Natural Hazards Observer

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Closet, Car, or Ditch? The Mobile Home Dilemma During a Tornado

--an invited comment

Understanding Tornado Fatalities

A tornado is a deadly phenomenon that strikes with little warning and can destroy a building in a matter of seconds. Thus, knowledge of the attributes of persons killed by tornadoes, their behavior when the storm threatened, and the circumstances of their death are useful in evaluating hazard preparedness, safety rules, and warning methods. This information identifies high-risk groups, high-risk situations, and high-risk behaviors and can be used to improve preparedness and warning programs and reduce tornado-related deaths.

Our research during the past five years has focused on risk factors for death due to tornadoes in the United States. My colleagues, Paul King, Barbara Hammer, and Yuichi Ono, and I have asked the question, "Why do some people die in tornadoes while others survive?" To find answers, we travel to the site of a tornado disaster about one week after the event in order to complete a detailed study of each fatality and of survivors who were in the path of the tornado. This research has been funded by Quick Response grants made available by the Natural Hazards Research and Applications Information Center (see the ***Observer***, Vol. XXII, No. 1, p. 5).

Our survey quantifies demographic data and information related to method of warning, access to warning, time of awareness of the impending tornado, exact location when the storm struck, degree of destruction at the site, and so on. Survivors are interviewed in person. Surveys are completed for fatalities through interviews with relatives, supplemented by neighbors, coroners, and funeral home directors. The survey responses for those who died are then compared to responses from those who survived, in order to identify differences between the two groups.

Data have been collected for the Georgia and Alabama tornadoes of March 27, 1994, and the Arkansas tornadoes of March 1, 1997. Surveys were completed for 45 fatalities and 104 survivors. In both cases, several tornadoes struck across rural areas of a southern state on a weekend afternoon with 10 to 30 minutes warning time from the National Weather Service (NWS).

What We Learned

Results from the Georgia and Alabama tornadoes (***Disasters*** 19 (1995): 170-177) showed risk factors for death to include advanced age, location in a mobile home, location in a room above ground with windows, not watching television in the hour before the tornado hit, and being aware of the approaching tornado for less than one minute. Results from the Arkansas tornadoes (available from the Natural

Hazards Center as ***Quick Response Report #98***, see the article in this ***Observer***) also showed risk factors for death to be location in a mobile home and in a room above ground with windows. In contrast to the earlier study, there was no difference in age between fatalities and survivors, although being divorced appeared as a risk factor, possibly due to the isolation and reduced income of divorced persons.

These results generally reinforce previous assumptions that were developed from studies of tornadoes and other hazards:

- The supreme importance of protection by a building in preventing deaths was evident. Mobile homes and outer rooms of frame homes do not offer that protection.
- In spite of long warning lead times, most people--fatalities as well as survivors--first became aware of the approaching tornado only when they saw or heard it, allowing little time to reach shelter. In addition, television was used to obtain weather information much more than radio. None of the persons we interviewed used NOAA weather radio on the day of the tornadoes.

Additional research of this type will provide a composite of tornado risk factors over a variety of geographic, demographic, and cultural settings--the foundation of a stable and reliable database from which general conclusions may be drawn.

Are Cars Safer than Mobile Homes?

While conducting the first study in Georgia and Alabama in 1994, we were surprised by the common occurrence of cars or pickup trucks that remained upright with little damage near mobile homes that were destroyed and the mobile home occupants killed. After careful thought, it did not seem so surprising. After all, a modern car has a low center of gravity, a streamlined form, a protective interior, and is designed to encounter strong winds and protect occupants in case of a roll-over and other crashes. Our preliminary estimates showed that a door-handle-height wind speed of about 120 mph is required to tip a car, compared to perhaps 80 mph to tip a mobile home.

Rural mobile home residents have few options when a tornado threatens. Underground shelters are rare and a sturdy building for shelter is usually some miles away. In those desperate situations *when sturdy shelter is not within running distance* from a mobile home, both the NWS and the American Red Cross recommend that mobile home residents leave the mobile home and "lie flat in a ditch or low-lying area" when a tornado warning is issued.

Mobile home residents recognize the legendary vulnerability of their dwellings in wind storms. However, when the tornado siren starts blowing or the Weather Channel screen turns red, few are willing to gather the family and leave their mobile home to run outside into a severe thunderstorm with heavy rain, lightning, hail, and flying debris to lie down in a water-filled ditch to await a tornado. They tell us such actions are counterintuitive.

Following our field observations in 1994, a reasonable option for those in mobile homes without nearby

shelter seemed to be to drive to one. Our public statements in 1994 that rural mobile home residents with no nearby shelter may be safer getting into their vehicles and driving to a shelter when a tornado threatens, rather than running outside to lie down in the storm, drew widespread media attention, many comments of agreement, and strong comments to the contrary by a few people in the NWS.

In light of NWS and Red Cross recommendations that mobile home residents and vehicle occupants exit and lie down outdoors when a tornado threatens, we sought previous studies on the relative safety of being in a vehicle compared to being outdoors that supported those recommendations. As we reported in a commentary last year (***Bulletin of the American Meteorological Society*** 77: 963-964), no studies have been found to support those recommendations.

Tornado Strength and Vehicle Safety

Following our surprising observations after the 1994 tornadoes, we embarked on a systematic survey of the effects of tornadoes on cars and pick-ups. We collected data on vehicles parked outdoors at homes with F1, F2, or F3 tornado damage following the Louisville tornado in May 1996, the Arkansas tornadoes in March 1997, and the Texas tornadoes in May 1997.

Not surprisingly, this sample of 180 vehicles showed that the percentage of cars moved or tipped tended to increase with increased home damage (and inferred wind speed). Surprisingly, at homes with F3 damage (158- 206 mph), fewer than half (46%) of cars were moved by the wind, only 15% were tipped over by the wind, and 39% of the vehicles were damaged sufficiently to cause serious injury to potential occupants. These results are now under review for publication.

Where does that leave us with respect to surviving tornadoes? We will continue postdisaster research of deadly tornadoes to determine general principles of high-risk behaviors and identify high-risk groups. It is clear that the 73 mph or less wind speeds of F0 tornadoes, the weakest of weak tornadoes, pose little threat to human life. It is also clear that the rare violent tornadoes (F4 and F5) with maximum wind speeds over 206 mph will destroy well-built homes and toss vehicles. The only reasonable protection in these extreme cases is an underground shelter, but only 3% of tornadoes have these wind speeds.

It is in the middle range of F1, F2, and F3 wind speeds that most tornadoes occur. Underground shelter is *always* safest, but the interior rooms of well-built homes or offices provide life-saving shelter in most cases. At the same time, mobile homes clearly remain a high-risk location in this range. For nearly half of the Americans who die from tornadoes, the last view they have of this world is the disintegrating interior of their mobile home. Only one-third of the 15 million mobile home residents in the U.S. live in a mobile home park, and some of these do not have sturdy shelters for all residents. The other 10 million live on private rural land,

and many of these people will not have a sturdy shelter within running distance when the tornado warning is issued. Mobile home occupancy is predicted to increase for the foreseeable future, and millions of Americans are on the road in their cars and trucks during the late afternoon when tornadoes

are most likely to occur.

Conclusions

The hazards community has an opportunity to find reasonable, affordable, and practical means of reducing the risk of death to mobile home residents due to tornadoes. We must also strive to provide safety recommendations for mobile home residents and vehicle occupants that are based on modern research.

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The Red Cross Responds . . .

The Alternate Dilemma: How to Explain and Encourage Counterintuitive Behavior

When reading Thomas Schmidlin's article on tornado safety messages for mobile home dwellers, the reader should be aware that only two tornado events were studied. According to the National Weather Service (NWS), the March 27, 1994, Georgia/Alabama tornado was rated F4 on the Fujita Tornado Intensity Scale, and the three killer Arkansas tornadoes on March 1, 1997, ranged from F2 to F4. The NWS post-storm survey of this event reveals that in one of these three killer tornadoes, seven people abandoned two mobile homes and got into a ditch. Two men died when a tree fell on them. The other five people were unhurt. Interestingly, however, at the time, the tornado created damage indicating F2 intensity; yet, the mobile homes that were abandoned were never found. One questions, then, what would have happened had all seven people remained in their mobile homes?

The NWS carefully points out that one should not apply the maximum F-scale rating of any particular tornado to the entire damage path. It was quite likely, therefore, that some of the mobile homes in Schmidlin's study were in lower intensity damage paths; thus, there was little or no damage to vehicles in the area. Studying more tornadoes and documenting the likely F-scale rating for specific areas is needed.

NWS statistics on tornadoes reveal that, since 1986, there have been 12,483 documented tornadoes in the United States. Of that total, 83.6% were F0 and F1, with another 11.2% rated as F2, and 3.7% categorized as F3. Only 1.5% of all events were classified as F4 and F5. From those statistics, one could conclude that planning for F0 through F3 tornadoes would be reasonable. However, all tornadoes are not the same: only seven of 503 tornado-related fatalities were associated with the 6,591 F0 tornadoes. By

comparison, the F4 and F5 tornadoes (again, just 1.5% of tornadoes) killed 255 people--50.7%. Your chances of dying in an F5 are 5,200 times greater than in an F0.

Schmidlin also states that the NWS and the American Red Cross recommend that mobile home occupants threatened by a tornado get out and lie in a ditch. As one of the authors of Red Cross national disaster education materials, I know this is not a correct interpretation of our tornado safety message. Since 1992, the NWS, the Federal Emergency Management Agency, and the American Red Cross have recommended that mobile home occupants leave and "choose another safe place in a sturdy, nearby building," not lie in a ditch. The "ditch" message was provided as a last resort for people driving vehicles out in the open where no nearby sturdy building was available.

We further recommended that mobile home residents acknowledge the potentially lethal tornado threat and make arrangements, in advance, for shelter. Many mobile home communities have shelters that afford safety within a minute's walking distance. And, yes, getting out in the rain, hail, wind, and lightning may not seem logical, but it beats becoming part of the debris field along with your mobile home.

Schmidlin points out that people are reluctant to expose themselves to severe weather when they perceive their current location (inside a car or inside a mobile home) as safe. I agree that counterintuitive behavior is among the most difficult things to explain or ask people to do. For example, during an earthquake, most people inside a building want to run outside; however, years of research have proven that it is safer to remain indoors and "drop, cover, and hold on." The same situation applies to those who think it is safer to remain inside their home or car when threatened by a tornado.

However, it has been well established that mobile homes are unsafe in tornadoes and other extreme windstorms. Also, violent tornadoes have turned automobiles into missiles and scrap metal, mercilessly wrapping their frame around the rest of the car and anyone left inside.

Research has shown that showing post-tornado damage images to the public does not encourage desired preparedness and safety actions. What does work is asking people to describe their alternatives and to discuss each situation on a case-by-case basis. I have done this frequently in my home state of Oklahoma, and in each case, we have been able, as a group, to identify a nearby sturdy building or underground shelter to go to in a tornado.

Finally, which tornado should we prepare for--the F0/F1 or the F4/F5? As a member of the hazards community, I would never recommend that someone go to their car for safety. Weather experts frequently remind me that the science of storm-scale meteorology does not allow precise warning regarding the intensity of a tornado. The NWS cannot tell anyone whether a tornado will be an F0, F3, or F5. We must assume, and prepare for, the worst-case scenario. Getting out of a mobile home and going to a sturdy nearby shelter remains the sole option.

Rocky Lopes, Community Disaster Education, American Red Cross National Headquarters

Making Communities Disaster Resistant

Evansville, Indiana, along with surrounding Vanderburgh County, is the first officially designated "Disaster-Resistant Community" in the United States. In July 1997, the Evansville City Council and the Vanderburgh Board of County Commissioners approved resolutions to implement a comprehensive disaster protection program, specified by the Institute for Building and Home Safety (IBHS) (formerly the Insurance Institute for Property Loss Reduction) and other representatives of the insurance industry, to showcase the benefits of risk reduction. The program supports the Federal Emergency Management Agency's Disaster Resistant Communities initiative, announced by Director James Lee Witt on December 26, 1996, to promote community responsibility for dealing with natural hazards.

The area in southern Indiana is endangered by earthquakes, flooding, and tornadoes. This agreement is the first between the insurance industry and a local government to reduce natural hazard losses. IBHS noted that natural hazard loss reduction, in order to be successful, must have the ongoing support of community leaders. This showcase initiative is intended to demonstrate to local leaders that such efforts can be successful.

Under the agreement, Evansville and Vanderburgh County will:

- assign responsibility to a single official to coordinate the project and insure its continued success;
- undertake a variety of education, training, and outreach programs to homes and businesses;
- incorporate natural hazard awareness and reduction programs into school curricula;
- maintain up-to-date emergency response and recovery plans; and
- modify existing city and county land-use practices to incorporate consideration of natural hazard vulnerability into land-use decisions.

For further information on the Disaster Resistant Community Initiative, contact *IBHS, 73 Tremont Place, Suite 510, Boston, MA 02108; (617) 722-0200; fax: (617) 722-0202; e-mail: info@ibhs.org; WWW: http://www.ibhs.org.*

For more information on the FEMA effort, contact their *Office of Public Affairs, 500 C Street, S.W., Washington, DC 20472; e-mail: eipa@fema.gov; WWW: http://www.fema.gov/home/NWZ97/focus97.htm.*

On the Web at . . . . . http://www.colorado.edu/hazards

The Latest Publications from the Hazards Center

Quick Response Reports

The Natural Hazards Center Web site now includes two dozen full-text Quick Response reports resulting from recent disaster research. The latest additions include:

- **QR95**: ***The Impacts of a Second Catastrophic Flood on Property Values in Linda and Olivehurst, California***, by Graham A. Tobin and Burrell E. Montz
- **QR96**: ***Buffalo Creek Fire and Flood Report***, by Charles C. Benight and Michelle L. Harper
- **QR97**: ***Public Response to the 1997 Northern California Floods***, by Paul W. O'Brien and James Payne
- **QR98**: ***Risk Factors for Death in the 1 March 1997 Arkansas Tornadoes***, by Thomas W. Schmidlin and Paul S. King
- **QR99**: ***Geographic Information Systems (GIS) in Small Communities: Application of GIS in Emergency Management***, by John Pine
- **QR100**: ***A Major Snow-Avalanche Episode in Northwest Montana, February 1996***, by David R. Butler

The entire list of quick response reports is available at *http://www.colorado.edu/qr/qr.html*.

In addition, printed copies of these reports can be purchased for $5.00 each, plus shipping charges: $3.00 for the U.S., Canada, and Mexico; $4.00 for international surface mail; and $5.00 for international air printed matter. To order copies, contact the *Publications Clerk, Natural Hazards Research and Applications Information Center, IBS #6, Campus Box 482, University of Colorado, Boulder, CO 80309-0482, (303) 492-6819; fax: (303) 492-2151; e-mail: jclark@spot.colorado.edu*.

1997 Hazards Workshop Session Summaries

In the previous ***Observer*** (Vol. XXII, No. 1, p. 6), we indicated that session summaries and other abstracts and materials from the 1997 Hazards Research and Applications Workshop were available for purchase from the Hazards Center. Well, hold onto your wallet; if you have access to the World Wide Web, the full texts of the summaries are now available free via the Session Summaries page on the Hazards Center Web site: *http://www.colorado.edu/hazards/ss/ss.html*.

More Internet Stuff

Below are some other useful Internet sites we've encountered recently. A comprehensive list of these resources is posted on the Hazard Center's Web site at *http://www.colorado.edu/hazards/sites/sites.html*.

http://www.fema.gov/kids

On October 7, the Federal Emergency Management Agency (FEMA) introduced a new World Wide Web site with games, stories, audios, fun facts, and other activities that deliver a serious message to children concerning disaster preparedness and mitigation. The "FEMA for Kid's" Web site is appropriate for most children grades three and above and can be used without adult assistance, although it is designed to support classroom-wide use. The site is interactive and children can submit jokes, feedback, poems, essays, and artwork to be posted. Users are also invited to become "Disaster Action Kids" by completing selected assignments, including games and quizzes. Successful applicants receive a certificate, signed by the FEMA director, proclaiming them a Disaster Action Kid, and the children become part of an "elite" e-mail group. The site includes a map that shows possible hazards for each state and which states have ongoing presidentially declared disasters (users can obtain the latest information about these disasters as well as audio and video clips); information about how to prepare for and recover from disasters; facts about hurricanes, tornadoes, earthquakes, fires and floods--including what to do if caught in a disaster; and teachers' resources, along with a bibliography and list of other disaster-related Web sites.

http://www.netsalud.sa.cr/crid

The Regional Disaster Information Center (Centro Regional de Información Sobre Desastres--CRID) for Latin America and the Caribbean (see the ***Observer***, Vol. XXI, No. 6. p. 14) is an information clearinghouse and training organization dedicated to improving disaster prevention and response in all countries of Latin America and the Caribbean. CRID offers bibliographic searches through the Internet, CD-ROM, or direct contact with the center; publication and distribution of bibliographic material in both Spanish and English; direct access via the Internet to an extensive collection of technical documents in full text; distribution of original publications and training materials (written and audiovisual) published by CRID members or other collaborating organizations; publication and distribution of instructional materials on bibliographic methods, bibliographic software use, and access to the Internet; mass distribution of public and technical information materials (bulletins, bibliographies, etc.); and technical advice and training on design and organization of disaster information units. For additional information, see the Web site above or contact the *Centro Regional de Informacion Sobre Desastres, Apartado 3745-*

1000, San José, Costa Rica; fax: (506) 231-5973; e-mail: crid@netsalud.sa.cr.

http://www.disasterrelief.org

This snazzy home page--a joint effort of the American Red Cross, the IBM corporation, and CNN--offers much background information about disasters, disaster relief, and disaster preparedness, as well as news about ongoing and recent events. Moreover, it provides a means for locating worldwide disaster relief organizations and either soliciting or offering aid for specific disasters. During emergencies, it can provide referrals for reaching friends and family at risk. As the organizers of this site state, "Our mission is to help disaster victims and the disaster relief community worldwide by facilitating the exchange of information on the Internet," and this includes services during actual events. The site also provides an on-line "Forum" for discussing relief issues and an extensive library of disaster facts, figures, and other information.

http://www.oneworld.org/odi/rrn

The new Relief and Rehabilitation Network (RRN) Web site is a neutral forum for the exchange of information among professionals from over 150 donor, government, U.N., Red Cross, nongovernmental, research, and media organizations in the field of humanitarian assistance. Participants represent more than 60 countries worldwide. The new site includes an on-line ***RRN Newsletter*** featuring articles and news on current developments in the field of humanitarian assistance, key policy issues, a regional focus section, and details of recent and forthcoming conferences, training courses, and publications. It also provides an up-to-date list of RRN publications and abstracts; "Red Pages" that offer a comprehensive directory of links to nongovernmental, U.N., and donor organizations, news, background information, and research resources relating to humanitarian assistance in both complex emergencies and natural disasters; a list of current members; and information on how to join the RRN or order RRN publications.

http://www.nccem.org

The National Coordinating Council on Emergency Management (NCCEM) has established its own Web site, which includes information about the council, its mission, and its Certified Emergency Manager program; details about NCCEM conferences; a "Topic of the Month" section; lists of NCCEM partners and experts; news regarding current issues in emergency management; and copious links to other emergency management-related sites.

http://ilrg.gndc.pg.cnr.it

The International Landslide Research Group (ILRG) is an informal group of individuals concerned about mass earth movement and interested in sharing information on landslide research. Alas, the group's newsletter, an oasis in the sometimes arid landscape of hazards newsletters, is being discontinued, and the Web site is now carrying the burden of maintaining communication among the group. The site currently provides all back issues of the newsletter, with information about landslide programs, new initiatives, meetings, and publications, the experiences of people engaged in landslide research, and "any other information about landslide research that `normal' journals will not accept."

http://www.csti.org/

The mission of the California Specialized Training Institute (CSTI)--the training arm of the California Governor's Office of Emergency Services--is to promote public safety and security in disaster management, criminal justice, and hazardous materials emergency response and mitigation. The institute offers courses at its campus near San Luis Obispo and elsewhere in California to enhance the knowledge and skills of middle- and upper-level management officials of city, county, state, and federal government agencies and private industry. A limited number of out-of-state applicants may also attend courses, some of which are available for college credit. The CSTI Web site provides complete information about the institute and its programs.

http://www.lcgbp.org

Initiated about one year ago, the Leadership Coalition for Global Business Protection is a group that includes representatives from major corporations, national and local governments, and the U.N (see the ***Observer***, Vol. XXI, No. 6, p. 10). The coalition's aim is to encourage business and industry to work with government emergency management agencies in disaster preparedness, response, recovery, training, and mitigation. The group includes such diverse participants as the IBM Corporation, the New York City Mayor's Office of Emergency Management, and the United Nations International Decade for Natural Disaster Reduction Secretariat. The coalition Web site offers background information about the group, descriptions of coalition initiatives and proposed activities, press releases, and a library.

http://www.ph.ucla.edu/cphdr/

This is the Web site for the UCLA Center for Public Health and Disaster Relief (see the ***Observer***, Vol. XXII, No. 1, p. 14), a newly formed institution dedicated to developing a curriculum and providing education on the public health aspects of disasters.

cepreden@sinfo.net

CEPREDENAC--the Center for Prevention and Coordination of Disaster in Central America--is publishing a weekly, Spanish-language e-mail bulletin for the Central American disaster community. To subscribe, send an e-mail message to the address above asking to be added to the list.

WSSPC-l

The Western States Seismic Policy Council (WSSPC) maintains an e-mail discussion list (WSSPC-l) to support ongoing deliberations via the Internet regarding all things seismic. Recently, the council and the e-mail list have begun focusing on real policy issues. For example, an initial week-long discussion examined the advantages and disadvantages of the proposed policy statement: "WSSPC supports a national earthquake risk assessment and an allocation of resources based on this assessment." Persons interested in participating in these policy discussions can join the WSSPC-l discussion list by sending e-mail to *majordomo@nisee.ce.berkeley.edu* with the sole message "subscribe wsspc-l [your e-mail address]." For more information about the council and this discussion list, contact *WSSPC, 121 Second Street, Fourth Floor, San Francisco, CA 94105; (415) 974-6435; fax: (415) 974-1747; e-mail: wsspc@wsspc.org; WWW: http://www.wsspc.org*.

NSF Funds Internet Workshop for Earthquake Researchers

The National Science Foundation (NSF) has funded a "Virtual Workshop" designed to help researchers in the earthquake engineering community better understand and use the resources available via the Internet. Building on an actual physical workshop held in early August, this demonstration project will run through the spring of 1998 and will offer instructional materials and services specifically designed to foster collaborative research among earthquake engineering researchers. Among the items being developed are information about basic electronic dissemination, interactive Web-based applications, distributed databases, digital imaging, and ways and means of creating electronic research communities. General information about the project can be found on the World Wide Web: *http://www.cmp.csuchico.edu/chico_1997/wshome.html*.

Governors Create Drought Council

On June 12, the Western Drought Coordination Council (WDCC) met for the first time and adopted a work plan for 1997-98. The WDCC resulted from a memorandum of understanding signed by the Western Governors Association and a number of federal agencies with responsibility for drought management; it is committed to improving drought management in the western U.S. through mitigation and preparedness. For more information about the council and a copy of the work plan, see *http://enso.unl.edu/wdcc/* on the World Wide Web, or contact the *National Drought Information Center, 239 L.W. Chase Hall, University of Nebraska, P.O. Box 830749, Lincoln, NE 68583-0749; (402) 472-2731; e-mail: wdcc@enso.unl.edu*.

Administration for the WDCC is housed at the National Drought Mitigation Center (NDMC), University of Nebraska-Lincoln; for more information about the NDMC, see *http://enso.unl.edu/ndmc/*, or contact the address above.

[Adapted from the June 1997 ***Drought Network News***]

FEMA Offers El Niño Information and Mitigation Conferences

The Federal Emergency Management Agency (FEMA) recently issued a press release urging U.S. residents and other citizens of the Pacific/Indian Ocean rim to prepare for the effects of the strong El Niño event currently developing in the Pacific Ocean. This climate pattern, characterized by the emergence of warm, long-lived currents in the eastern Pacific, can mean heavier than normal precipitation and above normal temperatures for many areas of the Americas. In other parts of the world (Australia, southern Africa, for example) it can have other consequences, including reduced precipitation

and even drought. To aid individual and community preparation for this meteorological event, FEMA has established an "El Niño Loss Reduction Center" Web site--*http://www.fema.gov/nwz97/elnino.htm*--that includes much information about mitigating El Niño hazards, as well illustrations of the phenomenon itself, news releases, and many links to other information on El Niño available through the World Wide Web.

In addition, FEMA is hosting several "El Niño Summits" for community and state officials concerned about possible impacts on their regions. (The first was held in Los Angeles on October 14.) For information about these events, see the Web site above or contact the *FEMA Office of Emergency Information and Pulbic Affairs, 500 C Street, S.W., Washington, DC 20472; (202) 646-4600; fax: (202) 646-4086; e-mail: eipa@fema.gov*.

Some Additional El Niño Web Sites

There are numerous locations on the World Wide Web where one can find El Niño information, but the sites below, as well as the FEMA site mentioned above, provide good places to begin browsing.

http://nic.fb4.noaa.gov
Via this site the National Oceanic and Atmospheric Administration's (NOAA's) Climate Prediction Center offers information about the current El Niño, with advisories and forecasts.

http://www.ogp.noaa.gov/enso/
Another NOAA site--the "El Niño--Southern Oscillation (ENSO) Home Page," produced by the NOAA Office of Global Programs is described as "your one-stop source for the latest on El Niño and the Southern Oscillation." It addresses the questions: How large is this El Niño? What is the El Niño forecast? How will El Niño affect the U.S.? How will El Niño affect the world? What is El Niño and where can I learn more? What are we doing to learn more about ENSO?

http://www.pmel.noaa.gov/toga-tao/el-nino/
Similarly, NOAA's Pacific Marine Environmental Laboratory El Niño Theme Page provides access to extensive distributed information related to the El Niño phenomenon. It covers current conditions and recent news releases, and includes sections addressing: What is El Niño? What are the impacts of El Niño? What are the current El Niño forecasts? What is the latest El Niño data? What are some frequently asked questions? and Where can I find more El Niño data and information? This site also provides numerous links to other El Niño information on the Web.

http://www.ceres.ca.gov/elnino
The California Resources Agency has created the California Environmental Resources Evaluation System (CERES) as a means both to disseminate original information and to link people to additional information sources on specific environmental resource topics. The CERES El Niño section includes

numerous links to information on everything from the physical phenomenon of El Niño to its potential economic impacts.

Group Activities

Introducing IDEM

The mission of the Institute for Disaster and Emergency Medicine (IDEM) at the University of Massachusetts Medical School is to enhance emergency medical systems and develop emergency medicine residency programs worldwide while working within the cultural and economic bounds of the host country. As part of this mission, IDEM offers courses in various aspects of emergency and disaster medicine and facilitates the development of local and regional training programs. Since 1993, IDEM has worked in Russia, the Newly Independent States (NIS) of the former Soviet Union, and Israel. For additional information, contact *Gregory Ciottone, M.D., Department of Emergency Medicine, University of Massachusetts Medical Center, 55 Lake Avenue North, Worcester, MA 01655; e-mail: greg.ciottone@banyan.ummed.edu*.

Announcing the Earthquake Hazard Centre

The Earthquake Hazard Centre is a nonprofit program established to promote earthquake-resistant construction in developing countries by disseminating information via a newsletter and the Internet. The center is based at the School of Architecture, Victoria University, Wellington, New Zealand.

The Earthquake Hazard Centre grew out of the International Workshop on Earthquake Hazard Mitigation for Non-Engineered Structures, held in Hyderabad, India, in June 1996. The people attending that meeting saw a significant need to establish a central clearinghouse to disseminate seismic research findings and serve as a forum for sharing earthquake design and construction expertise with and among developing countries. Although the new center is sponsored by the Commonwealth Science Foundation and its initial mailing list will include people primarily from Commonwealth countries, it intends to become fully international in both receiving and disseminating information.

The first issue of the ***Earthquake Hazard Centre Newsletter*** was published in July. To be added to the center mailing list or to obtain more information, contact the *Earthquake Hazard Centre, School of Architecture, P.O. Box 600, Wellington, New Zealand; tel: 64-4-802 6200; fax: 64-4-802 6204; e-mail: quake@arch.vuw.ac.nz*.

Presenting the Housing and Hazards Group

As with the Earthquake Hazard Centre, making homes safer for the world's most vulnerable people is the

primary objective of the Housing and Hazards Group at the University of Exeter. The group's activities during the past year have included staging a three-day workshop in Dhaka, Bangladesh, which brought together donors, researchers, local government officials, and NGO representatives; and field studies in northern Bangladesh of different information dissemination techniques appropriate for populations for whom the written word is not always understood. The group's next project is to host a one-day seminar on "Disseminating Safe Building Practice," to be held in Exeter, U.K., on November 17, 1997. This seminar will include reports on the workshop and field study, as well as contributions by distinguished researchers in disaster and emergency housing. Practical aspects of dissemination and rural participation, as well as the role of housing improvement in the wider context of development, will be emphasized. For details, contact *Robert Hodgson, Housing and Hazards Group, Earth Resources Centre, University of Exeter, North Park Road, Exeter EX4 4QE, U.K.; tel: +44-1392-263900; fax: +44-1392-263907; e-mail: R.L.P.Hodgson@exeter.ac.uk*.

ASCE Offers Continuing Education

The American Society of Civil Engineers (ASCE) recently announced its schedule of fall/winter continuing education courses. Many of the courses, offered throughout the U.S., cover natural hazards encountered in engineering. For example, courses include: Municipal Storm Water Management, Wetlands and 404 Permitting, Urban Watershed Best Management Practices, Applications in Storm Water Management, Working with the National Flood Insurance Program, Slope Stability and Stabilization, Hydrology and Hydraulics, Seismic Design and Performance of Building Structures, Wind Loads for Buildings and Other Structures, and Flood Loads and Flood Proofing/Retrofitting Residential and Nonresidential Buildings. ASCE seminars are available on a group/in-company basis, and many are also available via self-study. For a complete schedule and information about registering, contact *ASCE, 1015 15th Street, N.W., Suite 600, Washington, DC 20005-2605; (800) 548-2723 or (202) 789-2200; fax: (202) 289-6797; e-mail: conted@asce.org; WWW: http://www.asce.org*.

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Washington Update

HUD Announces Funds for Disaster Recovery Initiative

When a community is hit hard by a natural disaster, recovery can be a long and difficult process, particularly if that community is poor. In June 1997, President Clinton signed the 1997 Emergency Supplemental Appropriations Act for Recovery from Natural Disasters (Public Law 105-18), which, in addition to providing assistance to victims of recent disasters, makes $500 million available to the Department of Housing and Urban Development (HUD) to establish a new program--the Disaster Recovery Initiative.

The initiative will provide grants to community, county, or state governments that will fill significant funding gaps in current federal disaster assistance. Funds must be used primarily to benefit those of low or moderate income through the redevelopment of viable communities by providing "decent housing and a suitable living environment" to victims of disaster.

According to HUD, funds can be used for

- the purchase and relocation of damaged properties, such as those in a floodplain;
- assistance for displaced persons, businesses, organizations, and farm operations;
- debris removal, clearance, and demolition;
- acquisition, construction, or reconstruction of public facilities and improvements, such as government buildings, water and sewer facilities, streets, neighborhood centers, and schools;
- building code enforcement in disaster areas;
- assistance to facilitate home ownership;
- provision of public services;
- activities relating to energy conservation and renewable energy; and
- replacement of housing destroyed by the disaster.

Recipients may not use grants for activities that are already covered by other federal programs. For cities and counties, grants from the Disaster Recovery Initiative are considered part of the grantees' Community Development Block Grant (CDBG) funds, and are included in cost cap calculations and program requirements for use of the CDBG funds.

The notice of funds availability and a detailed description of the program can be found in the ***Federal Register***, *Vol. 62, No. 173 (September 8, 1997), pp. 47343-47358.* Copies are also available at *some federal depository libraries* or via the Internet: *http://www.acc ess.gpo.gov*.

The complete text of Public Law 105-18 can also be found at *some federal depository libraries* or via

the Internet: *http://thomas.loc.gov*.

FEMA Drafts a Strategic Plan

The Federal Emergency Management Agency (FEMA) wants "to change the emergency management culture from one that reactively responds to disasters to one that proactively helps communities and citizens avoid becoming disaster victims." In order to accomplish this, the agency will bring together private industry, the insurance industry, mortgage lenders, the real estate industry, homebuilders, and others to create model disaster-resistant communities in high-risk areas (see page 4 of this ***Observer***); overhaul FEMA's public assistance process to reduce red tape and time; establish a federal predisaster response fund; and continue to build and strengthen public-private partnerships for emergency management.

These goals and objectives are listed in the agency's draft version of its ***Strategic Plan: Partnership for a Safer Future*** (1997, 56 pp., free), which outlines FEMA's goals for fiscal years 1998 through 2007 and outlines operations objectives through fiscal year 2002. An updated strategic plan is required of federal agencies under the Government Performance and Results Act, and FEMA is interested in receiving written comments from interested individuals and organizations about its plan.

The plan also includes three strategic goals to be accomplished over the next 10 years:

1. Protect lives and prevent the loss of property from all hazards, including reducing by 10% the risk of loss of life and injury from hazards, as well as reducing by 15% the risk of property loss and economic disruption during the same period;
2. Reduce human suffering and enhance the recovery of communities after disaster strikes, including reducing by 25% the human suffering from the impact of disasters and increasing by 20% the speed with which individuals, businesses, and public entities are able to recover through "facilitated restoration of eligible public services";
3. Ensure that the public is served in a timely and cost-efficient manner by improving service efficiency by 20% and achieving a 90% overall customer satisfaction rating.

Copies of the ***Strategic Plan*** can be found on the FEMA Web site: *http://www.fema.gov/nwz97/spln_1.html*.

Also, the General Accounting Office (GAO) has published a review of FEMA's plan entitled ***Results Act: Observations on the Federal Emergency Management Agency's Draft Strategic Plan*** (GAO/RCED-97-204R, 1997, 14 pp., free). Copies can be ordered from *GAO, Document Distribution Center, P.O. Box 6015, Gaithersburg, MD 20884-6015; (202) 512-6000; fax: (301) 258-4006; e-mail: info@gao.gov; WWW: http://www.gao.gov*. The complete text of the report is also available via the Internet: *http://www.access.gpo.gov*.

FEMA Revises HMGP Designation Process

In a recent notice in the ***Federal Register*** (Vol. 62, No. 129, July 7, 1997, pp. 36289-36290), FEMA Director James L. Witt announced that his agency had revised the current process for designating counties eligible for the Hazard Mitigation Grant Program (HMGP), authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

In the past, HMGP funds were only available to counties designated eligible by FEMA for Individual Assistance (IA) or Public Assistance (PA). According to the Stafford Act, both IA and PA funds address damage or hardship *resulting from* a major disaster; however, HMGP funds are intended to reduce the risk of *future* damage or hardship. As a result, FEMA has determined that the use of HMGP funds should not be limited only to counties designated eligible for IA or PA funds. The notice states that, "following the declaration of a major disaster by the President, all counties within the State may be designated by FEMA as eligible for HMGP funds. The process of requesting that FEMA designate areas for assistance will remain unchanged."

For further information about this notice, contact *Robert F. Shea, Mitigation Directorate, FEMA, 500 C Street, S.W., Washington, DC 20472; (202) 646-3619; fax: (202) 646-3104.*

NEHRP Reauthorized

On October 1, President Clinton signed into law the National Earthquake Hazards Reduction Program (NEHRP) authorization bill (Public Law 105-47) for fiscal years 1998 and 1999. The law contains several new initiatives and includes increased funding for research and development in earthquake science, engineering, public education, and mitigation.

The law authorizes $105.8 million for FY 98 and $108.9 million for FY 99. Among other things, this legislation requires the U.S. Geological Survey to develop a "real-time seismic hazard warning system"; mandates an assessment of regional seismic monitoring networks; directs NSF to develop earth science teaching materials and provide them to schools; orders improvement of hazards assessments of seismic zones in the U.S.; charges FEMA to assess and report on earthquake training capabilities and programs; and compels NSF to work with the other NEHRP agencies to develop a plan to effectively use earthquake engineering research facilities.

The complete text of the bill can be found via the Internet at *http://thomas.loc.gov*.

FEMA Issues Final Rule on Snow Assistance

In the past, one of the areas of great confusion regarding federal disaster assistance involved the costs of snow removal. Often, false expectations arose concerning eligibility for assistance, or governments failed to plan for such circumstances. These events, which can become "slow emergencies" due to the continual accumulation of snow over an extended period of time, rarely received presidential disaster declarations. In order to clarify their policy, FEMA has issued a final rule that presidential disaster declarations will only be issued for snowstorms that are at or near record levels, as established by official government records. In addition, winter storms that cause extensive power outages, serious safety hazards, and significant physical damage to public infrastructure may require a declaration that authorizes several categories of recovery assistance. Indeed, the final rule notes that the extent of damage and needed assistance will continue to be the basis for a presidential disaster declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

Copies of the final rule can be found in the ***Federal Register***, *Vol. 62, No. 166 (August 27, 1997), pp. 45328-25330; WWW: http://www.access.gpo.gov*. For further information on this rule, contact *Melissa H. Howard, FEMA, Infrastructure Support Division, 500 C Street, S.W., Washington, DC 20472; (202) 646-3243.*

GAO Says GOES Needs More Attention

The Russian space station Mir isn't the only aging space jalopy orbiting the earth. Following a request from Congress, the General Accounting Office (GAO) reviewed the National Oceanic and Atmospheric Administration's (NOAA) management of the Geostationary Operational Environment Satellite (GOES) program, focusing on NOAA's strategy for replacing aging weather satellites, which will begin to reach the end of their useful lives by 2002.

In its report, ***Weather Satellite: Planning for the Geostationary Operational Environmental Satellite Program Needs More Attention*** (GAO/AIMD-97-37), the GAO noted that the potential for a gap in geostationary satellite coverage will be significant in the early years of the next century if procurement of new satellites does not begin soon. In order to prevent this, NOAA plans to purchase two to four spacecraft that will carry the same instruments as the current satellites and will incorporate modest technical improvements; the satellites are planned for launch beginning in 2002.

The GAO believes that NOAA's plans are reasonable, but that there are inherent difficulties in determining exactly when and how many of the new satellites will be needed. Thus, GAO includes several suggestions in this report for improving NOAA's spacecraft planning process, including implementing the replacement program earlier than 2003, as currently planned; re-examining the GOES architecture; conducting an updated analysis of user needs; moving new technology development outside the operational satellite program; and developing greater cooperation with the National

Aeronautics and Space Administration (NASA).

Copies of the report are free and can be obtained from the *GAO, Document Distribution Center, P.O. Box 6015, Gaithersburg, MD 20884-6015; (202) 512-6000; fax: (301) 258-4006; e-mail: info@gao.gov; WWW: http://www.gao.gov.* The complete text of the report is also available via the Internet: *http://www.access.gpo.gov*.

Congress Questions Weather Office Closures

In its recent report, ***National Weather Service: Closure of Regional Offices Not Supported by Risk Analysis*** (GAO/AIMD-97-133), the General Accounting Office (GAO) reviews proposed staffing cuts at the National Weather Service (NWS). The GAO concludes that the NWS did not perform any documented risk analysis to support its decision to close its southern regional headquarters office, noting that the closure of this office was undertaken in response to a $47 million budget shortfall for fiscal year 1997.

Although NWS officials admit that no risk analysis was conducted, they relied on their professional judgement, believing that no degradation of service would occur from the closure because the southern region office's responsibilities were transferred to other regional offices. Nevertheless, users raised concerns about whether the closure would affect weather services and jeopardize public safety.

In the report, the GAO proposes several alternative strategies for maintaining the current regional structure, despite objections by officials at NWS headquarters that the strategies did not meet the agency's overall staffing targets for the regions. On June 25, 1997, the Secretary of Commerce delayed the closure of the southern office for 60 days to give outside experts an opportunity to review the NWS budget and operations.

Copies of the report are available from the GAO at the *above address.*

GAO Says NWS Modernization May Not Achieve Full Potential

In testimony before the Senate Subcommittee on Oversight of Government Management, Restructuring, and the District of Columbia, Committee on Governmental Affairs, the General Accounting Office's (GAO) director of Information Resources Management, Joel C. Willemssen, discussed the National Weather Service's systems modernization program. This testimony is available in the GAO report, ***Weather Service Modernization: Risks Remain that Full Systems Potential Will Not Be Achieved*** (GAO/T-AIMD-97-85).

Willemssen noted that, in order to provide better forecasting and earlier warnings with smaller, downsized operations, the NWS has been acquiring new observing systems, including radars, satellites, and ground-based sensors that work in conjunction with powerful forecaster workstations. Willemssen believes that the NWS has generated better weather data, particularly with the new radars and satellites, and has greatly improved forecasts and warnings as a result. However, these modernization efforts have experienced cost increases and schedule delays, which may be attributed to changes in requirements, as well as program management and development problems.

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

FEMA to Rewrite Coastal Construction Manual

The Mitigation Directorate of the Federal Emergency Management Agency (FEMA) has initiated a process to revise FEMA's well-known ***Coastal Construction Manual*** (***CCM***). The consulting engineering firm of Greenhorne & O'Mara, Inc. was recently awarded the contract to undertake this effort. The revised document is intended to present state-of-the-art engineering techniques for building coastal residential structures.

The revised ***CCM*** will include case studies highlighting proper design and construction practices, innovative use of materials, and other building successes. It will place particular emphasis on design and construction capable of withstanding the simultaneous effects of high-velocity flow, wave action, debris impact, high winds, and erosion. Multi-

hazard issues, such as the use of open foundation systems (also known as soft understories) beneath coastal buildings in seismically active areas, will also be explored.

Currently, an international effort is underway to identify the state-of-the-art in coastal residential construction. Architects, engineers, building officials, contractors, trade groups, material suppliers, floodplain managers, and coastal zone managers are encouraged to provide information that can be used by others to reduce the vulnerability of coastal construction. Materials should be received no later than January 31, 1998. Please send comments, information, or literature to *Vince DiCamillo, Greenhorne & O'Mara, Inc., 9001 Edmonston Road, Greenbelt, MD 20770; (301) 220-1873; e-mail: Eletvin@G-and-O.com*.

FEMA Recruiting BPAT Members

In response to hurricanes, floods, earthquakes, and other disasters, the Federal Emergency Management Agency (FEMA) often deploys Building Performance Assessment Teams (BPATs) to conduct field

investigations at disaster sites. BPATs inspect disaster-induced damage incurred by residential and commercial buildings and other structures; evaluate local design practices, construction methods and materials, building codes, and building inspection and code enforcement processes; and make recommendations regarding design, construction, and code issues. With its goal of reducing the damage caused by future disasters, the BPAT process is an important part of FEMA's hazard mitigation activities.

The ability to quickly form and deploy BPATs whose members have the required skills and expertise is essential to the program's success. Therefore, FEMA created a national database of experts who are available for rapid deployment (within 48 hours of notification). The database is maintained by the engineering firm of Greenhorne & O'Mara, Inc. (G&O), which also provides the technical and administrative support for BPAT. Private-sector members of BPATs work as consultants to G&O.

The BPAT database also serves as a source of experts who can support FEMA's other hazard mitigation activities, such as conducting research and providing technical support to state and local governments in structure vulnerability assessment, hazards-resistant design and construction, and hazards awareness and mitigation training.

BPAT members have expertise in one or more of the following fields: structural and civil engineering; building design and construction; coastal construction; flood-, wind-, and earthquake-resistant design and construction; shoreline and coastal erosion; building inspection; and building code development and enforcement. If you are an expert in one of these fields, can be available for temporary field assignments on short notice, and would like to be considered for BPAT assignments, send your name, area of expertise, company/affiliation, address, phone, and fax number, to *Greenhorne & O'Mara, Inc., 9001 Edmonston Road, Greenbelt, MD 20770, attn: Vince DiCamillo; fax: (301) 220-2606*. G&O will then contact you for additional information.

Decade for Natural Disaster Reduction

Reducing Earthquake Risks in Major Metropolitan Areas . . .

Radius Project Seeks Associate Cities

In connection with last year's International Decade for Natural Disaster Reduction (IDNDR) Internet conference, which focused on urban issues, the IDNDR Secretariat announced the RADIUS (Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters) Project to deal with seismic risk in metropolitan settings, particularly in developing countries (see the ***Observer***, Vol XXI, No. 5, p. 7). Since that announcement, RADIUS has received applications from 55 cities worldwide wishing to participate. Approximately 10 of these will be chosen for inclusion in the project, and will receive

financial and technical assistance, as well as training for local experts.

To accommodate the many communities interested in this project and to create an interactive, global network of cities concerned about earthquake hazards, RADIUS has established an associate cities program and is now accepting applications. Candidate cities must have carried out, or be in the process of carrying out, a seismic risk assessment. Through information exchange via the resulting network of communities, an associate city will learn about state-of-the-art technologies from the international institutes and researchers participating in the project. At the same time, associate cities will share useful information with other participants and compare their degree of preparedness.

The organizers hope that cities not selected to be among the RADIUS case studies will nevertheless carry out similar studies and participate in the project as associate cities so that they can both learn from and contribute to the seismic safety of sister communities around the world. For more information, see the new RADIUS home page: *http://pangea.stanford.edu/~tucker/Radius/RADIUS.html*; or contact *Kenji Okazaki, IDNDR Secretariat, U.N. Department of Humanitarian Affairs, Palais des Nations, CH-1211 Geneva, Switzerland; tel: (41-22) 798-6894; fax: (41-22) 733-8695; e-mail: kenji.okazaki@dha.unicc.org*.

SWT Establishes Center for Research and Policy on Hazards and Environmental Geography

The Department of Geography and Planning at Southwest Texas State University (SWT) has formed a Center for Research and Policy on Hazards and Environmental Geography. The center will provide institutional support for scholarship concerning a variety of hazards topics, ranging from adverse meterological and geomorphic events, to landfills and hazardous wastes, to flooding and hurricanes. The center's objective is to foster cooperative exploration of hazards-related topics by faculty and students; it currently comprises eight SWT faculty.

Several funded projects are already underway, including studies of avalanche impacts in Montana, industrial waste management practices and policies in Texas, freeze impacts on agriculture in the Rio Grande Valley, and response to recent floods in Nevada. The center is also conducting an inventory and analysis of closed landfills in Texas.

For more information about this new center, contact *Craig E. Colten, Department of Geography and Planning, 601 University Drive, Southwest Texas State University, San Marcos, TX 78666; (512) 245-7976; fax: (512) 245-8353.*

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

Planning for the Next Drought: A National Drought Mitigation Center (NDMC) Workshop. Sponsor: U. S. Bureau of Reclamation. Salt Lake City, Utah: November 17-19, 1997. The drought that gripped the Southwest and Southern Great Plains in 1996 served as a reminder of the West's continuing and apparently increasing vulnerability to drought. Even though drought is a slow-onset disaster, local, state, federal, and tribal governments found that without drought contingency plans in place, it was difficult to respond quickly and effectively. The National Drought Mitigation Center is organizing a series of four workshops, each in a different region of the country, on how to prepare for drought. Salt Lake City is the second in this series; other workshops will be planned for the Midwest and the Southeast. The objectives of the workshops are to help people understand drought and the need for drought planning; teach natural resource managers, water utility managers, emergency managers, planners, and others how to develop drought contingency plans; and help different levels and agencies of government coordinate drought-related programs. To obtain additional information, such as the dates of future meetings, contact the *NDMC, University of Nebraska-Lincoln, P.O. Box 830749, Lincoln, NE 68583-0749; (402) 472-6707; fax: (402) 472-6614; e-mail: ndmc@enso.unl.edu; WWW: http://enso.unl.edu/ndmc/.*

American Geophysical Union (AGU) Fall Meeting. San Francisco, California: December 8-12, 1997. The fall AGU meeting includes a Special Session on "Hazard Mitigation: Use of Real-Time Information," sponsored by the Subcommittee on Natural Disaster Reduction (SNDR), Committee on Environment and Natural Resources of the National Science and Technology Council. For details, contact *Peter Ward, U.S. Geological Survey, 345 Middlefield Road, MS 977, Menlo Park, CA 94025; (415) 329-4736; e-mail: ward@andreas.wr.usgs.gov.*

78th American Meteorological Society (AMS) Meeting. Phoenix, Arizona: January 11-16, 1998. The AMS annual meeting includes numerous parallel conferences, symposia, and workshops, many of which deal with meteorological hazards. For a complete description, consult the AMS Web site: *http://www.ametsoc.org/AMS/*, or contact *AMS, 45 Beacon Street, Boston, MA 02108-3693; (617) 227-2425; fax:*

(617) 742-8718; e-mail: amsmtgs@ametsoc.org.

Engineering for Extreme Winds 1998. Offered by the Wind Engineering Research Center, Texas Tech University. Lubbock, Texas: February 4-6, 1998. This course is directed toward architects, engineers, building officials, and other personnel who are involved in the design of buildings to resist extreme winds, as well as toward individuals involved with the interpretation of wind load standards and codes. The course will cover wind load standards, examples of both successful design and wind-induced damage, and design for hurricanes and tornadoes. To register or receive additional information, contact *Ariel Fernandez, Division of Continuing Education, Texas Tech University, Box 41006, Lubbock TX 79409-1006; (806) 742-2352, ext. 237; fax: (806) 742-2318.*

Disaster '98--Assessing Threats to Your Community. Sponsors: Florida Emergency Medicine Foundation and others. February 19-22, 1998. The Disaster '98 conference will include sessions on community risk assessment and mitigation for a broad range of risks. The meeting will also feature a preconference workshop on "Children's Emergencies in Disasters," February 18-19. To request a conference brochure, contact the *Florida Emergency Medicine Foundation, 3717 South Conway Road, Orlando, FL 32812-7607; (407) 281-7396 or (800) 766-6335; fax: (407) 281-4407.*

Eighth Annual Conference and Trade Show on Disaster Recovery, Contingency Planning, and Business Continuation Using Telecommunications. Sponsor: International (Telecommunications) Disaster Recovery Association (IDRA). Boston, Massachusetts: March 15-18, 1998. All presentations and exhibits at this conference focus on contingency planning, business continuation, and disaster recovery using telecommunications. The program includes multiple tracks covering everything from basics in telecommunications to advanced systems. For a complete brochure or to suggest possible contributors, contact *IDRA, P.O. Box 4515, Shrewsbury, MA 01545; (508) 845-6000; fax: (508) 842-2585; WWW: http://www.idra.com.*

Identification of Emergency Management Innovation Seminar. Mt. Macedon, Victoria, Australia: March 16-20, 1998;
Community Emergency Risk Management Workshop. Mt. Macedon, Victoria, Australia: March 30-April 3, 1998.
For details about these and other upcoming workshops offered by the Australian Emergency Management Institute (AEMI), contact *AEMI, Mt. Macedon, Victoria 3441, Australia; tel: 61-3-54-215 100; fax: 61-3-54-215 273; e-mail: aemi@ema.gov.au; WWW: http://www.ema.gov.au.*

Second Western Washington School Emergency Management Conference. Sponsor: King County Emergency Management. Shoreline, Washington: March 31, 1998. This conference brings together school and district counseling staff, teachers, parent/teacher associations, and others with a role in emergency management for schools. The program will address the four phases of emergency management as they pertain to schools at all levels--from daycare to college. For a conference announcement and registration information, contact *King County Emergency Management, 7300 Perimeter Road South, Room 128, Seattle, WA 98018; (206) 296-3830; fax: (206) 296-3838; e-mail:*

richard.gelb@metrokc.gov.

14th International Meeting on Prevention, Preparedness, and Response to Hazardous Material Spills. Sponsor: U.S. Environmental Protection Agency. Chicago, Illinois: April 5-9. 1998. Under the theme "Risk Management: Closing the Loop," this conference will address the many aspects of hazardous materials spills management--from planning and analysis to response and recovery. The conference planning committee is currently seeking suggestions for topics, presentations, and training. For details, see: *WWW: http://www.nrt.org/nrt/hazmat98.nsf* or *http://www.epa.gov/ceppo/pubs/postcard.html*; or e-mail: *hazmat98@icfkaiser.com*.

The Emergency and Disaster Aspects of International Health-Summer School. Offered by the School of Health and Related Research, University of Sheffield. Sheffield, U.K.: May 11-15, 1998. This five-day course is intended for an international audience of high-level managers and decision makers involved in preparing for and responding to emergencies and disasters. Subjects will include the epidemiology of disasters; planning and preparedness for emergency situations; recent European complex disasters; the psychological aspects of emergency management; water and sanitation; immunization and communicable disease control; primary health care; physical and mental health; education and training for disaster preparedness and management; handling of mass casualties; legal issues; outcome monitoring and review; research; human rights aspects of emergencies and disasters; and humanitarian and development assistance. For further information, see the conference Web page: *http://www.shef.ac.uk/~scharr/flyer.html;* or contact *Deborah Owen; tel: +44 114 222 0720; fax: +44 114 272 4095; e-mail: d.owen@sheffield.ac.uk*.

Hazards '98--Seventh International Symposium on Natural and Man-Made Hazards. Sponsors: International Society for the Prevention and Mitigation of Natural Hazards and others. Chania, Island of Crete, Greece: May 17-22, 1998. The theme of the 1998 Hazards Symposium is "Natural Disasters--How Do We Mitigate Them?" The objectives of this conference series are to promote the hazard sciences, to explore those aspects that may be similar among various hazards, to review the latest developments in selected fields, and to outline new directions for research. Presentations on virtually all aspects of hazards management and research are currently being solicited, and abstracts are due December 31, 1997. For details and a conference brochure, contact the *Natural Hazards Society, P.O. Box 49511, 80 Glen Shields Avenue, Concord, Ontario, Canada L4K 4P6*; or *Tad S. Murty, Baird & Associates, 1145 Hunt Club Road, Suite 1, Ottawa, Ontario, Canada K1V 0Y3; (613) 731-8900; fax: (613) 731-9778; e-mail: t_murty@ottawa.baird.com*; or *G.A. Papadopoulos, Chair, Local Organizing Committee, Institute of Geodynamics, National Observatory of Athens, P.O. Box 20048, 11810 Athens, Greece*.

Association of State Floodplain Managers (ASFPM) 22nd Annual Conference. Milwaukee, Wisconsin: May 17-22, 1998. The ASFPM annual conference is one of the foremost venues in the U.S. for addressing flood and floodplain management issues. Reflecting the rapidly evolving profession, the theme of the 1998 ASFPM meeting is "Times Are Changing," and the conference organizers are particularly interested in offering presentations on new technologies available to floodplain managers.

For a conference brochure, contact the *ASFPM Executive Office, 4233 West Beltline Highway, Madison, WI 53711; (608) 274-0123; fax: (608) 274-0696; e-mail: asfpm@execpc.com*.

Response '98. Sponsor: National Association for Search and Rescue (NASAR). Portland, Oregon: May 27-30, 1998 (pre-conference training May 22-26). The 1998 NASAR conference includes educational tracks covering management, urban search and rescue (SAR), water SAR, canine SAR, technical SAR, medical aspects of SAR, and general SAR, as well as plenary sessions, an exhibition, and demonstrations. The preconference training is a comprehensive, hands-on program with workshops covering many different aspects of the discipline. For a conference brochure, contact *NASAR Headquarters, 4500 Southgate Place, Suite 100, Chantilly, VA 20151; (703) 222-6277; fax: (703) 222-6283; e-mail: conference@nasar.org; WWW: http://www.nasar.org*.

55th Annual Eastern Snow Conference. Sponsors: U.S. Army Cold Regions Research Laboratory and others. Jackson, New Hampshire: June 3-5, 1998. The main goal of this meeting is to document current progress in forecasting, modeling, measuring, and managing snow. The conference will bring together the snow research and operational communities to share their knowledge and thus to improve understanding and management of snow. Abstracts are due January 15, 1998. For more information, contact *R. Brown, 2121 TransCanada Highway, Dorval, QC, Canada H9P 1J3; (514) 421-4772; fax: (514) 421-4768; e-mail: ross.brown@ec.gc.ca; WWW: http://www.tor.ec.gc.ca/CRYSYS/esc/*.

Disaster Forum '98: Global Partnerships--Creating Solutions. Sponsors: Emergency Preparedness Canada and others. Edmonton, Alberta, Canada: June 26-July 1, 1998. Disaster Forum '98 is intended to benefit any person or organization with an interest in emergency preparedness. June 26-27 will be devoted to preconference workshops; the subsequent four days will cover planning, response, recovery, and mitigation respectively and will include presentations, hands-on planning and response exercises, and a trade show. For further details or a conference brochure, contact *Disaster Forum '98, Suite 437, 11215 Jasper Avenue, Edmonton, AB, Canada T5K 0L5; fax: (403) 422-1549; e-mail: disaster@freenet.edmonton.ab.ca; WWW: http://www.freenet.edmonton.ab.ca/disaster* .

25th Symposium of the International Committee for the History of Technology (ICOHTECH). Lisbon, Portugal: August 18-22, 1998. Under the conference's general theme of "European Technology in a Global Context," this meeting will include sessions on "Technology and Natural Disasters." The organizers hope to include presentations on all types and all dimensions of disasters. Persons interested in participating should contact *James C. Williams, Professor of History, De Anza College, 1130 Delynn Way, San Jose, California, 95125-3619; (408) 269-4837; e-mail: jcwl@netcom.com*.

XXVI General Assembly of the European Seismological Commission (ESC). Sponsors: International Association of Seismology and Physics of the Earth's Interior, International Union of Geodesy and Geophysics, and others. Tel Aviv, Israel: August 23-28, 1998. The ESC General Assembly will address all aspects of seismology, from physical science issues to human risk to seismic hazard preparedness, response, and mitigation. Abstracts are due March 31, 1998. For additional information contact the *Assembly Secretariat, c/o Ortra Ltd., Nirim 1 St., P.O.B. 9352, Tel Aviv 61092, Israel; tel: +972-3-638-*

4444; fax: +972-3-638-4455; e-mail: esc@ortra.co.il; WWW: http://www.iprg.energy.gov.il:8080.

U.N. International Decade for Natural Disaster Reduction (IDNDR) Conference on Early Warning Systems for the Reduction of Natural Disasters (EWC98). Potsdam, Germany: September 7-11, 1998. One of the key themes of the IDNDR is the realistic assessment of hazard, risk, and vulnerability and the development of early warning and response capabilities. To achieve these goals, to consolidate the accomplishments of the IDNDR, and to plan for the 21st century, the Federal Minister of Foreign Affairs of the Federal Republic of Germany is hosting this international conference. EWC98 will feature a critical assessment of successes, failures, possibilities, and requirements for the effective use of early warning systems in disaster mitigation. It will examine existing state-of-the-art science, technology, and practice, as well as future needs for early warning of geological, hydrological, meteorological, and other environmental and human-caused hazards at all scales--local to global. Contributions are currently being solicited. For complete information, contact *EWC98, GeoForschungsZentrum, Potsdam (GFZ), Telegrafenberg, D-14473 Potsdam, Germany; tel: +49 331 288 1523; fax: +49 331 288 1504; e-mail: ewc98@gfz-potsdam.de; WWW: http://www.gfz-potsdam.de/ewc98/.*

Fourth International Conference on Corporate Earthquake Programs (formerly the U.S.-Japan Conference on Corporate Earthquake Programs). Shizuoka City, Japan: November 11-13, 1998. The objective of this conference is to improve corporate earthquake preparedness programs by bringing together risk managers, earthquake hazard reduction practitioners, and researchers from both the public and private sectors. The conference facilitates technology transfer among these individuals so that they can improve not only the state of the art, but also the level of implementation of earthquake safety programs in the private sector. Exhibits of technical products that have been developed for earthquake hazard reduction are also planned. Papers are currently being solicited in four areas:

- Securing corporations and society from earthquakes;
- Developing communications systems for earthquake response;
- Emergency preparedness training in corporations;
- Role of the financial sector (banks, insurance companies) in earthquake recovery and response.

The deadline for receipt of one-page abstracts is May 1, 1998. Abstracts should be sent to, and additional information is available from, *Steven M. Vukazich, San Jose State University, Department of Civil Engineering, One Washington Square, San Jose, CA 95192-0083; (408) 924-3858; fax: (408) 924-4004; e-mail: vukazich@email.sjsu.edu.*

EMI 1997--1998

The Federal Emergency Management Agency's Emergency Management Institute (EMI) serves as a national focal point for the development and delivery of emergency management training. The institute offers both resident and nonresident courses to anyone with substantial involvement in emergency

management, and courses are tuition free. EMI recently issued its catalog of courses for 1997-1998. For a copy, or for more information about the many training opportunities available, contact *EMI, 16825 South Seton Avenue, Emmitsburg, MD 21727; (301) 447-1000 or (800) 238-3358*. Additionally, much information about EMI and its curriculum is available from the institute's Web site: *http://www.fema.gov/emi*.

For example . . .

Upcoming Flood Courses at EMI

The above-mentioned Emergency Management Institute (EMI) offers courses on almost all aspects of ing courses covering floods and floodplain management.

Course and Dates

- *Digital Flood Insurance*: December 1-5, 1997
- *Rate Maps*: February 2-6, 1998; April 20-24, 1998; August 24-29, 1998
- *Managing Floodplain Development Through the National Flood Insurance Program:* January 26-30, 1998; March 23-27, 1998; August 3-7, 1998
- *National Flood Insurance Program/Community Rating System*: November 17-21, 1997; August 17-21, 1998; September 14-18, 1998
- *Retrofitting Existing Floodprone Residential Buildings:* March 30-April 3, 1998; September 28-October 2, 1998

For more information about these courses, contact EMI at the address above.

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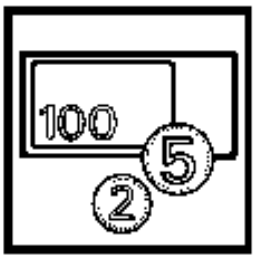

Contracts and Grants

The Hazardousness of Place: Modeling Risk Vulnerability, National Science Foundation, $50,000, 12 months. Principal Investigator: *Burrell E. Montz, Department of Geological Sciences and Environmental Studies, P.O. Box 6000, SUNY Binghamton, Binghamton, NY 13902-6000; (607) 747-2615 or 2264; fax: (607) 747-2288; e-mail: bmontz@binghamton.edu.*

With rare exceptions, hazards research has focused on individual hazards at particular locations, an approach that does not fully explain the risks that exist in an area. This project will employ a multiple hazard perspective to determine the hazardousness of a place. Using Tampa Bay, Florida, as the research area, researchers will use data on the spatial extent of events, the physical and built environments, and social characteristics to create a geographic information system-based model to examine the relationships among and between hazards.

Dissertation Research: Differential Access to Irrigation Water and Vulnerability to Flood Hazard in the Punjab: An Analysis of Structural Factors, National Science Foundation, $7,185, 18 months. Principal Investigator: *Daanish Mustafa, Department of Geography, Campus Box 260, University of Colorado, Boulder, CO 80309-0260.* For information, contact *James L. Wescoat, Department of Geography, Campus Box 260, University of Colorado, Boulder, CO 80309-0260; (303) 492-4877; fax: (303) 492-7501; e-mail: wescoat@spot.colorado.edu.*

This study will examine social structural factors underlying the inequities and inefficiencies of the Pakistani irrigation and flood management regime. The primary hypothesis is that influences of government, property ownership, and power and water resources management lead to increased vulnerability to flood hazard and irrigation water scarcity for underprivileged social groups. The research will entail field work in four central Pakistani communities.

Prediction in the Earth Sciences: Use and Misuse in Policy Making, National Science Foundation, $99,781, 24 months. Principal Investigators: *Daniel E. Sarewitz, Radford Byerly, Roger Pielke, and Dale Jamieson, Geological Society of America.* For information, contact *Daniel Sarewitz, Geological Society of America, 3300 Penrose Place, P.O. Box 9140, Boulder, CO 80301; (303) 447-2020; fax: (303) 447-1133; e-mail: sarewitz@geosociety.org.*

Policy makers increasingly demand predictive information that can help guide political decision making on controversial environmental issues that involve global climate change, radioactive waste disposal,

and mitigation of natural hazards. As a result, major financial and intellectual resources are now focused on developing models and techniques for predicting natural and human-induced environmental phenomena. At the same time, research budgets are tightening. This project will begin a systematic analysis for understanding if, how, and when research focusing on prediction can be productively applied to policy making. Two workshops will be convened that will focus on identifying principles and criteria that can help policy makers judge the potential value of scientific prediction.

Reducing Losses from Storms, Federal Emergency Management Agency (FEMA) and State of North Carolina, $111,000, 12 months. Principal Investigator: *David Brower, Department of City and Regional Planning, Campus Box 3140, New East Hall, University of North Carolina-Chapel Hill, Chapel Hill, NC 27599-3410; (919) 962-3983; fax: (919) 962-5206; e-mail: brower.dcrp@mhs.unc.edu.*
With funds primarily from FEMA's Hazard Mitigation Grant Program, this study will examine the effects of Hurricanes Fran, Edouard, and Bertha on the state's barrier islands, floodplains, environmental systems, water and wastewater facilities, schools, transportation systems, and other infrastructure. FEMA approved 5% of the total federal hazard mitigation funds available following Hurricane Fran to be used at the state's discretion to reduce future damage. Thus, this project will assist North Carolina's Emergency Management Division in implementing mitigation measures against future storms.

Coastal Change, Climate, and Instability, European Commission, 866,000, 36 months. Principal Investigator: *Robin McInnes, Isle of Wight Council, County Hall, Newport, Isle of Wight P030 1UD, U. K.; tel: (01983) 823107; fax: (01983) 823109.*
The aim of this project is to examine how predicted climate change may affect unstable coastal areas and landslide areas. The project involves partners in the U.K., France, Italy, and Ireland and will be supported by both geotechnical and archaeological studies. A key element will be to improve understanding of the relationship between rainfall, groundwater levels, coastal erosion, and ground movement in order to develop more reliable methods for landslide forecasting and risk assessment in urban areas. Archeological evidence will be used to predict the nature, scale, and pace of coastal change, as well as to study themes closely linked with long-term response to the Holocene rise and short-term climatic changes and weather patterns.

Development and Analysis of Alternative Housing Mitigation and Recovery Strategies for Earthquakes, National Science Foundation, $223,038, 18 months. Principal Investigator: *Jeanne B. Perkins, Association of Bay Area Governments, P.O. Box 2050, Oakland, CA 94604-2050; (510) 464-7934; fax: (510) 464-7970.*
The goals of this project are to improve pre-earthquake housing mitigation programs, provide additional data to support emergency planning and disaster response, and accelerate residential rebuilding efforts in future earthquakes. The project will evaluate the effectiveness of existing pre-earthquake housing damage mitigation programs, examine factors that motivate homeowners to retrofit, model the demands for post-earthquake emergency assistance, and examine the time periods for the repair or replacement of habitable units.

Integrated Earthquake Mitigation Strategies for Metropolitan Cities, National Science Foundation,

$55,477, 24 months. Principal Investigator: *Wei Min Dong, Risk Management Solutions, Inc., 149 Commonwealth Drive, Menlo Park, CA 94025-1133.*
The U.S. and the People's Republic of China have both recently developed computer loss estimation software systems: HAZUS97 in the U.S. and P95-06 in China. Although similar in purpose, the two programs differ considerably in content. Under this project, the two countries will undertake a joint effort to understand the similarities and differences of the two systems, with a view toward improving both. In addition, HAZUS97 will be evaluated concerning its applicability to other countries with different seismic, geologic, and building stock characteristics than the U.S.

Adoption of Earthquake Hazard Adjustments by Households and Complex Organizations, National Science Foundation, $392,498, 48 months. Principal Investigator: *Michael K. Lindell, Hazard Reduction and Recovery Center, Texas A&M University, College Station, TX 77843-3137; (409) 845-7813; fax: (409) 845-5121.*
This research will assess the extent to which social units located in areas with different levels of seismic vulnerability vary in their adoption of earthquake hazard adjustments, including preparedness and mitigation. The study will involve two kinds of social units--households and complex organizations--with the latter divided into private businesses and government agencies. The research will also address characteristics of the physical and social environment affecting each of these social units by comparing units at high seismic risk in southern California to units at medium risk in western Washington.

NSF Creates Three New Earthquake Centers

In a major new earthquake research initiative, the National Science Foundation (NSF) has named three centers to conduct and coordinate earthquake engineering research for the U.S. NSF will provide approximately $2 million a year for five years to each center, for a total of $30 million. The centers are expected to match the federal funds, dollar for dollar, with nonfederal funds and must form consortia of research organizations linked through electronic networks.

Pacific Earthquake Engineering Research Center (PEER Center)

The PEER Center, a consortium of nine institutions, will conduct research in five basic areas: 1) policy, planning, and economics; 2) seismic hazards; 3) performance assessment; 4) systems reliability; and 5) innovative technologies. The center will develop a business and industrial partnership program, conduct urban demonstration projects to test research, and provide education programs for both K-12 students and undergraduates. For more information, contact the principal investigator, *Jack P. Moehle, Earthquake Engineering Research Center, University of California-Berkeley, 1301 South 46th Street, Richmond, CA 94804-4698; (510) 231-9554; fax: (510) 231-9471; e-mail: moehle@euler.berkeley.edu.*

Mid-America Earthquake Center (MAE)

The MAE will work to reduce potential earthquake losses in the central and eastern U.S., concentrating on problems associated with less frequent seismic events and their consequences for individuals, economic systems, and infrastructure. Projects will focus on identification and evaluation of seismic hazards and development of loss-reduction strategies for the built environment. This center will also work to educate the next generation of earthquake engineers and provide outreach to industry, government, pre-college schools, and potential user groups. For more information, contact the principal investigator, *Daniel P. Abrams, Department of Civil Engineering, 3148 Newmark Celab, MC 250, 205 North Matthews, University of Illinois-Urbana-Champaign, Urbana, IL 61801; (217) 333-0565; fax: (217) 333-0565; e-mail: d-abrams@staff.uiuc.edu.*

Center for Advanced Technologies in Earthquake Loss Reduction (ATEL)

ATEL, a nine-institution consortium, will develop and apply advanced and emerging technologies for design, construction, and retrofitting of buildings and infrastructure to reduce earthquake losses. It will focus on three major elements: performance assessment of the built environment, rehabilitation of critical facilities, and response and recovery using new loss-estimation methods and technologies. Like the other centers, it will also provide outreach to students of all ages, as well as to the public and private sectors. For more information, contact *George C. Lee, National Center for Earthquake Engineering Research, SUNY Buffalo, 109 Red Jacket Quadrangle, Buffalo, NY 14261-0025; (716) 645-3391; fax: (716) 645-3399.*

New Group Forms to Manage Risk

In September, the first meeting of the Public Entity Risk Institute (PERI) was held to identify ways that PERI could work with other organizations to reduce insurance losses. PERI was created in 1996 as part of the settlement of an antitrust lawsuit brought by attorneys general in 20 states and several private parties against 32 insurance providers; the institute was created to improve the management of risk, including natural hazards. The PERI Board of Directors believe that effective risk management requires interaction among local governments, small businesses, nonprofit organizations, risk managers, educators, and environmental and natural hazards experts.

According to its Executive Director, Gerard Hoetmer, PERI's mission is to provide a useful resource for enhancing risk management in public, private, and nonprofit organizations, particularly smaller organizations. To meet this goal, PERI will serve as a clearinghouse of information on risk management and develop a network of experts and information centers to share information on risk management.

For further details on this new organization, contact *PERI, 11350 Random Hills Road, Fairfax, VA 22030; (703) 934-6046; fax: (703) 352-7085.*

Recent Publications

All Hazards

Emergency Management: A Legislator's Guide. *Laura Hagg Nelson. 1997. 55 pp. $20.00, plus $4.00 shipping. Copies can be purchased from the National Conference of State Legislatures (NCSL), 1560 Broadway, Suite 700, Denver, CO 80202; (303) 830-2054; fax: (303) 863-8003; e-mail: books@ncsl.org; WWW: http://www.ncsl.org.*

This guide, part of a larger effort by NCSL to assist states in developing emergency management policy, presents information about natural disasters; preparedness, response, recovery, and mitigation; state financial responsibility for natural disasters; and options for state legislative action. It contains an overview of emergency management, including the roles of federal and state governments; describes tools for mitigating disasters, such as land-use planning, acquisition programs, building codes and enforcement, and insurance premium credits; lists state resources for funding emergency management and mitigation programs; describes mutual assistance compacts and partnerships; offers suggestions for state legislative action; and details other federal assistance programs.

State Emergency Management Funding and Structures: NEMA/CSG 1997 Report. *1997. 45 pp. $25.00, plus $4.00 shipping. Purchase from the Council of State Governments, 2760 Research Park Drive, P.O. Box 11910, Lexington, KY 40511-8410; (606) 244-8000; fax: (606) 244-8001; e-mail: info@csg.org; WWW: http://www.csg.org.*

This report provides a comprehensive overview of state spending on emergency management, detailing information for 44 states, FEMA regional spending, population characteristics, and spending per emergency management function. The report notes that between 1992 and 1996, state expenses for postdisaster programs increased by 63%, while predisaster expenses grew by 97%. It also discusses state structures and funding; performance partnership agreements; emergency management assistance; trends in comprehensive emergency management, including changes in preparedness, mitigation, response, and recovery costs; interstate mutual aid agreements; cost-sharing for postdisaster assistance; and state versus federal declarations and spending.

World Health Statistics Quarterly*, Vol. 49, No. 3/4. Subscription: 121 Swiss francs; individual copies: 39 Swiss francs. Available from the World Health Organization (WHO), Distribution and Sales, CH-1211, Geneva 27, Switzerland; tel: (+41 22) 791 24 76; fax: (+41 22) 791 4857; e-mail: bassanif@who.ch.*

This issue of ***World Health Statistics*** is devoted to the health consequences of emergencies and disasters, as well as their management. Articles include: "A New Role for the WHO in Emergencies," "Health Sector Approach to Vulnerability Reduction and Emergency Preparedness," "Disasters in Africa: Old and New Hazards and Growing Vulnerability," "SUMA, A Management Tool for Post-Disaster Relief Supplies," " Disaster Preparedness: Institutional Capacity Building in the Americas," "The Impact of Hurricane Luis on the Health Services of Antigua and Barbuda," "The Effects of Volcanoes on Health: Preparedness in Mexico," "Standardization of Health Relief Items Needed in the Early Phase of Emergencies," and "UNICEF's Rich History in Emergency Preparedness."

Mitigating the Millennium: Proceedings of a Seminar on Community Participation and Impact Measurement in Disaster Preparedness and Mitigation Programmes*. Jane Scobie, Editor. 1997. 74 pp. Free. Copies can be requested from Intermediate Technology, Myson House, Railway Terrace, Rugby CV21 3HT, U.K.; tel: +44-(0)1788-560631; fax: +44-(0)1788-540270; e-mail: itdg@itdg.org.uk. Although the publication is free, donations to this registered charity are welcome (checks payable to Intermediate Technology).*

Mitigating the Millennium contains the proceedings of a seminar held in London on World Disaster Reduction Day, October 9, 1996. Practitioners working on disaster management issues in both relief and long-term development programs examined ways to promote local participation in mitigation. Topics include: encouraging community participation in practice, defining a participative approach, evaluating and measuring the impact of mitigation projects, prioritizing mitigation, undertaking emergency preparedness in cyclone areas in Madagascar, improving practice, getting donors involved in disaster mitigation, and recommending initiatives to reduce hazards through the promotion of community-based disaster mitigation programs at all levels of government.

The Emergency Management Assistance Compact Guidebook and Standard Operating Procedures, 1997. *D.P. Munro, Compiler. 1997. 106 pp. Free. Request from Doug Munro, Southern Governors' Association, 444 North Capitol Street, Suite 200, Washington, DC 20001; (202) 624-5897; fax: (202) 624-7797.*

The Emergency Management Assistance Compact (EMAC), agreed to by southern states following Hurricane Andrew in 1992 (see the ***Observer***, Vol. XXI, No. 3, p. 13), established potential needs and capabilities of member states and laid the legal groundwork for mutual aid among states following a disaster. The agreement specifically calls for states to perform risk assessments to determine what types of assistance and equipment they will need following a disaster. The ***Emergency Management Assistance Guidebook*** provides an introduction to interstate assistance, outlines the history of the EMAC, discusses legal issues, profiles training and exercises, describes the EMAC committee, delineates standard operating procedures under EMAC, provides summaries of state agency structures and responsibilities, contains a directory of EMAC state personnel, and includes forms to be used by states requesting assistance, as well forms to be used by responding states.

The Economic Impact of Natural Disasters in Fiji. *Charlotte Benson. Working Paper 97. 1997. 108 pp. 6.00, plus 4.00 shipping.*

The Economic Impact of Natural Disasters in Viet Nam. *Charlotte Benson. Working Paper 98. 1997. 121 pp. 6.00, plus 4.00 shipping.*

The Economic Impact of Natural Disasters in the Philippines. *Charlotte Benson. Working Paper 99. 1997. 135 pp. 6.00, plus 4.00 shipping.*

Copies can be purchased from the Overseas Development Institute, Portland House, Stag Place, London SW1E 5DP, U.K.; tel: +44 (0) 171 393 1600; fax: +44 (0) 171 393 1699; e-mail: publications@odi.org.uk; WWW: http://www.oneworld.org/odi/

There has been relatively little research on the economic impacts of natural disasters in developing nations, and these three books attempt to quantify some of the losses that occur in such countries, as well

as their impacts on national economies. The first book reports findings from a study of Fiji and concludes that severe natural disasters create major shocks to the Fijian economy, resulting in substantial declines in its Gross Domestic Product. In particular, the manufacturing and agricultural sectors have become increasingly vulnerable since the early 1980s. Benson concludes that considerable attention has been paid to disaster preparedness and recovery, although little has been paid to economic strategic planning or efforts to mitigate the economic impacts of disasters.

In Viet Nam, natural disasters exacerbate regional and occupational income inequalities and reinforce poverty. The second study suggests that vulnerability could increase in the future, both at macroeconomic and household levels. Because Viet Nam retains an essentially agrarian economy, natural disasters have clear adverse implications for agriculture. Benson concludes that, overall, government and aid donor policies have typically failed to acknowledge natural disasters as a major threat to sustainable economic growth and as an obstacle to development.

The Philippines experiences all major types of natural hazards and is one of the most hazard-prone countries in the world. Moreover, environmental degradation is increasing the incidence of disasters. As in the other two countries, the agricultural sector is particularly vulnerable, and there have been few mitigation measures adopted. In the Philippines, natural hazards have discouraged new investment and placed a continual burden on government to meet the costs of public prevention, mitigation, and preparedness, as well as relief and rehabilitation following disasters. In particular, poverty programs in this country have ignored the role disasters play in sustaining poverty, and failure to address this issue is reinforced by donor agencies that focus on preparedness and response, rather than prevention and mitigation.

Area G Veterinary Disaster Team Resource Guide. *Patty Boge. 1997. 85 pp. $10, print; $5.00, diskette. $10.00, video. Resource guide and video together, $17.00. Available from the Torrance Police Department, 3300 Civic Center Drive, Torrance, CA 90503, attn: Chief; (310) 325-5850. Prepayment is required.*

Many disaster responders overlook the importance of addressing animal-related issues before a disaster. Often, good planning can make the difference between having concerned pet owners evacuate a dangerous area quickly because they have their pets, or refusing to evacuate at all. This guide contains information on the "12 Steps to Forming a Veterinary Disaster Team," the California Standardized Emergency Management System (SEMS), applying SEMS to veterinary response, the role of the primary veterinary coordinator, the incident command system, useful forms for tracking pets and farm animals, volunteers, transportation, medi-cation, planning, finance, and conducting exercises.

Tasmanian Lifelines Project: Launceston Lifelines Project Report. *1996. 36 pp. $50.00 (U.S.).*
Tasmanian Lifelines Project: Tasmania North West Region Project Report. *1996. Free, plus cost of shipping and handling.*
Tasmanian Lifelines Project: City of Hobart Lifelines Project Report. *1996. Free, plus cost of shipping and handling.*
All three reports can be purchased for $100.00 from the Tasmania State Emergency Service, 1st Floor, 47 Liverpool Street, Hobart, Tasmania, Australia 7000; tel: 61 3 62302711; fax: 61 3 62349767; e-

mail: tases@info.tas.gov.au.

Lifelines, those services and structures that handle transportation, electricity, communications, water, and wastewater, are often seriously disrupted or destroyed in a natural disaster. These reports document the efforts by Tasmania to mitigate the impacts of disasters on the region's lifelines. The reports identify appropriate essential service lifelines, then describe individual project workgroups that conducted a risk assessment of lifelines, identified interdependency issues related to lifelines, developed measures to reduce the impacts of emergencies, and established methods to improve the capability of essential service lifelines to cope with the impact of a disaster.

Humanitarian Report 1997. *1997. 110 pp. $45.00. Obtain from the United Nations Bookshop, Room GA-32, Department I003, New York, NY 10017; (212) 963-7680 or (800) 553-3210; fax: (212) 963-4910; email: bookshop@un.org; WWW: http://www.un.org.*

Humanitarian tragedies occur every day in every corner of the world. The United Nations Department of Humanitarian Affairs notes that these events point to the inextricable connection between the problem--a disaster and the humanitarian imperative to save lives--and the underlying causes, which are political, military, economic, social, and environmental. The U.N. believes that political will and requisite resources must be directed toward finding a lasting cure. This report examines the evolution of humanitarian coordination, including responding to complex emergencies and natural disasters, mobilizing resources, and providing information on humanitarian response. It also discusses recent major events in emergency relief coordination for 1996 and 1997. Finally, it examines continuing challenges for humanitarian coordination, including reducing natural, technological, and environmental disasters; eliminating anti-personnel landmines; assisting displaced populations; and linking relief with development practices.

Weather and Climate

The Weather Almanac. *1997. 700 pp. $135.00. Available from Gale Research, 835 Penobscot Building, 645 Griswold Street, Detroit, MI 48226-4094; (800) 877-4253; WWW: http://www.gale.com.*

The Weather Almanac provides detailed weather records for 108 major U.S. cities as well as a climatic overview of the U.S. It explains weather phenomena; describes safety measures for threatening weather situations; and presents statistics for hurricanes, tornadoes, floods, lightning, and volcanoes. Other sections cover climate, record-setting weather, weather fundamentals, retirement and health, and weather and air pollution. The almanac also includes a glossary, an index, maps, and charts. Weather statistics are provided for nearly 550 cities worldwide, with data on extreme temperatures, snowfall, early and late frosts, sunshine, and prevailing winds. The ***Almanac*** also includes sections on weather and health, wind chill, the summer comfort index, livestock safety, the NOAA weather radio warning network, marine advisories, and how to forecast weather.

"El Niño and Climate Prediction." ***Reports to the Nation: Our Changing Planet****, Spring 1994, No. 3. 24 pp. Free. Request from the University Center for Atmospheric Research, Office for Interdisciplinary Earth Studies, P.O. Box 3000, Boulder, CO 80307-3000; (303) 497-8665; fax: (303) 497-2699; e-mail: oies@ncar.ucar.edu.*

At times, the tropical Pacific Ocean and large expanses of the global atmosphere undergo changes that disrupt the normal patterns of life for countless species of plants and animals, along with millions of human beings. Scientists are seeking to understand these changes, particularly those in the Pacific region called "El Niño." This report describes the phenomenon; its impacts on the food web; its impacts on ocean winds; its global consequences; its prediction; the use of these predictions; and mitigation of its impacts on agriculture, forests, and other elements.

Floods

Automated Local Flood Warning Systems Handbook. *Weather Service Hydrology Handbook No. 2. 1997. 148 pp. Free. Copies can be requested from Larry Wenzel, W/OH2 Office of Hydrology, NOAA/ NWS, SSMC2, #8115, 1325 East-West Highway, Silver Spring, MD 20910; (301) 713-0666, ext. 147; e-mail: larry.wenzel@noaa.gov.*

This document explains local flood warning systems and the kinds of assistance available to implement such systems. It contains information on flood mitigation, determining the need for a local flood warning system, types of warning systems, implementing a flood warning system, standards for automated local flood warning systems, response planning, the National Flood Insurance Program Community Rating System, software, roles and activities of participants, as well as selected references and addresses. Appendix A contains sample memoranda of understanding, and Appendix B contains a manual of local flood forecast procedures.

Insurance

Flooding and Insurance. *1997. 79 pp. $15.00, plus shipping*
Topics: Annual Review of Natural Catastrophes 1996. *1997. 16 pp. Free, plus shipping.*
To obtain shipping charges and to order, contact Münchener Rück-versicherungs-Gesellschaft (Munich Re), Central Division: Re-insurance/Research and Development, Königinstraße 107, D-80791 Munich, Germany; tel: (0 89) 38 91-52 91; fax: (0 89) 38 91-56 96; WWW: http://www.munichre.com.

One of the world's largest reinsurance companies, Munich Re, recently released ***Flooding and Insurance***, a report that examines the impacts of flooding on world insurance markets. After first noting that the damage caused by flooding in recent decades has been "extremely severe," Munich Re examines the causes of various flood types, the observed upward trends in frequency and severity, and the related challenges for the insurance industry. Section 1 reviews the science and technology related to flood hazards, including classifications, causes, trends, climate change, loss potential, and storm surge. Section 2 discusses loss prevention and minimization, exposed and affected groups, public authorities, and the insurance industry. Section 3 examines the insurability of flood risk, including underwriting aspects of flood coverage in property insurance, rating, accumulation control, and reinsurance. The last section notes that floods represent a particular challenge to the individual insurer and discusses aspects of this problem.

Topics looks at the previous year's natural catastrophes and longer-term trends in natural disaster losses. The Geoscientific Research Group of Munich Re concluded that 1996 was a "normal" year for

catastrophic losses, with over $60 billion in losses globally (along with 12,000 fatalities), of which only $9 billion were insured. This document provides data on recent losses and trends in catastrophic losses worldwide, includes a "World Map of Natural Catastrophes 1996," discusses the increasing threat to the world's cities due to natural hazards, and examines the potential effects of global climate change on natural catastrophes.

"Energy Efficiency: No-Regrets Climate Change Insurance for the Insurance Industry." ***Research Review: Journal of the Society of Insurance Research****, Fall 1996.*
"Going Green Reduces Losses." ***Reinsurance,*** *March 1997.*
Free reprints can be requested from Joanne Lambert, Center for Building Science, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, MS 90-3058, University of California-Berkeley, Berkeley, CA 94720; (510) 486-4835; fax: (510) 486-5394; e-mail: jmlambert@lbl.gov; WWW: http://eande.lbl.gov/CBS/CBS.html.
These two articles, by Evan Mills of the Center for Building Science, examine the risks of increasing financial losses due to global climate change. "Energy Efficiency" suggests that insured losses from extreme weather events with potential links to climate change, such as windstorms, drought, and floods, have been steadily rising. A 20-fold increase in inflation-adjusted annual insured losses due to windstorm damage since the 1960s is a dramatic indicator of the growing threat to insurers. Thus, the insurance industry can either take a reactive approach to climate change by limiting or withdrawing coverage, or a proactive approach, by encouraging actions to reduce greenhouse gas emissions.

"Going Green" notes that energy consumption is the largest contributor to global climate change; therefore, promoting energy efficiency is a promising strategy for the insurance industry. Mills notes that many energy efficient technologies also have the potential to reduce ordinary losses, including demand-controlled ventilation, efficient windows, and energy-efficient building techniques.

Earthquakes

A Critical Review of Current Approaches to Earthquake Resistant Design. *ATC-34. 1997. 94 pp. $30.00. Order from the Applied Technology Council, 555 Twin Dolphin Drive, Suite 550, Redwood City, CA 94065; (650) 595-1542; fax: (650) 593-2320; e-mail: atc@atcouncil.org; WWW: http://www.atcouncil.org.*
This report documents the history of U.S. codes and standards of practice for earthquake resistant design, focusing primarily on the strengths and deficiencies of current codes. It then identifies goals that a new seismic code should achieve.

"Liquefaction Maps." ***ATC Techbrief*** *1. 1997. 12 pp. Free. To obtain, contact the Applied Technology Council, 555 Twin Dolphin Drive, Suite 550, Redwood City, CA 94065; (650) 595-1542; fax: (650) 593-2320; e-mail: atc@atcouncil.org. The complete text is available on-line: http://www.atcouncil.org.*
This is the first in a new series of short documents on subjects of interest to earthquake engineering professionals, summarizing research relevant to design practice. It inventories and describes the available regional liquefaction hazard maps in the U.S., as well as their applicability. The second

Techbrief, which will be available later this year, will address "Earthquake Aftershocks and Building Safety." Upcoming topics will cover both geotechnical and structural engineering issues.

National Seismic Safety Advisory Boards' Directory. *1996. 190 pp. $10.00. Purchase from the California Seismic Safety Commission, 1900 K Street, Suite 100, Sacramento, CA 95814; (916) 322-4917; fax: (916) 322-9476; e-mail: SSCbase@aol.com.*

Many states with seismic activity have developed seismic advisory boards and commissions, made up of representatives from state and local governments, private industry, banking, utilities, the health professions, and education, to provide advice to states about how to cope with earthquake hazards. This directory contains the proceedings of the first National Workshop for Seismic Advisory Boards and Commissions, held December 3-5, 1996, in Los Angeles. Breakout sessions addressed making advisory boards more effective, developing state and local seismic hazard maps, adopting and enforcing seismic building codes, establishing effective communication of earthquake risk, developing mitigation programs, assessing hazard and risk, understanding earthquake and all-hazards insurance, and developing legislation and policy. The directory also includes in-depth descriptions of and contact information for each board in the U.S.

Plio-Quaternary Faulting and Seismic Hazard in the Flagstaff Area, Northern Arizona. *Philip A. Pearthree, Kirk R. Vincent, Richard Brazier, and David Hendrikcs. Bulletin 200. 1996. 31 pp. Two maps, 18" x 22" and 41" x 47". $20.00, plus $4.50 shipping. Arizona residents, add 7% sales tax. Order from the Arizona Geological Survey, 416 West Congress Street, Suite 100, Tucson, AZ 85701; (520) 770-3500; fax: (520) 770-3505; WWW: http://www.azgs.state.az.us.*

Numerous small to moderate quakes have occurred in northern Arizona during the past century, and in 1993, a magnitude 5.4 quake struck an area between Flagstaff and the Grand Canyon. Geologic mapping around Flagstaff indicates that many faults have been active in the past several million years, strongly suggesting that larger quakes may rupture the ground surface in this region. In this report, the Arizona Geological Survey summarizes the geologic evidence for large prehistoric quakes and considers their implication for northern Arizona. It includes several probabilistic seismic hazard assessments for the region that estimate the potential level of shaking and therefore can be used used to develop design specifications for structures. The two maps plot the geologic area near the Bellemont Fault and Camp Navajo and the neotectonic characteristics of the Flagstaff area.

Electronic Publications

An International Collection of Wildland-Urban Interface Resource Materials. *1996. 3½" diskette, ASCII or ANSI format. Free. Request from Publications, Canadian Forest Service, Northern Forestry Centre, 5320-122 Street, Edmonton, Alberta, Canada T6M 3S5; (403) 987-7210; fax: (403) 435-7359; e-mail: publications@NOFC.forestry.ca.*

We mentioned the printed version of this extensive bibliographic listing of approximately 2,200 wildfire resources in the July 1996 ***Observer*** (Vol. XX, No. 6, p. 23). This diskette contains the same information compiled by the International Association of Wildland Fire and the Canadian Forest Service, Northwest Forestry Centre. Most items were produced prior to 1993 and pertain to the U.S., Australia, and Canada.

Listed alphabetically by author, they provide information on a wide spectrum of topics, including building materials to mitigate the fire hazard in the wildland-urban interface, hazard reduction techniques, disaster management, and political and social issues. Citations are also indexed by subject in three categories: general and technical materials, newspaper articles, and public education materials.

***Geologic Hazard Photos (1997 Release)**. CD-ROM. $195.00, commercial; $145.00, nonprofit.*
***Geologic Hazard Photos (1997 Update to 1994 Release).** CD-ROM. $120.00, commercial; $90.00, nonprofit.*
Both items can be purchased from the National Geophysical Data Center, 325 Broadway, E/GC4, Department 993, Boulder, CO 80303-3328; (303) 497-6826; fax: (303) 497-6513; e-mail: info@ngdc.noaa.gov; WWW: http://www.ngdc.noaa.gov.
The first CD-ROM contains photographs from both private and government sources of damage caused by natural hazards, including earthquakes, volcanoes, landslides, tsunamis, and other geologic hazards. NGDC converted the photographs to digital images in both TIFF and GIF format. The second item is an update of the 1994 edition and also contains files in TIFF and GIF format.

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, National Oceanic and Atmospheric Administration, U.S. Geological Survey, U.S. Army Corps of Engineers, U.S. Forest Service, Environmental Protection Agency, U.S. Department of Transportation, National Aeronautics and Space Administration, and the Institute for Business and Home Safety.

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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:

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