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State Mandates and Local Policy

--an invited comment

Three land-use policy trends are significantly affecting hazards mitigation in the United States. The first is a change in the way government attempts to exert influence. Government is shifting from a "heavy hand" of regulation toward greater use of incentives, illustrated by the introduction of the Community Rating System into the National Flood Insurance Program and by emphasis of the Federal Emergency Management Agency (FEMA) on mitigation and proactive incentives to reduce losses from natural disasters. The second trend is the growing state role in hazards reduction programs. This trend reflects a more general trend in the implementation of environmental policy, where the role of states is increasing. The third trend is the broader renewed attention to mitigation as a cornerstone for managing natural hazards. An important but largely unrealized element of this approach is land-use regulation to manage development in hazard-prone areas.

We could write much about the forces behind these trends and the significance of each, particularly the burdensome aspects of command-and-control regulation, federal mandates that shift costs to state and local governments, and the support for hazard mitigation programs. The state role is important in these discussions because states can and will be central in working with local governments and the private sector to bring about effective hazard mitigation. However, this role has not been studied in depth.

We have undertaken two large multi-year research projects, in collaboration with a dozen colleagues in diverse parts of the world, to examine state policies governing land use and development in hazard-prone areas. The first project addresses the effectiveness of state requirements that local governments undertake comprehensive planning to manage development. From this study, we have drawn lessons about the importance of such mandates in fostering comprehensive hazard mitigation. The second project addresses new forms of hazard mitigation mandates, particularly innovations in Australia and New Zealand, which provide insights about state and local collaboration in carrying out hazard mitigation.

Making Governments Plan: State Experiments in Land-Use Planning

Twelve states now require local governments to prepare comprehensive land-use plans, and, as part of that planning, to find solutions to problems posed by exposure to natural hazards. While much has been written about these state planning programs, a key question has not been answered: Do these new state efforts have any real impact on local government decisions? Previous studies make it clear that the pace with which local governments incorporate considerations of risk is slow without some form of external inducement.

By comparing the experiences of local governments in states with comprehensive planning mandates (California, Florida, North Carolina-coast) to others without mandates (North Carolina-mountains, Texas, Washington), we were able to evaluate the influence of mandates on local plans, and the

influence of mandates and plans on local development management. Three key findings emerged:

- **Planning Mandates Make a Difference.** Local governments are more likely to prepare comprehensive plans when required to do so. For states that require comprehensive plans of local governments and follow through on those requirements, local plans have more substantial factual underpinnings, goals tend to be stated more clearly, and local policies proposed for guiding development are stronger. Furthermore, these higher-quality plans foster commitment by local officials to mitigate hazards. In states without mandates, plans, commitment, and development management programs tend to be substantially weaker.
- **Design and Implementation Efforts Matter.** The influence of planning mandates varies considerably among states. We attribute variation to differences in the way mandates are designed and to differences in the degree of effort state agencies devote to them. The key design variables are features (such as withholding state aid) that build local commitment to follow state directives and features (such as grants-in-aid and technical assistance) that build local capacity to develop hazard mitigation plans and programs.
- **Mandates Affect Development Management.** By influencing the quality and character of local plans, planning mandates in turn influence the way local governments manage development in hazard-prone areas. Only those communities with strong planning commitment *and* good plans undertake balanced mitigation programs that combine public information, building standards, land-use regulation, and structural protection.

Cooperative Policies in Australia and New Zealand

In order to explore these issues further, we launched a second research project that compared key aspects of the American study with planning processes addressing floodplain management in New South Wales, Australia, and planning for environmental management in New Zealand. This research provided a more systematic comparison of relatively prescriptive and coercive American mandates to the more outcome-oriented and cooperative policy mandates in Australia and New Zealand.

Specifically, we examined what it takes to bring about intergovernmental cooperation, which cannot be legislated, especially when there is a history of distrust among layers of government. Much depends on the abilities and willingness of lead state agencies to adopt a cooperative, capacity-building stance toward local governments. We found variation in these factors among lead agencies and between headquarters and the field. Legal formalism (e.g., judicial review, formal commentary on local plans) can become a key obstacle to a cooperative regime.

We also discovered a commitment conundrum. Clearly, gaining the commitment of local governments to hazard mitigation is a key challenge, and we found that the process of developing a plan can be important in mobilizing constituencies for hazard mitigation and influencing the commitment of elected officials. However, because not all jurisdictions will undertake such processes, we believe state (or higher-level) mandates are necessary. The trick is to design a mandate that is not overly prescriptive in telling local governments what plans must contain or how they should manage development in hazard-

prone areas. Instead, state officials who implement mandates need to be firm with local governments about the *procedures* that are used in preparing plans, so that all relevant stakeholders are brought into the planning process.

In comparing coercive and cooperative approaches, we identified two dilemmas. The dilemma for the coercive approach is that it tends to work well in getting local governments to follow dictates, yet it limits local innovation and the ability to tailor solutions to local circumstances. Conversely, although the cooperative approach fosters local ownership of problems and spurs innovation in local management of development, it is only effective in those jurisdictions that are committed to doing something about natural hazards. Even when many of the traditional inducements (e.g., financial assistance and technical advice) are present, compliance is spotty, at best, for local governments that do not view hazards as an important problem.

Policy Implications

The overall message of these two research projects is clear: state (or higher-level) planning mandates make a difference. If states fail to employ comprehensive planning mandates, they forsake an important tool for persuading local governments to manage development in hazard-prone areas. However, mandates must be properly designed and implemented. With respect to hazards policies in the United States, we conclude that government should:

- **Incorporate Planning into Federal Policies.** Federal hazards policies (e.g., coastal management, hurricane preparedness, and earthquake risk reduction programs) should strongly encourage, if not require, states to use planning mandates for development in hazardous areas. Federal programs in which the government has attempted to influence local mitigation of hazards (e.g., the National Flood Insurance Program) should invoke planning mandates.
- **Adopt Planning Mandates at the State Level.** Mandates push local governments to use new approaches to address natural hazards and other development management issues. By empowering planners and putting land-use tools on the table, mandates shift the policy mix. Equally important, planning mandates foster a much stronger store of knowledge in the facts, goals, and policy dimensions of problems and solutions. Our evidence suggests higher quality plans help foster better development management programs.
- **Design Better Mandates.** How does one increase shared commitment to hazard mitigation among different layers of government and foster practices that promote, rather than undermine, sustainability? Three ingredients appear to be essential. The first is adequate authority for state agencies to monitor and enforce compliance with prescribed planning processes. The second is programs that build commitment to state policy objectives, evidenced when state and local officials agree that natural hazards are a serious problem requiring attention. The third is capacity-building tools within mandates, such as technical assistance, workshops, model plan provisions, and maps of hazard zones. (These are also important tools for helping to bring about commitment.)
- **Rethink Implementation Strategies.** Strong outreach efforts to those jurisdictions that are incapable or unwilling to participate is required. Different approaches can be employed; for

example, state governments can deal leniently with local governments that make good faith efforts to comply with procedural prescriptions, put pressure on those that are reluctant, and provide technical assistance to those that are incapable.

One central question that remains is the extent to which the principles of cooperative regimes, such as those found in New South Wales and in New Zealand, can be transferred to the United States. The American system is exceptional for its procedural and legal complexity in regulatory programs and intergovernmental policies. We have discovered that legal formalism can undermine a cooperative approach among layers of government. Breaking through these complexities and the adversarial climate is a noteworthy challenge. Our hope is that others will see our findings as challenges and an incentive to identify further improvements in hazards policies.

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and

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Editor's Note

Full reports of the research referred to by May and Burby will be available in two forthcoming books: 1) *Making Governments Plan: State Experiments in Managing Land Use*, by Raymond J. Burby and Peter J. May, with Philip R. Berke, Linda C. Dalton, Steven P. French, and Edward J. Kaiser; Baltimore, Maryland: Johns Hopkins University Press (Fall 1996); and 2) *Environmental Management and Governance: Intergovernmental Approaches to Hazards and Sustainability*, by Peter J. May, Raymond J. Burby, Neil J. Ericksen, John W. Handmer, Jennifer E. Dixon, Sarah Michaels, and D. Ingle Smith; London: Routledge (August 1996).

Looking for Information

The University of Colorado-Boulder is considering contracting for assistance in developing a business continuity and disaster recovery program. Therefore, the campus administration is seeking any

descriptions, specifications, and informational literature from vendors that address business continuity and disaster recovery and provide a description of specific tasks the campus should undertake, a description of a recommended process to develop such a program, an estimate of types and numbers of campus personnel that would be involved, and an estimate of the total costs, including labor and materials. These figures will be used for informational purposes only.

Individuals or companies should respond by May 31, 1996. For a copy of the complete request for information, contact *Betty Dadisman, Buying and Contracting Department, 1B29 Regent Administrative Center, Campus Box 8, Boulder, CO 80309-0008; (303) 492-7774; fax: (303) 492-6507; e-mail: dadisman@spot.colorado.edu.* Questions about the project should be directed to *Dave Evans or Michell Irving, Police Department, Campus Box 502, University of Colorado, Boulder, CO 80309-0502; (303) 492-7311; fax: (303) 492-4427; or Dennis Maloney, Telecommunications Services, Campus Box 313, University of Colorado, Boulder, CO 80309-0313; (303) 492-1282; fax: (303) 492-5105.*

Our Spring Line . . .

New Offerings from the Natural Hazards Center's Publications Department

The Natural Hazards Center has published yet another bundle of inciteful writings for readers of natural hazards literature. In the spirit of spring, new beginnings, and fresh ideas, we offer the following.

Evacuating People on the Move

Two years ago sociologist Tom Drabek published *Disaster Evacuation and the Tourist Industry*--a hard look at disaster planning (and the lack of it) among hoteliers and others whose livelihood centers on tourism (see the *Observer*, Vol. XVIII, No. 4, p. 4). His conclusion was that the tourist industry represented a "ticking time bomb" because of its lack of preparation for disaster.

Even before that study was complete, Drabek had begun looking at the behavior of tourists themselves when disasters struck. He subsequently expanded this study to include other transient individuals--business travelers, migrant workers, and homeless persons--and the results of that research are now available in the Hazards Center's latest monograph, *Disaster Evacuation Behavior: Tourists and Other Transients* (Monograph #58, 1996, 375 pp.).

Disaster Evacuation Behavior addresses the basic question: When people are away from home and are impacted by disaster, how do they respond? Through interviews with over 800 individuals who were affected by one of three hurricanes or two earthquakes, this comparative study provides two important answers to this question: 1) policies and procedures for the timely evacuation of tourists and other transients are spotty at best and frequently leave victims critical of those they feel are responsible for their safety, and 2) investments in community disaster planning through public-private partnerships can

reduce a community's vulnerability to catastrophe--a vulnerability that otherwise worsens daily.

Drabek's monograph covers the five objectives of his research: 1) to describe the behavior that culminates in evacuation from disaster sites by persons who are away from their residences--for example, tourists, business travelers, migratory workers, or people in the process of relocating; 2) to describe the range of variation in this behavior among different types of evacuees, events, disaster phases, and locations; 3) to identify factors that affect variation in these behavioral sequences; 4) to document perceptions of disaster victims regarding evacuation policies and procedures implemented by private firm executives and government representatives; and 5) to formulate policy recommendations for local emergency managers and business executives.

Drabek concludes by constructing a set of prediction models to answer the question: Who leaves first?, and then presents an "Action Agenda" for both disaster managers and tourist industry personnel. In a sense, this book is part of Drabek's attempt to defuse the "ticking time bomb" before it's too late.

Disaster Evacuation Behavior: Tourists and Other Transients costs \$20.00, and copies are available from 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.* See the chart on the following page for shipping charges.

Making Flood Mitigation a Local Issue

If "all mitigation is local," then the Association of State Floodplain Managers (ASFPM) is right on target. The group held its annual meeting in Portland, Maine, in 1995 under the theme "From the Mountains to the Sea--Developing Local Capabilities." The proceedings from that meeting, held May 22-26, 1995, are now available from the Natural Hazards Center.

From the Mountains to the Sea--Developing Local Capabilities (Special Publication #31, 1996, 486 pp., \$20.00) contains 85 papers on nearly all aspects of floodplain management. Sections address local and regional efforts, building local capability, public involvement and education, acquisition and relocation of flood-prone structures, multiobjective floodplain management, watershed management, natural and cultural resources and environmental compliance, mapping, modeling and new technology, flood-proofing, flood warnings, coastal hazards management, national programs, and international perspectives.

Copies are available from the *Publications Clerk* at the address on the previous page. See the chart below for shipping charges.

Looking at Floods as a Social Issue

Following the widespread flooding in the Midwest in 1993, the Federal Interagency Floodplain Management Task Force established a Scientific Assessment and Strategy Team to undertake a massive

data-gathering and interpretation project. Part of that effort was the compilation of a bibliography of the social aspects of flooding in the U.S., and the Natural Hazards Center has recently published the results of that endeavor.

The Socioeconomic Aspects of Flooding in the U.S.: A Topical Bibliography (T.B. 19, 1996, 50 pp.), by John Wiener, lists all sorts of useful resources that address federal policy; natural hazards in general; disaster relief; the impacts of the 1993 flood; social, health, and psychological impacts; insurance and the national flood insurance program; agricultural assistance; land values, flood risks, and flood hazard mitigation; local governments; nonstructural measures; wetlands; navigation; and economic analysis.

Printed copies cost \$20.00 and can be ordered from the *Publications Clerk* at the address on page 5. See the chart below for shipping charges.

For Lighter Reading, May We Recommend . . .

The Natural Hazards Center administers a program, sponsored by the National Science Foundation, that enables social scientists to conduct research at disaster sites immediately after impact. The findings from these studies are published by the center as Quick Response Reports, which are available from the center in two formats: 1) in printed form for the cost of reproduction and mailing; and 2) from the Natural Hazards Center home page on the World Wide Web for free.

The four most recent reports include:

QR78: *Self Organization in Disaster Response: The Great Hanshin, Japan, Earthquake of January 17, 1995*, by Louise K. Comfort. 1995. 50 pp.

QR79: *Transition from Response to Recovery: A Look at the Lancaster, Texas, Tornado*, by David M. Neal. 1996. 12 pp.

QR80: *Effects of Investigation of a Fatal Air Crash on 13 Government Investigators*, by Carolyn V. Coarsey-Rader. 1996. 15 pp.

QR81: *Newspaper Reporting in the Wake of the 1995 Spring Floods in Northern California*, by Ute J. Dymon and Francis P. Boscoe. 1996. 12 pp.

Printed copies of all Quick Response Reports cost \$5.00, but shipping charges vary. See the chart below for prices.

For those in an electronic frame of mind, the Quick Response Report page can be accessed from our home page (listed on the back of this *Observer*), or via the direct URL:

[qr/qr.html](#)

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Number of Pages	Printed Matter	First Class
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36 - 80	\$3.50	\$4.00
81 - 450	\$4.00	\$5.00

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36 - 80	\$3.50	\$4.50
81 - 450	\$5.00	\$6.00

International

Number of Pages	Surface Printed Matter	Air Printed Matter
0 - 35	\$4.00	\$5.00
36 - 80	\$5.00	\$6.00
81 - 450	\$6.00	Please call for price

Hazards Assessment Update

The Natural Hazards Research and Applications Information Center is currently undertaking an assessment of knowledge and research needs regarding natural hazards in the United States (see the *Observer*, Vol. XX, No. 2, p. 6). We offer these assessment updates to inform readers of the *Observer* of the efforts of the many contributors to the project.

Insurance Issues

Before 1988, the insurance industry world-wide had never experienced a loss greater than \$1 billion due to a single event. Since that date, there have been 15 natural disasters that have exceeded that figure. Topping the list is Hurricane Andrew, with insured losses exceeding \$15.5 billion. The Northridge earthquake is a close second, with current estimated damage in the range of \$13 billion. These events have severely strained the capacity of the insurance industry to provide financial protection against future disasters. The increasing concentration of population and new structures in hazard-prone regions, notably coastal areas subject to hurricanes, suggests that catastrophic losses are only likely to increase in the future.

The Assessment Subgroup on Insurance is documenting these changes and assessing how well insurance in the United States has been able to identify and distribute risk, deter their impacts, and monitor and control natural hazards. We are also trying to project current trends into the future. There is considerable empirical evidence suggesting that few individuals voluntarily protect themselves against natural hazards until after a severe disaster occurs. Meanwhile, on the supply side of the equation, insurance companies have been reluctant to offer coverage against earthquakes and wind damage due to hurricanes.

The subgroup is now completing a preliminary draft of a monograph that examines the factors primarily responsible for the limited demand for insurance by potential disaster victims and the reasons why there is a lack of interest by insurers and reinsurers in supplying coverage against events that have catastrophic potential. We are also exploring the more effective use of insurance in conjunction with other policy tools, such as regulations and standards, to reduce future losses from natural disasters and the potential role of new financial instruments, as well as some type of federal reinsurance, to help cover insurer and reinsurer losses due to a mega-disaster.

Specifically, we are looking to the National Flood Insurance Program for insights into the links between insurance and other policy tools. To encourage mitigation, while at the same time promoting coverage, the insurance industry will need to form solid partnerships with other interested parties in the private sector, such as financial institutions and the real estate community, as well as local, state, and federal government agencies.

The subgroup welcomes ideas and contributions from both researchers and practitioners. Please contact *Howard Kunreuther, Center for Risk Management and Decision Processes, Wharton School, University of Pennsylvania, Philadelphia, PA 19104; (215) 898-4589; fax: (215) 573-2130; e-mail: kunreuth@wharton.upenn.edu.*

Examining Economic Icons

The icons of economic fragility and smoothly functioning market response to risk and disruption are powerful images guiding how we see both disasters and hazard policies. These concepts tend to provide rallying points for proponents of differing political/ideological persuasions to argue their respective positions and values. The Economic Subgroup is currently drafting a monograph that examines the economic myths, or icons, that have emerged since the first hazards assessment 20 years ago. Some of these myths are supported by subsequent events, and some are not. Given the charged and politicized nature of the subject, the subgroup anticipates that the findings will stir both backlash and debate.

A closer examination of the six following icons suggests that risks to the economy have, in some cases, been overstated and, in others, ignored completely. Economists will have to re-examine these notions in a rapidly shifting political and economic landscape, recognizing: 1) the extent to which the country's demographic and wealth patterns are in a state of flux; 2) the influence that global markets exert on domestic affairs; and 3) the greater political and economic autonomy of state governments in the wake of federal downsizing. The last of the three is clearly the most important; decentralization implies a greater concentration of hazard risk. The Northridge earthquake proved to be a modest event for the nation as a whole, but would have been ruinous to California had that state been solely responsible for rebuilding destroyed public infrastructure.

Icon 1) Regional economies are highly fragile; losses radiate from crippled economic sectors to interconnected suppliers and demanders. There is little evidence that disasters produce sizable indirect economic losses (the so-called ripple effects produced by supply shortages or the loss of forward markets). However, economic performance data collected after the Hanshin, Northridge, Andrew, and Hugo disasters underscore the importance of pre-existing and subsequent economic conditions, such as levels of unemployment and economic structure, outsourcing, and reconstruction spending. This does not imply that regional economic collapse is impossible; it may well occur. However, at this point we have only a crude notion regarding what conditions might promote such fragility.

Icon 2) Disasters are good for economies. Reconstruction after Hurricane Andrew and the Northridge earthquake fueled economic recoveries in both Dade and Los Angeles counties. However, such gains were short-lived and purchased at the expense of future economic growth. Disaster-related indebtedness depressed normal household spending and restricted local government's ability to borrow. Furthermore, federal assistance added to the federal debt.

Icon 3) Financial institutions are highly fragile and are prone to collapse when shocked. Except for the 1929 stock market collapse and the ensuing wave of bank failures, financial markets have exhibited resiliency--they are anything but frail. Since the depression, they have weathered a savings and loan debacle, another stock market "correction" (otherwise known as "Black Tuesday," October 19, 1989, where the market lost 20% of its value in a single day), and a string of costly natural disasters. None of these produced bank runs, panic selling, or fallout for the economy as a whole. Why? Better information and the development of risk-spreading strategies (hedging) have served to absorb these shocks. Most

important, the emergence of a highly integrated and informed world capital market (\$30 trillion) has served to insulate most economies from wild swings in capital asset values.

Icon 4) The Great Tokyo earthquake will induce a worldwide financial panic, causing the U.S. to slip into a 1929-like depression. The world capital market (nearly \$30 trillion) dwarfs the loss forecast for even the costliest natural disaster. Financial markets have thus far been unmoved by disaster (Kobe) or the prediction of disaster (annual hurricane forecasts in the U.S.). Japan's banking fiasco, fueled by a speculative bubble in real estate prices, is reputed to have cost Japanese banks upwards of \$1 trillion. Despite these losses, Japan's unemployment rate appears to be driven by other forces. Furthermore, this "crisis" has had little impact on a booming U.S. stock and bond market. This does not discount the possibility that under certain conditions capital flight might prove problematic.

Icon 5) Housing markets reflect natural hazard risk; therefore, public sector intervention is unnecessary and meddling. There is little evidence to support this contention. An analysis of tens of thousands of real estate transactions in Los Angeles, San Francisco, and Alameda counties shows that, in areas near known seismic faults, homebuyers either do not care about hazards or they remain ignorant despite the availability of published risk information. Research on how to improve risk signaling via the real estate market seems warranted.

Icon 6) Without rational price signals such as those provided by insurance, mitigation efforts will remain haphazard. The patterns of damage after Hurricane Andrew and the Northridge earthquake were surprising. Welded-frame multistory structures and single family wood-framed houses failed at acceleration levels and wind velocities below their respective design limits. It appears that the creation of credible damage functions (at least for hurricanes and earthquakes) may be more difficult than once thought. Without a credible means of predicting damage, the efficacy of insurance must be called into question. The problem is compounded by the legislative compromises that are the inevitable result of attempts to fashion an all-hazards insurance program. At this juncture, we can only caution that the pricing of insurance may not prove to be as rational as once hoped, and further work to enhance the accuracy of loss estimating techniques and predict how populations at risk are likely to respond to compromised rate differentials is essential.

The subgroup welcomes ideas and comments regarding their efforts from both researchers and practitioners. Please contact *Hal Cochrane, Hazards Assessment Laboratory, Colorado State University, Fort Collins, CO 80325; (970) 491-6493; fax: (970) 491-2925; e-mail: hcochrane@vines.colostate.edu.*

The Internet Page

(Another Hodgepodge of Interesting Stuff We've Stumbled Across on the Net)

[Home.html](#)

The Natural Hazards Center's very own Web site has a couple of new resources available:

First, the *Natural Hazards Observer*--the award-winning periodical you are scrutinizing at this very moment--is now available on-line, even before it appears at your local newsstand. The direct URL is:

[o/http://www.colorado.edu/hazards/o/](http://www.colorado.edu/hazards/o/)

In addition, the Hazards Center Web site now offers an annotated list of other centers and institutions (primarily in academia) that conduct research on hazards and disasters, with contact information, a brief description, and hypertext links, if available.

<http://volcano.und.nodak.edu/>

Those people at the University of North Dakota must have a lot of time on their hands, between waiting out the latest arctic blizzard and trucking through the drifts to the next home hockey game. And they've put that time to good use (at least in the computer department); UND was a pioneer in e-mail lists for disaster communications and now they've put up a sharp Web site, called *Volcano World*, that covers almost all aspects of volcanoes. The home page includes the following items: What is Volcano World?: Volcanoes of the World; Volcanic Parks and Monuments; Learning about Volcanoes; Test your Knowledge of Volcanoes Contest; Ask a Volcanologist; Search Volcano World; Search the Bulletin of Volcanology; Volcano News; and a space for providing comments.

http://xrfmac.lanl.gov/heiken/IAVCEI_home_page

Another place to look for the latest information on lava, lahars, and lapilli is the home page of the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI). The site includes information about the association's structure, purpose, and programs, and about many of the association's members. It also offers a publications list, a list of safety recommendations for volcanologists and the general public, a list of upcoming conferences, and *numerous* links to other volcanology sites on the Web.

<http://tsunami.ce.washington.edu/tsunami/counter.acgi?view>

This on-line, interactive resource of tsunami information contains extensive background information intended primarily for the general public, including information about the mechanisms of tsunami generation and propagation, great tsunamis in history, the impact of tsunamis on humankind, tsunami warning systems, and tsunami hazard mitigation. The site also includes more detailed material about recent tsunami events and ongoing studies that will be of interest to tsunami and interdisciplinary researchers. Finally, the site provides numerous links to other World Wide Web pages with tsunami data.

<http://www.ccalmr.ogi.edu/STH>

If you're looking for more scholarly information about tsunamis and the latest scientific research, abstracts from the international journal of the Tsunami Society, *Science of Tsunami Hazards*, are now also available on the Web. In the future, special issues of the journal will include full papers from this Web site. The site also includes general information about the Tsunami Society, conference

announcements, and, of course, links to other sources of tsunami data.

<http://gandalf.ceri.memphis.edu/~cusec/index.html>

The Central United States Earthquake Consortium (CUSEC) is now on line. The CUSEC home page provides a broad overview of the agency, a list of organizations with which CUSEC works, and information on the state agencies that make up the consortium. CUSEC is in the process of expanding the page to include more in-depth information on the organization and its mission, and invites comments and suggestions on this new venture into cyberspace. The e-mail address for CUSEC is *cusec@ceri.memphis.edu*.

<http://www.dartmouth.edu/artsci/geog/floods/Index.html>

A team of geographers at Dartmouth College is using satellite technology and other means to develop up-to-the-minute flood maps to support flood management and relief efforts and to further flood prediction around in the world. The Global Flood Monitoring and Analysis Project uses high resolution synthetic aperture radar (SAR) satellite imagery, which dramatically enhances the remote sensing of floods. With this technology, floods can be viewed and mapped even through heavy cloud cover and at night. The team is both using current technology and developing new techniques for using SAR to analyze extreme flood events. This Web site includes an evolving data base of extreme events that have occurred in areas around the world since January 1, 1994, as well as satellite SAR images of several major floods. In addition the site serves as a research tool for quick response mapping of ongoing major floods. In short, this home page contains a wealth of data on recent flooding for response agencies and researchers alike.

<http://hoshi.cic.sfu.ca/~anderson/hazards96/call.html>

Persons interested in earthquake, tsunami, and volcano hazards in the Pacific Rim will want to review the abstracts of the papers and posters scheduled for presentation at the Pan Pacific Hazards '96 Conference to be held in Vancouver, British Columbia, Canada, later this summer (see the *Observer*, Vol. XIX, No. 6, p. 15). The full text abstracts, titles, and authors' names are in a searchable data base available from this Web site, along with the conference program, registration materials, and other information.

<http://www.fema.gov/PDF/fdp.htm>

The Federal Emergency Management Agency (FEMA) recently announced that three very popular pamphlets, produced through a cooperative effort between FEMA's Family Protection Program and the American Red Cross, are now available from FEMA's Web site. ***Family Disaster Plan***, ***Family Disaster Supplies***, and ***Emergency Preparedness Checklist*** have been scanned and PDF files that retain all of the original graphics are posted at the URL above. These files require the Adobe Acrobat Reader software to view and use. That software is available at no cost from the Adobe Web site: <http://www.adobe.com>.

Users are welcome to download these files, print them locally, and distribute them as necessary. As more material becomes available on the FEMA Web site in this format, the new additions will be announced on FEMA's "What's New" page: <http://www.fema.gov/fema/whatsnew.html>. For those who prefer more conventional technology, camera-ready art and a limited number of printed copies are available from the *FEMA Distribution Facility, P.O. Box 2012, Jessup, MD 20794-2012; (800) 480-*

2520 or (202) 646-3059; fax: (301) 407-6378.

<http://www.slip.net/~dfowler/1906/museum.html>

That very same FEMA "What's New" page led us to another interesting site--the home page of the Museum of the City of San Francisco, which, not surprisingly, given that city's tragic disaster history, is chock full of information, images, and other Web stuff concerning the 1906 earthquake and fire, the 1989 Loma Prieta earthquake, and the 1991 Oakland Hills fires. The site is a gold mine for anyone searching for data on any of these events.

<gopher://gopher.unicc.org>

Each month, the specialized library at the United Nations Department of Humanitarian Affairs (DHA) Documentation Center and the International Decade for Natural Disaster Reduction (IDNDR) Secretariat library acquire a large number of new publications. The subjects covered include humanitarian assistance to victims of complex emergencies; natural disaster reduction, prevention, mitigation, preparedness, protection, relief, training, early warning, safety tips, etc.; technological disasters and their environmental impacts; disaster communications; civil defense; and other related subjects. Since June 1995, the bimonthly selections of recently acquired works have been posted by the Documentation Center on the Internet at the gopher site listed above. (They will soon also be available on the Web.) To browse information about these recent works, gopher to the address above, look under "DHA On-line," then under "DHA Information Sources," then under "DHA Documentation Center." The site includes hundreds of recent publications.

EQNET and the Earthquake Information Network

With support from the National Science Foundation, early this year the National Information Service for Earthquake Engineering (NISEE) at the University of California's Earthquake Engineering Research Center (EERC) hosted a workshop to establish a national earthquake information network. The workshop gathered together representatives from many of the major earthquake information organizations in the U.S., as well as representatives from several of the key groups who use such information, to discuss common needs and ways to integrate their work. The workshop resulted in the establishment of a steering committee and 11 working groups. To support the network and encourage ongoing discussion, NISEE has established an Internet discussion list for the participants.

One of the key initiatives coming out of the meeting was the decision to develop a national earthquake hazards Web site--EQNET--to serve as a clearinghouse and common entry point to the many sources of earthquake information now popping up on the Internet. Both the human network and the Web site are intended to foster cooperative activity and joint projects among the many providers and users of information in the earthquake community and thus limit duplication of effort.

Proceedings of this workshop will be issued this summer, and the group plans to continue meeting

regularly.

For more information about this initiative or to obtain proceedings ordering information, contact *Katie Frohberg, EERC, 1301 South 46th Street, Richmond, CA 94804-4698; (510) 231-9401; e-mail: katie@eerc.berkeley.edu*.

For details about the formation of the EQNET Web site, contact *Pat Coty, National Center for Earthquake Engineering Research, State University of New York-Buffalo, 304 Capen Hall, Buffalo, NY 14260-2200, (716) 645-3377; e-mail: nernceer@ubvms.cc.buffalo.edu*.

Washington Update

FEMA Releases Recovery Program Guide

When disaster strikes your state or community, do you know where to find current information on disaster assistance? To simplify the search, FEMA recently published *Disaster Assistance: A Guide to Recovery Programs*, which summarizes 100 federal financial and technical assistance programs available to individuals, businesses, and local governments. It includes specific agency disaster aid programs as well as regular programs that may be applied to disaster recovery under special circumstances. FEMA created this document at the request of state emergency management directors, who had expressed a need for this type of guidance.

Printed copies of *Disaster Assistance* are available from the *FEMA Publication Center, 8231 Stayton Drive, Jessup, MD 20794; (800) 480-2520; (202) 646-3484; fax: (301) 497-6378*. The guide will also be available soon from the FEMA Website: <http://www.fema.gov/fema/whatsnew.html>.

Taking a Snapshot of NEHRP User Needs

Agencies involved in the National Earthquake Hazards Reduction Program (NEHRP) recently participated in an evaluation of the needs of users and an assessment of existing knowledge that supports earthquake risk reduction. In the resulting report, *Earthquake Risk Reduction in the United States: An Assessment of Selected User Needs and Recommendations for the National Earthquake Hazards Reduction Program* (FEMA 263, 1995, 317 pp.), FEMA provides a "snapshot" of NEHRP user needs in four broad areas: the seismic hazard, the built environment, societal and policy issues, and implementation.

The effort resulted in six cross-cutting conclusions:

- Lack of funding has prevented the NEHRP from becoming a truly national program and has

limited the pace of mitigation.

- Management and coordination improvements are needed in the program.
- The lack of consensus involving various NEHRP products is limiting the pace of risk reduction.
- The link between research products and user needs or ability to use those products must be improved.
- The lack of, and the need for improvement in, existing codes, standards, guidelines, and methodologies are hampering risk reduction.
- There is a significant need for more education and for improvements in information flow from researcher to user.

The report also includes information on the success of technical publications, implementation courses for hospitals and health care facilities, a discussion of NEHRP strengths and successes, a bibliography, and a glossary.

Copies of the report are free and can be obtained from the *FEMA Publication Center, 8231 Stayton Drive, Jessup, MD 20794; (800) 480-2520; (202) 646-3484; fax: (301) 497-6378.*

Introducing Duryog Nivaran

Duryog Nivaran is a Sanskrit term meaning "disaster mitigation." Duryog Nivaran is now also a network of individuals and organizations in South Asia committed to and working toward an alternative perspective on disasters and vulnerability to improve disaster mitigation in the region. The group is similar to and closely affiliated with the Network for Social Studies on Disaster Prevention in Latin America (perhaps better known by its Spanish acronym--"La Red") (see the *Observer*, Vol. XVII, No. 6, p. 7; Vol. XVIII, No. 5, p. 13).

Rather than viewing disasters as isolated aberrations in the "normal" path of development, the members of Duryog Nivaran see catastrophes as manifestations of prevailing society and as unresolved problems of development. Hence, the group's emphasis is on improving social structure, that is, on effective rehabilitation, construction, and mitigation, rather than on response and relief operations. They believe that the aim of disaster management and relief organizations should not be to restore pre-impact conditions. Instead, all development activities, at the national or community level, should pay more attention to mitigating and preventing disasters; people most immediately affected by disasters--often the poorest members of a society--should be involved in this effort; and institutional structures that increase people's vulnerability to disaster should be identified and changed.

Duryog Nivaran has established a set of organizational objectives and a program strategy to reduce the vulnerability of communities to disasters by integrating this perspective into programs at all levels. That agenda, along with descriptions of all the members of the network, is set out in a booklet provided by the group. For a copy or for further information about Duryog Nivaran, contact *Mr. Hashanti, Coordinator*,

Duryog Nivaran Secretariat, ITDG Sri Lanka, 15 B Alfred Place, Colombo 3, Sri Lanka; tel: (94 1) 577455-7; fax: (94 1) 577 458; or Sanny Jegillos, Senior Manager, International Consultancies and Alumni Coordination, Asian Disaster Preparedness Center, Asian Institute of Technology, P.O. Box 2754, Bangkok 10501, Thailand; tel: (66-2) 524-5391, 524-5362; fax: (66-2) 524-5360; e-mail: SannyJ@ait.ac.th.

Looking for Information II

Wind Damage Data

The Federal Emergency Management Agency (FEMA) is currently evaluating a wind computer model for estimating damage to inland communities caused by hurricanes. As part of this effort, FEMA is looking for data related to wind speed, types of damage, and geographic location and would like to receive photographs, videos, or written descriptions and estimates of damage. Information on any wind-related damage that occurred as a result of Hurricane Opal would be particularly appreciated.

Any organization having such information, including state and local agencies, newspapers, utilities, and property insurers, is requested to send their data to *Eileen Miller, Greenhorne & O'Mara, Inc., 9001 Edmonston Road, Greenbelt, MD 20770*. For further information about this project, contact *Eileen O'Mara* at the above address or *Bill Massey, FEMA, Region IV, 1371 Peachtree Street, NE, Atlanta, GA 30309-3108; (404) 853-4430; fax: (404) 853-4440*.

Community Rating System

The Association of State Floodplain Managers (ASFPM) is conducting a nationwide review of the effectiveness of stormwater management practices in reducing flood hazards. This review is part of a comprehensive evaluation of the Community Rating System (CRS) currently being conducted by FEMA.

Objectives of this effort include: reviewing credit given within the CRS for stormwater management regulations, stormwater master plans, and freeboard for new buildings in B, C, D, and X flood zones; assessing the impact of management practices on downstream flooding; identifying the most effective regulatory standards; evaluating the option of giving credit to communities for increasing channel carrying capacity; and assessing effectiveness of erosion and sedimentation controls.

The ASFPM is looking for comments, reports, and studies relevant to these topics and asks that anyone with information forward it to *Dave Carlton, Chair, ASFPM Stormwater Management Committee, KCM, 1917 First Avenue, Seattle, WA 98101-1027; (206) 443-2788; fax: (206) 443-5372; e-mail: kcmsea@halcyon.com*.

Letters to the Editor

Teaching Is an Essential Component of Hazard Mitigation

Editor:

The *Natural Hazards Observer*, in its March 1996 issue, contains an invited comment by Walter G. Peacock of Florida International University entitled "Disasters, Development, and Mitigation: Taking a Proactive Stance." Professor Peacock's message is clear, logical, factual, and, above all, refreshingly and unexpectedly powerful, coming, as it does, from the world of academia where obscure research or esoteric writings are expected, by some popular belief, to be the norm.

I agree with the conclusions reached by Professor Peacock. Development, or the lack of development, can and must be managed to reduce the potential for damage from recurring hazard events in vulnerable communities. Implicit in the article is the need for total community involvement as a key element of the proposed proactive stance.

The active 1995 hurricane season provided an invaluable background for a graduate level class I taught in the Department of Construction Management at Florida International University during the fall of 1995. The class, entitled "Topics in Hazard Mitigation," followed an interactive "learn by doing" format, deriving practical real-life examples from hurricanes Marilyn, Opal, and Gerry as they brought destruction and suffering to many communities.

One of the many rewards of teaching this class was the tremendous wealth of accumulated practical knowledge my students brought with them to be shared with the group. Additionally, most of these students, having shared the experience of living through Hurricane Andrew and its aftermath, found in the class a forum to express their ideas and learn how to practice hazard mitigation in their professional lives.

As much as I was a teacher of hazard mitigation, I also learned important lessons from this class. I'd like to share two of these:

1. The empirical knowledge and real-life disaster experience of design professionals, building industry managers, code enforcement and other public officials, and of industrialists and business people involved in the protection of buildings and facilities, offers very fertile ground for the promotion of hazard mitigation ideas and practices.
2. Teaching at the university and college level is a practical way of transferring a wealth of knowledge to those who can do the most for hazard mitigation, by applying what they learn in the daily practice of their professions. Teaching can complement research activities and become a catalyst for the implementation of hazard mitigation measures and the protection of vulnerable

communities.

With these lessons in mind, I'd like to propose the following:

1. Education, that is the teaching of hazard mitigation and other emergency management-related topics, should be made an integral component of the proactive stance recommended by Professor Peacock.
2. Universities and other institutions of higher learning should and must take the lead in developing, implementing, and promoting educational programs that can become effective tools in the practice of hazard mitigation.

In summary, and borrowing from Professor Peacock's article, proactive mitigation also means teaching mitigation.

Florida International University has already started its contribution by offering the Topics in Hazard Mitigation course, by planning seminars and workshops, and by its association with the International Center for Hurricane Damage and Mitigation Research, as well as with the National Hurricane Center.

Twenty-seven other universities and colleges throughout the United States already offer degrees, certificates or continuing education programs in different areas of emergency management and hazard mitigation. Some of these also have important research programs and extended education and communication efforts underway.*

The Federal Emergency Management Agency [FEMA] has undertaken a "Higher Education Project" to encourage and support the efforts of universities and colleges in the area of emergency management and hazard mitigation. Additionally, FEMA's Emergency Management Institute (EMI), at Emmitsburg, Maryland, has had a comprehensive, and always expanding, educational program in place for some time.

Universities and colleges, hand in hand with FEMA and EMI, and with professional associations such as the American Institute of Architects (AIA), the American Society of Civil Engineers (ASCE), and others, must proactively develop teaching and research programs in these fields. Local and state governments must support these efforts with appropriate budgetary allocations. The manufacturing industry, and especially the insurance industry, must also be on board supporting these programs.

Let's move forth and teach. An investment in teaching will result in benefits, especially in the form of more protected communities and reduced future damages due to hazards, that will exceed by far any costs associated with this effort. The personal and institutional rewards will also be significant.

Ricardo A. Alvarez, FEMA Hazard Mitigation Officer, Adjunct Professor, Florida International University

*For a list of colleges and universities offering courses in disaster management, see the Natural Hazards

Center's World Wide Web home page: [Home.html](#).

On The Line

Rehearsing for Recovery

We've All Been There

Most emergency response officials have endured this scene before. Local government administrators sit around a long table wearing long faces during the annual "table top" disaster simulation. The exercise officer reads the scenario. A tornado strikes the community and the play begins.

The firefighters describe the possible emergencies they would have to face and how they plan to respond. The police and medical teams do the same. Two hours later, the "incident" has been handled (more or less), and the exercise is over for another year. Meanwhile, the human resources director, bored and uninterested in the exercise because she is unaware of the potential impacts of a disaster on her department, has used the time to look over backlogged employment applications. And the city manager has nodded off four times, despite gentle nudges from the deputy city manager.

A Different Approach

Why are so many key officials uninterested in the effects of a disaster? The problem is that most disaster simulations include only the agencies involved in emergency response and cover only the emergency phase of a disaster. Many communities overlook what occurs *after* the emergency phase, that is, what it takes for a community to recover from disaster.

The city of Olathe, Kansas, tried something different in 1995: a recovery phase disaster simulation. Departments that had been tested and retested (firefighters, police, and medical professionals) in the previous exercises became secondary, while municipal services, human resources, information services, engineering, planning, housing and human services, and the city manager's office took on primary roles.

In phase one of our recovery exercise, involving a small tornado strike, emergency responders simulated their usual response functions. Then we took a break and advanced the clock twelve hours to begin phase two.

We threw common disaster recovery problems--such as dealing with inquisitive members of the news media, supervising unsolicited volunteers, scheduling emergency work rotations, coordinating debris removal, handling long-term disaster site security, and rapidly assessing damage--into the laps of never-before-tested administrators. Administrators who were previously uninvolved and uninterested in disaster exercises had to think seriously about what role they would play following such an event.

The Benefits to Our City

What were the benefits for Olathe? Non-emergency administrators learned the difficulties of rapid decision making with only superficial information and unpredictable long-term effects. They also discovered potential problems that had never been considered before, such as staff's lack of understanding of the legal implications of damage assessment, much less which forms to use. Other administrators discovered that a low-tech backup for the networked computer system was a critical need. Without it, the system might be down for days or weeks--although payroll checks and other warrants would still be needed.

Perhaps most critically, city administrators learned that preparation for disaster recovery is a basic requirement for a full-service city government. As we've seen in disasters in other cities, citizens demand competence after disaster strikes, and the unprepared pay dearly. Preparation for recovery is critical to a community's and its city administrators' survival.

A disaster recovery exercise must:

- educate top administrators about the problems that occur, such as the need to document fast and furious financial outlays in order to receive reimbursement from state or federal government;
- reveal the unique situations that will confront a community and its local government during recovery, such as the need to assist city workers' families, who may be suddenly homeless, while the employees are working forced and extended shifts;
- give administrators the incentive to improve their own departments' readiness by developing departmental emergency operating centers and procedures,
- build general support for a formal disaster management program and encourage participation in the preparation of emergency operations plans, and
- better prepare a community as a whole for recovery.

So, this year when you're brooding about the upcoming task of planning yet another emergency response simulation, be unconventional in your thinking. Think recovery!

Mike Penner, Emergency Management Director, Olathe, Kansas

The author can be contacted at *Box 768, Olathe, KS 66051; (913) 829-3747; fax: (913) 829-6625; e-mail: dmfd87a@prodigy.com.*

NEMA Takes Stock of State Emergency Management Efforts

Emergency management in the United States is a shared responsibility of governments at the local, state, and federal levels. During the 103rd Congress, both the House and Senate formed bipartisan task forces

to examine the growing costs of disaster assistance. The House task force concluded that current federal disaster assistance policies, in some instances, may actually discourage individuals, communities, and states from mitigating the impacts of disasters. The Senate task force compiled a great deal of information on the relationship between federal disaster relief and the federal deficit.

However, a recent report from the National Emergency Management Association (NEMA) notes that neither of the congressional reports recognized that federal funds for emergencies are--by design--the last resort, that most response to such events is a local responsibility, and that federal resources are not called upon until an event overwhelms state and local capabilities. In an effort to develop a more balanced picture of spending for emergency management, NEMA, through the Council of State Governments (CSG), conducted an extensive survey in 1995 of all 50 states and one territory to gather a comprehensive overview of state spending for disaster preparedness and response. The results of that effort are contained in the report *NEMA/CSG Report on State Emergency Management Funding and Structures* (1996, 34 pp., \$25.00).

NEMA discovered that between 1992 and 1994, state costs for comprehensive emergency management have increased 5% for preparedness, 58% for mitigation, 6% for response, and 108% for recovery. Also, in fiscal year 1994, state spending for emergency management averaged \$6.23 per capita, and overall state spending in this area rose 37% for the period. Further, the study found that, although gubernatorial declarations rose by 26%, presidential declarations fell by 50%.

In addition to presenting data on staffing and budgeting, the report concludes that state expenses for preparedness and response are rising, as are federal costs. As a result, states continue to look for cost-effective ways to improve preparedness, mitigation, and response. Copies of the report are available from *NEMA, c/o CSG, P.O. Box 11910, Lexington, KY 40578-1910; (606) 244-8000 or (800) 800-1910*. Ask for publication C-138-9600.

Contracts and Grants

Social Stress and Functioning Following Hurricane Hugo, National Institutes of Health, \$36,750, 12 months. Principal Investigator: *Fran Norris, Department of Psychology, 456 Sparks Hall, Georgia State University, University Plaza, Atlanta, GA 30303; (404) 651-1610*.

Many theories state that one enduring behavioral consequence of trauma should be an increase in precaution. This research will build on a study of victims of Hurricane Hugo and will examine their efforts to protect themselves from subsequent traumatic events. It will address four major questions: 1) What is the frequency of cautious behavior? 2) What is the structure of this behavior? 3) What are the precursors for this behavior? and 4) What are the consequences?

Social and Cultural Dynamics of Disaster Recovery, National Institute of Mental Health, \$211,858, 12 months. Principal Investigator: *Fran Norris, Department of Psychology, 456 Sparks Hall, Georgia*

State University, University Plaza, Atlanta, GA 30303; (404) 651-1610.

This project will extend research begun following Hurricane Andrew, permitting follow-up interviews with the original sample and concurrent interviews with additional subjects within the stricken area and beyond to evaluate the social and cultural factors that relate to postdisaster community life. Ethnic, psychological, and socioeconomic factors will be measured.

Stress and Mental Health Effects of a Petrochemical Disaster, National Institutes of Health, \$504,880, 48 months. Principal Investigator: *Andrew Baum, University of Pittsburgh Cancer Institute, 405 Iroquois Building, Pittsburgh, PA 15213; (412) 624-4805.*

This is a comprehensive research project to study short- and long-term stress and mental health effects of petrochemical disasters. Workers at refineries and petrochemical plants who experienced fires or explosions in the workplace constitute an understudied population. This project will undertake three studies. The first will examine disasters that occurred between 1989 and 1992 and their effects on 300 Oil, Chemical, and Atomic Workers Union (OCAW) members. The second will involve OCAW workers who experience such events after this study has begun. The third will evaluate the effectiveness of a brief intervention administered at three disaster sites visited in the second phase of the study.

Stress Among Emergency Workers After an Air Disaster, National Institutes of Health, \$73,005, 12 months. Principal Investigator: *Andrew Baum, University of Pittsburgh Cancer Institute, 405 Iroquois Building, Pittsburgh, PA 15213; (412) 624-4805.*

On September 8, 1994, U.S. Air flight 427 crashed as it approached Pittsburgh International Airport, killing all 132 people aboard. The tasks of body location and recovery, recovering possessions and plane parts, and site cleanup fell to rescue, emergency, medical, civil, and airport workers. This research will evaluate lasting stress among the disaster workers, as well as potential mental health difficulties.

Psychosocial Consequences of Disaster--Longitudinal Study, National Institute of Mental Health, \$372,028, 12 months. Principal Investigator: *Elizabeth M. Smith, Washington University, School of Medicine, Campus Box 8134, St. Louis, MO 63110; (314) 362-2586; fax: (314) 362-4765.*

This study will examine the differences in responses of victims in the acute phase of a disaster compared to their responses three years later. Researchers will gather data regarding the course of recovery and the long-term psychiatric outcomes following disasters. Better understanding of the needs of disaster victims and of disaster typology will enhance future intervention programs.

Integrated Telecommunication Information System for Disaster Reduction, National Science Foundation, \$74,975, six months. Principal Investigator: *Leon R. Wang, InfraTech, Inc. 13429 Fairland Park Drive, Silver Spring, MD 20904; (301) 384-8896.*

The primary objective of this project is to develop a fast early warning system for impending earthquake motion. The system integrates advanced satellite telecommunication technology, intelligent sensor devices, and accumulated disaster modeling knowledge. The system may be able to provide early warning that will reduce earthquake casualties, and may be extended to global warning for severe storms, floods, and other disasters.

Public Policy and Behavioral Response Associated with Imminent Warnings: An Examination of Mexico City's Seismic Alert System, National Science Foundation, \$43,680, 12 months. Principal Investigators: *Paul J. Flores and James D. Goltz, EQE International, Inc., 44 Montgomery Street, Suite 3200, San Francisco, CA 94104-4805; (415) 989-2000; e-mail: pjflores@irv.eqe.com.*

Researchers will collect perishable information regarding the operation, policy issues, and behavioral response associated with Mexico City's earthquake early warning system (Sistema de Alerta Sismico) following the September 14, 1995, earthquake. Interviews with providers and users of the system will be conducted to understand the development, operation, and deployment of this system and to determine transferrable lessons for an early warning system in the United States.

United States Strong Motion Program Advisory Committee, National Science Foundation, \$306,237, five years. Principal Investigator: *J.C. Stepp, Earthquake Hazards Solutions, 6607 Cuesta Trail, Austin, TX 78730-2330; (512) 338-2330.*

Recent evaluations of the needs of the earthquake engineering and hazard mitigation communities have recommended a committee to deal with strong motion activities in the U.S. This funding will support the formation and management of this committee, to consist of representatives from the various strong motion recording networks and data users from academia and practitioners. The committee will identify issues that affect data acquisition and dissemination, set priorities, and form working groups to develop working papers with recommended actions.

Climatic Effects of Volcanic Eruptions, National Science Foundation, \$165,000, 36 months. Principal Investigators: *Alan Robock, University of Maryland-College Park, Department of Meteorology, Computer and Space Sciences Building, Room 2227, College Park, MD 20742; (301) 405-5377; e-mail: alan@atmos.umd.edu; and Georgi L. Stenchikov, University of Maryland-College Park, Department of Meteorology, Computer and Space Sciences Building, Room 2113, College Park, MD 20742; (301) 405-5370; e-mail: gs90@umail.umd.edu.*

This project will model the climatic effects of volcanic eruptions and include the construction of a data base of direct observations of recent eruptions and ice core records of past eruptions, in order to simulate climate effects.

Nondestructive Evaluation for Seismic Damage Assessments Using Real-Time X-Ray and Gamma-Ray Imaging System, National Science Foundation, \$74,886, six months. Principal Investigator: *Wei L. Cao, CSL Opto Electronics Corporation, 9806 Gwynn Park Drive, Ellicott City, MD 21042-5708; (410) 461-4131.*

This grant will provide the researchers with an opportunity to develop an x-ray or gamma-ray technique to visualize and quantify information on structural damage due to an earthquake, including damage location, pattern, and size. During the first phase of this research, CSL will work with the National Center for Earthquake Engineering Research to develop a portable, effective, low-cost inspection system.

Bereavement and Attributions in Fire Survivors, National Institutes of Health, \$371,104, 12 months. Principal Investigator: *Anne Keane, Department of Nursing, University of Pennsylvania, Philadelphia, PA 19104-6096; (215) 898-5766; e-mail: keane@son.nursing.upenn.edu.*

Residential fires are devastating events that produce loss of life and injury as well as emotional, social, and financial costs to survivors. Over 6,000 people die annually in the U.S. due to residential fires, but, because these fires are isolated disasters with a relatively low profile, little information is available on the reactions of survivors. This project will draw on the disaster research literature to describe the process of grieving over time in survivors; compare this process to other types of grief and loss; examine the effects of the fire and grieving responses; survey the relationship among grief and searching, self-blame, control, and preventability; and develop a predictive model of grieving responses in survivors of fire.

Hot Off the Presses . . .

Publications from the Disaster Research Center

The Disaster Research Center (DRC) at the University of Delaware, the oldest catastrophe research center in the world, engages in a variety of social science research projects on group and organizational preparations for, responses to, and recovery from community-wide emergencies, particularly natural and technological disasters. The center recently announced their newest publications. For further information about how to order them, contact the *DRC, Publications, University of Delaware, Newark, DE 19716*; (302) 831-6618; fax: (302) 831-2091; e-mail: susan.castelli@mvs.udel.edu; World Wide Web: <http://www.udel.edu/nikidee/drc.htm>. Prepayment is required.

Articles

#281: *Disasters and Catastrophes: Their Conditions In and Consequences for Social Development*, by E.L. Quarantelli. 1995. 18 pp. \$5.00.

#282: *Business Disruption Due to Earthquake-Induced Lifeline Interruption*, by Joanne M. Nigg. 1995. 15 pp. \$5.00.

#283: *Patterns of Sheltering and Housing in U.S. Disasters*, by E.L. Quarantelli. 1995. 12 pp. \$5.00.

#284: *Disaster Recovery as a Social Process*, by Joanne M. Nigg. 1995. 14 pp. \$5.00.

#285: *Risk Communication and Warning Systems*, by Joanne M. Nigg. 1995. 16 pp. \$5.00.

#286: *Social Science Approaches in Disaster Research: Selected Research Issues and Findings on Mitigating Natural Hazards in the Urban Environment*, by Joanne M. Nigg. 1995. 11 pp. \$5.00.

#287: *Societal Impacts and Emergency Response: The Hyogo-Ken Nambu Earthquake*, by Joanne M.

Nigg. 1995. 4 pp. \$5.00.

#288: *Societal Research Under NEHRP: Past Accomplishments and Future Directions*, by Joanne M. Nigg. 1995. 5 pp. \$5.00.

#289: *Editor's Introduction: What is a Disaster? and Epilogue*, by E.L. Quarantelli. 1995. 15 pp. \$5.00.

#290: *The Impact of the 1993 Midwest Floods: Business Vulnerability and Disruption in Des Moines*, by Kathleen J. Tierney, Joanne M. Nigg, and James M. Dahlhammer. 1995. 30 pp. \$5.00.

#291: *Business Vulnerability to Disaster-Related Lifeline Disruption*, by Kathleen J. Tierney and Joanne M. Nigg. 1995. 9 pp. \$5.00.

#292: *Societal Impacts and Emergency Response*, by Kathleen J. Tierney. 1995. 24 pp. \$5.00.

#293: *Working Sociologists as Globetrotters: Utilizing Disaster Research and Policy Networks*, by Russell R. Dynes. 1995. 17 pp. \$5.00.

#294: *Disastrous Assumptions about Community Disasters*, by Russell R. Dynes. 1995. 6 pp. \$5.00.

#295: *Preparedness Planning: The Adequacy of Assumptions about Social Organizations*, by Russell R. Dynes. 1995. 18 pp. \$5.00.

Preliminary Papers

#220: *Business Disruption Due to Earthquake-Induced Lifeline Interruption*, by Joanne M. Nigg. 1995. 14 pp. \$5.00.

#221: *Disasters are Different: Therefore, Planning for and Managing Them Requires Innovative as Well as Traditional Behaviors*, by E.L. Quarantelli. 1995. 26 pp. \$5.00.

#222: *Loan Request Outcomes in the U.S. Small Business Administration Business Disaster Loan Program*, by James M. Dahlhammer. 1995. 37 pp. \$5.00.

#224: *Determinants of Business Disaster Preparedness in Two U.S. Metropolitan Areas*, by James M. Dahlhammer and Melvin J. D'Sousa. 1995. 26 pp. \$5.00.

#225: *Social Aspects of the Northridge Earthquake*, by Kathleen J. Tierney. 1995. 12 pp. \$5.00.

#226: *Emergent Behaviors and Groups in the Crisis Time of Disasters*, by E.L. Quarantelli. 1995. 40

pp. \$5.00.

#227: *Disaster Planning, Emergency Management, and Civil Protection: The Historical Development and Current Characteristics of Organized Efforts to Prevent and to Respond to Disasters*, by E.L. Quarantelli. 1995. 32 pp. \$5.00.

#228: *Draft of a Sociological Disaster Research Agenda for the Future: Theoretical, Methodological, and Empirical Issues*, by E.L. Quarantelli. 1994. 42 pp. \$5.00.

#229: *The Future is Not the Past Repeated: Projecting Disasters of the 21st Century from Present Trends*, by E.L. Quarantelli. 1995. 24 pp. \$5.00.

#230: *Impacts of Recent U.S. Disasters on Businesses: The 1993 Midwest Floods and the 1994 Northridge Earthquake*, by Kathleen J. Tierney. 1995. 53 pp. \$5.00.

#231: *An Examination of Gender Roles in Crowds*, by Gary R. Webb, David Neal, and Brenda Phillips. 1995. 24 pp. \$5.00.

#232: *Emergency Preparedness Policy-Making: A Comparative Analysis Between California and Italy*, by Brunetta Baldi. 1995. 36 pp. \$5.00.

#233: *Earthquake Vulnerability and Emergency Preparedness Among Businesses in Memphis/Shelby County, Tennessee*, by Kathleen J. Tierney and James M. Dahlhammer. 1995. 36 pp. \$5.00.

#234: *The Impact of Disaster on the Public and Their Expectations*, by Russell R. Dynes. 1995. 16 pp. \$5.00.

#235: *Managing Organizational Impressions in Crisis Situations: Exxon Corporation and the Exxon Valdez Oil Spill*, by Kathleen J. Tierney and Gary R. Webb. 1995. 37 pp. \$5.00.

Dissertation

#30: *Disaster Settings and Mobilization for Contentious Collective Action: Case Studies of Hurricane Hugo and the Loma Prieta Earthquake*, by Catherine Simile. 1995. \$25.00.

Conferences and Training

These are the latest announcements the Hazards Center has received. A comprehensive list of all the meetings we've heard about is posted on our World Wide Web site:

[Home.html](#)

First Annual Northeast Regional All Hazards Conference. Sponsors: Massachusetts Emergency Management Association and others. Boston, Massachusetts: June 26-29, 1996. This conference is designed for federal, state, and local government officials; emergency management; police, fire, and EMS personnel; hospital staff; and business and industry representatives. It will include more than 50 workshops, three general sessions, and numerous demonstrations. The program will focus on incident management, communications, preparedness, recovery, and mitigation following a hurricane, flood, earthquake, terrorism, hazardous material incident, or other disaster. For more details, contact *Kevin Tully, Area 1 Director, Massachusetts Emergency Management Agency, P.O. Box 116, Tewksbury, MA 01876-0116; (508) 640-9500; fax: (508) 851-8218; e-mail: chief@sore.net; World Wide Web: <http://www.magnet.state.ma.us/mema>.*

Reconstruction after Disaster: Issues and Practices--British Council International Seminar 9695. Newcastle, U.K.: September 1-7, 1996. This seminar will review current practice and provide in-depth understanding of the various aspects of disaster planning and management. Main themes to be addressed include conceptual issues of disasters; psychological, social, economic, and physical impacts; emergency and relief plans; assessment of needs and field methods; the relation between development policies and reconstruction; community participation after disaster; the role of women in reconstruction; vulnerability assessment and risk reduction in natural disasters; reconstruction after human-caused disasters; and refugee camps and resettlement plans. The program is intended for planners, architects, relief organization and government officials, and field workers. For further information, contact the *Marketing Manager, International Seminars Department, The British Council, 10 Spring Gardens, London SW1A 2BN, U.K.; tel: +44(0)171 389 4264/4162/4226; fax; +44(0)171 389 4154; e-mail: international.seminars@britcoun.org.*

National Institute for Urban Search and Rescue (NI/USR) Seventh Annual Conference and First Research and Technology Transfer Meeting. Las Vegas, Nevada: September 3-6, 1996. NI/USR invites all interested persons to join colleagues from around the nation to explore cutting edge technologies available for saving lives following disaster. The program is designed to demonstrate how the administrative and technical sides of lifesaving can be joined into a unified effort to better serve the victims of disaster-- resulting in more lives saved, less time taken, and fewer dollars spent. For a conference brochure, contact *Lois Clark McCoy, NI/USR, P.O. Box 90909, Santa Barbara, CA 93190; (800) 767-9983; fax: (805) 966-6178; e-mail: 3090usar@ucsbuxa.ucsb.edu; World Wide Web: <http://niusr.org/~usar>.*

Western States Seismic Policy Council (WSSPC) Annual Conference. Polson, Montana: September 18-21, 1996. Emergency managers, geologists, and state officials from the western United States, Canada, and Pacific islands will meet at this conference to explore current seismic policy issues. WSSPC '96 will offer plenary speakers, general sessions, and discussion groups targeted at increasing efficiency and better preparing for seismic hazards. The meeting will address such topics as seismic mapping, building inventory loss estimation, urban search and rescue, and hazard insurance. In addition, participants will

take a field trip to explore seismic sights of the Mission fault system in Montana. For details, contact *Steven Ganz, WSSPC, 121 Second Street, 4th floor, San Francisco, CA 94105; (415) 974-6422; fax: (415) 974-1747; e-mail: wsspc@wsspc.org.*

Fourth New Mexico Symposium on Disaster Medical Issues. Albuquerque, New Mexico: September 22-24, 1996. This symposium will include sessions on disaster medicine training program curriculum development, disaster medicine and pediatrics, epidemiology, terrorism and technological disasters, preparedness for the 1996 Olympics, hazardous materials, and new technologies for disaster medicine. For more information, contact *Carol Glavey, Conference Coordinator, University of New Mexico Health Sciences Center, School of Medicine, Office of Continuing Medical Education, Campus Box 713, Albuquerque, NM 87131-5126; (505) 277-3942; fax: (505) 277-8604; e-mail: cglavey@medusa.unm.edu.*

Analyzing Economic Impacts and Recovery from Urban Earthquakes: Implications from Research on the Northridge Event. Sponsors: Earthquake Engineering Research Institute (EERI) and the Federal Emergency Management Agency. Pasadena, California: October 10-11, 1996. This conference will focus on policy issues that emerged following the Northridge quake and will be organized around four papers addressing:

- public and private capital losses due to the earthquake;
- indirect economic losses;
- financial sector response in Northridge; and
- the future scenario: what might L.A. recovery look like with limited federal assistance and "mini" insurance coverage?

In addition to these presentations, a number of panelists will speak on their Northridge-related research, and respondents will react to the findings. To be placed on the mailing list for further information about the conference, contact *EERI, 499 14th Street, Suite 320, Oakland, CA 94612-1934; (510) 451-0905; fax: (510) 451-5411; e-mail: eeri@eeri.com.*

International Conference on Disaster Management: National Experiences in Disaster Response and Rehabilitation. Sponsors: Government of Venezuela and others. Merida, Venezuela: October 11-14, 1996. The organizers of this conference anticipate addressing a wide range of topics, including existing national disaster management systems, search and rescue, damage and needs assessment, evacuation, sheltering, emergency assistance, hospital and medical issues, detection and warning systems, reinforcement of damaged buildings, reconstruction, and economic and social effects of disasters. Abstracts from outside Venezuela will be accepted until May 15. For further details, contact *Comite Organizador, Apartado Postal 344, Merida 5101, Venezuela; tel/fax: (58-74) 634-773/441-270; e-mail: confmer@bolivar.funmrd.gov.ve or angelm@bolivar.funmrd.gov.ve.*

Third Asia-Pacific Conference on Emergency and Disaster Medicine. Sponsors: Indonesia Ministry of Health and others. Bali, Indonesia: October 15-19, 1996. This conference will provide an opportunity

for physicians and other health professionals to learn the latest advances in emergency and disaster medicine. It will also provide prehospital professionals with training in both the clinical and management aspects of disaster medicine. One full day will be dedicated to a field simulation of a large-scale emergency. For a conference brochure, contact the *Conference Secretariat, Third Asia-Pacific Conference on Emergency and Disaster Medicine, c/o Pacto Convex Ltd., Hotel Borobudur Intercontinental, 3rd Floor, Jalan Lapangan Banteng Selatan, Jakarta 10710, Indonesia; tel: 62-21-2311363, 3805555, ext. 76128-9; fax: 62-21-3810837.*

International Symposium on Disasters and Health. Sponsor: University of the Philippines-Manila, and others. Manila, Philippines: October 16-18, 1996. The program for this meeting includes three symposia:

- The Environment of Disaster and Disaster Management,
- Effects of Disaster (The Victims of Disaster), and
- Disaster Preparedness and Management (Coping with Disaster).

In addition, the conference will include an all-day field trip as well as concurrent workshops and poster sessions. The organizers have issued a call for papers, with abstracts due June 30. Further enquiries should be directed to the *Symposium Secretariat, International Symposium on Disasters and Health, Chancellor's Office, 8th floor, Central Block Building, Philippine General Hospital Complex, Taft Avenue, Manila 1000, Philippines; tel: (+632) 587 501/526 2267; fax: (+632) 521 0184/58 5750/58 5762; e-mail: pso@upm.edu.ph.*

1994 Association of Contingency Planners (ACP) National Symposium: Roundup '96--Applied Contingency Planning for Business and Government. San Antonio, Texas: October 21-22, 1996. Business continuity, disaster recovery, and crisis management professionals around the world are invited to meet with their colleagues and other specialists in the field at this, the second annual ACP symposium. In addition to numerous plenary speakers, *Roundup '96* will include 12 breakout sessions, led by experts in the field, covering such topics as legal liability, network recovery, cellular communications, automated planning tools, emergency transportation, integrated planning, disaster awareness, and electronic vaulting. For more information, contact *Roundup '96, P.O. Box 50226, Austin, TX 78763-0226; or call or e-mail Tommye White, (210) 560-2005; e-mail: tommye.white@cpa.state.tx.us; or Chuck Walts, (512) 475-3426; e-mail: walts@tenet.edu.*

International Conference on Natural and Technological Coastal Hazards. Sponsors: International Society for the Prevention and Mitigation of Natural Hazards and others. Tirupati, Andhra Pradesh, India: December 2-6, 1996. The east coast of India has a history of severe disasters due to both tropical cyclones and, more recently, technological hazards such as oil and gas explosions. Recognizing that similar hazards are shared by most of the other countries of south Asia and that, with the advent of the International Decade for Natural Disaster Reduction (IDNDR), concern about these problems is increasing, the conveners have organized this conference to examine the many aspects of natural and technological coastal hazards and to focus on the warning, preparedness, and mitigation systems that can save human lives and safeguard property. A call for papers has been issued; abstracts of not more than two pages are due May 30. To submit an abstract or obtain more information, contact *C. Rajasekara*

Murthy, National Water Research Institute, McMaster University, Canada Centre for Inland Waters, P. O. Box 5050, 867 Lake Shore Road, Burlington, Ontario, Canada L7R 4A6; fax: (905) 336-4989/6230.

Rescheduled: *ASCE International Conference and Exposition on Natural Disaster Reduction. Sponsor: American Society of Civil Engineers (ASCE). Washington, D.C.: December 3-5, 1996.* In support of the International Decade for Natural Disaster Reduction, this conference will assess and promote the role of civil engineering in preventing, mitigating, preparing for, and recovering from the impacts of natural disasters on the built and natural environments. The conference will not only examine engineering issues, but socioeconomic, political, public health, and institutional aspects as well. Virtually all types of disasters will be addressed, and the organizers have defined the following areas to be covered: hazard identification, vulnerability assessment, risk management, mitigation, education, institutional issues, and response and recovery. To be placed on the mailing list to receive additional information, contact *Natural Disaster Reduction '96, ASCE, 345 47th Street, New York, NY 10017; (800) 548-2723; (212) 705-7285; fax: (212) 705-7975; e-mail: conf@ny.asce.org.*

1996 Society for Risk Analysis (SRA) Annual Meeting. New Orleans, Louisiana: December 8-11, 1996. Held in conjunction with the International Society of Exposure Analysis Annual Conference, the 1996 SRA meeting will focus on interdisciplinary themes and initiatives to provide an integrated perspective to risk problems. The organizers are currently accepting proposals for workshops, symposia, poster and paper presentations. For more information and complete guidelines, contact the *Society for Risk Analysis, 1313 Dolley Madison Boulevard, Suite 402, McLean, VA 22101; (703) 790-1745.*

Cal's EM Certificate Program

The University of California at Berkeley-Extension offers an eight-course certificate program, conducted in San Francisco, on emergency management. This year, the program begins in June with a five-day course on "Strategic Planning and Implementation." For persons new to the field of emergency management, the two-day course "Introduction to Emergency Management" is offered the prior week. For more information about this program, contact *John Laye, 1995 University Avenue, Suite 300, Berkeley, CA 94704-4704; (510) 631-0400; fax: (510) 643-0702; e-mail: johnlaye@violet.berkeley.edu.* To register for courses, contact *Diane Wolcott, Environmental Management, University of California Extension, 1995 University Avenue, Suite 300, Berkeley CA 94704; (510) 642-7537; fax: (510) 643-8920; e-mail: dlw@unx.berkeley.edu.*

Recent Publications

All Hazards

Applications in Hazard Assessment and Management. Srinivas Emani, Editor. Explorations in Geographic Information Systems Technology Volume 6. 1996. 242 pp. \$75.00, plus \$10.00 shipping.

Copies are available from the Clark Labs, Clark University, 950 Main Street, Worcester, MA 01610; (508) 793-7526; fax: (508) 793-8842; e-mail: idrisi@vax.clarku.edu; World Wide Web: <http://www.idrisi.clarku.edu>.

This workbook on geographic information systems (GISs) and hazard assessment and management, published under the auspices of the United Nations Institute for Training and Research, consists of a review paper and a set of tutorial exercises. The exercises, which come with digital data sets on three 3" diskettes, address: 1) mapping and assessing natural hazards in Ecuador, 2) evaluating socioeconomic vulnerability to extreme storms and associated flooding, 3) examining the vulnerability of the U.S. Gulf Coast to accelerated sea-level rise, 4) estimating populations at risk due to hazardous materials transportation accidents, 5) modeling nonpoint source pollution, 6) using GIS to examine the extensive flooding in the American Midwest in 1993, and 7) employing time series analysis as an early warning tool for drought in Africa.

Local Building Code Administration Survey Results. 1995. 16 pp. \$2.50.

State Building and Energy Code Administration: Report to Respondents to a National Survey of State Agencies. Peter May, Dan Hansen, and Mark Donovan. 1995. 16 pp. \$2.50.

Both documents are available from Raymond Burby, College of Urban and Public Affairs, University of New Orleans, New Orleans, LA 70148; (504) 286-6277; fax: (504) 286-6272. Checks should be payable to the College of Urban and Public Affairs.

Local Building Code Administration Survey Results contains a summary of responses to a national survey of building departments conducted by the University of New Orleans. Questions were asked regarding building department missions and goals, enforcement philosophy and methods, the amount of discretion an agency allows its inspectors in enforcement, mitigation of natural hazards, the political environment, and workload and capacity.

Similarly, ***State Building and Energy Code Administration***, contains the findings of a survey regarding state building codes and code enforcement. The authors found that shortfalls in compliance are most evident in the aftermath of natural disasters and note that there is surprisingly little research that provides a nationwide perspective on code administration and enforcement. This report examines state roles in code adoption and enforcement, state building-code-related agencies, state assistance and oversight, interest group involvement, code compliance problems and potential improvements, and the variation in state code provisions.

Disaster Planning for Health Care Facilities, 3rd Edition, Revised and Expanded. James A. Hanna. 1995. 373 pp. \$69.95 (U.S.). *Copies may be purchased from the Canadian Healthcare Association, 17 York Street, Suite 100, Ottawa, Ontario, Canada K1N 9J6; (613) 241-8005; fax: (613) 241-9481.*

James Hanna begins his book by quoting John Donne, " 'no man is an island, entire of itself.' . . . He might well have been referring to a health care facility, for it exists within and for the community. It therefore follows that a disaster that affects the community will also have a direct or indirect impact on the facility." With that in mind, Hanna examines all aspects of disaster health care planning. The first part of the book looks at emergency health planning in the community and in health care facilities, departmental planning, triage, fire emergencies, patient evacuation, emergency relocation, earthquake preparedness, radiation accidents, pharmacy services, food services, patient transport, the disaster site, and mass fatalities and the temporary morgue. Part 2 addresses other emergency-related problems, such

as highly communicable disease, mass hyperthermia, threats of violence and terrorist actions, and civil disturbances. Part 3 looks at health facility management in disaster, including facility design and renovation, continuity of management, communications, uniform disaster codes, emergency public information, and debriefing and recovery. Finally, Part 4 lists resources that can be used in disaster situations; it covers using volunteers in disaster planning, creating multihospital emergency operations centers, and using special medical support vehicles.

Engineering in Emergencies: A Practical Guide for Relief Workers. Jan Davis and Robert Lambert. 1995. 448 pp. \$28.50. Available from Women, Ink., 777 United Nations Plaza, New York, NY 10017; (212) 687-8633; fax: (212) 661-2704.

Engineering in Emergencies is a practical handbook for engineers and relief workers that describes how to implement an effective engineering response following a disaster. Although the book focuses on the types of emergencies exemplified by the Rwandan crisis and the ensuing refugee exodus to Tanzania and Zaire, it is relevant to a broad range of emergencies and disasters. In addition to engineering concerns related to water, sanitation, roads, and shelters, the guide addresses managerial skills, personal effectiveness, understanding the needs of refugees, and the international relief system. Other sections examine the role of relief workers, assessment and planning, logistics, and the management of refugee camps.

Informal Settlements, Environmental Degradation, and Disaster Vulnerability: The Turkey Case Study. Ronald Parker, Alcira Kreimer, and Mohan Munasinghe, Editors. World Bank Environment Paper No. 12. 1995. 208 pp. \$11.95, plus \$5.00 shipping. Available from the World Bank, Box 7247-8619, Philadelphia, PA 19170-8619; (202) 473-1155; fax: (202) 522-2627; World Wide Web: <http://www.worldbank.org>.

This volume, published in conjunction with the United Nations International Decade for Natural Disaster Reduction (IDNDR), examines sustainability in urban areas as it relates to natural disaster vulnerability. Turkey was selected for this study because it provides clear-cut examples of urban problems--uncontrolled population growth, chronic poverty, and environmental degradation--that have increased urban vulnerability to both natural and technological disasters. The report provides information on the four Turkish cities studied, furnishes a "framework of urban vulnerability," describes special issues related to urban vulnerability, depicts what the authors refer to as "formal and informal cities," and discusses the effect of earthquakes in these cities.

Emergency Planning and Management: Ensuring Your Company's Survival in the Event of a Disaster. William H. Stringfield. 1996. 192 pp. \$59.00. Copies can be ordered from Government Institutes, Inc., 4 Research Place, #200, Rockville, MD 20850; (301) 921-2355; fax: (301) 921-0373; e-mail: giinfo@aol.com.

Over 50% of companies affected by emergencies or disasters fail within two years of such an event; however, those with emergency management plans in place are often able to resume business quickly and survive. This book is an emergency planning primer for business that describes federal emergency management requirements, hazardous waste and fire regulations, vulnerability assessment, disaster planning and implementation, and business survival. Appendices provide information on Internet

resources, disaster-related organizations, publications, federal assistance and disaster loans, and principal threats facing communities.

Historical and Projected Costs of Natural Disasters. Dennis Engi. #DE95013875GAR. 1995. 58 pp. \$19.50. Available from the National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, VA 22161; (703) 487-4650; fax: (703) 321-8547.

Natural disasters cause billions of dollars in damage and thousands of deaths each year around the world. While the magnitude of these events is clear, the exact costs are difficult to identify. This document reports the results of a survey of data on disaster costs. Although there is much work going into natural disaster research, mitigation, and relief, there are surprisingly few consistent and reliable data available. Nevertheless, it is clear that the damage and fatalities from natural disasters are increasing. Using the available data, Engi projects that, in the U.S. alone, the cost of natural disasters between 1995 and 2010 will be approximately \$90 billion and 5,000 lives.

"Disaster Vulnerability of Megacities." *GeoJournal*, Vol. 37, No. 3 (November 1995). \$80.00, single copies; \$328.00, subscription for one year (four issues). To order or subscribe, contact Kluwer Academic Publishers, P.O. Box 358, Accord Station, Hingham, MA 02018-0358.

This issue of *GeoJournal*, a periodical devoted to research in geographic issues, examines the vulnerability of large cities to disasters. Articles include: "Disaster Vulnerability of Megacities: An Expanding Problem that Requires Rethinking and Innovative Responses," by D.J. Parker and J.K. Mitchell; "Coping with Natural Hazards and Disasters in U.S. Megacities: Perspectives on the Twenty-First Century," by J.K. Mitchell; "Hazard Transformation and Hazard Management Issues in the London Megacity," by D.J. Parker and S. Tapsell; "Urban Disasters and Megacities in a Risk Society," by T. Horlick-Jones; "Bridging 'Expert' and 'Local' Knowledge for Counter-Disaster Planning in Urban South Africa," by B. Wisner; "The Catastrophic Events in Petropolis City (Rio de Janeiro State) Between 1940 and 1990," by A.J.T. Guerra; "Managing Vulnerability in Sydney: Planning or Providence?," by J.W. Handmer; "Coastal Megacities and Climate Change," by R.J. Nicholls; and "Assessing Disaster Needs in Megacities: Perspectives from Developing Countries," by C. Kelly.

Floods and Severe Weather

Flood Proofing Techniques, Programs, and References. 1996. 26 pp. Free. To order, contact Annette Wolf, Department of the Army, Albuquerque District of the Corps of Engineers, 4101 Jefferson Plaza, N. E., Albuquerque, NM 87109-3435; (505) 342-3320; fax: (505) 342-3199.

This report provides information on various approaches to flood proofing, descriptions of government flood-proofing programs, references, and a glossary. It describes such mitigation measures as elevation, relocation, construction of flood control structures, dry flood proofing, wet flood proofing, and emergency measures. In addition, it explains federal regulations and financial assistance and lists specific government programs, including points of contact. The reference section also includes information on where to obtain the documents cited.

An Evaluation of Flood Management Benefits through Floodplain Restoration on the Willamette

River, Oregon, U.S.A. 1996. 60 pp., plus 24" X 36" map. \$5.00. Copies can be ordered from the River Network, P.O. Box 8787, Portland, OR 97207-8787; (800) 423-6747 or (503) 241-3506; fax: (503) 241-9256; e-mail: rivernet@igc.apc.org.

This study examines the danger of flooding on the Willamette River. Commissioned by the River Network, a national river conservation organization based in Portland, Oregon, the study concludes that restoring former wetlands and woodlands in the floodplain of the Willamette and its tributaries could reduce peak flood flows by as much as 18%, preventing millions of dollars in damage. The report includes sections on the role of floodplains and riparian wetlands; strategies for flood management; the Willamette Basin and its history of flooding; opportunities, constraints, and benefits for floodplain restoration; flood hydrology and flood management methods; and recommendations.

National Directory of Floodplain Managers. 1995. 162 pp. \$20.00. Order from the Association of State Floodplain Managers (ASFPM), Executive Office, 4233 West Beltline Highway, Madison, WI 53711; (608) 274-0123.

The ASFPM is a professional organization whose members are involved in floodplain management; flood hazard mitigation; the National Flood Insurance Program; and flood preparedness, warning, and recovery. In addition to listing all the members of the association, this directory provides information on the activities of various ASFPM committees, flood-related services from federal agencies along with complete contact information, and related nongovernmental organizations.

Out of Harm's Way: The Missouri Buyout Program. 1995. 17 pp. Free. Available from the State Emergency Management Agency (SEMA), P.O. Box 116, Jefferson City, MO 65102-0116; due to changes in area code, dial either (314) or (573) 526-9136; fax: (314) or (573) 634-7966; e-mail: mosema@mail.state.mo.us; World Wide Web: <http://www.state.mo.us/sema/semapage.htm>.

The 1993 floods in the Midwest broke numerous records in terms of river levels and duration. Of the nine states affected, Missouri was the hardest hit, suffering losses estimated at \$3 billion. Because that state suffered 13 presidentially declared flood disasters over a 22-year period, Missouri examined ways to alleviate future vulnerability. With the receipt of \$100 million in federal assistance, the governor instituted a program to buy out flood-prone properties. This report describes the program and its implementation, the financial benefits of the program, local government involvement, the creation of open space, health and safety issues, and lessons for the future. The agency also has three related reports available: **The Response, Recovery, and Lessons Learned from the Missouri Floods of 1993 and 1994** (1995, 80 pp., free); and a limited number of copies of **Report and Recommendations of the Governor's Task Force on Floodplain Management** (1994, 24 pp., free) and **After Action Report: The 1995 Missouri Flood** (1995, 45 pp., free).

The Great Flood of 1993: Causes, Impacts, and Responses. Stanley A. Changnon, Editor. 1996. 332 pp. \$65.00, hardback; \$24.95, paperback. Copies can be ordered from the Customer Service Department, Westview Press, 5500 Central Avenue, Boulder, CO 80301-2877; (800) 386-5656; fax: (303) 449-3356; e-mail: jennifer.wortman@harpercollins.com.

The Great Flood of 1993 diagnoses the social and economic impacts of the flooding in the Midwest and assesses how resource managers, flood forecasters, public institutions, the private sector, and volunteers responded to the disaster. It examines how the floods were forecast and monitored, how existing

recovery programs performed, and how the U.S. manages its floodplains generally. Chapters describe the flood from both a physical and a policy perspective, the weather that led to the flood, the physical impacts of the flood, the effects on ecosystems, the influences on agricultural production, the disruption of various transportation systems, the economic repercussions, the human and governmental responses to the flood, changes in national flood policy as a result, the losers and winners from the flood, and other conclusions.

Homeowner's Guide for Flood, Debris, and Erosion Control. 1996. 36 pp. Free. To obtain, contact the Los Angeles County Department of Public Works, Planning Division, P.O. Box 1460, Alhambra, CA 91802-1460; (818) 458-4311.

The Los Angeles basin is subject to devastating floods that are often intensified by debris flows resulting from destruction of the watershed by wildland fires. The Los Angeles County Department of Public Works compiled this booklet to assist homeowners in the installation of inexpensive devices to mitigate these impacts. The guide stresses problems related to hillside areas, describing protected versus unprotected homes, flood insurance, debris flows, debris control aids, general safety rules, the use of sandbags, deflection devices, building protection, drainage, control of water intrusion, erosion and fire control, and types of useful vegetation.

"*Nature Bats Last: The Politics of Floodplain Management,*" ***Environment and Development*** (January/February 1996). Subscriptions: \$50.00, U.S.; \$65.00, foreign. To subscribe, contact the American Planning Association (APA), 122 South Michigan Avenue, Suite 1600, Chicago, IL 60603-6107; (312) 431-9100; fax: (312) 431-9985.

This issue of ***Environment and Development*** focuses on the forces that drive development in floodplains, how communities can deal with this problem, and the distinguishing features and program components of communities with effective floodplain land-use regulations. Specifically, it asks how communities develop good programs, describes the experiences of communities in managing floodplains, and offers advice about various tools and their effectiveness. Articles also examine the management of riparian open space, the construction of disaster-resistant communities, and the experiences of Tulsa, Oklahoma.

Tsunamis, Earthquakes, and Other Geologic Hazards

The Business Interruption Effects of the Northridge Earthquake. Peter Gordon, Harry W. Richardson, Bill Davis, Chris Steins, and Ashwani Vasishth. Research Report No. LCRI-95-01R. 1995. 55 pp. \$10.00. Copies can be ordered from the Lusk Center Research Institute, School of Urban and Regional Planning, University of Southern California, Los Angeles, CA 90089-0045; (213) 740-2264; fax: (213) 740-8180.

Most discussions of the costs of the Northridge earthquake of January 17, 1994, refer only to damage estimates, not to the total cost of the earthquake, including business interruption. This report presents research that estimated these often undocumented costs through analysis of major economic indicators, telephone surveys of businesses and employees, and the construction of an economic impact model. The researchers discovered that four-fifths of respondents experienced some degree of business interruption due to the quake, mainly because of difficulties employees had in getting to work, employees' need to

attend to personal matters (e.g., damage to their homes), damage to the workplace, inhibited customer access to the business, and lack of utility service. The report also includes information on types of damage incurred, impacts according to size of firm, aggregate business losses, and intra-regional business losses.

A Call for Action: Findings and Recommendations, 1995 CUSEC Annual Meeting. 1996. 76 pp. \$10.00.

Towards an Action Agenda for Increasing Research Utilization in the Central United States. 1995. 40 pp. \$10.00.

Both documents are available from Wilma Durand, Central U.S. Earthquake Consortium (CUSEC), 2630 East Holmes Road, Memphis, TN 38118-8001; (901) 345-0932; fax: (901) 345-0998.

A Call for Action contains 39 recommendations from participants at the CUSEC annual meeting for improving earthquake preparedness in the central U.S. These recommendations relate to mass care and housing recovery, postdisaster safety assessment, energy infrastructure, health and medical services, transportation, emergency management assistance compacts, and loss estimation.

The ***Action Agenda*** presents the results of a workshop on the translation of research into practice. It provides recommendations related to the National Earthquake Hazards Reduction Program (NEHRP), application goals, barriers to implementation, constituency building, mitigation, the role of professional organizations, and the improvement of research and mitigation. It concludes with an action agenda for increasing research use in the central U.S.

Tsunami: Progress in Prediction, Disaster Prevention, and Warning. Yoshito Tsuchiya and Nobuo Shuto, Editors. 1995. 368 pp. \$193.00. Order from Kluwer Academic Publishing Group, Order Department, P.O. Box 358, Accord Station, Hingham, MA 02018-0358; (617) 871-6600; fax: (617) 871-6528; e-mail: kluwer@world.std.com.

This volume contains the proceedings of the International Tsunami Symposium held in Wakayama, Japan, in 1993 by the Tsunami Commission of the International Union of Geodesy and Geophysics and the International Coordination Group of the International Oceanographic Commission. It includes an overview of the symposium; photographs of recent tsunami disasters; and several papers that address prediction and simulation, prevention and mitigation, and tsunami observations and warning systems.

Northridge Building Case Studies. SSC 94-06. 1996. 440 pp. \$40.00.

Provisional Commentary for Seismic Retrofit. SSC 94-02. 1996. 126 pp. \$15.00.

To order, send a check to the California Seismic Safety Commission, 1900 K Street, #100, Sacramento, CA 95814; (916) 322-4917; fax: (916) 322-9476; e-mail: SSCbase@aol.com.

Northridge Building Case Studies describes the damage suffered by 25 buildings in the 1994 Northridge earthquake. The report highlights failures that occurred to department stores, parking structures, and unreinforced masonry buildings and less spectacular damage in buildings that performed well. The report also includes recommended code changes and a critical discussion of how engineers presently evaluate the performance of buildings.

The ***Provisional Commentary*** describes the evolution of seismic performance levels and objectives and offers guidance to design professionals in applying these new principles when retrofitting buildings.

Addressing Seismic Hazards in Southern California: Establishing Dialogue Among Academia, the Insurance Industry, and Risk Assessment Professionals. 1996. 150 pp. \$15.00. Requests for copies should be directed to the Southern California Earthquake Center (SCEC), Knowledge Transfer, University of Southern California, University Park, Mail Code 0742, Los Angeles, CA 90089-0742; (213) 740-1560; fax: (213) 740-0011; e-mail: ScecInfo@usc.edu.

Addressing Seismic Hazards is the proceedings of a meeting held in Los Angeles in November 1995 to foster communication between scientists undertaking state-of-the-art earthquake hazards research and companies and individuals providing property insurance in that region. It contains abstracts that address partnerships for consensus building, basic earthquake concepts, new approaches to earthquake hazard assessment, hazard mapping, new technologies, and the improvement of building design and codes.

Wildfires

Federal Wildland Fire Management: Policy and Program Review. 1995. 54 pp. Free. Copies can be obtained from the Office of External Affairs, National Interagency Fire Center, 3833 South Development Avenue, Boise, ID 83705-5354; (208) 387-5150; (208) 387-5179. The full text is also available on the World Wide Web: <http://www.fs.fed.us/land/wdfire.htm>.

This document contains the results of a review to assess if federal fire management policies are uniform and agencies work together efficiently and effectively to carry out fire management programs across administrative boundaries. The review resulted in the development of unified principles and policies to improve wildland fire response. The report notes that managing wildland fire in the U.S. is increasing in scope and complexity and lists nine key areas that should be improved: the protection of human life, fire impacts on ecosystems, agency organizational climate, fire in areas with hazardous fuel build-ups, management of burnable vegetation, integrating wildfire management into land and resource management, partnerships, cooperation among all levels of government, and structural fire protection.

Findings From the Wildland Firefighters Human Factors Workshop--Improving Wildland Firefighter Performance Under Stressful, Risky Conditions: Toward Better Decisions on the Fireline and More Resilient Organizations. 1995. 52 pp. Free. Copies are available from the U.S. Department of Agriculture, U.S. Forest Service, Distribution, MTDC, Building 1, Fort Missoula, Missoula, MT 59801; (406) 329-3857.

Since 1990, decision making and organizational structure have proven increasingly fragile when conditions on the fireline become life-threatening. In 1994 alone, 34 firefighters died. To address the human factors that may help to reduce these tragic deaths, experts in psychology, sociology, organizations, fire safety, and wildland firefighting attended a five-day workshop in June 1995. This document outlines the workshop's findings and recommendations, such as the need for reorganizing the wildland fire community, undertaking assessment and feedback activities on a regular basis, changing the culture of fire organizations, improving situational awareness and decision making, enhancing communication, and providing more cohesion and adaptability. The book lists 12 recommendations that relate to organizational research, improved training, improved guidelines for engaging and disengaging in fire assignments, and the development of a common protocol and language for all firefighting communication.

Recent Videos

The March 1962 Storm on Long Beach Island. VHS. 1995. 90 minutes. \$24.00. Order from Greg Hoffman, Wet Water Video Company, P.O. Box 1341, Beach Haven, NJ 08008.

This video examines the effects of a storm that hit Long Beach Island in 1962. The footage of the storm is accompanied by interviews with survivors, who describe the lack of warning about the danger; the inadequate official response, including the sending of high school students back to the island where flooding was occurring; rescue operations; and destruction of homes and transportation routes. Interestingly, a meteorologist expresses his surprise that people were not warned, since the storm was so large and predictable. The video also points out how developers took advantage of depressed market prices to purchase ocean front lots, replacing destroyed homes with more and bigger structures.

Disasters: America's Stormy Dilemma. A&E Investigative Re-ports. \$19.95, plus \$3.95 shipping. Order by calling (800) 423-1212.

The Arts and Entertainment Channel (A&E) offers a regular series called ***Investigative Reports***. Hosted by Bill Kurtis, this episode traces the Federal Emergency Management Agency (FEMA) from its creation in 1979 to its current form. Noting that the U.S. is experiencing increasingly expensive disasters, Kurtis interviews Senator John Glenn, chair of the Senate Natural Disasters Task Force, and Representative Richard Durbin, Chair of the House Natural Disasters Task Force. Both politicians talk candidly about the problem of pork barrel projects that are consistently attached to federal disaster funding bills and add to the escalating costs. The report also looks at the current all-hazards insurance debate, the need for better home construction and code inspection, floodplain relocation and other management techniques, the work of agency director James Lee Witt in restructuring the agency's mission, infrastructure damage and replacement, and the potential for future disaster losses in the U.S.

Firewise Landscaping: Part 1--Overview. VHS. 13 minutes.

Part 2--Design and Installation. VHS. 16 minutes.

Part 3--Maintenance. VHS. 9 minutes.

\$5.31 for the set of three videos. Order from the U.S. Department of the Interior, Bureau of Land Management, National Interagency Fire Center, 3833 South Development Avenue, Boise, ID 83705-5354; (208) 387-5104.

These videos illustrate the need for mitigative landscaping to protect homes from wildland fires. The first video explains fire growth and how fires are affected by terrain and landscape, the seasonal aspects of wildfire, and the wildland/urban interface. It also describes techniques for creating defensible space around a structure, including site evaluation, fuel reduction, and landscaping. Part 2 describes five important factors in wise fire mitigation design: function, the fit with nature and the locale, financial considerations, aesthetics, and maintenance. It covers how to use native vegetation, create a low fuel-volume zone, use fire retardant plants, and choose the most effective irrigation and spacing. Part 3 discusses the fire ladder, that is, how fire grows and spreads in a wildland area. It emphasizes the need for irrigation, pruning, and debris removal, and offers tips on maintaining garden equipment and

undertaking safety precautions.

The Hidden Danger: Low-Water Crossing. VHS. 1996. 9 minutes. \$2.00. Order from the National Weather Service, Office of Hydrology, SSMC-2 Room 8115, 1325 East-West Highway, Silver Spring, MD 20910; (301) 713-0006, ext. 147.

Motorists account for nearly half of all flood-related deaths; most of these deaths occur in highway dips or in drainage areas called low-water crossings. Road-bed erosion, night-time driving conditions, and over confidence in a vehicle's performance ability contribute to the high number of fatalities. This video includes safety rules that address the hidden dangers of these crossings and stresses how treacherous even small depths of water can be to an unsuspecting driver.

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, and the Insurance Institute for Property Loss Reduction. Please send information of potential interest to the center or the readers of this newsletter to the address below. The deadline for the next *Observer* is May 15, 1996.

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[Home.html](#)

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