Austria: June 26-30, 2000. Conference topics include protection and control measures against natural hazards, especially floods, mudflows, erosion, landslides, and avalanches. More information is available from *Interpraevent 2000, P.O. Box 117, A-9020 Klagenfurt, Austria; tel: +43 463 536 31818; fax: +43 463 536 31828; e-mail: interpraevent@ktn.gv.at; WWW: http://www.ktn.gv.at/akl/abt18/interpraevent.htm*.

Sixth International Symposium on Land Subsidence (SISOLS 2000). Sponsors: United Nations Educational, Scientific, and Cultural Organization (UNESCO), International Association of Hydrological Sciences, and others. Ravenna, Italy: September 25-29, 2000. In recent years, there has been an increasing awareness of problems related to the sinking of land surfaces, as well as the natural and anthropogenic causes of such hazards. This international symposium, the sixth focusing on this problem since 1969, will bring together the leading members of the scientific community in this field to present the latest research, discuss recent experiences, and deterine a "sustainable" approach to land subsidence management. All dimensions of this problem are potential topics; abstracts are due June 1, 1999. A conference brochure is available from *Jane Frankenfield Zanin, SISOLS 2000 Secretariat, c/o CNR-ISDGM, San Polo 1364, 30125 Venezia, Italy; tel: +39-041-5216826; fax: +39-041-5216892; e-mail: jane@isdgm.ve.cnr.it*.

Sixth International Conference on Seismic Zonation (6ICSZ). Sponsor: Earthquake Engineering Research Institute (EERI). Palm Springs, California: November 12-15, 2000. 6ICSZ will gather members of the scientific, engineering, planning, and public policy disciplines--both users and developers of seismic zonation information--to review current developments and new needs in the field. The conference will address six major themes: financial risk management, planning and public policy, engineering and codes, new mapping technologies, new developments in hazard estimation, and lifelines and utilities. Abstracts are due February 1, 2000. Details are available from *EERI, 499 14th Street, Suite 320, Oakland, CA 94612-1934; (510) 451-0905; fax: (510) 451-5411; e-mail: 6icsz@eeri.org; WWW: http://www.eeri.org*.

LSU Hosting Hurricanes and Chemical Hazards Internet Conference

Louisiana faces a dual threat from Gulf of Mexico hurricanes and accidental releases of hazardous substances associated with chemical process operations in the state. The potential compound effects of these two risks could be severe, but they are not well understood. Beginning June 1, 1999, a team of faculty and graduate students at Louisiana State University will launch an Internet-based conference to address this issue. Additional information is available on-line at *http://hurricane.lsu.edu* or from the *Institute for Environmental Studies, 42 Atkinson Hall, Louisiana State University, Baton Rouge, LA 70803; (225) 388-8521; fax: (225) 388-4286*.

A New Mitigation Course from FEMA/EMI

A course entitled ***Introduction to Mitigation*** (IS-393), intended for persons new to emergency management and/or mitigation, is now available from the Federal Emergency Management Agency's Emergency Management Institute (FEMA/EMI) Independent Study Program. The course explains the rationale for mitigation and its function as a component of emergency management; defines the principles, purposes, and priorities of mitigation; describes mitigation measures that apply to local hazards; summarizes responsibilities and resources; and outlines mitigation planning considerations. Interested persons can enroll electronically via the FEMA/EMI Web page, *http://www.fema.gov/home/emi/ishome.htm*, which offers numerous other independent study courses for emergency managers. The course materials can also be ordered from the *Emergency Management Institute, Independent Study Program, 16825 South Seton Avenue, Emmitsburg, MD 21727-8998*.

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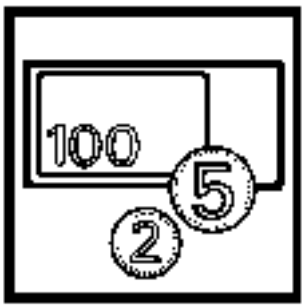

Contracts and Grants

Improvisation in Emergency Response Organizations: A Cognitive Approach. Funding agency: National Science Foundation, $305,537, 36 months. Principal Investigator: *William A. Wallace, Rensselaer Polytechnic Institute, Troy, NY 12180-3522; e-mail: wallaw@rpi.edu.*

The objective of this project is to improve the ability of emergency response organizations to improvise. The need for suppport in improvisation in the form of training and real-time decision aids is well recognized, and this endeavor will model cognitive processes in improvisation in documented cases of emergency response. The resulting decision support system will be tested in two separate gaming situations, one in Europe and one in the U.S.

Compliance with Building Code Provisions: Decision-Making for Residential Construction. Funding Agency: National Science Foundation, $127,033, 14 months. Principal Investigator: *Peter J. May, Department of Political Science, Box 353530, University of Washington, Seattle, WA 98195-3530; (206) 543-9842; fax: (206) 685-2146; e-mail: pmay@u.washington.edu.*

Shortfalls in building-code compliance and enforcement have been cited repeatedly as obstacles to reducing losses of lives and property in natural disasters. Conventional responses call for stronger code enforcement by local authorities and for improved building codes. This research will examine the role of various factors in shaping the decisions that residential contractors make about compliance with code provisions, shifting the focus from increasing enforcement to obtaining compliance. The central question is how compliance can be improved in the absence of strong enforcement.

Natural Disasters and Industrial Activities in the Urban Environment: Potential Impacts of Joint Events and Preparedness for Industrial Accidents Caused by Natural Disasters. Funding agency: National Science Foundation, $241,951, 24 months. Principal Investigators: *Laura J. Steinberg and Ronaldo Luna, Tulane University, 6823 St. Charles Avenue, New Orleans, LA 70118; (504) 862-3254; e-mail: lauras@mailhost.tcs.tulane.edu.*

Natural disasters pose a major threat to human life and property in urban environments. The mix of land use in urban space, especially in the close proximity of industry to residential uses in some areas, presents special issues in planning for natural disasters. Industries often use or produce hazardous materials that could be released unexpectedly during severe natural hazard events, and explosions are

also possible. Thus, the consequences of natural hazard events could be compounded for the environment and for nearby residential communities. This research will examine the potential impacts of natural and technological disasters on residents and property in urban environments. It will involve two case studies of industrial sites and examine the preparedness of industry, government, and individuals for response to such events.

Public Involvement in Planning and Local Government Commitment to Hazard Mitigation. Funding agency: National Science Foundation, $294,303, 24 months. Principal Investigator: *Raymond J. Burby, College of Urban and Public Affairs, University of New Orleans, New Orleans, LA 70148; (504) 286-5497; fax: (504) 286-6272; e-mail: rjbur@uno.edu.*

This research will investigate the effectiveness of public involvement in state and federal programs to foster hazard mitigation planning. It will examine program activities already underway among local governments in states that have mandated the preparation of local government comprehensive plans and among local governments that are participating in the Federal Emergency Management Agency's Community Rating System that have prepared floodplain management plans. The processes through which citizen involvement is, or is not, translated into commitment by public officials will be evaluated, as will the effectiveness of various public involvement techniques.

Corps Soliciting Grant Proposals

The U.S. Army Corps of Engineers (USACE), Vicksburg Consolidated Contracting Office, recently issued a Broad Agency Announcement, soliciting proposals for basic and applied research. The announcement states that areas of interest include earthquake engineering, coastal engineering, slope stability, human-environment interaction, and several other hazard-related areas. The complete announcement is available on the World Wide Web at *http://www.mvk.usace.army.mil/contract/baa.asp*. The deadline for proposals is December 31, 1999. Se e *http://www.mvk.usace.army.mil/contract* for more information, or contact the *USACE Vicksburg Consolidated Contracting Office, 4155 Clay Street, Vicksburg, MS 39180-3435; attn: Trudy James, (601) 631-7265, or Robin Green, (601) 631-7266.*

Recent Publications

All Hazards

The Disaster Handbook: 1998 National Edition. *Publication #SP-241. 1999. Volume 1-500 pp.; Volume 2-500 pp., plus CD-ROM.* ***Are You Ready?*** *VHS. $100.00 for the entire package; individual components are not sold separately. To order, contact the University of Florida, Institute of Food and Agricultural Sciences, Publications, P.O. Box 110011, Gainesville, FL 32611-0011; (352) 392-1764;*

fax: (352) 392-2628; http://disaster.ifas.ufl.edu.

The land grant programs in each state are an important link to local communities that can quickly reach individuals and groups in emergencies. This module was created to help county extension personnel assist their communities in times of disaster. Besides containing a list of all the cooperative extension offices in the U.S. and its territories as well as other agencies that can provide information and assistance, it provides detailed guidance on disaster preparedness, what to do during a disaster and after the event, home recovery, farm recovery, hurricanes, lightning, floods, tornadoes, hazardous material spills, radiological accidents, fires, terrorism, extreme heat and cold, earthquakes, preparing radio public service announcements, and methods of coping with stress. The CD contains the complete module in PDF format. The video presents the 1998 Disaster Preparedness Satellite Videoconference.

***The Takings Issue: Constitutional Limits on Land Use Control and Environmental Regulation**. Robert Meltz, Dwight H. Merriam, and Richard M. Frank. 1999. 525 pp. $60.00. Available from Island Press, Box 7, Department 2NET, Covelo, CA 95428; (800) 828-1302 or (707) 983-6432; fax: (707) 983-6414; WWW: http://www.islandpress.org.*

Land-use restrictions and controls are important components of many local hazard reduction programs, most notably floodplain restrictions under the National Flood Insurance Program. As challenges to these controls by landowners and members of the property-rights movement have increased, the concept of "takings"--government action that excessively limits a property owner's use of private land--has become both increasingly familiar to the public and increasingly problematic for local officials. A vast and diverse body of case law has emerged over the past several decades, and this volume attempts to make sense of it all. It provides an overview and explanation of issues surrounding regulatory takings on the local, state, and federal level and describes where the law is now, predicts where it might go in the future, and reviews conflict-reducing solutions to a variety of situations. Among the hazards-related cases discussed are *Dolan v. City of Tigard* regarding permits and use of the floodplain; *Lucas v. South Carolina Coastal Council* regarding restriction of development on oceanfront property; and *Nollan v. California Coastal Commission*, regarding permitting and beachfront access restrictions.

***State Emergency Management Funding and Structures: NEMA/CSG 1998 Report**. 1998. 40 pp. $35.00. Copies can be purchased from the Council of State Governments, Publications Sales Department, P.O. Box 11910, Lexington, KY 40578-1910; (800) 800-1910; e-mail: info@csg.org; WWW: http://www.csg.org.*

Part of the continuing effort by the National Emergency Management Association (NEMA) and the Council of State Governments (CSG) to promote greater recognition of states' commitment to emergency management and to educate the public about the true costs of disasters, this report details state spending on emergency management. It also describes the organizational structure of state emergency management, sources and levels of funding, and interstate mutual aid.

***Applied Geography**, Vol. 18., No. 1 (January 1998). Subscription: $392.00 annually. To order, contact Elsevier Science Customer Support Department, P.O. Box 945, New York, NY 10010; (212) 633-3730; fax: (212) 633-3680; e-mail: usinfo-f@elsevier.co.com.*

Applied Geography is a journal devoted to the publication of research that uses geographical theory and

methods to resolve human problems. The special theme of this issue is Hazards in Changing Cities, and it contains papers presented at a special session of the International Geographical Union's Study Group on the Vulnerability of Megacities, held in 1996 in The Hague. Topics include hazards in changing cities, the geography of disaster vulnerability, marginality and vulnerability, urban earthquake hazards, time variation of risk, earthquake disaster mitigation strategy evaluation, estimating megacity growth, and analyzing city systems.

A National Mitigation Policy: Findings from National Consultations on Canada's Preparedness for Disasters. *1998. 20 pp. For availability, contact Emergency Preparedness Canada, 122 Bank Street, Second Floor, Jackson Building, Ottawa, Ontario, Canada K1A 0W6; (613) 991-7034; fax: (613) 996-0995; WWW: http://hoshi.cic.sfu.ca/epc/.*

This report emerged from a series of meetings held throughout Canada to consider methods of reducing that country's vulnerability to disasters. In the near future, Emergency Preparedness Canada and the Institute for Catastrophic Loss Reduction will use the results of these meetings to propose a national mitigation policy. The report notes that, although Canada has a proven record of effective emergency response and recovery, responsibilities to mitigate the impacts of disasters have not been clearly defined, coordinated, or reported in a systematic manner. It calls for management policies and practices that work to reduce long-term vulnerability. Among the topics discussed are: mechanisms for action, leadership for safer communities, and mitigation as an investment.

Disaster Policy and Emergency Management in Russia*. Boris Porfiriev. 1998. 230 pp. $70.00. Copies can be purchased from Nova Science Publishers, Inc., 6080 Jericho Turnpike, Suite 207, Commack, NY 11725; (516) 499-3103; fax: (516) 499-3146; e-mail: novascience@earthlink.net; WWW: http://www.nexusworld.com/nova.*

For many decades, emergency and disaster policy has been an important element of national policy in the former Soviet Union, although it has also been one of the least studied and publicized. This book discusses major disasters that occurred in the region, many of which were unknown to the outside world, as well as the historical and legal development of the Russian emergency management system. Topics include armed conflicts, emergencies and disasters, underlying causes of disasters, classification of emergencies, emergency management strategies and mechanisms, organization of emergency management in Russia, a radiation accident at the Siberian Chemical Complex, a major fire at the Kamski car plant, and the Neftegorsk earthquake.

FEMA Issues Second Report on Costs and Benefits of Mitigation

American businesses are increasingly recognizing that, while they cannot prevent natural disasters, they can prevent many of their impacts, including business interruption, lost production, and lost supplies. In an effort to highlight successful mitigation efforts by businesses, FEMA recently issued ***Protecting Business Operations: Second Report on Costs and Benefits of Natural Hazard Mitigation*** (FEMA 331, 1998, 41 pp., free).

With competitive markets, tight overhead, and slim profit margins, losses due to natural hazards can make the critical difference in a business' ability to maintain profitability, or even survive. Fortunately, mitigation is a cost-effective method to reduce or prevent losses, especially when it is integrated into the way a business operates. This report provides 10 case studies of successful mitigation in the private sector, including the programs of Warner Bros. Studios, BellSouth, Hewlett-Packard, and other businesses that have taken an active role in preventing business losses from disasters.

Copies of the report can be requested from the *FEMA Publications Distribution Facility, P.O. Box 2012, Jessup, MD 20794-2012; (800) 480-2520.*

***Development at Risk? Natural Disasters and the Third World**. 1999. 24 pp. Free. Single copies can be requested from Tony Eades, Secretary of the U.K. National Co-ordination Committee for the IDNDR, The Royal Academy of Engineering, 29 Great Peter Street, London, U.K. SWIP 3LW; tel: 0171-222-2688; fax: 0171-222-0054; e-mail: eades@raeng.co.uk.*

Many people fail to see the connection between the natural disasters that affect developing countries and those countries' long-term social and economic development. In truth, disasters have a significant impact on development, seriously retarding the growth of households, communities, and even nations. Moreover, development and its consequences can themselves be a contributing factor in disasters. This report examines this interrelationship, considering the effects disasters have on developing communities and the reasons why some people are more at risk than others. It also explores the economic impacts of disasters and why these are often underestimated, successful attempts by vulnerable communities to use their own experiences to mitigate hazards, and the contributions of the U.K to the International Decade for Natural Disaster Reduction.

***Climate, Change and Risk**. Thomas E. Downing, Alexander J. Olsthoorn, and Richard S.J. Tol, Editors. 1999. 420 pp. $115.00. To purchase a copy, contact Routledge Customer Service, 7625 Empire Drive, Florence, KY 41042; (800) 634-7064; fax: (800) 248-4724; e-mail: cserve@routledge-ny.com; WWW: http://www.routledge-ny.com.*

Although human societies have always suffered from, and often adapted to, extreme weather events, as populations grow, data show a decline in number of deaths but an increase in economic losses due to these hazards. Some experts have become convinced that extreme climatic events are increasing, and that global climate change may be contributing to this increase. This volume, intended to advance understanding of extreme events, includes papers that address such topics as policy responses in Australia, land subsidence, drought and flooding in Europe, hurricane impacts on the eastern U.S. seaboard, the economic impacts of sea-level rise, windstorms, heatwaves, economic analysis of natural disasters, weather insurance, and policy responses to changing climatic risks.

***Veterinary Disaster Team Resource Development Guide**. Second Edition. Patty Boge. 1999. 110 pp. $21.95. To purchase a copy, contact the Iowa State University Press, 2121 South State Avenue, Ames, IA*

50014-8300; (800) 862-6657 or (515) 292-0155; fax: (515) 292-3348; WWW: http://www.isupress.edu.

In the aftermath of disasters, care of pets and stray domestic animals is a critical but sometimes overlooked necessity. This guide describes how to organize and manage a program for veterinary treatment of animals following disasters. It stems from a successful program established by the author and currently used in Los Angeles City and County. The guide describes 12 steps to forming a veterinary disaster team, the role of the primary veterinary coordinator, the incident command system, planning, protocol, flow sheets, logistics, finance, and the use of exercises. It also provides numerous sample forms for tracking animals, supplies, and medications.

The Role of the Wildlife Rehabilitator in Disaster Preparedness and Response. *Stephen Dickstein and Guy R. Hodge. 1997. 14 pp. Free. Copies can be obtained from the Federal Emergency Management Agency (FEMA) Web site: http://www.fema.gov/home/fema/iwrcpap.htm.*

Disasters and other crises can have a devastating impact on wildlife. Just as human victims are in need of assistance, many wild animals must also rely on human intervention for their survival. This paper discusses the role of licensed wildlife rehabilitators in disaster response. The authors explore disaster response as it applies to animals, including the role of national, state, and local organizations such as the Humane Society, the Red Cross, and FEMA; potential impediments posed by wildlife to relief workers; the impacts of disasters on wild animals and their behavioral responses; capture, medical care, and temporary sheltering of wildlife; and the provision of advisories and practical tips to the public on such items as avoiding injuring animals and assisting them to safe ground.

Natural Disaster Experiences: How to Prepare Environmental Facilities for the Worst*. American Academy of Environmental Engineers. 1995. 86 pp. $5.95, plus $4.75 shipping and handling. Order from the Environmental Engineering Bookstore, 130 Holiday Court, Suite 100, Annapolis, MD 21401; (410) 266-3390.*

This book draws on the experiences of nine environmental facilities managers who had first-hand involvement with earthquake and flood disasters, focusing on the 1994 Northridge earthquake and the Great Midwest Floods of 1993. It includes a checklist of lessons learned and guidance for disaster preparedness planning.

Disaster Recovery Yellow Pages*. 1999. 320 pp. $98.00, plus $3.00 shipping. Regular updates are also available. To order this guide, contact the Systems Audit Group, Inc., 25 Ellison Road, Newton, MA 02459; (617) 332-3496; fax: (617) 332-4358; e-mail: dryp@javanet.com.*

This directory was designed to help users locate recovery services throughout the United States and Canada. It contains over 3,000 vendors and covers over 350 categories--from drying microfilm records to trauma counseling. The information is divided into five sections: restoration services, mobile buildings, computer and emergency equipment, planning and data recovery software, and training publications and videos. The directory also includes an alphabetical index of companies and a tutorial on disaster recovery planning.

Australian Emergency Management Glossary. *Manual 3. 1998. 143 pp. Free. Available on the World Wide Web at http://www.ema.gov.au/pdffiles/glossary.pdf.*

***Australian Emergency Management Thesaurus**. Manual 4. 1998. 122 pp. Free. Available on the World Wide Web at http://www.ema.gov.au/pdffiles/thesaurus.pdf.*

Printed copies can be provided to persons overseas upon payment of handling and shipping costs. Enquiries should be sent to the Director General, Emergency Management Australia, P.O. Box 1020, Dickson, ACT2602, Australia.

Although Aussies say bushfire and Americans say wildfire, when it comes to emergency management, it's important for responders to speak the same language. Emergency Management Australia developed these two publications after consulting with key emergency management organizations in that country. The ***Glossary*** provides definitions for everything from aftershock to critical incident to lifelines to seismic zonation. The ***Thesaurus*** lists terms, along with non-preferred terms, related terms, broader terms, and narrower terms, ranging from aborigines to zoning.

Floods

***A New Evaluation of the USGS Streamgaging Network: A Report to Congress**. 1998. 20 pp. Free. Copies can be obtained from the U.S. Geological Survey (USGS), 415 National Center, 12201 Sunrise Valley Drive, Reston, VA 20192; (703) 648-5303; fax: (703) 648-5295; WWW: http://water.usgs.gov/streamgaging.*

Since 1889, the USGS has operated a streamgaging network to collect information about American water resources. Data are freely available to the public and all agency partners. In March 1998, the USGS began to evaluate the rivers and watersheds network by simulating hydrological data and applying it to a geographic information system database to determine how well it meets specific goals. This report discusses how well the streamgaging network meets those federal goals. The report describes the streamgaging network, provides a detailed evaluation of the network, describes the evolution of funding, details modernization efforts, and outlines the upcoming National Streamflow Information Program.

***Floods, Famines and Emperors: El Niño and the Fate of Civilizations**. Brian Fagan. 1999. 300 pp. $25.00, bookstores; $17.50, via the Internet at http://www.amazon.com.*

In recent years, El Niño became a household term, as one of the largest increases in eastern Pacific Ocean temperatures in recent history caused bitter freezes in Europe, brutal snowstorms and floods in western North America, and deadly droughts throughout the South Pacific. In ***Floods, Famines and Emperors***, Brian Fagan examines the social impacts of this and other powerful weather phenomena. He explores how droughts, flood, heat, and cold have stressed cultures and forced them to adapt, as well as how they adapt successfully. He questions how these stresses affect faith in foundations of society and legitimacy of rulers, as well as how our own society is vulnerable to climate change. Fagan goes on to show how short-term climate shifts have been a major force in history; El Niño-driven droughts caused the collapse of dynasties in Egypt and historic famines in India, while El Niño floods have destroyed whole civilizations in Peru. He also suggests that other climate changes may have caused the mysterious abandonment of Anasazi dwellings in the American Southwest, the collapse of the Mayan empire, and changes in the course of European history.

Wet Weather Flow Management: A Research Needs Survey for Urban Areas*. James P. Heaney, Leonard Wright, and David Sample. 1999. 270 pp. $85.00. Copies can be purchased from the Water Environment Research Foundation, 601 Wythe Street, Alexandria, VA 22314-1994; (703) 684-2470; fax: (703) 684-2492; e-mail: werf@werf.org ; WWW: http://www.werf.org.*

Proper management of urban runoff remains one of the major environmental problems in the U.S. and worldwide. One of the aims of this publication is to summarize research into wet weather flow nationally and internationally. Topics include previous research needs assessments, source characterization, reception of water impacts, management of runoff and excess water, regulatory policies and financial aspects, control technologies, and topics for additional research.

Hurricanes

Racing to Catch Up: South Florida's Battle over Building Codes, ***America's Hurricane Threat****, Vol. 1, No. 1 (Fall 1998). John Tibbetts. Free. To subscribe, contact John Tibbetts, South Carolina Sea Grant Consortium, 287 Meeting Street, Charleston, SC 29405; (843) 727-2078; e-mail: tibbetj@musc.edu; WWW: http://www.haznet.org/text/sflhurricane.html.*

This report is the first in a series that describes community efforts to reduce future hurricane damage, mitigate storm threats, and address roadblocks to change. Racing to Catch Up describes the 1990s as a decade of missed mitigation chances for coastal areas from Texas to Maine. Tibbetts asserts that, following hurricanes Hugo and Andrew, many coastal communities ignored the hurricane threat while population and development boomed. As a result, South Florida is probably more vulnerable today than before Hurricane Andrew. However, governments can implement a number of measures to reduce future hurricane damage, such as funding retrofitting programs, relocating structures, toughening building codes and enforcement, improving evacuation routes, and educating the public on the need for these efforts. Tibbetts discusses the South Florida experience with building failures following Hurricane Andrew, current rules regarding mitigation requirements, Miami-Dade County building materials testing requirements, and the statewide building code that will be implemented in 2001.

Hurricane Evacuation Traffic Analysis and Operational Measures*. Douglas P. Zaragoza, Mark W. Burris, and Edward A. Mierzejewski. 1998. 218 pp. $47.00, plus $5.00 shipping. Copies can be purchased from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161; (800) 553-6847; fax: (703) 605-6900; e-mail: orders@ntis.fedworld.gov; WWW: http://www.ntis.gov.*

This report, prepared for the Florida Department of Transportation, examines traffic behavior during hurricane evacuations. The first section provides an historical analysis of traffic demands during evacuations for hurricanes Opal and Bertha, describes current traffic data collection methods, outlines alternative technologies, and discusses the potential role of the Internet in monitoring evacuation traffic. The second section describes the potential use of traffic surveillance cameras, and the third section examines real-time traffic information Web sites from around the U.S.

Crying Wolf: Repeat Responses to Hurricane Evacuation Orders, ***Coastal Management****, Vol. 26 (1998). Kirstin Dow and Susan L. Cutter. $130, individual subscription. To purchase a single issue or to*

subscribe, contact Taylor & Francis, 47 Runway Road, Levittown, PA 19057-4700; (215) 269-0400; fax: (215) 269-0363.

Dow and Cutter examine the evacuation behavior of residents in two South Carolina communities, Hilton Head and Myrtle Beach, during the 1996 hurricane season. Two hurricanes that approached this region but struck in North Carolina provided an opportunity to study the impacts of repeated false alarms (evacuations based on expectation of a hurricane landfall that did not occur). The authors examine differences in evacuation behavior, concerns prompting evacuation, information content, and reliability of information sources, to evaluate the impacts on credibility of warning systems. They discovered that, although residents listen to warnings and evacuation orders from public officials, they also depend upon the news media for more detailed information, including information about storm characteristics and advisories, to help them make evacuation decisions.

Earthquakes and Volcanoes

The Challenge of Land Use Planning After Urban Earthquakes: Observations from the Great Hanshin Earthquake of 1995. *Catherine Bauman. Report No. PF96-5. 1998. 52 pp. Free. Copies can be requested from the Earthquake Engineering Research Center (EERI), 499 14th Street, Suite 320, Oakland, CA 94612-1934; (510) 451-0905; fax: (510) 451-5411; e-mail: eeri@eeri.org; WWW: http://www.eeri.org.*

The earthquake that struck Kobe, Japan, in 1995 devastated many parts of the city, resulting in a need for coordinated reconstruction planning. During this process, city planners had to take into account the layout of the city's infrastructure, land use patterns, and residents' loyalty to their homes and neighborhoods. Kobe has traditionally taken an innovative approach to land-use planning, and this report describes how Kobe is dealing with the loss of 95,000 housing units and how owners and public agencies are coping with damage to cultural resources such as historic buildings. Although the recovery tools available in Kobe differ from those in the U.S., most of the issues the Japanese are facing will reappear when a large quake strikes a modern city in this country.

Insured Losses from the Northridge Earthquake*. 1999. 8 pp. Free. Copies can be requested from Greta Ljung, Institute for Business and Home Safety, 175 Federal Street, Suite 500, Boston, MA 02110-2222; (617) 292-2003; fax: (617) 292-2022; WWW: http://www.ibhs.org.*

IBHS recently released this report, derived from its Catastrophe Paid Loss Database covering insured losses for property damage due to natural catastrophes. According to that organization, insurers paid approximately $15.3 billion to cover losses in the 1995 Northridge, California, earthquake. The report also estimates total economic losses from the quake at $40 million. Not suprisingly, insured losses were paid mostly to those who carried residential earthquake coverage ($11 billion), while the remainder ($4.4 billion) covered commercial losses. Only Hurricane Andrew, which struck Florida in 1992, exceeds the Northridge quake in insured losses with a total of $15.5 billion.

Achieving Earthquake Risk Reduction Through Community-Based Partnerships*. 1998. 138 pp. Free. To request a copy, contact the Central United States Earthquake Consortium (CUSEC), 2630 East Holmes Road, Memphis, TN 38118-8001; (901) 544-3570; fax: (901) 544-0544; e-mail: cusec@ceri.*

memphis.edu; WWW: http://gandalf.ceri.memphis.edu/~CUSEC/index.html.

The 1998 CUSEC annual conference built on the Federal Emergency Management Agency's Project Impact initiative, laying the groundwork for a unified approach to earthquake risk reduction in the central U.S. by linking earthquake expertise and resources with the groups and organizations that must implement hazard reduction activities. This proceedings volume includes papers that describe risk reduction in the central U.S., the Mid-America Earthquake Center, the Central U.S. Earthquake Consortium, the role of business alliances in building disaster-resistant communties, successful community-based partnerships, risk reduction strategies for medical facilities, hazard and risk assessment, transportation networks, the use of geographic information systems in earthquake hazard reduction, and education and public outreach.

***Temporary Shoring and Stabilization of Earthquake Damaged Historic Buildings**. Roy W. Harthorn. 1998. 36 pp. $10.50. To purchase a copy, contact the International Conference of Building Officials, 5360 Workman Mill Road, Whittier, CA 90601-2298; (800) 284-4406; WWW: http://www.icbo.org/wsnsa.dll/prodshow.w?prodid=349S98.*

This publication is a guide for government officials, architects, engineers, preservationists, community members, and building owners concerned with the hazards posed to historic buildings by earthquakes. Shoring and stabilizing techniques that reduce potential damage are presented, and state and federal preservation statutes and regulations governing shoring design and construction are also referenced. The guide summarizes for local government officials and building owners both the sociopolitical environment they should anticipate after an earthquake disaster and the shoring and stabilization methods that will provide the necessary time to determine the best options for dealing with a damaged building. Accordingly, this guide discusses how to retain historic structures whenever possible and indicates why such direction may be desirable. It also contains sections on dealing with competing experts, inspector and engineer protocol, search and rescue shoring, determining the feasibility of repair, moving historic buildings, demolition, and community preparedness.

*"The Shock of the Old," by Jane Kramer. **The New Yorker**, Vol. LXXIV, No. 45 (February 8, 1999). (Try your local library for back issues).*

For those of you who, like ourselves, sometimes weary of the sound and fury of quantitative research, there's always ***The New Yorker*** magazine. From time to time, the ***New Yorker*** offers articles about disasters and their aftermath that, thanks to their narrative approach, provide insights and understanding that chi squares and correlation coefficients somehow can never grasp. This article is the story of Massa Martana, an Umbrian town devastated by an earthquake in May 1997. The author writes about the political and cultural factors affecting Massa's recovery and the restoration of its church and other cultural artifacts. More significantly, she shows the human hopes and frustrations accompanying that slow process.

Overcoming Barriers: Lifeline Seismic Improvement Programs. *Craig Taylor, Elliott Mittler, and LeVal Lund. Technical Council on Lifeline Earthquake Engineering Monograph No. 13. 1998. 305 pp. $39.00. Available from the American Society of Civil Engineers, Book Orders, P.O. Box 79404, Baltimore, MD 21279; (800) 548-2723; fax: (703) 295-6211; WWW : http://www.asce.org.*

This volume evaluates the seismic improvement programs of several large lifeline organizations, demonstrating a variety of ways to accomplish seismic safety. The authors found that these organizations were guided by past earthquake experiences, past research, and educational programs when they developed their overall view of system earthquake vulnerabilities and their subsequent seismic programs. The authors discuss political and regulatory issues, seismic evaluation approaches, and offer recommendations for improving programs. The case studies examine the Seattle Water Department, the Los Angeles Department of Water and Power, the East Bay Municipal Utility District, Caltrans Los Angeles Traffic Operations Center, Questar Gas Company, and the Southern California Edison Company.

Seismic Zonation: A Framework for Linking Earthquake Risk Assessment and Earthquake Risk Management*. Walter Hays, Bagher Mohammadioun, and Jody Mohammadioun, Editors. 1999. 160 pp. 250 French Francs ($45.00), plus 20 French Francs ($4.00) postage. Order from Quest Éditions, Presses Académiques, 1 rue de Noe, B.P. 52106, 44321 Nantes Cedex 3, France; tel: 3312 40 14 34 34; fax: 3312 40 14 36 36.*

This monograph is designed to provide scientists, engineers, planners, emergency managers, and policy makers in earthquake-prone communities with the basic information they need to reduce unacceptable risk due to various seismic hazards (from ground shaking to tsunamis). It includes contributions from over 30 world authorities regarding: why earthquake risk assessment and earthquake risk management constitute an urgent worldwide need and why we need to rethink the process of seismic zonation; what policy options a community should adopt for earthquake risk management and the relative benefits of various options; what opportunities for collaboration exist for earthquake-prone nations to increase their ability to reduce seismic risks; what information and databases are available to aid risk reduction; and what approaches now exist to link risk assessment and risk management.

Volcanoes*. Third Edition. Robert Decker and Barbara Decker. 1998. 320 pp. $19.95. Includes* ***Volcanoes CD-ROM****. To purchase, contact VHPS-Von Holtzbrinck Publishing Services, 16365 James Madison Highway, Gordonsville, VA 22942; (888) 330-8477 or (540) 672-7600; fax: (800) 672-2054; WWW: http://www.whfreeman.com.*

This revised and updated third edition of ***Volcanoes*** provides snapshots of the most famous volcanoes in

the world, including many first-person accounts of volcanic events. The authors provide an introduction to volcanology based on plate tectonics, then discuss various volcanoes around the world, hot spots, volcanic eruptions, lahars and avalanches, cones and craters, volcanoes and climate, eruption forecasting, volcanic risk reduction, and the world's 101 most notorious volcanoes. The CD-ROM features 100 images of volcanoes and a database of important volcanoes in the U.S. and Canada. The authors also list numerous Web sites from which readers can obtain more information on volcanoes.

Electronic Goodies

South Carolina Atlas of Environmental Risks and Hazards*. Susan L. Cutter, Deborah S.K. Thomas, Micah E. Cutler, Jerry T. Mitchell, and Michael S. Scott. CD-ROM. 1998. $19.95, plus $4.00 shipping. South Carolina residents add 5% sales tax. To order, contact the University of South Carolina Press, Business Office, 718 Devine Street, Columbia, SC 29208; (800) 768-2500; fax: (800) 868-0740.*
South Carolina, like many other states, is constantly threatened by environmental hazards--both natural disasters and those caused by human activity. Besides being threatened by tornadoes, the Palmetto state is also one of the most seismically vulnerable in the East, averaging 10 quakes a year. This atlas, produced by the Hazards Research Laboratory at the University of South Carolina, is a computer-based resource for understanding such environmental threats. It includes sections on hurricanes, thunderstorms, tornadoes, wind, hail, lightning, floods, winter hazards, wildfires, drought, earthquakes, toxic spills and releases, radiological hazards, pollution, and the hazards of everyday life. Each section provides a general description of the hazard and offers practical preparedness information. Detailed explanations and extensive maps and graphs illustrate the historic and geographic patterns of each hazard, and links throughout the atlas enable readers to consult additional resources, World Wide Web sites, and data tables.

Lightning Safety Education Video. *VHS. 1998. 58 minutes. $495.00. (Ten day return policy if the video is not suitable.) Available from the National Lightning Safety Institute , P.O. Box 778, Louisville, CO 80027; (303) 666-8817; fax: (303) 666-8786.*
This new training video is designed for educating groups about the fundamentals of lightning safety. Filmed in both a classroom and outdoor setting, it describes the history of lightning in society, early science, present-day science, effects of lightning, and lightning safety defenses in the work place and recreation.

Disasters Are Preventable. *Standard VHS (NTSC) and PAL formats. 1998. 22 minutes. Free. Copies can be requested from Maxx Dilley, U.S. Agency for International Development, Office of Foreign Disaster Assistance, Washington, DC 20523-8602; (202) 712-5117; e-mail: mdilley@usaid.gov.*
Co-sponsored by the U.S. Agency for International Development (USAID), Federal Emergency Management Agency, European Community Humanitarian Office, and Emergency Management Australia, this production documents the high socioeconomic costs of natural and human-caused disasters worldwide, while focusing on measures that could prevent their impacts. The topic is approached through a series of vignettes, each addressing a specific region and hazard and illustrating a principle of disaster prevention or preparedness. The video is currently available in French and English, and USAID is exploring the development of a Spanish version.

NISEE Releases Software on CD-ROM

The National Information Service for Earthquake Engineering (NISEE) at the University of California-Berkeley has recently released the ***NISEE Software Library CD-ROM***, a comprehensive collection of 112 engineering research software programs. These computer applications range from strong motion data processing programs to geotechnical and structural analysis tools. User documentation for all programs on the CD-ROM is available through NISEE. The cost of the NISEE Software Library CD-ROM is $139, including shipping in the U.S. For international orders and/or courier service, or to place an order, contact *NISEE, University of California-Berkeley, PEER Building 451 RFS, 1301 South 46th Street, Richmond, CA 94804-4698; (510) 231-9403; fax: (510) 231-9461; e-mail: info@nisee.ce.berkeley.edu; WWW: http://www.eerc.berkeley.edu.*

Who We Are

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, U.S. Geological Survey, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Department of Transportation, 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 center or the readers of this newsletter to the address below. The deadline for the next ***Observer*** is *May 20, 1999*.

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Back issues of the ***Observer*** are available for $2.00 each, plus shipping and handling. Orders must be prepaid. Checks should be payable to the University of Colorado.

Copies of the ***Observer*** and the Hazards Center's electronic newsletter, ***Disaster Research***, are also available from the Natural Hazards Center's World Wide Web site: *http://www.colorado.edu/hazards*.

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