Natural Hazards Observer

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Designing Disasters: Determining Our Future Vulnerability

--an invited comment

A New Paradigm

The Second U.S. Assessment of Research and Applications for Natural Hazards, a multi-disciplinary effort to evaluate and summarize knowledge about natural and technological hazards and disasters from the perspectives of physical, natural, social, behavioral, and engineering sciences, is nearing completion. It is being conducted by staff of the Natural Hazards Center and scores of volunteer hazards researchers and managers. Since 1994, over 100 nationally and internationally recognized experts have worked and debated together to evaluate our nation's relationship to past, present, and future hazards.

It is clear to most involved in this effort that natural and related technological disasters are not problems that can be solved in isolation, but symptoms of more basic problems created culturally and based on the ways we view the natural world. We have concluded that it is time for a change in the prevailing thinking about how to cope with these hazards.

How we prepare for disasters today will greatly affect the sustainability of our cities in the future. With every passing year, we are laying the groundwork for increasingly catastrophic natural and technological disasters. We need a new paradigm of hazard reduction--sustainable hazard mitigation--that embraces the notion of adjusting to the environment, incorporates a global systems perspective, embodies the concept of sustainability, and derives its moral authority from local consensus. In short, the new paradigm must go beyond simply reducing losses to building sustainable local communities throughout the U.S.

Under this new paradigm, actions to reduce losses would only be taken when they are consistent with five principles of sustainability: environmental quality, quality of life, disaster resiliency, economic vitality, and inter- and intra-generational equity. This paradigm cuts across all areas of research and hazard reduction.

Sustainable Hazard Reduction

To accomplish these goals, we recommend new approaches in several areas:

- **Sustainable Culture:** We must acknowledge that we are never fully in control of nature and that humans are the cause of disaster losses. We must acknowledge that how and where we build determines the losses we suffer. Developing consensus among divergent stakeholders is the first step, and we propose "sustainable hazard mitigation networks" to undertake collaborative problem-solving within appropriate geographical areas, such as metropolitan areas or watersheds. Prototype network projects should be initiated to move us toward more sustainable hazard mitigation.
- **Events, Losses, and Costs:** To understand future disaster vulnerability, we must understand where we have been. We conservatively estimate that, in the U.S. between January 1, 1975, and December 31, 1994, natural hazards have killed over 24,000 people (about 23 per week) and injured about 100,000 (about 385 per month). We also estimate that the U.S. sustained about $500 billion in damage during this period, or about one-half billion dollars a week. Of these losses, more than 80% were weather-related, and about 10% were caused by earthquakes and volcanoes. Yet, only 17% of losses were insured.

  Despite these significant, ongoing losses, there is no systematic reporting method for loss data and no single repository for this information. We need to develop a method that will enable researchers, particularly those in the social sciences, to archive their data in a central repository. We also need to develop standardized measures that can be used across studies and disciplines.

- **The Interactive Structure of Risk:** We need to assess--immediately--the interaction among all the facets of the natural world, our population, and our constructed environment to understand better how they shape risk, losses, and their distribution. For example, many scientists believe that global warming will have an adverse effect on the earth's ecosystems, yet, we have very little understanding of the types of climate variability it will cause.
- **Putting Knowledge into Practice:** The first Assessment of Research on Natural Hazards, conducted in 1975, emphasized the need for applying hazards-related social science research to disaster prevention and recovery. Since then, many changes have occurred in the way we approach hazards in this country, particularly with the new federal emphasis on mitigation and the emergence of an interdisciplinary "hazards community" of researchers and practitioners. However, contrary to the first assessment's recommendations, little attention has been given to studying ways to enhance the adoption of sound land-use schemes, measuring their social effectiveness, understanding why people and organizations make different choices about adjustments, assessing the effectiveness and equity of relief distribution, and evaluating building code enforcement.
- **Land-Use Management:** By planning for and managing land use to accomplish social, ecological, and economic sustainability, communities can also reduce disasters. This can be accomplished through comprehensive land-use plans and supportive federal and state policies.
- **Engineering Codes, Standards, Practices, and Control and Protection Works:** Any

engineering code is only as good as its enforcement; therefore, the issue of building and systems performance in a disaster is not purely a technical one. Until recently, engineers relied on safety factors or made assumptions about uncertainties when estimating how a system would perform. New methods have brought these uncertainties to the forefront of the planning process. For example, the U.S. Army Corps of Engineers is developing methods and procedures to incorporate risk analysis into their evaluations of proposed flood mitigation measures.

- **Prediction, Forecast, Warning, and Planning:** As in the past, our ability to provide timely public warnings must continue to improve in order to reduce the number of injuries and deaths due to disasters. We must continue to improve our distribution of warnings, and, at the same time, develop a comprehensive national warning strategy that uses efficient and affordable technology. Otherwise, the gap will only increase between state-of-the-art technology and practice.
- **Disaster Response and Preparedness**: Since the 1975 assessment, a large body of research has been carried out on disaster response and preparedness. We have a much clearer picture of household preparedness, the importance of socioeconomic factors, and the way that information about risk and preparedness can foster appropriate behavior, but our knowledge is far from complete. We need to learn more about why disaster preparedness has little support and determine ways in which disaster preparedness can serve as a foundation for sustainable development.
- **Recovery and Reconstruction:** Over the last 20 years, there has been a shift in conceptualizing disaster recovery, moving from thinking of recovery as a linear process that follows specific steps to viewing it as a process of interaction and decision making among groups and institutions. We believe that sustainability may be the concept that provides the crucial link between disaster recovery and mitigation. In particular, planning for recovery has been given minimal attention in the U.S., although in comparison, considerable resources have been devoted to emergency preparedness and response.
- **Insurance:** Although insurance is never an acceptable alternative to loss prevention, it can be an important part of a hazards management program, particularly if it is used to encourage and enforce cost-effective loss-reduction measures. We suggest a three-faceted approach to its use: improve current estimates of catastrophic risk, use inspections and certifications to verify damage-resistance of buildings, and determine additional ways of raising capital to cover catastrophic losses.
- **Economics:** We need better data to estimate losses due to natural hazards and disasters. In the past, insurance industry loss data has not been shared with researchers. In addition, we need to understand better how individuals respond to risk and uncertainty through economic means, propose public policies that have appropriate economic incentives, and analyze the effectiveness of public policies by looking at their true economic consequences.
- **Adoption and Implementation:** To date, several strategies have dominated the adoption of hazards adjustments, including technological fixes, risk communication, incentives, and sanctions. Reduction of future catastrophic losses will require significantly more sophisticated forms of these and other approaches.

Looking Toward the Future

Finally, we ask the nation to acknowledge that we will never be totally safe from disasters. We ask that those who are charged with making national and local decisions acknowledge that they are designing the disasters that future generations will experience. And we seek to begin a nationwide conversation that will lead to actions that link hazard mitigation and disaster response to the broader goals of sustainability.

Dennis Mileti, Second U.S. Assessment of Research and Applications for Natural Hazards

Designing Future Disasters will be available in the near future and will be announced in an upcoming issue of the ***Natural Hazards Observer***.

Hazards Center Library Now On-Line

Since the Natural Hazards Research and Applications Information Center was established over 20 years ago, the backbone of its information service has been its library, which has grown to become one of the most extensive collections of documents on human adaptation to natural hazards in the world. In the past, persons wanting to consult that repository of disaster knowledge had to contact the center's librarian and request a search of the library catalog.

Now, anyone can conduct such searches via the Internet.

Christened "HazLit," the library Internet database, including many fully annotated entries, is available through the World Wide Web at:

http://www.colorado.edu/hazards/litbase/litindex.htm

At that Web location, users will find an overall description of library services, a brief summary of how to search HazLit (recommended reading for first-time visitors), a list of suggested keywords to use when searching the database, and, most importantly, the search mechanism that allows the user to query HazLit based on concepts or keywords.

HazLit is intended to make the Hazards Center library readily accessible to the world beyond Boulder, Colorado. At the same time, the Hazards Center staff recognize that computer technology cannot yet replace the knowledge or skill of the people who have managed the center library for years. Hence, for a fee, we still offer customized extensive searches of the library by a human being, and information about that service is available from the Web address above.

The Natural Hazards Center hopes this new service will help both the hazards research and practitioner

communities in their work. We welcome comments regarding HazLit and the Internet access we are providing. Comments should be directed to *Mary Fran Myers, Natural Hazards Research and Applications Information Center, IBS #6, Campus Box 482, University of Colorado, Boulder, CO 80309-0482, (303) 492-2150; fax: (303) 492-2151; e-mail: myersmf@colorado.edu*.

A Flood of Stuff on Floods and Other Things

Our Newest Monograph

How They Dealt With Floods in Georgia

On July 3, 1994, Tropical Storm Alberto struck the Florida panhandle and proceeded northeast before stalling just south of Atlanta, Georgia. As the storm lingered and then slowly retraced its steps to the southwest over the next six days, it dumped more than 20 inches of rain over large parts of the Flint River Basin in southwest Georgia, flooding the cities of Montezuma, Albany, Newton, and Bainbridge, and inflicting over $1 billion in damage. This devastation notwithstanding, the flood provided an opportunity to identify and document the successes and failures of state and local floodplain management programs and activities.

An Assessment of Floodplain Management in Georgia's Flint River Basin, by Elliott Mittler (Monograph #59, 1997, 190 pp.), documents such a study. Mittler assessed the impact of federal, state, and local floodplain management activities on losses in the Flint River Basin, paying special attention to the impact of the National Flood Insurance Program (NFIP) and local floodplain management efforts. In this monograph, he looks at previous studies; evaluates the political situation affecting flood recovery in each community; examines federal, state, and local responses to the disaster, concentrating on recovery plans and the use of hazard mitigation programs to reduce future flood losses; analyzes the effectiveness of the NFIP; and offers a series of findings and recommendations based on the relatively successful recovery programs he found.

In his foreword to this book, flood expert Gilbert White says, "This is the first thorough effort to assess in one area the effects of current local, state, and federal policies on the use of floodplains in the United States. Although focused on one river basin, it illustrates the problems that should be addressed for the nation as a whole . . . It thoughtfully raises a series of questions to which sound answers must be found if wise use is to be achieved in the long run. . . . If the nation is to be well served in managing floodplains, this should be seen as a basic step toward genuine assessment."

An Assessment of Floodplain Management in Georgia's Flint River Basin costs $20.00, plus shipping charges (consult the chart on the facing page). It can be ordered from 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.

Our Newest Special Publication

Have We Learned Anything Since the Big Thompson Flood?

On July 31, 1976, the Big Thompson Canyon, northwest of Denver, Colorado, was ravaged by a flash flood, causing the worst natural disaster in Colorado history. At least 139 people died, 88 were injured, and seven people were never found. The flood destroyed 316 homes, 45 mobile homes, and 52 businesses, and damaged numerous other structures.

More than 20 years after the flood, vulnerability to this type of disaster remains--flash flood deaths have not declined, and the public continues to underestimate the power of flowing water. Moreover, debris flows, mudslides, and alluvial fan flooding in canyon areas in the Western United States are causing greater damage as more people move to the West. And, experts still have not devised an effective way to get motorists to abandon their cars and climb uphill to safety during flash floods in steep mountain canyons.

The Natural Hazards Center's newest Special Publication, ***Twenty Years Later: What We Have Learned Since the Big Thompson Flood***, edited by Eve Gruntfest (SP #33, 1997, 230 pp., $20.00), contains papers from a meeting held in Colorado on the anniversary of the flood to examine subsequent advances in our knowledge about and ability to prevent such disasters. The volume includes sections on federal perspectives, dam safety, human dimensions of disaster, meteorological capabilities and climatological issues, warning systems, international experiences, and paleo-hydrological methods.

Copies can be purchased from the *Publications Clerk* at the address above.

Our Newest Working Paper

The Taking Issue and Hazardous Areas

Geographically specific natural disasters such as floods, hurricanes, and earthquakes inflict tens of billions of dollars in public and private costs upon the United States annually, and the level of damage in particular disasters is often related to the location and design of structures in areas of known risk. Governmental regulations such as floodplain zoning and coastal setbacks may be imposed under police powers to restrain unsafe building practices. State courts have generally upheld such measures against takings challenges, that is, claims based on the Fifth Amendment to the Constitution, which prohibits government from taking private property without compensation. However, one of the more perplexing

recent legal developments--at least for hazards managers--has been the apparent tendency of courts to restrict the ability of governments to regulate development in hazardous areas.

The Hazards Center's latest working paper, ***The Taking Issue and the Regulation of Hazardous Areas***, by Rutherford H. Platt and Alexandra D. Dawson, examines these issues in depth. The authors note that since 1992 an invigorated property rights movement has achieved two favorable decisions in the U.S. Supreme Court: *Lucas v. South Carolina Coastal Council* and *Dolan v. City of Tigard*, each involving hazard area regulations. However, they maintain that, while these decisions imposed a higher burden of justification upon public regulators, they did not undermine the longstanding presumption that government may enact reasonable limits on private land to mitigate natural disaster risks without compensation to the owner.

The Taking Issue and the Regulation of Hazardous Areas, Natural Hazards Working Paper #95, is available free on the World Wide Web:

http://www.colorado.edu/hazards/wp/wp95.html

Individuals without access to the World Wide Web, can order a printed copy of the working paper for $9.00, plus shipping and handling. To determine total cost, contact the *Publications Clerk* at the address above.

Shipping Charges						
	Domestic		Canada and Mexico		International	
Number of Pages	Printed Matter	First Class	Surface Printed Matter	Air Printed Matter	Surface Printed Matter	Air Printed Matter
0 - 35	$3.00	$3.00	$3.00	$3.00	$4.00	$5.00
36 - 80	$3.50	$4.00	$3.50	$4.50	$5.00	$6.00
81 - 450	$4.00	$5.00	$5.00	$6.00	$6.00	Call for price

The Natural Hazards Center's Quick Response Program

The Natural Hazards Center is soliciting proposals for its 1998 Quick Response (QR) program, which enables social scientists to collect perishable data immediately after a disaster. If you would like to study

a disaster before the last of the debris is swept up, submit a brief proposal describing the research question you would like to pursue in *anticipation* of an event. If your proposal is approved, you will then be eligible to receive funding to carry out your investigation, should an appropriate disaster occur in the next 12 months. Grants average between $1,000 and $3,000 and essentially cover travel only. In return, grantees must submit reports of their findings, which are published by the Natural Hazards Center both electronically and in hard copy.

Researchers who wish to submit proposals for Quick Response Research Grants should request a QR solicitation letter from *Mary Fran Myers, Co-Director, Natural Hazards Center, Campus Box 482, University of Colorado, Boulder, CO 80309-0482; (303) 492-2150; fax: (303) 492-2151; e-mail: myersmf@colorado.edu*. The deadline for proposal submission is October 15, 1997.

In the meantime, to obtain a list of Quick Response reports and other Natural Hazards Center publications, send $3.00 to the *Publications Clerk* at the address on the previous page. This list, as well as full text copies of recent QR reports, are available at no charge from the center's home page on the World Wide Web: *http://www.colorado.edu/hazards*.

The 1997 Annual Hazards Research and Applications Workshop

In July, hazards professionals from around the world gathered in Denver, Colorado, for the 22nd Annual Hazards Research and Applications Workshop. There was plenty of debate and discussion during the four days of the workshop, as federal, state, and local government officials, nonprofit organization and private industry representatives, and others who work to alleviate the suffering and loss caused by natural disasters talked, listened, and learned from one another.

To ensure that the ideas and information generated at the workshop are not limited to the participants only, the Natural Hazards Center publishes brief summaries of each session, abstracts of the hazards research presented, and descriptions of the programs and projects discussed at the meeting. A set of all workshop materials, including the agenda and participant list, costs $20.00, plus $5.00 shipping. (For orders beyond North America, contact the Publications Clerk at the address below for shipping charges.) Currently, the list of all session summary and abstract titles is available on our Web site: *http://www.colorado.edu/hazards/ss/ss.html*. In November, the complete text of all session summaries will also be available on our Web page, although the abstracts of hazards research, programs, and projects will not.

To order these materials, send your payment (checks should be payable to the University of Colorado) to the *Publications Clerk, Natural Hazards Research and Applications Information Center, Campus Box 482, University of Colorado, Boulder, CO 80309-0482; (303) 492-6819; fax: (303) 492-2151; e-mail: jclark@spot.colorado.edu*. Visa, Mastercard, American Express, and Diner's Club cards are also accepted.

Late-Breaking Information Sources

In June 1997, the ***Natural Hazards Observer*** published a special issue that contained a list of information sources on hazards and disasters. Below are recent corrections and additions to that list. To obtain a printed copy of the original Information Sources edition of the ***Observer***, send $2.00, plus $3.00 for shipping, to the *Publications Clerk, Natural Hazards Research and Applications Information Center, Campus Box 482, University of Colorado, Boulder, CO 80309-0482; (303) 492-6819; fax: (303) 492-2151; e-mail: jclark@spot.colorado.edu.* Readers can also access the list electronically via our World Wide Web site: *http://www.colorado.edu/hazards*.

Additions

TSUNAMI PROJECT, PACIFIC MARINE ENVIRONMENTAL LABORATORY, AND TSUNAMI HAZARD MITIGATION FEDERAL/STATE STEERING GROUP
National Oceanic and Atmospheric Administration (NOAA), 7600 Sand Point Way N.E., Seattle, WA 98115-0070. *Eddie N. Bernard, Director; (206) 526-6800; fax: (206) 526-6815; WWW: http://www.pmel.noaa.gov/tsunami and http://www.pmel.noaa.gov/tsunami-hazard.*

RISK RESEARCH GROUP/CENTRE FOR ENVIRONMENTAL STRATEGY
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Department of Geological Sciences, University College London, Gower Street, London WC1E 6BT, U. K. *Bill McGuire, Director; tel: +44 (171) 419 3449; fax: +44 (171) 388-7614; e-mail: ucfbkwg@ucl.ac.uk.*

UNIVERSITY OF CALIFORNIA-LOS ANGELES, CENTER FOR PUBLIC HEALTH AND DISASTER RELIEF
School of Public Health, P.O. Box 951772, Los Angeles, CA 90095-1772. *Steven J. Rottman, Director; Loc H. Nguyen, Program Coordinator; (310) 794-6646; fax: (310) 794-1805; e-mail: locn@ucla.edu.*

Updated Information

REGIONAL DISASTER INFORMATION CENTER
Apartado 3745-1000, San José, Costa Rica. *Tel: (506) 296-3952; fax: (506) 231-5973; e-mail: crid@netsalud.sa.cr; WWW: http://ns.netsalud.sa.cr/crid.*

ASSOCIATION OF ENGINEERING GEOLOGISTS
323 Boston Post Road, Suite 2D, Sudbury, MA 01775. *Norman R. Tilford, Executive Director; (508) 443-4639; fax: (508) 443-2948; e-mail: aeghq@aol.com.*

No Longer in Operation

URBAN HAZARD PROJECT/HAZARD AND RISK MANAGEMENT STUDIES
London School of Economics and Political Science

Washington Update

FEMA's Exemplary Practices II: The Sequel

Taking a cue from Hollywood, the Federal Emergency Management Agency (FEMA) has recently published its followup collection of outstanding emergency management practices. In its recently released Volume II of ***Partnerships in Preparedness: A Compendium of Exemplary Practices in Emergency Management*** (1997, 74 pp., free), FEMA describes nine superior emergency management practices and 29 commendable practices.

The nine superior programs include the Los Angeles City Fire Explorer Program, the California Standardized Emergency Management System, a volunteer wildfire mitigation effort called Neighbors for Defensible Space, an Emergency Responders Appreciation Day, a Chronology of Historic Disasters in Tennessee, the Special Needs Awareness Program (SNAP), the National Coordinating Council on Emergency Management's program to certify professional emergency managers, a police-fire incident management course, and a high school earthquake preparedness program.

Commendable practices cover a broad range of emergency management efforts, including business emergency preparedness, earthquake preparedness and debris collection, information dissemination, small city disaster preparedness, interagency agreements, floodplain management, animal management in disasters, and citizen involvement in preparedness and mitigation.

The compendium is indexed according to program title, subject, location, and contact information. Copies can be obtained from the *FEMA Publications Distribution Center, 8231 Stayton Drive, Jessup, MD 20794; (800) 480-2520 or (202) 646-3484; fax: (301) 497-6378;* or via the World Wide Web: *http://www.fema.gov/old97/publicat.html*.

FEMA and NEMA Develop CAR

Recognizing the need for cooperation across jurisdictional boundaries in many disaster situations, the Federal Emergency Management Agency (FEMA) and the National Emergency Management Association (NEMA) recently announced a joint effort to develop a system for emergency managers and FEMA regional offices to assess their level of preparedness for responding to emergencies.

The Capability Assessment for Readiness (CAR) evaluates the ability of federal and state emergency management agencies to respond to disasters--particularly in partnership with one another. CAR focuses on 13 core elements that can enhance or inhibit major emergency management functions: laws and authorities; hazard identification and risk assessment; hazard management; resource management; planning; direction, control, and coordination; communications and warnings; operations and procedures; logistics and facilities; training; exercises; public education and information; and finance and administration. Using CAR, each state and territory will conduct a comprehensive self assessment and use the results to improve state and FEMA joint strategic planning.

For further information on this effort, contact the *Preparedness, Training, and Exercises Directorate, FEMA, 500 C Street, S.W., Washington, DC 20472; (202) 646-3487; fax: (202) 646-4557; e-mail: eipa@fema.gov; WWW: http://www.fema.gov/pte/car.htm.*

To obtain a free copy of the recent publication ***User's Guide for the Capability Assessment for Readiness (CAR)*** (1997, 31 pp.), contact *FEMA, Preparedness, Training, and Exercises Directorate, State and Local Preparedness Division, attn: CAR Team, 500 C Street, S.W., Washington, DC 20472; (202) 646-3080; e-mail: car.team@fema.gov.*

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On The Line

Meeting the Promise of Flood Forecasting

Introduction

Decision makers in the private sector and at all levels of government rely on flood forecasts to decide how to respond to the threat of flooding. The U.S. is currently spending more than $4 billion to "modernize" its National Weather Service (NWS), including improvements to its river and flood program (Fread et al., 1995). Such improvements carry with them a promise to "greatly improve the capability of water facility and emergency managers to take . . . effective actions that will significantly mitigate the impact of major floods." (Braatz et al., 1997). At the same time, our country has experienced considerable economic and other losses; during the 1990s, flood-related damage has averaged almost $5 billion a year.

"Improved" flood forecasts are themselves insufficient to reduce flood losses. As Gilbert White noted in 1939, "a forecast is of no value unless those who receive it are prepared to act promptly and efficiently." Further, a forecast that is "inadequate," meaning either mistaken, misleading, or misused, "may cause more loss than if there had been no forecast at all." Thus, improved flood forecasting requires success on two fronts: the *technical aspects*, where information is generated, and the *choices* that are made by those who use this information.

The Red River of the North

Mounting evidence suggests that many decision makers inadequately use existing flood forecast products. Consider the case of recent flooding in the Red River of the North Basin in the spring of 1997. In April, the river, which flows north along the North Dakota-Minnesota border, experienced extreme flooding (see the ***Observer***, Vol. XXI, No. 6, p. 1). Damage is estimated at $1-2 billion, with most occurring in Grand Forks, North Dakota, and East Grand Forks, Minnesota. Considerable attention has been focused on flood stage outlooks and forecasts and their role in decisions leading up to the flooding.

The North Central River Forecast Center issues two types of forecast products for this basin. A numerical *outlook* is issued one to two months prior to the expected peak flooding, typically in early-March. Such a long lead time is possible largely because most large-scale floods in the basin are the result of snowmelt, not rainfall. Operational *forecasts* are issued periodically in the weeks prior to and following peak flooding and are the product of a hydrologic modeling system.

When the flood outlooks are issued, two numbers are presented for the expected river stage for each forecast location. One is based on a scenario of average temperature and no subsequent precipitation, the

other on average temperature and average precipitation (i.e., "normal" climate). For East Grand Forks, the outlooks issued in mid-February 1997 were for 47.5 and 49 feet.

In interviews conducted in May 1997 with various decision makers in the flooded region, it was clear that different people interpreted the flood stage outlooks in different ways. Some viewed the two numbers as a range, i.e., that the maximum flood stage would be between 47.5 and 49 feet. Others viewed the higher number as a maximum; for example, on April 8, 1997, the ***Grand Forks Herald*** reported that NWS "experts are still forecasting a maximum 49-foot crest at East Grand Forks." Others viewed the flood outlook as exact, i.e., "the crest will be 49 feet." Still others viewed it as somewhat uncertain; believing it could vary one to six feet above or below the outlook level.

Which perception might have been correct is not known because NWS flood outlooks do not include any quantitative information regarding uncertainty. A qualita-tive disclaimer is included with the outlook that warns of uncertainty. Looking back at East Grand Forks crest data, the actual crest equaled or exceeded the "normal" level outlook in six of the 12 years outlooks were issued, and, at East Grand Forks, in four of 12 years the "normal" crest outlook was off by more than 10% of the outlook value.

When decision makers ascribe uncertainty to the forecasts, this can potentially introduce a number of pathologies to the decision process, including: misplaced responsibility for flood fight decision making, misunderstandings of the uncertainty associated with forecasts, potential over-confidence in forecasts, inability of the forecasting community to develop appropriate justifications for improvements to (or maintenance of) forecast products, and obstacles to effective preparation for and response to the flood event. Final determination of the extent to which these occurred in, or resulted from, the flooding in the Red River of the North Basin in 1997 awaits further study. Nevertheless, the way decision makers in the region interpreted the flood outlooks affected the actions they took in preparing for the flood.

Little attention has been paid to the manner in which flood forecasts are interpreted by decision makers, and subsequently, how this information is incorporated into decisions. In short, the use and value of *existing* flood forecast products is not well understood, much less the potential increased usefulness and value that might be attained through "improving" the products and manner in which they are delivered. Other recent experience suggests that this circumstance may be fairly common beyond the Red River of the North Basin (see Changnon, 1996).

Effective use of flood forecasts cannot be attained by simply providing "more information," such as confidence intervals or exceedance probabilities. If decision makers have difficulty using existing products, these difficulties will not go away simply by providing more or "better" information. More attention must be paid to *how* forecasts are issued, *who* actually receives *what* information, and with what *effect*. Several recent studies suggest that as the amount of information available for decision increases, the judgment process may actually become less reliable, especially in contexts of high uncertainty such as flood forecasting. As a result, decision making skill can *decrease* as the amount of information increases (see Stewart et al., 1992).

The Advanced Hydrological Prediction System (AHPS), initially being implemented by the NWS in the Des Moines River Basin, provides an opportunity to learn more about how decision makers perceive and use flood forecast information. Decision makers in the basin were sent a questionnaire about their information needs. The results of this first AHPS implementation need to be closely evaluated regarding use of information. If successful, the AHPS may provide a model that can be used in other basins.

Conclusion

We find ourselves at a fork in the road. In the past, it has been enough to focus on developing and refining technical capabilities, because most decision makers had little or no reliable information about flood forecasts at their disposal. Today, we may have reached a point where our capability to produce sophisticated flood forecasts has outstripped our ability to use those forecasts effectively. As we move forward, we must decide whether to continue to focus scarce resources solely on improving our technical capabilities or to apply some resources to better understand--and ultimately better use--the sophisticated information that is now (or soon will be) available. Meeting the promise of flood forecasting lies in the balance.

Roger Pielke, Jr., Environmental and Societal Impacts Group, National Center for Atmospheric Research

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UND Researchers to Aid Community and Examine Effects of Red River Floods

The purpose of the Community Redevelopment and Research Network, University of North Dakota (UND), is to provide a focus point for community redevelopment and research efforts in the Grand Forks region following the severe Red River floods that occurred this spring (see the ***Observer***, Vol. XXI, No. 6, p. 1). The hallmark of the network's approach, as exemplified in the on-going Grand Forks Business Emergency Census, is to combine the strengths of traditional university-based research with outreach and intervention to address social problems and community needs following the disaster. Network members will use the expertise and resources of the university to aid the community and in the process develop research and learning opportunities for faculty and students.

The network is seeking working relationships and partnerships with organizations and groups in and out of the Red River Valley to generate resources and identify research needed to address social problems arising both from the disaster and from the economics of recovery.

If you or your organization would like to explore partnership or collaboration with this group, or if you would like to learn more about the Community Redevelopment and Research Network, contact *Clifford L. Staples, Department of Sociology, University of North Dakota, Grand Forks, ND 58202; (701) 777-4417; fax: (701) 777-2468; e-mail: staples@badlands.nodak.edu*.

Water and Disasters . . .

IDNDR Plans New Internet Conference for 1997 World Disaster Reduction Campaign

The United Nations International Decade for Natural Disaster Reduction (IDNDR) Secretariat invites all interested persons to join its 1997 Internet Conference on "The Socio-Economic Impact of Water-Related Disasters." The conference is part of the 1997 World Disaster Reduction Campaign: "Water: Too Much . . . Too Little . . . Leading Cause of Natural Disasters" (see the ***Observer***, Vol. XXI, No. 6, p. 8).

What is the Conference About?

The conference will focus on floods and drought and will feature reports that outline the impact of water-related disasters on specific locations around the world. From there, participants will work toward building a culture of prevention, focusing on recent actions that have been successful in mitigating disaster impacts.

The conference will take place from mid-September to mid-October 1997 on the Internet using electronic mail and the World Wide Web.

Who Can Participate?

The 1997 IDNDR Internet conference is for anyone concerned about water-related disasters. Persons interested in participating are invited to provide brief (one- to three-page) reports on floods and drought, based on their organizational and geographic perspective. Other individuals can comment or introduce new cases during the debate.

Key policy-making institutions and eminent specialists will contribute. Thus the conference will help to link people and organizations with similar concerns, since it will bring together professionals from local, national, regional, and international bodies in developed and developing countries--all with different perspectives on water-related disasters. It will also allow participants to post announcements regarding related events, projects, or initiatives and thereby stimulate bilateral networking among conference participants.

Conference participation is free. Most presentations will be in English, with some in Spanish.

How Can You Participate?

To participate in this conference, send an e-mail message to: *listserv@thecity.sfsu.edu*, and in your message write, "subscribe risk [your first name] [your last name]." You will then receive information about the conference and a registration form. You can also register via the conference Web site: *http://www.quipu.net/*.

For More Information

The conference is jointly organized by the IDNDR Secretariat, part of the United Nations Department of Humanitarian Affairs, and by Quipunet, a nonprofit organization whose aim is to promote education via the Internet. For more information, contact the *IDNDR Secretariat, United Nations, Palais des Nations, CH-1211 Geneva 10, Switzerland; tel: (41-22) 798 6894; fax: (41-22) 733 8695; e-mail: idndr@dha.unicc.org*. Persons in Latin America and the Caribbean should contact the *IDNDR Regional Office, P.O. Box 3745-1000, San José, Costa Rica; tel: (506) 257 2139; fax: (506) 257 2139; e-mail: hmolin@undpcos.nu.or.cr*.

Insurance Industry to Work with UNEP on Environmental Disaster Issues

Over 60 leading international insurers from 23 countries have joined together to form the UNEP (United Nations Environment Programme) Insurance Industry Initiative. The group will address risks caused by environmental change. The organization is concerned because:

- natural disasters represent 85% of all insured losses;
- disaster losses have increased dramatically in the last decade; and
- the International Panel on Climate Change (IPCC) has concluded that mean global temperature is likely to rise significantly by the end of the next century, potentially increasing the risk of extreme events and thus posing severe financial risks for the insurance industry.

The UNEP initiative gives the industry its own voice on climate change and other important global environmental issues, and insurance companies of all kinds (life, health, property, etc.) are invited to participate. For more information, contact *UNEP, Environment, Trade, and Investment Unit, Geneva Executive Center, C.P. 356, CH-1219 Geneva, Switzerland; fax: (41-22) 796-9240.*

[Adapted from the ***Network Newsletter*** - a publication of the Environmental and Societal Impacts Group, National Center for Atmospheric Research]

International Hurricane Center Offers Certificate Program and Courses in Hazards Management

The International Hurricane Center, Florida International University, now offers an Emergency Management and Hazard Mitigation Certificate Program--continuing education to meet the needs and interests of all professionals who could benefit from the flexible format and extended schedule of this program.

The first seminar of the program series, "Our Communities and Hazards," was offered in May. Upcoming seminars include (dates tentative):

- Principles of Emergency Management: September 19-20, 1997
- Principles of Hazard Mitigation: November 14-15, 1997
- The Practice of Hazard Mitigation: January 16-17, 1998
- Technology in Emergency Management and Hazard Mitigation: March 15-16, 1998
- The Sociology of Disasters; Laws and Regulations in Disasters: May 15-16, 1998

In addition, a new graduate-level course "Vulnerability Analysis" is being offered this fall through the Department of Construction Management at Florida International University. This course will complement "Topics in Hazard Mitigation," which was introduced in 1995 and which is also being taught this fall. Both of these courses are offered to students pursuing a Master's degree in Construction

Management, and both are offered by videotape through the FEEDS (Florida Engineering Education Delivery System) program to locations anywhere in the U.S.

For details about the International Hurricane Center's education programs, contact *Ricardo A. Alvarez, International Hurricane Center, Florida International University, University Park Campus, Miami, FL 33199; (305) 438-1607; fax: (305) 348-1605; e-mail: ricardoalfonso@msn.com; or, malvar04@solif.fiu.edu; WWW: http://www.fiu.edu/~hurrican/*. Persons interested in the videotape program should contact *Mercy Rueda; (305) 348-2801*.

SNDR Publishes National Plan for Disaster Reduction

In December 1996, the Subcommittee on Natural Disaster Reduction (see the article above), published ***Natural Disaster Reduction: A Plan for the Nation***, a document that proposes an interagency approach for the coordination and adva ncement of programs, strategies, and research to reduce the social, environmental, and economic costs of natural hazards. The plan focuses on resilience, rather than resistance, to natural hazards through the creation of anticipatory practices with regard to risk assessment, mitigation, and warning.

Natural Disaster Reduction summarizes existing federal research programs dealing with hazards and identifies promising approaches that federal agencies might undertake to reduce disasters' toll. It calls for three major policy shifts in the nation's approach to disasters: 1) anticipating and assessing risk; 2) focusing on comprehensive mitigation that builds resilience; and 3) implementing warning and dissemination systems that permit resilience. To support these goals, the plan identifies four areas of needed research: 1) better understanding of the character of the hazards themselves; 2) improved risk assessment; 3) holistic understanding of the socioeconomic factors driving societal vulnerability and the full range of strategies available to improve mitigation; and 4) improved use of new information technologies to disseminate warnings and provide information on disaster reduction. Finally, in coordination with existing programs, such as the National Mitigation Strategy, the National Earthquake Hazards Reduction Program, and the modernization of the National Weather Service, the plan calls for new efforts, including a National Risk Assessment and an Integrated Natural Disaster Mitigation Information Network.

Natural Disaster Reduction is now available via the World Wide Web at *http://www.usgs.gov/sndr/report*. Individual copes of this 50-page report are also available from *William Hooke, National Weather Research Program, National Oceanic and Atmospheric Administration, SSMCIII, Room 11360, 1315 East-West Highway, Silver Spring, MD 20910; (301) 713-0460, ext. 218; fax: (301) 713-0666; e-mail: bhooke@rdc.noaa.gov*.

Presenting PPP 2000

Public Private Partnership 2000 (PPP 2000) is a cooperative endeavor of the federal agencies comprising the Subcommittee on Natural Disaster Reduction (SNDR--a subcommittee of the Committee on Environment and Natural Resources of the president's National Science and Technology Council), the Institute for Business and Home Safety (IBHS--formerly, the Insurance Institute for Property Loss Reduction), and other private-sector organizations. The partnership is committed to reducing deaths, injuries, property damage, economic loss, human suffering, and detrimental environmental impacts caused by natural disasters.

The goal of PPP 2000 is to seek new and innovative opportunities for government and nongovernment partners to work together to reduce losses from and vulnerability to natural hazards. One of the group's principal means of doing this will be a series of forums on public policy issues affecting natural disaster reduction. In each forum the partnership will seek a wide range of ideas and opinions in order to identify common agendas and determine ways to resolve scientific, technical, economic, and policy issues to reduce disasters. The aim is to improve risk assessment, risk management, and emergency response.

The first forum, hosted by IBHS, will introduce concepts and a framework that will be common to all subsequent forums. All PPP 2000 forums will be held in Washington, D.C.; the first two are: *Natural Disaster Reduction Initiatives of the Insurance Sector--September 10, 1997 (host: IBHS)*; and *The Uncertainty of Managing Catastrophic Risks--December 11, 1997 (host: Catastrophic Risk Management Project, Wharton School, University of Pennsylvania)*.

Additional forums will address such topics as cities at risk, a domestic and international broadcast media partnership to support natural disaster reduction, reduction of earthquake vulnerability in California: 1998-2003, assisting communities to deal with vulnerability to natural hazards, global perspectives on natural disasters, a disaster recovery business alliance, real-time monitoring and warning for natural hazards, natural hazards safety and reliability of utility and transportation systems, grass roots mitigation awareness and education, a national risk assessment, and demonstration studies for natural disaster reduction.

For more information about the PPP 2000 project, contact the *Institute for Business and Home Safety, 73 Tremont Street, Suite 510, Boston, MA 02108-3910; (617) 722-0200; fax: (617) 722-0202; WWW: http://www.iiplr.org;* or *Walt Hays, U.S. Geological Survey, 955 National Center, Reston, VA 20192; (703) 648-6711; fax: (703) 648-6747; e-mail: whays@usgs.gov*.

Some Communication/Information Initiatives . . .

SNDR Establishes Working Group on Natural Disaster

Information Systems

The Subcommittee on Natural Disaster Reduction (SNDR) (see the articles on the previous page) has recently created a new Working Group on Natural Disaster Information Systems (NDIS). The group's goal is to "evaluate and foster ways to integrate public and private resources and infrastructure to ensure that the most accurate and timely technical information regarding natural disasters is available instantly to everyone who can take action to save lives, reduce damage, and speed response and recovery." The group is made up of 17 representatives from the spectrum of federal agencies dealing with natural disasters. For more information, or to contribute information to the group, contact *Peter Ward, U.S. Geological Survey, 345 Middlefield Road, MS 977, Menlo Park, CA 94025; (415) 329-4736; fax: (415) 329-5163; e-mail: ward@andreas.wr.usgs.gov*.

NRC/CSTB Seeking Information on Disaster Communication Needs

The information needs of disaster managers are extraordinary, especially in times of acute crisis, and information technology developed for ordinary business may well be inadequate under such demanding conditions. Inspired by the positive reception by the disaster management community of its report ***Computing and Communications in the Extreme*** (see the ***Observer***, Vol. XXI, No. 1, p. 23; the report is now available on the World Wide Web at *http://www2.nas.edu/cstbweb*), the Computer Science and Telecommunications Board (CSTB) of the National Research Council (NRC) is now working to understand this issue in greater depth and to identify possible solutions.

In the broadest sense, the board is seeking to build intellectual bridges between disaster managers and the information technology research community. Hence, anyone--particularly emergency management professionals--wanting to be informed about CSTB plans in this area should send his or her name, organizational affiliation, address, phone and fax numbers, and e-mail address to the board: *fax: (202) 334-2318; e-mail: cstb@nas.edu*.

Moreover, anyone who can identify operational needs that are not being met by today's information technology is asked to contact the board and let the NRC know what those needs are. Stated differently, the board is asking, "What is your wish list? What information technology would you want to have during a crisis?"

ERLink Created to Ease Electronic Information Exchange in Disasters

The U.S. Federal Response Plan outlines the coordinated roles of federal agencies when responding to

significant disasters. The plan consists of 12 "Emergency Support Functions," and Support Function Two--"Communications"--is headed by the National Communications System (NCS). To improve that function, and to support emergency communication generally, NCS is hosting a pilot program called Emergency Response Link (ERLink).

ERLink offers key organizations a way to share information electronically, simplifying disaster response planning and operations. It employs a collection of communications protocols, information structures, and software that use World Wide Web technology for data sharing. Thus, ERLink provides a simple "point and click" method of retrieving all sorts of information, from text, to graphics, to databases, to modeling tools.

ERLink is a controlled access Web site that allows Federal Response Plan partners to both obtain and post information. The system is currently being tested by several federal agencies to determine if ERLink can truly support the community's information requirements. To obtain more information about ERLink, contact program manager *John O'Connor; (703) 607-6130; e-mail: oconnorj@ncs.gov*.

[Adapted from ***Aware Report***, Spring 1997, a newsletter of the National Oceanic and Atmospheric Administration]

Introducing the UCLA Center for Public Health and Disaster Relief

Recently, the Los Angeles County Board of Supervisors awarded funding to the University of California at Los Angeles (UCLA) School of Public Health for a two-year project, beginning July 1, 1997, to develop a curriculum on the public health aspects of disasters. This curriculum will address the interdisciplinary roles of public health professionals in preparing communities prior to a disaster and assisting them following a mass population emergency. This program, combined with an existing research project on community response to the Northridge earthquake, will form the core of the new multidisciplinary UCLA Center for Public Health and Disaster Relief.

The director of the center, Steven J. Rottman, has stated that the center's objectives will include:

- Development of a Curriculum Advisory Board composed of experts from various disciplines related to disaster education, preparedness, management, and health sciences;
- Development of graduate-level courses devoted to the public health perspective of disaster preparedness, response, and recovery;
- Training of professionals in disaster community health;
- Collaboration with governmental, academic, private, and nonprofit organizations in addressing the potential needs of people affected by disasters; and
- Identification of sources of sustained funding to maintain these course offerings and develop

additional programs dealing with humanitarian relief, refugee populations, and disaster research.

This effort is the first significant collaboration between a major educational institution--the UCLA School of Public Health--and a major local health agency--the Los Angeles County Department of Health Services--to address the effects of natural and human-generated disasters on public health.

For further information, contact *Loc H. Nguyen, Program Coordinator, UCLA Center for Public Health and Disaster Relief, P.O. Box 951772, Los Angeles, CA 90095-1772; (310) 794-6646; fax: (310) 794-1805; e-mail: locn@ucla.edu*.

Introducing the Greig Fester Centre for Hazard Research

The Greig Fester Centre for Hazard Research, sponsored by the major reinsurance broker, Greig Fester International, is the first multidisciplinary natural hazards research group in the United Kingdom. The center was officially launched June 1, 1997, and is housed in the Department of Geological Sciences, University College London. The center incorporates staff from 10 departments within the university, who are engaged in a broad range of natural hazards research, including studies of volcanic eruptions, earthquakes, floods, windstorms, and landslides. Center researchers have recently attracted over two million pounds in research funding from the European Commission, the U.K. Research Councils, and other sources. Current projects include: analysis of Atlantic sea-surface temperatures for hurricane forecasting; formulation of digital elevation models to identify active, potentially seismogenic, faults; determination of mechanisms of formation and transport of long run-out landslides; development of a PC-based hazard simulator for training civil authorities; and mitigation of volcanic risk among vulnerable island communities. For more information about this new center, contact *Bill McGuire, Director, Greig Fester Centre for Hazard Research, Department of Geological Sciences, University College London, Gower Street, London WC1E 6BT, U.K.; tel: +44 (171) 419 3449; fax: +44 (171) 388-7614; e-mail: ucfbkwg@ucl.ac.uk*.

Green Cross UK Takes on Environmental Disasters

When news of a disaster breaks, everyone's first concern is naturally humanitarian. It may be some time before attention and funds turn to the effect on the environment, even though this impact could eventually cause more suffering than the original event.

Recognizing this problem, Green Cross UK, established in 1994 and based at Kingston University, is focusing on the prevention and mitigation of environmental damage due to disasters, and the group is establishing the Green Cross Disaster Response Network as one of its principal projects.

Funded by the European Commission and undertaken in collaboration with Kingston University and others, including the Oracle Corporation, the Disaster Response Network is intended to prevent or mitigate environmental damage following any catastrophe by providing accredited environmental experts to organizations responding to a disaster. The experts will go to the scene in the earliest stages, assess impacts, point out the environmental risks and associated humanitarian risks, evaluate needs, and recommend actions to mitigate or prevent further damage. The network will provide people who can also organize and execute those actions.

For practical and economic reasons, this project will probably use experts from the U.K. (or Western Europe) in its development and trials, although the aim is to provide a model for adoption globally. The network experts will need to have knowledge and expertise in several areas, including:

- in-country (ideal) or regional (essential) experience;
- awareness of local political issues and considerations;
- disaster work experience, preferably in the country or region concerned;
- general environmental training and understanding;
- specific and relevant environmental knowledge.

Besides experts who can assess and mitigate the environmental consequences of disasters, the network will also acquire, manage, and distribute information (including appropriate environmental impact assessment procedures, action plans, material lists, and equipment databases) that experts can draw upon during an emergency. Again, the overall aim is to avert unnecessary long-term damage to the environment.

Because the Environmental Response Network is just starting, the organizers are seeking information on previous work in this area--especially any assessment tools or plans that have already been developed. They are also still identifying the qualities, expertise, and experience, as well as the supporting information and tools, that network experts will need to succeed in particular environmental disaster situations. Finally, they are interested in learning about any earlier work to create a logical and manageable framework for managing and storing the large body of information concerning environmental disasters that this undertaking will require.

Any information, comments, or suggestions are welcome and should be addressed to *Nicholas Fickling, Green Cross UK, Kingston University-Reg Bailey Building, Penrhyn Road, Kingston-upon-Thames, Surrey KT1 2EE, U.K.; tel: +44 181 547 8274; fax: +44 181 547 7980, e-mail: greencross@kingston.ac.uk*, or *n.fickling@kingston.ac.uk; WWW: http//www.kingston.ac.uk/~ad_s611/gc.h tm*.

The Green Cross currently includes 16 national organizations worldwide, with many additional countries now preparing to join. All are linked to Green Cross International, founded by Mikhail Gorbachev in the wake of the Rio Summit and based in Geneva. Information about Green Cross International is available from the World Wide Web: *http://www.gci.ch*.

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The Internet Pages

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

This issue of the ***Natural Hazards Observer*** includes information about several new academic institutions dealing with disasters. An overview and index of most (but probably not all) of these institutions is also included on our Web site at: *http://www.colorado.edu/hazards/centers.html* and *http://www.colorado.edu/hazards/infosource1/infosource1.html*.

http://www.colorado.edu/hazards
The Natural Hazards Center Web site now includes the center's 1996 Annual Report at *http://www.colorado.edu/hazards/96annrpt.html*, which provides not only a summary of the center's activities in the past year, but also a good overview of the center--present, past, and future. Quick Response Report #94--***Risk Communication in Southern California: Ethnic and Gender Response to 1995 Revised, Upgraded Earthquake Probabilities***, by Denise R. Blanchard-Boehm, is also now available at *http://www.colorado.edu/hazards/qr/qr94.html*, and our latest Working Paper (see p. 5) can also be viewed at *http://www.colorado.edu/hazards/wp/wp95.html*. Finally, as reported on page 3 of this ***Observer***, the Natural Hazards Center library database can now be accessed via *http://www.colorado.edu/hazards/litbase/litindex.htm*.

http://www.emforum.org
As most disaster professionals know, information is the key to successful emergency management in any setting. Recognizing this fact, several years ago the Congressional Fire Service Institute, the Federal Emergency Management Agency, the National Emergency Management Association, the National Coordinating Council on Emergency Management, the National Volunteer Fire Council, and the State and Local Emergency Management Data Users Group jointly founded the Emergency Information Infrastructure Partnership (EIIP) to help ensure coordinated sharing of emergency management information on the Internet.

To that end, the EIIP has recently established the "Virtual Forum for Emergency Management

Professionals" at the address above. This new Web site provides a means for both locating extensive information about emergency management and networking with emergency professionals around the globe. The EIIP forum is a "virtual arena" for anyone involved in emergency management, particularly professionals from academia, business, government, and voluntary organizations. It includes monthly feature topics for discussion, live chat areas, newsgroups, mailing lists, an e-mail capability, as well as a significant base of information that emergency professionals can consult to aid disaster preparedness, response, and recovery, including a "Virtual Library," "Virtual Classroom," and a "Technology Arena."

http://www.pmel.noaa.gov/tsunami-hazard/

This site describes the National Tsunami Hazard Mitigation Program, a joint effort of a consortium of state and federal agencies. It outlines the five goals of the program: to develop state and National Oceanic and Atmospheric Administration (NOAA) coordination and technical support, to deploy tsunami detection buoys, to produce inundation maps, to develop hazard mitigation programs, and to improve seismic networks. The site reviews current projects under this program and offers numerous links to other sites with tsunami information.

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

Speaking of tsunamis . . . this site, the home page of the West Coast and Alaska Tsunami Warning Center, includes the most recent press release, advisory, watch, or warning messages from the center; links to earthquake and tsunami catalogs; an index of the most recent tsunamis; a statement of the West Coast and Alaska Tsunami Warning Center's mission; a page on the physics of tsunamis; a list of tsunami safety rules; and a bunch of tsunami pictures.

http://rubicon.water.ca.gov/FEATReport120.fdr/featindex.html

In January of this year, Californians suffered severe flooding across the entire state, resulting in at least $2 billion in damage. To address the many questions that these floods raised, the governor formed a Flood Emergency Action Team (FEAT), which held citizen advisory meetings throughout California. The resultant report, available at the URL above, describes FEAT's efforts, lists the teams's final recommendations to the governor, summarizes the flood event and the emergency management response to it, lists broad floodplain management issues for the state, describes possible flood control system improvements, and examines consequent funding issues.

http://www-drs.dpri.kyoto-u.ac.jp.

The Research Center for Disaster Reduction Systems (DRS), established in 1993 and expanded in 1996 within the Disaster Prevention Research Institute, Kyoto University, is a center of excellence for various fields of research dealing with catastrophic disasters affecting megacities. The goal of the center is to minimize direct and indirect losses and reduce human suffering from natural disasters. DRS focuses on four domains of disaster management: hazard mitigation, urban design and planning, preparedness and societal reactions, and information and intelligence. One principal aim of the center is to develop an integrated program for loss reduction that encompasses all phases of the disaster cycle. To obtain more information about the DRS and this project, see the Web site above, or contact the *Research Center for Disaster Reduction Systems, Disaster Prevention Research Institute, Kyoto University, Uji, Kyoto,*

Japan 611; tel: +81-(774)38-4273, 4278; fax: +81-(774)31-8294.

http://www.ias.unt.edu:9510/

The Institute of Emergency Administration and Planning at the University of North Texas offers the most extensive resident emergency management degree program in the U.S. This site provides information about the institute, a guide to its educational programs and research, recent news and upcoming events, and the institute's newsletter, ***The Mitigator***.

http://epdwww.engr.wisc.edu/dmc

Up north, the University of Wisconsin's Disaster Management Center (DMC) offers numerous courses focusing on the management of disasters and emergencies in an international context. This site lists the center's many workshops and seminars offered in Madison, as well as other cities throughout the world, and describes the center's series of self-study correspondence courses that provide distance-learning educational opportunities for those who cannot travel. Individuals can earn a Disaster Management Diploma through distance learning by combining DMC self-study courses with appropriate courses at other institutions.

http://www.fiu.edu/~hurrican/

The Web site of Florida International University's International Hurricane Center includes a description of the center, summaries of various research now being conducted, a list of past and upcoming events hosted by the center, information on education and training available (see the related article on p. 11), biographical sketches of center staff, full-text publications, and links to other hurricane Web sites. The center recently posted the proceedings from the Hemispheric Congress on Disaster Reduction and Sustainable Development held in Miami in October 1996: *http://www.fiu.edu/~hurrican/congress/congress.html*.

http://www.csu.edu.au

In partnership with Tasmania State Emergency Services, Charles Sturt University in New South Wales, Australia, offers an on-line Bachelor of Social Science degree program with an emphasis in emergency management. Information about this distance learning program is available from *http://www.csu.edu.au/handbook/handbook97/undergrad/s9-27.htm*. In addition, the school also offers a "Virtual Library on Hazards and Risk" that covers civil disturbances and war, emergency management, epidemics, fires, geological events, impacts of disaster, infestation, meteorological/hydrological hazards, and technological hazards. The contents are indexed several different ways for easy access and can be browsed at *http://life.csu.edu.au/hazards/library.html*.

http://www.nws.noaa.gov/om

The National Weather Service (NWS) Office of Meteorology (OM) Web site contains full-text weather service publications--including hazard awareness materials on hurricanes, tornadoes, thunderstorms and lightning, floods, winter weather, and other topics--a "Hot Topics" section, and a section on "Significant Weather." It also offers 1995 natural hazards statistics, as well as Disaster Survey Reports--evaluations

of NWS performance in recent disasters.

http://geohazards.cr.usgs.gov

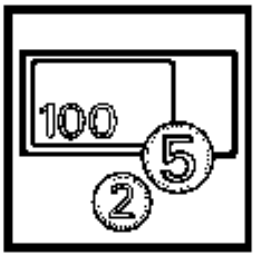
The Geologic Hazards Team of the U.S. Geological Survey (USGS) conducts global investigations of earthquake, geomagnetic, and landslide hazards. The team consists of eight research groups and three information centers. The research specialties are seismic hazard mapping, seismograph networks, global seismology, engineering seismology, neotectonics, paleoseismology, landslide hazards, and geomagnetism. The information activities include the National Earthquake Information Center, the National Geomagnetic Information Center, and the National Landslide Information Center. The Geologic Hazards Team Web site includes sections on earthquakes, landslides, recent publications, hazard images, solar winds, the Northridge earthquake, and geomagnetism, as well as links to the USGS's "Ask-a-Geologist" public service and other useful sites.

http://orbit-net.nesdis.noaa.gov/ora/ht/ff

The Office of Research and Applications of the National Environmental Satellite, Data, and Information Service, National Oceanic and Atmospheric Administration (NOAA) is producing experimental products in real-time to help monitor conditions conducive to flash floods. Their Soil Wetness Index (SWI) shows current surface conditions, while the accompanying SWI Anomaly represents the difference of current conditions from the past four-year average. Experimental Automated Precipitation products for the U.S. are instantaneous estimates of precipitation as well as 1-, 3-, 6-, and 24-hour totals. A recent enhancement allows users to zoom-in on their area of interest. These products are derived from the NOAA geostationary satellite and the Department of Defense's Defense Meteorological Satellite Program satellites.

http://www.slonet.org/~abenini/

Hazards researchers Aldo and Jan Benini have established this Humanitarian Scenarios Web site, which provides full-text papers on humanitarian and disaster management issues written from an academic perspective, but drawing on the authors' personal experience working for the International Red Cross and in emergency management training professions. The site also offers two examples of simulations written in a popular spreadsheet application that can be downloaded and tested. More resources will be added regularly. Current papers include: ***Computer Simulation of Humanitarian Scenarios***, ***Simulating the Effectiveness of Humanitarian Action***, ***Ebola Strikes the Global Village***, ***Early Warning Systems for Violent Conflict***, ***Relief Economics: Walking in a Political Minefield***, and ***Uncertainty and Information Flows in Humanitarian Agencies***.



Contracts and Grants

The Loma Prieta, California, Earthquake of October 17, 1989--Performance of the Built Environment, National Science Foundation, $66,365, 12 months. Principal Investigator: *Thomas L. Holzer, U.S. Geological Survey, 345 Middlefield Road, MS 977, Menlo Park, CA 94025; (415) 329-5637; e-mail: tholzer@usgs.gov.*

This grant provides funds to document research conducted following the Loma Prieta earthquake that occurred in the San Francisco Bay Area in 1989. In particular, it funds a section on performance of the built environment that forms part of a comprehensive report on that earthquake. The report should serve as the major reference on Loma Prieta for future generations of scientists, engineers, and social scientists.

Collaborative Study of Analogs to Earthquake Mitigation, National Science Foundation, $48,460, 12 months. Principal Investigator: *Peter J. May, Department of Political Science, Campus Box 353530, University of Washington, Seattle, WA 98195-3530; (206) 543-9842; fax: (206) 685-2146; e-mail: pmay@u.washington.edu.*

A central component of efforts to address losses posed by earthquakes is the incorporation of mitigation measures into decisions about land use, building practices, and risk bearing. Still, there is poor understanding of the prospects for mitigation. This research will use case studies to gain insight about the design and performance of federal earthquake-hazard mitigation programs.

Businesses and Disasters: Consequences of Disaster Victimization for Businesses and Business Districts, National Science Foundation, $237,095, 24 months. Principal Investigators: *Kathleen J. Tierney and Joanne M. Nigg, Disaster Research Center, University of Delaware, Newark, DE 19716; (302) 831-6618; fax; (302) 831-2091; e-mail: tierney@udel.edu or joanne.nigg@mvs.udel.edu.*

This project addresses three related questions: 1)What longer-term consequences do disasters have for individual businesses? 2) What factors are associated with differential disaster outcomes for businesses? and 3) What conse-quences does heavy and concentrated damage to business and commercial districts have for business activity in those highly damaged areas? The project will focus on two geographic areas that suffered severe damage and disruption in two major disasters: Santa Cruz County, California, whose communities were heavily damaged in the 1989 Loma Prieta earthquake; and southern Dade County, Florida, which sustained major damage in Hurricane Andrew in 1992.

Coming in 1998 . . .

The Centre for Risk and Disaster Management Studies: Institute for Cindynics

In July 1998 Campus du Fort Saint-Jean in Quebec, Canada, will inaugurate its Centre for Risk and Disaster Management Studies: Institute for Cindynics (*cindynic* is a Greek word for danger). The institute will provide a platform for training and a means for exchanging risk and disaster management information with similar centers or individuals worldwide. The center will be a unique institution where information can be obtained, lessons shared, and new concepts taught. It will offer formal academic courses, seminars, and practical experience across disciplines that address disasters and risk. Programs will be offered in both French and English. For more information about this new institute, contact *Marie-Christine Therrien, Campus du Fort Saint-Jean, Edifice de Lery, bureau 2062, 15 rue Jacques Cartier nord, Saint-Jean-sur-Richelieu, Quebec, Canada J3B 8R8; (514) 358-6500, ext. 5659; e-mail: therrienm@cfsj.qc.ca*, or, *marie-christine=therrien%campus%fort=st-je an@ban.cfsj.qc.ca*.

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*

Emergency Management Technology Partners: A Workshop Focused on Building Bridges for Technology Transfer. Sponsor: Federal Emergency Management Agency (FEMA). Richland, Washington: September 22-25, 1997. This workshop is designed to link first responders at the local, state, and national levels with developers of new emergency management technology, including private industry and the U.S. Department of Energy National Laboratories. The workshop will provide emergency managers an opportunity not only to examine new technologies, but also to inform researchers and developers of specific needs. The meeting will address technologies for risk, crisis, and consequence management; natural disasters; training and exercises; unconventional threats; and response. For details, contact the *FEMA Workshop, c/o Pacific Northwest National Laboratory, P.O.*

Box 999, K1-05, Richland, WA 99352; (800) 806-9790; e-mail: FEMA.Workshop@pnl.gov; WWW: http://pnl113.pnl.gov/fema/femamain.nsf.

Risk Based Decision Making in Water Resources VIII. Sponsor: The Engineering Foundation. Santa Barbara, California: October 12-17, 1997. The program for this conference tentatively includes sessions on the president's Commission on Critical Infrastructure Protection; dam safety and risk of catastrophic events; forecasting in management of water resources: uncertainties in data, models, forecasts and their influence on analysis; ecosystem protection; regulatory analyses in support of risk management; advances in risk analysis; and other areas regarding hazards and risks. A conference announcement is available from *The Engineering Foundation, 345 East 47th Street, New York, NY 10017; (212) 705-7836; fax: (212) 705-7441; e-mail: engfnd@aol.com; WWW: http://www.engfnd.org/engfnd/.*

The Management of Emergencies and Disasters: An Interdisciplinary Approach. Sponsor: The British Council. Stoke-on-Trent, England: October 12-17, 1997. The strength of the response to any emergency depends on the degree of preparation and planning, and the experiences of those who have already confronted and overcome problems associated with emergencies are key elements in the education of those who are preparing for the next disasters. This seminar will bring together national and international experts in the fields of emergency and disaster medicine with the aim of improving participants' understanding of emergencies and medical management systems and demonstrating the continuum between individual patient emergencies and larger-scale emergencies. Main themes will include disaster planning, systems of trauma care, emergency medical service, sudden onset of natural disasters, and complex emer gencies. The program will be of particular interest to health care managers and planners, specialists in emergency medicine and trauma surgery, health officials, and heads of emergency services in general. Details are available from *International Seminars, The British Council, 1 Beaumont Place, Oxford OX1 2PJ, U.K.; tel: +44 (0) 1865 316636; fax: +44 (0) 1865 557368; e-mail: international.seminars@britcoun.org; WWW: http://www.britcoun.org/seminars/isem7038.htm*, or *The British Council, P.O. Box 88, Edgecliff, NSW, Australia; (02) 9326 2022; fax: (02) 9327 4868.*

International Workshop on the Vrancea Earthquakes. Sponsors: Romanian Academy of Science and others. Bucharest, Romania: November 1-4, 1997. Vrancea earthquakes occur irregularly but frequently, with the largest recorded event being an M7.7 quake on November 10, 1940. In the last 20 year, Bucharest has been threatened by three events with magnitudes larger than 6.5, and a quake in 1977 caused more than 1,500 casualties. This workshop will examine all aspects of earthquake activity in the Carpathian region, including assessment of hazards and determination of options for risk mitigation. Additional information is available from *Friedemann Wenzel, Vrancea Earthquake Workshop Committee, Geophysikalisches Institut, Universität Karlsruhe, Hertzstraße 16, D-76187 Karlsruhe, Germany; tel: +49-721-608-4431 or 608-4558; fax: +49-721-71173; e-mail: fwenzel@gpiwap1.physik.uni-karlsruhe.de.*

Health Emergencies in Large Populations (H.E.L.P.). Sponsors: The International Committee of the Red Cross and others. Addis Ababa, Ethiopia: November 3-21, 1997. Intended for any health professional involved in disaster management, this course will cover planning, food and nutrition, environmental

health, communicable diseases, health services, epidemiology, coordination, ethical issues, and international humanitarian law. More information is available from the *International Committee of the Red Cross, Medical Division, H.E.L.P., 19 avenue de la Paix, 1202 Geneva, Switzerland; tel: (41-22) 730 28 10; fax: (41-22) 733 96 74.*

Cal-Berkeley Announces Fall E.M. Courses

A tentative schedule for the autumn 1997 University of California-Berkeley Extension Emergency Preparedness Planning and Management Program is now available. Upcoming seminars include:

- *Introduction to Emergency Management: September 12-14*
- *Strategic Planning/Implementation in Emergency Management: September 22-26*
- *Practicum in Emergency Preparedness: October 6-7*
- *Land Use Planning and Emergency Management: October 9-10*
- *Financial Support for Emergency Preparedness Planning: October 14-17*
- *Planning for the Human Element in Emergency Preparedness: October 29-Nov. 1*
- *Critical Incident Stress Management: Basic Training: November 6-7*
- *Practicum in Emergency Preparedness: December 8-9*
- *Corporate/Public Agency Coordination and Interdependence: January 20-23, 1998*

For information on this University of California-Berkeley program contact *Diane Wolcott, Emergency Preparedness Planning and Management Program, U.C.-Berkeley Extension, 1995 University Avenue, Suite 300, Berkeley, CA 94704-4704; (510) 642-7537; fax: (510) 643-8290; e-mail: dlw@unx.berkeley.edu*.

Survive! Business Continuity Group 9th Annual U.K. Conference. Bournemouth International Centre, U.K.: November 5-6, 1997. Survive! is an international organization supporting business continuity and disaster recovery planning. Recognizing the different training, experience, and responsibilities among emergency management professionals, the Survive! group has designed a conference with four concurrent tracks: management and strategy, tactics and techniques, city center focus, and products and services. The meeting will feature innovative approaches and solutions to the more challenging problems of the profession. The organization is also offering a series of business continuity workshops later in November. For details, contact *Survive! Ltd, The Chapel, Royal Victoria Patriotic Building, Fitzhugh Grove, London SW18 3SX, U.K.; tel: +44-181-874 6266; fax: +44-181-874 6446; e-mail: surviveuk@cityscape.co.uk; WWW: http://www.survive.com/*.

Health Crisis and the Internet: An International Meeting on Harnessing the Internet for Disasters and Epidemics. Sponsors: Pan American Health Organization (PAHO), World Health Organization (WHO), and Ministry of Health of Colombia. Santa Fe de Bogota, Colombia: November 18-21, 1997. Managing

disasters and epidemics--from early detection or warning through public health intervention--requires rapid information management. Today, crisis managers have more places than ever to look for the information they need, and finding information is not a problem. However, finding *reliable* information and disseminating it *quickly* can be. Recognizing this issue, PAHO and WHO have undertaken major projects in Latin America and worldwide to improve information access using the Internet. However, the rapid, pervasive spread of the Internet has raised problems in itself. This meeting will support the exchange of ideas, experience, and concerns among disaster and health experts and other personnel who use, or could use, the Internet to aid their work. It will explore actual use of the Internet to mitigate crises, identify useful sources of information on the Internet, develop recommendations for interregional and intraregional collaboration via the Internet, and forge new links--electronic and otherwise--among the many individuals and agencies involved in disease and disaster management. For a conference brochure, contact the *Pan American Health Organization, Emergency Preparedness Program, 525 Twenty-third Street, N.W., Washington, D.C. 20037; (202) 974-3520; fax: (202) 775-4578; e-mail: crisis-internet@paho.org; WWW: http://www.paho.org/english/ped/ped-internet.htm*.

II Latin American Conference on Chemical Accidents. Buenos Aires, Argentina: November 19-21, 1997. Accidents and disasters involving chemical substances require special well-planned emergency response, because of their complexity and the serious consequences and dangers involved. Similarly, prevention, mitigation, preparedness, warning, rehabilitation, and long-term recovery all require unique knowledge and management if they are to be successful. All these aspects of chemical emergency management will be addressed at this conference. For more information, contact *Diego Gotelli, Chemistry Information Center for Emergencies, Av. San Pedrito 220, (1406) Buenos Aires, Argentina; tel: +54 1 612-6912, or 613-1100; fax: +54 1 613-3707; e-mail: dgotelli@impsat1.com.ar*.

Ninth Annual Chemical Emergency Preparedness and Prevention (CEPP) Conference. Sponsor: U.S. Environmental Protection Agency Region III. Pittsburgh, Pennsylvania: December 2-5, 1997. This year, the theme of the annual CEPP meeting, EPA's oldest and largest regional chemical emergency preparedness conference, is "If Not Us, Who?" The meeting will focus on a number of issues: chemical accident prevention and process safety, hazardous materials response and contingency planning, crisis leadership, risk management and communications, federal facility compliance, and other important topics. For details, contact *Vtec2, 252 Newtown Road, Richboro, PA 18954; (888) 429-6289 (toll free) or (215) 942-2088; fax: (215) 357-3613; WWW: http://www.vtec2.com/cepp97.htm*.

ATC-29-1 Seminar on Seismic Design, Retrofit and Performance of Nonstructural Components. Sponsor: Applied Technology Council (ATC). San Francisco, California: January 22-23, 1998. This seminar will focus on architectural, electrical, and mechanical components in buildings, hospitals and other essential structures, and hazardous materials and industrial facilities. It will examine current research, practice, and knowledge regarding the seismic design, retrofit, and performance of such systems, as well as the appropriateness of current codes and regulations. Abstracts are due September 15, 1997. For additional information, contact *ATC-29-1 Project, Applied Technology Council, 555 Twin Dolphin Drive, Suite 550, Redwood City, CA 94065; (415) 595-1542; fax: (415) 593-2320; e-mail: atc@atcouncil.org*.

Fourth International Symposium on Hydrologic Applications of Weather Radar. Sponsor: American Geophysical Union and many others. San Diego, California: April 5-9, 1998. Radar remote sensing is rapidly changing operational hydrology and supplying hydrologic science and engineering with much rich data. This symposium will provide a forum for exchanging experience and new ideas in this field. Both theoretical and applied papers are currently being solicited, and abstracts are due November 1, 1998. For guidelines or a conference brochure, contact *Konstantine P. Georgakakos, Hydrologic Research Center, 12780 High Bluff Drive, Suite 250, San Diego, CA 92130, attn: Ms. Corinne Rice; (619) 794-2726; fax: (619) 792-2519; e-mail: admin@hrc.ucsd.edu; WWW: http://hrc.ucsd.edu, or http://www.iihr.uiowa.edu/meetings.*

TIEMS '98--The Fifth Annual Conference of the International Emergency Management Society (TIEMS). Washington, D.C.: May 19-22, 1998. TIEMS was founded in 1993 to bring together users, planners, researchers, managers, response personnel, and others to exchange information on the use of innovative methods and technologies to improve our ability to avoid, mitigate, respond to, and recover from natural and technological disasters. The theme of the 1998 TIEMS conference is "Disaster and Emergency Management: International Challenges for the Next Decade," and the organizers are currently soliciting papers, applicable to all disaster types, concerning human aspects of emergency management; use and misuse of technology in emergency management; information management and decision support technology; emergency and disaster management training and exercising; risk and vulnerability assessment, communication, and management; technology in prevention and mitigation; and urban disasters. They are also seeking papers specifically addressing transportation-related disasters, chemical hazards and accidents, natural disasters, nuclear emergencies, and terrorism. Abstracts are due December 1, 1997. For a conference announcement, contact *Greg Shaw, Conference Coordinator, c/o The George Washington University Institute for Crisis and Disaster Management, 20101 Academic Way, Suite 220B, Ashburn, VA 22201; (703) 729-8271; fax: (703) 729-8248; e-mail: crisismgt@seas.gwu.edu .*

Eighth World Conference on Disaster Management: "Real Events . . . Real Leaders . . . Real Solutions." Sponsor: Canadian Center for Emergency Preparedness. Hamilton, Ontario, Canada: June 14-17, 1998. Since 1991, this meeting has provided a venue for emergency managers and others interested in preparation for, response to, and mitigation of disasters to meet, share their knowledge and concerns, and learn about the latest developments in their professions. A complete conference description is available from the *Canadian Centre for Emergency Preparedness; (800) 965-4608 or (905) 546-3911; fax: (905) 546-2340; e-mail: ccep@netaccess.on.ca; WWW: http://nas.net/ccep or http://www.netaccess.on.ca/~ccep/ccep/index.shtml.*

International Symposium on New Trends and Guidelines on Dam Safety. Sponsors: Spanish National Committee on Large Dams, International Commission on Large Dams, and others. Barcelona, Spain: June 17-19, 1998. This symposium will address dam safety for both new and existing structures and cover four principal areas: legislation and guidelines on dam safety, structural safety, hydrological safety, and presentations by European working groups. Engineers, scientists, and facility managers

interested in dam design, construction, and maintenance are invited to participate. Abstracts are due November 30, 1997. For more information, contact the *Secretariat of the Symposium on Dam Safety, Spanish National Committee on Large Dams, E.T.S. de Ingenieros de Caminos, Canales y Puertos, Modulo D1, c/ Gran Capitan, s/n, 08034 Barcelona, Spain; tel: (34-3) 401 64 78; fax: (34-3) 401 73 57.*

Fourth International Symposium on Environmental Geotechnology and Global Sustainable Development. Sponsors: U.S. Environmental Protection Agency and others. Boston, Massachusetts: August 9-12, 1998. This conference will include several sessions relevant to hazards management, including presentations on geohazards and waste disposal facilities, zonation of hazardous areas, and coastal issues. Abstracts are due November 15, 1997. For more information, contact *Hilary I. Inyang, Conference Chairperson, Center for Environmental Engineering and Science Technologies, James B. Francis College of Engineering, University of Massachusetts, One University Avenue, Lowell, MA 01854; (508) 934-2285; fax: (508) 934-3092; e-mail: inyangh@woods.uml.edu*.

Second International Conference on Climate and Water. Sponsors: Helsinki University (HUT), World Meteorological Organization, and others. Espoo, Finland: August 17-20, 1998. Since the First Conference on Climate and Water in 1989, research on climate change and its impacts has been extensive. The objective of this second conference is to review developments since the earlier meeting and to continue the debate, at both national and international levels, on the potential impact of climate change on hydrology and water resources. Complete conference information is available from *Risto Lemmela, HUT/Water Res. Eng., Huhtatie 12, FIN-04300 Tuusula, Finland; tel: +358 9 275 3835; fax: +358 9 451 3827; e-mail: rlemmela@ahti.hut.fi*, or *Nea Helenius, HUT/Water Res. Eng., Tietotie 1, FIN-02150 Espoo, Finland; fax: +358 9 451 3827; e-mail: nheleniu@ahti.hut.fi; WWW: http://ahti.hut.fi/wr/caw2*.

Upcoming Workshops at ADPC

The Asian Disaster Preparedness Center (ADPC) at the Asian Institute of Technology (AIT), Bangkok, has announced several upcoming emergency management training programs:

- *Training of Trainers Course in Disaster Management: October 20-31, 1997*
- *Executive Development Program: November 17-December 5, 1997*
- *Community Based Approaches to Disaster Management: January 12-24, 1998*
- *Basic Course in Disaster Management: March 9-28, 1998*

For information on these programs and other courses currently being planned, contact *Sanny Jegillos, Senior Manager, Learning and Professional Development, ADPC/AIT, P.O. Box 4, Klong Luang, Pathumthani 12120 Thailand; fax: (66 2) 524 5360; e-mail: sannyj@ait.ac.th, or lpdadpc@ait.ac.th*.

Recent Publications

All Hazards

World Disasters Report 1997. *1997. 180 pp. $35.00. Call for shipping charges. Purchase from Oxford University Press, Order Department, 2001 Evans Road, Cary, NC 27513; (800) 451-7556; fax: (919) 677-1303; WWW: http://www.oup-usa.org.*

In recent years, the ability of governments to aid vulnerable people has waned throughout the world. Thus, the provision of disaster assistance is increasingly the responsibility of inter-national humanitarian organizations, like the Red Cross and Red Crescent Society. The 1997 ***World Disaster Report*** focuses on the role of these humanitarian institutions, or nongovernmental organizations (NGOs), and their changing missions. Section One looks at the changes NGOs are going through and the resulting "crisis of confidence," difficulties in maintaining neutrality and impartiality, and issues related to military intervention, including "cardinal ethics" and inherent risks. The second section describes various approaches employed by these organizations, and Section Three provides information on major disasters that occurred in 1996 throughout the world. Section Four describes four disaster databases and the information they contain, while Section Five discusses the role of the Red Cross and Red Crescent "from codes of conduct to standards of performance."

Disaster Preparedness for People with Disabilities. *1997. 45 pp. This booklet is also available as a book on tape in a two-cassette set with braille labeling. Contact your local American Red Cross Chapter for availability and prices. The book can also be viewed on the World Wide Web: http://www.redcross.org/disaster/safety/disability.html.*

This booklet was designed to help people who have physical, visual, auditory, or cognitive disabilities to prepare for natural disasters. Anyone with a disability or anyone who assists a person with a disability will find this booklet useful. It contains information on organizing a personal disaster plan and includes plans for the care of service animals and/or pets during a disaster. It also provides information on understanding disasters, creating a personal support network, completing a personal assessment, undertaking personal disaster preparation, gathering disaster supplies, and making a home and/or office safer. Appendixes provide information on what to include in disaster supply kits and other essential supplies, how to maintain a disaster supply calendar, and how to create emergency information list, medical information list, and disability-related supplies and special equipment lists.

Environmental Hazards: Assessing Risk and Reducing Disaster. *Keith Smith. Second Edition. 1996. 414 pp. $84.95, hardbound; $27.95, paperback. Copies can be purchased from Routledge, 7625 Empire Drive, Florence, KY 41042-2919; (800) 634-7064; fax: (800) 248-4724.*

This substantially revised and expanded second edition of ***Environmental Hazards*** integrates key findings from the natural and social sciences to provide a comprehensive assessment of environmental risk and the policy responses required to achieve a safer world. The author covers all the major rapid-onset events that directly threaten humans and their communities. In the first half of the book, Smith provides an overview of hazards in the environment, focusing on hazard awareness, the definition of an environmental hazard, and a typology of hazard and disaster. He then discusses the differential impacts

of disasters and disaster trends; looks at risk assessment and management; examines adjustment to hazards, including accepting and sharing of losses; and outlines options for reducing losses. In the second half, he discusses the "experience and reduction of hazards," notably earthquakes, volcanoes, mass earth movements, severe storms, wildfires, floods, extreme heat, droughts, and technological hazards.

First International Emergency Settlement Conference: New Approaches to New Realities, April 15-19, 1996. *1996. 473 pp. $50.00, plus $10.00 shipping (U.S.), $30.00 shipping (international). Copies can be purchased from the Disaster Management Center, University of Wisconsin, Department of Engineering Professional Development, 432 North Lake Street, Madison, WI 53706; (608) 262-5441; fax: (608) 263-3160; e-mail: dmc@engr.wisc.edu; WWW: http://epdwww.engr.wisc.edu/dmc/.*

At present, more than 40 million people are displaced by natural and human caused disasters, and many reside in "emergency settlements" that spring up as large populations flee dangerous situations. The First International Emergency Settlements Conference brought together representatives from 49 countries to discuss critical issues concerning populations in need of emergency humanitarian assistance. Discussions were organized around four basic themes: identification and planning of emergency settlement; political, security, protection, civil, and human rights aspects; basic assistance needs; and social, psychological, economic, and developmental issues. This preliminary proceedings volume contains the working drafts of 24 papers describing the experiences of 100 individuals working with the United Nations, nongovernmental organizations, and other groups.

Coping with Natural Hazards in Canada. *1997. 215 pp. $35.00 (U.S.). Copies can be purchased from W. Elaine Collier, Underwriting Management Services, Insurers' Advisory Organization, Inc., 18 King Street East, Eighth Floor, Toronto, Ontario, Canada, M5C 1C4; (416) 601-1801; fax: (416) 368-0333.*

The Canadian insurance industry is becoming increasingly concerned about reducing catastrophic losses and recently identified three areas of particular concern: the definition of an "occurrence," the validation of computer models of estimates of probable loss, and the determination of responsibility for losses from natural hazards. This report attempts to address those issues and contains an overview of natural hazards in Canada and their impacts and a preliminary inventory of the social and economic effects of hydrometeorological hazards and disasters. It discusses occurrence definition, probable maximum loss, hazards mitigation, emergency preparedness, response and relief, and recovery. It also contains numerous conclusions relating to vulnerability, scientific support for managing hazard exposure, and the changing patchwork or responsibility for natural disasters in Canada.

Global Climate Change

Elements of Change 1996. *Susan Joy Hassol and John Katzenberger, Editors. 1997. 270 pp. $23.50, plus $5.00 shipping. Copies can be purchased from the Aspen Global Change Institute, 100 East Francis Street, Aspen, CO 81611; (970) 925-7376; fax: (970) 925-7097; e-mail: agcimail@agci.org; WWW: http://www.gcrio.org/agci-home.html.*

In 1996, the Aspen Global Change Institute hosted two summer science sessions: Natural Hazards and Global Change, and Characterizing and Communicating Scientific Uncertainty--both of which are

summarized in ***Elements of Change 1996***. The first session was held to produce specific recommendations regarding public policies and programs that ought to be instituted or expanded to reduce the impacts of future natural disasters. The proceedings examine societal, technological, and environmental trends; elements of natural disaster reduction; and priorities for action. In addition, they present a thematic framework for addressing these issues involving citizens, technology, the private sector, politics, and the nexus of all system elements, and conclude with a summary of recommendations and actions. The proceedings of the second session address the uncertainties associated with climate change, the role of the scientist in explaining complexity and uncertainty as well as the need for advocacy, the role of journalists in dealing with scientific uncertainty, the difficulty in making policy decisions with incomplete information, and the social costs of climate change.

Hurricanes

"Hurricanes 101: Lessons on Saving Lives and Property," ***Coastal Heritage****, Vol. 12, No. 1 (Summer 1997). Subscriptions to* ***Coastal Heritage*** *are free. Contact the South Carolina Sea Grant Consortium, 287 Meeting Street, Charleston, SC 29401; (803) 727-2078; WWW: http://www.csc.noaa.gov/SCSeaGrant/.*

This edition of ***Coastal Heritage*** is devoted entirely to hurricanes, discussing the increasing dangers posed by coastal development, the need for adequate building practices and code enforcement, insurance issues, the history of hurricanes in the U.S., and structural weak links in hurricane protection. It also covers evacuation issues and provides lists of suggested additional reading as well as experts to contact for further information.

Floods

An Assessment of Port, Terminal, and Navigation Impacts Resulting from the 1993 Upper Mississippi River Flood. *Document No. PB97-171532. 1997. 100 pp. $28.00. Available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161; (703) 487-4650.*

This document contains the final report of a study that assessed impacts of the 1993 Mississippi River flood on commercial freight traffic in the region. Many ports and terminal facilities were forced to close for up to three months, and many manufacturing industries incurred unexpected expenditures because they were forced to use other, more costly, shipping methods. The study concluded that prolonged closure of facilities had a greater economic impact than physical damage; waterway operators and users are greatly concerned about the prospects for recurring, widespread flooding in the area; susceptibility to future flooding was considered when new facilities were built after the flood; and the majority of companies located in the floodplain wish to remain, but realize they will have to assume risks associated with that decision.

Earthquakes and Other Geological Hazards

Economic Consequences of Earthquakes: Preparing for the Unexpected. *Barclay G. Jones, Editor. Publication No. NCEER-SP-0001. 1997. 275 pp. $40.00. Copies can be purchased from Publications,*

National Center for Earthquake Engineering Research (NCEER), State University of New York at Buffalo, Red Jacket Quadrangle, Buffalo, NY 14261; (716) 645-3391; fax: (716) 645-3399; e-mail: nceer@acsu.buffalo.edu; WWW: http://nceer.eng.buffalo.edu

This book examines the ramifications of a large-scale earthquake in the U.S., while considering preparedness options to minimize losses. It contains 15 papers by experts in seismology, engineering, sociology, business, and insurance that discuss the earthquake problem in the U.S., the vulnerability of our built environment, the impact of damaged and destroyed facilities on social and economic systems, and precautionary measures to reduce exposure to risk. Additional topics include: strategies for dealing with earthquake hazards; comparisons between Kobe, Japan, and major U.S. metropolitan areas; characteristics of earthquakes in the eastern and central U.S.; issues in preparedness and mitigation; risk mitigation; economic and business impacts; and the effect of catastrophic losses on the insurance industry. Finally, the book contains recommendations for reducing the economic risks of earthquakes in the U.S.

Fire

***Fire Safety Education Resource Directory**. Publication No. FA-172. 1997. 654 pp. Free. Available from the Federal Emergency Management Agency (FEMA), U.S. Fire Administration (USFA), Publications Center, 16825 South Seton Avenue, Emmitsburg, MD 21727; (301) 447-1189; fax: (301) 447-1213; USFA Automated Publications Line: (301) 447-1660; WWW: http://www.usfa.fema.gov.*

The U.S. Fire Administration compiled this resource directory to provide information on the materials available from a variety of sources for creating, improving, or expanding public education programs on fire safety. Divided into 13 broad categories, topics include burn and scald prevention, CPR and first aid, electrical hazards, escape plans and drills, fire and the elderly, fire extinguishers, fire safety and the disabled, flammable fabrics, residences, residential fire inspections and home safety, fire safety programs for schools and day care facilities, smoke detectors, and other programs, including fire service personnel resources and foreign language programs. Entries contain the name of the item, a brief summary of its contents, the item number, its suggested audience, and contact information.

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. Please send information of potential interest to the center or the

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http://www.colorado.edu/hazards

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September 2, 1997

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