50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. NSF/RA-790660	2.	3. Recipient's Accession No. PB81 185944
4. Title and Subtitle Natural Hazards Observer, Vol. 4, No. 2			5. Report Date December 1979
			6.
7. Author(s)			8. Performing Organization Rept. No.
9. Performing Organization Name and Address University of Colorado Institute of Behavioral Science #6 Natural Hazards Research and Applications Research Center Boulder, CO 80309			10. Project/Task/Work Unit No.
			11. Contract(C) or Grant(G) No. (C) (G) ENV7605682
12. Sponsoring Organization Name and Address Office of Planning and Resources Management (OPRM) National Science Foundation 1800 G Street, N.W. Washington, D.C. 20550			13. Type of Report & Period Covered Newsletter
			14.

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This issue contains brief articles covering the following items: the application of advanced technology to improve warnings of natural hazards; a study on impediments to Federal sponsorship on nonstructural floodplain management and flood recovery measures; the President's environmental message; a project to evaluate a Canadian flood program; Australian natural disaster insurance; an examination of potential liability of local governments for earthquake losses; and a description of a crisis management guide. Project summaries are presented for grants in the areas of flood plain management, hazards information, disaster mitigation and energy conservation, and response to earthquakes. Other projects reported include a public policy assessment of natural hazards, hurricane education, coping with flooding, the earthquake threat in southern California, and long-term disaster impacts. The newsletter also provides a list of available films, slides, publications, and conferences relating to natural hazards research.

17. Document Analysis a. Descriptors

Hazards	Hurricanes	Economic factors	Grants
Earthquakes	Public policy	Forecasting	Liabilities
Flood plains	Disaster	Technology innovation	Australia
Canada			

b. Identifiers/Open-Ended Terms

Southern California

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
	20. Security Class (This Page)	22. Price

(See ANSI-Z39.18) See Instructions on Reverse OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

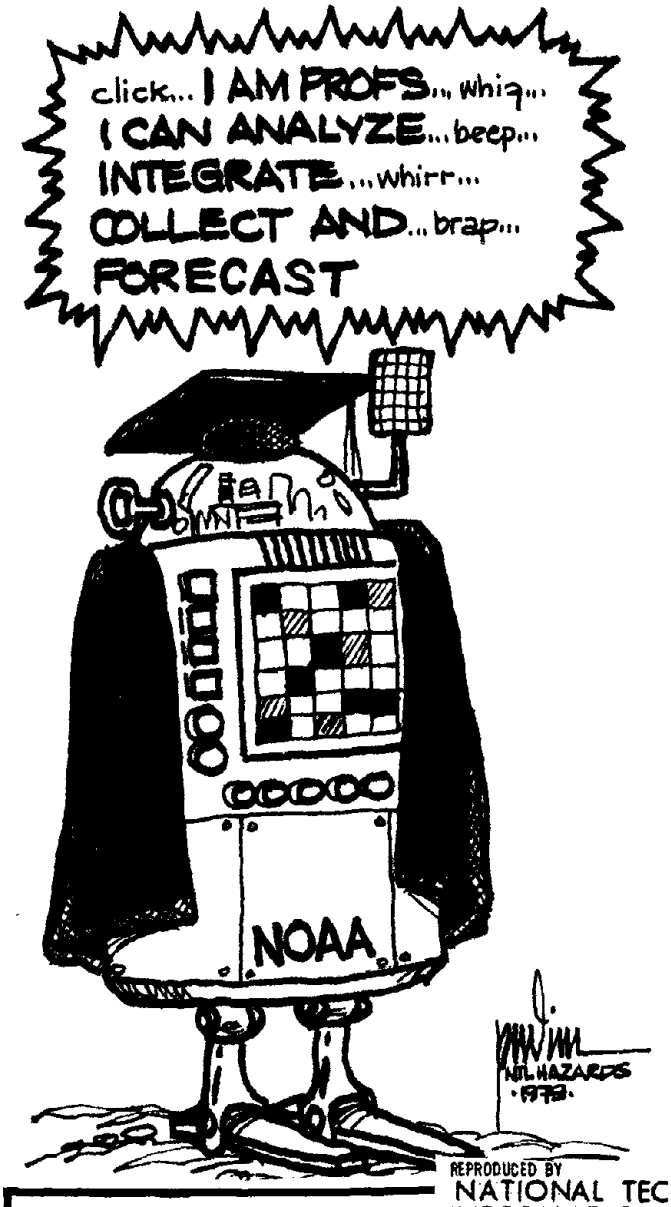
CAPITAL SYSTEMS GROUP, INC.
11301 ROCKVILLE PIKE
KENSINGTON, MD. 20795

NSF/RA-790660

PB81-185944

Natural Hazards OBSERVER

VOLUME IV NUMBER 2 December, 1979



NOAA APPLIES ADVANCED TECHNOLOGY TO IMPROVE WARNINGS OF NATURAL HAZARDS

—an invited comment

To provide warnings of natural hazards, the National Oceanic and Atmospheric Administration (NOAA) maintains over 300 field offices supported by a complex array of computers, satellites, and communications. Over the next decade, NOAA will devote increased emphasis to the preparation and dissemination of very short-range forecasts of severe weather (0-3 hours), to provide additional time for local disaster teams to save lives and property in emergency situations.

The Prototype Regional Observing and Forecasting System (PROFS) is a new, major program which NOAA has mounted to promote the development of very short-range forecasts. PROFS is designed to examine remote sensing techniques and to determine how they can be incorporated into an operational system for the rapid collection, analysis, and dissemination of weather information.

Another NOAA initiative is the Coastal Hazards Program. Over 75% of our population lives within 100 miles of the coasts and the Great Lakes. The National Weather Service seeks to improve forecasts of coastal zone flooding from hurricanes, tidal action, tsunamis, and severe storms. NOAA's Office of Coastal Zone Management is involved in evaluating ways in which losses due to severe natural phenomena can be minimized by effective land use.

A third NOAA initiative is an effort to improve flash flood warnings. In cooperation with the Appalachian Regional Commission, a pilot program is being developed in a 12-county area of Virginia, West Virginia and Kentucky. This project will be expanded next year to other parts of these states and to Pennsylvania.

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CONTENTS

Washington Update 2
Liability for Earthquake Damage 4
Grants 5
Natural Disaster Effects 8
Conferences 9
Recent Publications 10

INFORMATION RESOURCES
NATIONAL SCIENCE FOUNDATION

The threat of natural hazards is a part of life for millions of Americans. With support from several federal agencies, with assistance from state and local governments, and with the backing of private citizens, NOAA is applying advanced technology to alleviate the impact of these hazards on the citizens of our country.

George Benton
Associate Administrator
National Oceanic and Atmospheric Administration

WASHINGTON UPDATE

FEDERAL FLOOD PLAIN MANAGEMENT

The U.S. Water Resources Council has submitted its study, *Impediments to Federal Sponsorship of Nonstructural Floodplain Management and Flood Recovery Measures,* to the President's Water Policy Committee. Addressed to elements of flood response which involve flood plain management, and are primarily within the jurisdiction of the federal government, the report draws on field studies of federal nonstructural management projects, and a review of selected federal programs.

The study is divided into four sections, each one of which was prepared by a specialist: an overview of the current status of nonstructural measures, Gilbert White; land acquisition, Jon Kusler; the revision of principles and standards, Leonard Shabman; and the coordination of federal post-flood recovery programs, Rutherford Platt.

Among the many recommendations made to improve federal efforts to mitigate future flood losses through nonstructural means, the report includes the following:

- An interagency agreement should be executed among all agencies involved in post-disaster recovery stipulating mutual intent to develop and implement nonstructural mitigation plans.
- A hazard mitigation assessment team should be established at the time of a major flood; it should be interdisciplinary, interagency, and involve state and local representatives. It will assess the damage and identify opportunities for mitigation.
- A mitigation report should be written promptly after a flood, recommending areas in the disaster zone where nonstructural measures should be taken, and specifying actions to be taken by each agency and level of government.
- Conformity with the hazard mitigation reports should be required to satisfy Executive Order 11988.
- FEMA should coordinate all the foregoing processes. It should direct the preparation of hazard mitigation reports, and thereafter guide the allocation of post-disaster assistance by all agencies.

Copies of the report are available from the *U.S. Water Resources Council, 2120 L Street, N.W., Suite 800, Washington, DC 20037.*

CARTER'S ENVIRONMENTAL MESSAGE

On August 2, 1979, President Carter issued his second environmental message, setting out his administration's environmental priorities for the coming year. Two aspects of the message are of particular concern to those in the natural hazards field.

Carter reaffirmed commitment to the use of revised criteria for evaluating water projects and the intention of the administration to enact further reforms in water resources management. He emphasized the preparation of legislation to introduce cost-sharing and assistance to states for comprehensive water resources planning. This would affect planning and funding of flood protection projects.

A new initiative for national coastal protection was announced, endorsing the designation of 1980 as the "Year of the Coast." Carter described three plans for strengthening coastal protection:

- the submission to Congress of legislation to extend for five years federal assistance to coastal zone management programs under the Coastal Zone Management Act;
- recommendation of amendments to the Coastal Zone Management Act to establish a clear national coastal protection policy which would include as goals the protection of coastal resources, wise management of coastal development, and increased public access to the coast; and
- a review of federal programs that significantly affect coastal resources in order to develop recommendations for improving federal administration of coastal programs.

It is hoped that such measures will assist in establishing and maintaining strong coordinated efforts to cope with increasing population and development pressures, and to ensure that coastal areas are managed in a balanced way.

PUBLIC INFORMATION AND EDUCATION

The Office of the United Nations Disaster Relief Coordinator (UNDRO) has released the tenth volume in its "Disaster Prevention and Mitigation" series, *Public Information Aspects.* The purpose of every volume in the series has been to identify existing knowledge and expertise which may be applied to the prevention of natural disasters, and to identify gaps in current knowledge. *Public Information Aspects* provides general and specialized information on what is known about the behavior of individuals, groups, organizations and institutions in disasters. The study discusses public information policy and procedures—warning systems, educational programs, dealing with the mass media—examines the responsibility of various levels of government, and treats the abilities of various groups to respond to, and implement actions indicated by, warnings and information. The volume considers many modes of communication, from telecommunication to word-of-mouth, and makes recommendations for the most effective uses of each.

Other volumes in the series, which was begun in 1976, include the following: *Volcanological Aspects,* Vol. 1; *Hydrological Aspects,* Vol. 2; *Seismological Aspects,* Vol. 3; *Meteorological Aspects,* Vol. 4; *Land Use Aspects,* Vol. 5; and *Economic Aspects,* Vol. 7. Each volume has a comprehensive bibliography of other works in its particular area of concern. All are available from the *Office of the United Nations Disaster Relief Co-ordinator, Palais des Nations, CH-1211, Geneva 10, Switzerland.*

CANADIAN FLOOD PROGRAM

The first phase of a project to evaluate the Canadian federal-provincial Flood Damage Reduction Program has been completed. The study, funded by the Inland Waters Directorate of Environment Canada, is investigating the impact of flood hazard maps on the local community, and the reasons for such impact.

Initial analysis of the first-phase data suggests that maps and brochures alone are not very effective modes of communication. In the future, attention should be directed to experiments with educational efforts through the school system and with the use of more dramatic presentations through the electronic media. Other suggested methods for improving the impact of the program include the following:

- Maps should be simple and visually striking and produced at a scale that will enable residents to identify their homes.
- To avoid detrimental publicity, maps should be free of errors, especially if the limits of an historical flood are delineated.
- The target audience for flood hazard information should not be limited to flood plain dwellers since this will not inform those who may be planning to move into the risk area.
- Influential commercial groups such as real estate agents and mortgage companies should be persuaded or compelled to assist with the program.

Work is continuing under the direction of *Anne V. Whyte, Institute for Environmental Studies, University of Toronto, Toronto, Ontario, Canada M5S 1A4.* A copy of the phase one summary may be obtained from *John W. Handmer, Department of Geography, The Australian National University, Box 4, Post Office, Canberra, A.C.T. 2600 Australia.*

AUSTRALIAN NATURAL DISASTER INSURANCE

The proposal for a natural disaster insurance program for Australia *(Natural Hazards Observer,* Vol. III, No. 3, p. 7) was tabled in Parliament by the Treasurer on June 4, 1979. Bases for the decision not to proceed with the program included doubts as to the potential success of the plan, as well as philosophical notions regarding governmental roles in the private sector.

Influencing the decision were such viewpoints as the following: 1) a multi-hazard approach to disaster insurance would unfairly burden some states whose risk exposures differ widely from those of other states; 2) a national insurance system would need to be made compulsory to be effective; 3) the implementation of the program would likely not relieve the government of the need to provide special assistance to victims following major disasters; and 4) the government should exercise restraint in intervening in matters that can be left to the private sector.

A copy of a policy information paper entitled "Natural Disaster Insurance" is available for Australian $1.00 from *The Australian Government Publishing Service, P.O. Box 364, Kingston, A.C.T. 2604 Australia.* A photocopy is available for U.S. $1.00 from the *Natural Hazards Research and Applications Information Center.*

WHADDYA MEAN, YA CAN'T UNDERSTAND RESEARCHERS?

"Dear Ms. Nathe:

You are correct about the grant. . . . The intent is to describe both objective and subjective matters in a quantitative way. The objective is defined as involving countable information which can be bounded or averaged. The unbiased probability associated with this information is provided by Jaynes' ideas on maximizing entropy. The subjective is regarded as imprecise information. This leads to quantitative schemes based on Zadeh's fuzzy set theory. At the moment two methods of merging the objective probabilities with subjective fuzzy memberships have been explored. Also, the assignment of such fuzzy memberships is being examined.

Yours truly,"

LIABILITY FOR EARTHQUAKE DAMAGE

An examination of the potential liability of local governments for earthquake losses was carried out during 1978 by the Association of Bay Area Governments (ABAG) with funds from the National Science Foundation (see the *Natural Hazards Observer,* Vol. II, No. 4, p. 9).

ABAG analyzed legal aspects of the problem, conducted extensive interviews with local officials at sites of recent earthquakes, and surveyed officials regarding their attitudes about earthquake hazards and tort liability.

The research indicates that increasing numbers of courts are holding governmental bodies liable for damages suffered by persons in natural disasters. While the earthquake itself remains designated as an "act of God", its effects on buildings and people are foreseeable and preventable due to advances in structural engineering for earthquake-resistant buildings, improved geological information about risk zones, and the development of earthquake prediction capability. Local governments who fail to mitigate the potential effects of an earthquake on people and property in their communities will be held financially responsibility by the courts for resulting losses.

Advice to local governments on how to cope with their liability for earthquake damage includes:

- familiarize policymakers and administrative officials with major principles of tort liability;
- develop and implement strategies for maximizing discretionary immunity;
- establish and maintain an inspection program for public property; and
- enforce building codes by following through on violations.

The project concludes that, although the law should be providing clear guidance for governmental bodies that seek to minimize their potential liability, it is presently failing to do so, largely because local governments perceive it to be confused and unpredictable. Under current law a local government may be held liable if it displays evidence of actual knowledge of a hazardous situation, for example, by taking steps to reduce that hazardous condition. Accordingly, the project recommends that state legislatures exercise care in formulating laws to ensure that local governments are induced to minimize their vulnerability both to earthquake hazards and to the associated liability, rather than being discouraged from doing so.

Reports of the earthquake liability study may be obtained from the *Association of Bay Area Governments, Hotel Claremont, Berkeley, CA 94705, (415) 841-9730.*

CRISIS MANAGEMENT GUIDE

The American Bankers Association has published a guide to assist officials of banks to prepare and implement plans for coping with emergencies resulting from natural hazards as well as from man-made events.

"Developing a Crisis Management Plan for Banks", by Dan R. Anderson, first presents a discussion of the vulnerability of banks to various hazards, then provides an outline for the development of plans to respond to the crisis, taking into consideration the special protection required for bank property and the need for prompt restoration of services for the benefit of the stricken community. One chapter focuses on mechanisms available to finance crisis programs, and the final chapter lists resources for additional information on crisis management.

The 44-page booklet is available from *American Bankers Association, Order Processing Department, 1120 Connecticut Avenue, N.W., Washington, DC 20036. $10.00 for members, $12.50 for non-members.*

GRANTS

Flood plain management. "National Training Program on Community Floodplain Management." Federal Emergency Management Agency, $435,000, 12 months. Project Director: *Clem Rastatter, The Conservation Foundation, 1717 Massachusetts Avenue, N. W., Washington, DC 20036, (202) 797-4300.*

The project will develop a national training program to educate local officials and citizen leaders in creative approaches to hazard mitigation and environmental protection. Ways will be explored to integrate a variety of federal, state and local programs into a comprehensive approach which exceeds the minimum requirements for entry into the National Flood Insurance Program. To achieve this goal, a flood plain management guidebook will be produced and used as a training manual for three-day institutes in which selected leaders of targeted flood-prone communities will participate. In addition, a slide presentation will be produced which will describe the National Flood Insurance Program.

Hazards information. "Methods Development for Assessing the Value of Hazards Information," U.S. Geological Survey, $149,351, 12 months. Principal Investigator: *David S. Brookshire, Department of Economics, The University of Wyoming, University Station, Box 3985, Laramie, WY 82071, (307) 766-6425.*

Information on hazards is viewed as a public good, but as yet no generally acceptable methods have been developed to measure the benefits and costs of hazards information programs. This project will consider the hazard mapping information provided by the USGS, and attempt to understand its benefits and costs to consumers—households, businesses, and governments—as it is used to make plans, to regulate, and to reduce hazard levels. The framework to be developed will include indirect, as well as direct, benefits and costs to all users of the information.

Disaster mitigation and energy conservation. "Multi-Design Approach to Seismic Safety," National Science Foundation, $194,600, 12 months. Principal Investigator: *Robert Sockwell, Hazards Program, American Institute of Architects Research Corporation, 1735 New York Avenue, N.W., Washington, DC 20006, (202) 785-7800.*

Although design techniques for resisting earthquakes, fire, flooding and extreme winds, and for conserving energy, have become sophisticated, integration of the techniques is at a much more primitive stage. The study will survey design standards and practices now used for hazard resistance and energy conservation. It will explore both the conflicts and the mutual reinforcements that arise when provisions for earthquake resistance, energy conservation, and one or more other hazards are imposed. The goal of the project is to provide local and national building code organizations and designers with guidelines for integrating solutions to these multiple concerns.

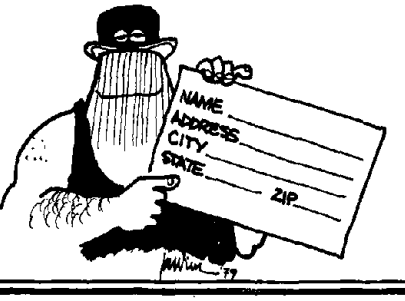
Response to earthquakes. "Alaska Earthquake Response Study," Department of Housing and Urban Development, $100,000, 12 months. Principal Investigator: *Duane Bessette, Alaska Division of Emergency Services, Department of Military Affairs, State of Alaska, 1306 East 4th Avenue, Anchorage, AK 99501, (907) 272-0594.*

The Alaska Division of Emergency Services is conducting a study of community earthquake vulnerability in south-central Alaska. Since the population of Anchorage has tripled since the 1964 earthquake, much more extensive damage is expected from a future quake. Damage information from the 1964 quake and analysis of the damage potential to new facilities will be used to evaluate the capability of the state, city, smaller municipalities, and other private and public agencies to respond to an earthquake.

The study will culminate in recommendations for improving response ability in a variety of areas such as emergency plans and procedures, public education, mass shelter and feeding, and increasing the earthquake resistance of important facilities. Suggestions will also be made regarding the delineation of tsunami inundation areas, tsunami warnings and evacuation routes.

HELP!

Since many subscribers have recently been relocated by FEMA, and still others have flowed hither and thither on the tides of life, our address list for the *Observer* is somewhat in arrears. Please send us your new address, and include your old label with it.



NATURAL HAZARDS AND PUBLIC POLICY

Attempts to reduce vulnerability to natural hazards and to cope with the results of natural disasters have taken a variety of public and private forms. Any response to the presence of such risks ultimately imposes costs on some sector of society at some time. The problem of how to deal fairly and effectively with the continued exposure of people and property to natural hazards is, therefore, a complex yet significant one for public policy makers at federal, state and local levels. A study funded by the National Science Foundation and carried out by the J.H. Wiggins Company examined this problem and its findings have been published in *Natural Hazards: A Public Policy Assessment.*

The multi-disciplinary research team used risk analysis techniques to develop information to assist policy makers in identifying specific problems related to natural hazards, and in reaching solutions to those problems. The framework presented by the report includes:

- estimates for 1970 and 2000 of annual natural hazards losses;
- specific strategies and technologies theoretically capable of reducing such losses;
- an analysis of past and current public policies and administrative arrangements aimed at reducing natural hazard losses;
- an assessment of contemporary social, technical, administrative, political and economic constraints on public policies for mitigating the effects of natural hazards; and
- policy options for the future management of natural hazard risk.

Information on the project and report is available from the *J.H. Wiggins Company, 1650 South Pacific Coast Highway, Redondo Beach, CA 90277.*

HURRICANE AWARENESS EXAMINED

The final report of a project to study hurricane education in the Gulf and Atlantic coastal states, funded by the National Weather Service, National Oceanic and Atmospheric Administration, reveals that almost no coastal states offer hurricane instruction beyond that found in conventional curricular materials. Officials from state education departments agreed, however, that additional hurricane awareness lessons are needed in the schools.

Results of the project indicate that instruction on hurricanes should be approached from a broad perspective, encompassing both scientific and social aspects of the storms. Short units containing information of local interest could be widely incorporated into existing courses taught in schools. The report recommends that a pilot study be conducted to develop curricular materials and to devise implementation strategies that would result in hurricane awareness education in all coastal schools.

For information about the project contact *Ira W. Geer, National School Weather Project, State University College, State University of New York, Brockport, NY 14420.*

FLOOD PLAINS BELONG TO THE RIVER

The Committee on Geology and Public Policy of the Geological Society of America has recently released *Floods and People: A Geological Perspective,* authored by John H. Moss, Victor R. Baker, Donald O. Doehring, Peter C. Patton and M. Gordon Wolman. The report, prepared with partial support from the National Science Foundation, explains the dynamics of flooding, details concisely current ways of coping with flooding, and examines the problems involved in managing flood plains intelligently. "With building on flood plains occurring at an ever-increasing rate, it is apparent that legislators, planners, builders, and the public, despite years of experience, have failed to comprehend the fact that flood plains will inevitably be flooded." The seven-page report is available from *The Geological Society of America, 3300 Penrose Place, Boulder, CO 80301.*

WAITING FOR THE BIG ONE

Although a majority of southern Californians interviewed in a recent study were fatalistic about the damage an earthquake will do to them and their communities, 85% said that the government, particularly the local government, should take steps to protect especially endangered groups—the elderly, the disabled, and those living in unsafe structures. *Earthquake Threat: The Human Response in Southern California,* by Ralph Turner, et al., is the interim report of a study begun in 1977 with funds from the National Science Foundation and the U.S. Geological Survey.

Approximately one year after the announcement of the southern California Uplift, 1450 adult residents of Los Angeles County were questioned on many of their attitudes and beliefs about the earthquake hazard. Interviewers from UCLA's Survey Research Center began by asking respondents whether they were aware of the Uplift and of various predictions for earthquakes in the future, and then proceeded to ascertain, among other things, their degree of concern about the earthquake threat, whether they want to be kept informed about the threat, what they thought could be done by governments or individuals to ameliorate losses, and whether they would believe scientific earthquake predictions.

Two-thirds of those interviewed had two or more specific suggestions about what federal, state and local government ought to be doing about earthquake threat. The vast majority thought that government should invest more money in structural safety programs, public education, and planning for emergency care and relief. Only about 8%, however, mentioned a need for improving prediction techniques. When asked if it is very important for the government to spend large amounts of money in these areas, 65% of the respondents said that investment in the enforcement of building and safety codes was the priority.

Copies of the report are available from the *Survey Research Center, University of California, Los Angeles, CA 90024.*

ONE PICTURE IS WORTH . . .

A number of slide shows, movies, and other graphic treatments of disaster preparedness and response have recently become available. All could be included in a variety of public education programs, from courses in an elementary school to a supplement in a weekend newspaper.

Hazard Awareness . . . Planning Ahead for What Comes Naturally is a 15-minute film based on the first national hazard awareness workshop held in Corpus Christi earlier this year. Designed for researchers, planners and coordinators, those who must prepare for disasters and alleviate their effects when they occur, the film is accompanied by a workbook and survival checklist. Bookings can be arranged at no charge by contacting the *Texas Insurance Information Center of the Insurance Information Institute, Suite 501, 1011 Congress, Austin, TX 78701.*

When Lightning Strikes, a 15-minute slide program, was prepared by the National Weather Service to explain the dynamics of lightning and to elucidate safety rules. The text is suitable for any audience. To obtain the 67 slides and 11-page commentary (@ $21.50) request order #A01979 from the *National Audiovisual Center, Order Section, General Services Administration, Washington, DC 20409.*

Tornado Safety in Residences comprehensively reviews designs of homes that make some safer than others, and recommends the wisest place to take cover from a tornado for various types of structures. Of interest to architects, builders, and home owners, the 33-minute slide program includes 130 slides, a cassette tape, and a commentary. Order #A00796 (@ $36.00) is available from the *National Audiovisual Center, Order Section, General Services Administration, Washington, DC 20409.*

Readers of some local newspapers in Kansas recently received the NWS *Winter Storm* brochure in their Sunday newspaper. Negatives of all NWS and NOAA preparedness materials can be made available to local agencies or news media. For information contact the *Weather and Flood Warnings Coordination Staff, Wx5 Gramax Building, Room 419, Silver Spring, MD 20910.*

The Emergency Response Institute in Tacoma, Washington, can provide, among its many services, pamphlets, 35mm slides, and graphics for overhead projectors that indicate correct personal response to earthquakes, summer storms, and winter storms and hazards. The materials are suitable for use by audiences of all ages. For a list of audiovisual aids or information on the Institute's other activities, write the *Emergency Response Institute, 9036 Golden Given Road, Tacoma, WA 98445.*

The *Building Construction Checklist,* written for investors in property along the Texas coast, enumerates problems that can arise—in any shoreline area—from high winds, flood, erosion and subsidence, and enables the buyer or owner to determine the soundness of the building in question. Copies of the brochure, and a special set of model minimum hurricane-resistant building standards, can be obtained from the *Texas Coastal and Marine Council, P.O. Box 13407, Austin, TX 78711, (512) 475-5849.*

PREPAREDNESS COORDINATION

The Tampa Bay Regional Planning Council recently released the final report of a project to assess the existing disaster preparedness plans in the Tampa Bay Region. *Regional Disaster Preparedness Needs Study,* financed by the Department of Housing and Urban Development, describes the present ability of local governments in the Tampa Bay Region to coordinate efforts in response to a disaster affecting more than one county or municipality.

The survey was accomplished by reviewing and comparing all the local preparedness plans and by analyzing data on service responsibility and delivery from questionnaires completed by the local preparedness agencies and organizations. The questionnaire revealed the general nature of the plans, officials' perceptions of regional planning, and the types of hazards to which each agency would respond.

The study recommends that a number of actions be taken in order to meet the regional disaster preparedness needs.

- Local governments in the region should support the preparation of a regional inventory of disaster preparedness resources—manpower, equipment and facilities.
- Every county and municipality should enter into mutual aid agreements with adjacent counties and municipalities to provide assurance of assistance in times of disaster.
- Written agreements should be made with local public entities such as Red Cross chapters and school boards to provide specific assistance during an emergency.
- The region should formulate a regional hurricane evacuation plan including alternative routes and estimates of expected shelter needs.
- Yearly simulations and tests of county disaster plans should continue, and all counties should participate.

Information about the Council's report is available from the *Tampa Bay Regional Planning Council, 9455 Koger Boulevard, St. Petersburg, FL 33702.*

FLOAT THAT LOAN

The New Jersey Supreme Court recently heard debate on whether a municipality may prohibit a homeowner from putting a sign on his front lawn announcing that the area is flood-prone. Owner Donald Miller erected a 32 square-foot sign that proclaimed in red and black letters: "Welcome! Prospective Residents of Lawrence Brook Glen. This Resident and Others of Riva Avenue Want to Welcome You to This Flood Hazard Area. Good Luck!! Information Available."

Lawyers for the municipality of Milltown maintain that the sign is not political and, therefore, Miller can't claim his constitutional right to free expression. Furthermore, they maintain that, "A neighbor should not have the right to say anything he wants," particularly about flooding in an area of town. Such a sign could cause neighbors to flee from the area, deter others from buying homes in the town and, consequently, reduce property values, they contend.

Chief Justice Robert Wilentz wondered whether a neighborhood dispute or a matter dealing with the public interest could be considered a political issue and protected by the Constitution. The court has reserved decision on the case.

MORE EFFECTIVE IMPLEMENTATION

The *Citizen Participation Handbook* is one of a number of offerings from the Institute for Participatory Planning. Concerned with aiding and advising public officials, agencies, and professionals working with the public, the institute also provides short courses, a newsletter, a journal, and a video tape training program. To implement projects or programs that are complex, controversial, and unpopular, it is necessary to involve the affected citizens, and the handbook suggests designs and techniques for doing so in the most productive way. Additional chapters discuss the administration and management of a citizen participation program, and present studies of actual decision-making cases.

To order the handbook (@ $15.00 in 1979), or for more information, contact the *Institute for Participatory Planning, Box 4068, University Station, Laramie, WY 82071.*

LONG-TERM DISASTER IMPACTS

Recently published findings from two separate studies call into question the belief that disasters leave lasting socio-economic scars on communities. *Aftermath: Communities After Natural Disasters* and *After the Cleanup: Long-Range Effects of Natural Disasters,* both released by Sage Publications, report that it is difficult to find any significant social or economic changes for the community as a whole lasting any longer than a few months in disaster-stricken communities.

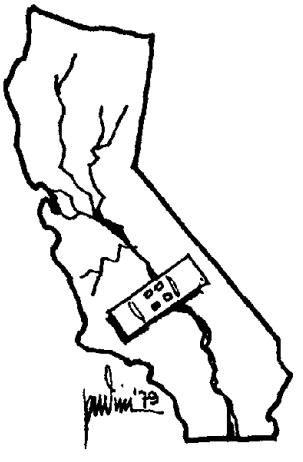
Aftermath, by H. Paul Friesema, et al., is the result of a study begun in 1975 with funds from the National Science Foundation. The objectives were to identify long-term social and economic disruptions, develop suitable methods for gathering the necessary data, and ascertain variations in disaster recovery associated with event severity and external assistance. The authors examined four communities that had been stricken by a disaster between 1955 and 1966: Yuba City, California (flood); Galveston, Texas (hurricane); Conway, Arkansas (tornado); and Topeka, Kansas (tornado). Using an interrupted time-series analysis, that is, periodic observations of some community variables and the occurrence of the disaster at some point in the series, the study defined recovery and then measured it in the four communities. While the authors note that using aggregate indicators may mask severe personal impacts on victims, and allow that measuring external assistance is very difficult, they hold that the indices they developed for measuring social and economic severity of a disaster impact were valid, and should be used and tested further.

Studies at the Social and Demographic Research Institute of the University of Massachusetts are detailed in *After the Cleanup,* by James D. Wright, et al. The long-term effects of floods, tornados and hurricanes that struck between 1960 and 1970 were estimated in two ways: by contrasting statistically counties that had been affected by a disaster with counties that had not, holding constant other characteristics that may affect growth trends; and by making similar contrasts within Standard Metropolitan Statistical Areas. The 1960 and 1970 Censuses were the sources of data. The authors warn that their findings do not address individuals, households, or organizations that may suffer irreparable damage from a disaster, but they state ". . . as far as housing and population trends and the available socio-demographic characteristics are concerned, it is not possible to find that such disasters had effects that lasted more than a few months."

Both books are available from *Sage Publications, 275 South Beverly Drive, Beverly Hills, CA 90212: Aftermath @ $15.95; After the Cleanup @ $16.95, or $7.95 for the paperback.*

CONFERENCES

Focus on the San Andreas Fault: Research Frontiers and Social Impacts, San Francisco State University, Department of Geosciences. San Francisco: January 4, 1980. This symposium at the national meeting of the American Association for the Advancement of Science will address both analyses of the physical structure of the fault system, and socio-economic aspects of earthquakes and the potential effects of their prediction. A field trip will be held on January 5th to visit locations in the Bay Area at which geologic studies of the fault have been made. Further information is available from *Raymond Sullivan, Department of Geosciences, San Francisco State University, 1600 Holloway Avenue, San Francisco, CA 94132, (415) 469-2061.*



Social and Economic Impact of Earthquakes on Utility Lifelines, Construction Division of the American Society of Civil Engineers. San Francisco: May 19-20, 1980. The conference will explore potential economic and social impacts of lifeline disruptions due to an earthquake and other hazards related to seismic events. Sessions will address state-of-the-art in engineering, economic considerations, new policy and planning initiatives, and capabilities to summarize hazards information for use in siting. Private and public decision makers, planners, regulators, designers and builders are urged to attend. For further information, contact *Bill Ayer, ASCE Headquarters, 345 East 47th Street, New York, NY 10017, (212) 644-7495.*

33rd Annual Conference, Canadian Water Resources Association. Kelowna, British Columbia: June 4-6, 1980. Evolving water management strategies in Canada will be the focus of the three-day conference. In addition to meetings and discussions on water management, one day will be given to inspection trips to such sites as the Mica Dam at Revelstoke, and drip irrigation systems at Osoyoos. Queries may be addressed to *T.R. Carter, Conference Chairman, P.O. Box 6, East Kelowna, B.C., VOH 1G0.*

A general symposium of Natural Disasters as Environment will be held as part of the Congress of the International Geographical Union in Tokyo, September 3, 1980. The aim of the symposium is to exchange and summarize geographical experience, knowledge and methods that might be useful in future studies on natural disasters throughout the world. Particular attention will be given to a global summary of disasters and prevention, extreme meteorological events, and earthquakes. Papers dealing with damages and human response to natural disasters are solicited.

Information about the symposium and details of paper submission are available from *Takamasa Nakano, Department of Geography, Tokyo Metropolitan University, Setagaya-ku, Tokyo, Japan.*

The American Meteorological Society is laying plans for its Second Conference on Flash Floods to be held in Atlanta, March 18-20, 1980. Papers are solicited on the following topics:

- responsibility for forecasting, warning, response and recovery,
- costs of flash floods,
- social aspects,
- advances in knowledge of causes and improvements in forecasting and
- protective structure design.

For information about papers contact *Gene E. Willeke, Institute of Environmental Sciences, Miami University, Oxford, OH 45056, (513) 529-2732.*

International Conference on Engineering for Protection from Natural Disasters, Asian Institute of Technology. Bangkok, Thailand: January 7-9, 1980. The seventy-three papers to be presented will address issues in the following areas: modelling, mitigation and control of natural hazards; earthquake effects on structures; geotechnical aspects of natural hazards; flood protection; strong winds and cyclones; structural resistance to natural hazards; and earthquake resistance analysis in design. Address all correspondence to *Pisidhi Karasudhi, Conference Convener, Asian Institute of Technology, P.O. Box 2754, Bangkok, Thailand.*

PILOT PROJECT FOR EVACUATION

The Southwest Florida Regional Planning Council has completed and published the *Lee County, Florida, Emergency Evacuation Plan,* a pilot project funded by the U.S. Army Corps of Engineers for the purpose of producing a decision-making framework for the prevention or reduction of deaths during a hurricane.

The Technical Data Report describes the methods used to develop warning, evacuation and shelter aspects of the plan. The county was divided into zones of potential risk and population determinations were made for each zone. Evacuation routes were planned for each area, taking into account probable road conditions, carrying capacity per hour, and length of time needed to reach shelter. Traffic control problems and special procedures for evacuating the elderly and handicapped were also considered. Capacity, quality and location of shelters were determined and assignments made for each. Provisions were made for communication and coordination between shelters and the county emergency operations center.

The Implementation Report describes procedures to be followed by each component of the emergency response network, from the initial hurricane warning to the beginning of the recovery stage.

The plan also includes two brochures for distribution to the public. One gives information about hurricane preparedness—securing property, staying informed through radio or television, evacuation procedures, and the phone numbers of responsible county departments in case more information is needed. The second is a map specific to the resident's neighborhood showing recommended evacuation routes to shelters and inland.

Copies of the reports are available from the *Jacksonville District, Corps of Engineers, Department of the Army, P.O. Box 4970, Jacksonville, FL 32201.* Brochures may be obtained from the *Lee County Division of Disaster Preparedness, P.O. Box 398, Ft. Myers, Fl 33902.*

RECENT PUBLICATIONS

Catastrophe: The Violent Earth. Tony Waltham. New York: Crown Publishers, Inc. 1978. 170 pp. $7.95.

A series of lectures given to civil engineering students at Trent Polytechnic were expanded and amplified in order to be published under this title. It was the author's hope that an appreciation of the geological causes of natural disasters would increase the students' awareness of how engineering practices could precipitate or magnify the effects of natural disaster, or conversely, minimize the effects. Considerable attention is given to earthquakes, rockslides, landslides, subsidence, and other forms of earth movement. Technical language is held to a minimum, facilitating a clear presentation of the subject to those without a formal background in geology. The book has a good bibliography and is well illustrated.

"Anthropological Studies in Hazardous Environments: Past Trends and New Horizons." William I. Torry. Current Anthropology 20 (September 1979) 3:517-540.

The author presents an excellent comprehensive review of anthropological research on disasters. The two main categories of studies are described: the homeostatic approach which documents and analyzes the ability of societies, under aboriginal conditions, to maintain their long-term stability in the face of a hazardous environment; and the developmental approach which deals largely with societies under the influence of modernizing pressures, and in which a disaster is viewed as only one of several agents which disrupt the social system, promoting change.

Information needs which can be met through anthropological research are listed, including the identification of vulnerability in different societies, development of transcultural communication ability, comparisons of social systems, and research on urban hazards.

International Disaster Health Care: A Conceptual Framework for Evaluation. Richard Alan Bissell. Master's Thesis, Department of Preventive Medicine and Comprehensive Health Care, University of Colorado Health Science Center, 4200 East 9th Avenue, Box C-245, Denver, CO 80262. 1979. 157 pp. Arrangements for borrowing the study should be made through the Inter-Library Loan service. Copies of the thesis are available for the cost of reproduction from the Natural Hazards Research and Applications Information Center.

Although millions of dollars are spent annually on the provision of international disaster health care, there exists very little scholarly literature on the effectiveness of these programs. This thesis examines the process and problems of disaster health care, the causes of injury in various disasters, and finally presents a conceptual model for evaluating disaster health care. The model considers physical environment, population characteristics, community organization, pre-disaster health status, the type and force of the disaster agent, warning and protective action, first aid, rescue, the transport of patients, and both initial and advanced medical care. The author hypothesizes that primary disaster health care is most likely to be provided best by teams that come from the same international "area" as the impacted zone, primarily because a regional team has distinct advantages in geographical and cultural proximity, and in linguistic comprehension.

Natural Hazards Management in Northern Australia: Proceedings and Papers Arising from the 2nd NARU Seminar. G. Pickup, Editor. Australian National University, North Australia Research Unit. 1978. 493 pp. Available from: NARU, P.O. Box 39448, Winnellie, N.T. 5789, Australia.

The seminar, held in Darwin, September 11-14, 1978, served as a review and assessment of Australia's recently increased awareness of natural hazard risk and of the progress made in developing suitable hazard management practices. State-of-the-art reports concentrated on five basic themes: risk assessment, mitigation measures, disaster handling, reconstruction, and future priorities. "Land-Use Management as a Disaster Mitigation Measure: the Successes and Failures in the Case of Post-Tracy Reconstruction in Darwin", by J. D'Rozaria, and "Role and Contribution of Private Sector Insurance in Natural Disaster Mitigation", by J.P. Dawson are samples of the twenty-two papers included in the proceedings. Of some interest are the references accompanying the papers since many refer to fairly recent Australian studies and public reports of which American hazard specialists may not be aware.

Disaster Response: A Handbook for Church Action. John C. Bush. Scottsdale, PA: Herald Press. 1979. 171 pp. $4.95.

The handbook grew out of the experience gained by the Kentucky Council of Churches' Interchurch Disaster Recovery Program during the 1974 tornado outbreak and the 1975-1977 floods in Kentucky. Following a general discussion about how people react to disaster, a series of disaster response models are presented which previously had been implemented by church groups. The models provide practical information on both the material and psychological aspects of disaster relief and recovery. Almost half the handbook is devoted to a directory of resources that lists public, private, quasi-private, and church organizations involved with natural disasters.

"Weather Emergencies and the Mass Media." H. Michael Mogil. In ***Eleventh Conference on Severe Local Storms (October 2-5, 1979): Preprint Volume.*** *American Meteorological Society, 45 Beacon Street, Boston, MA 02108. 1979. 634 pp. $21.50. A limited number of reprints of the article are available from the author at National Weather Service Headquarters, Public Services Branch, 8060 13th Street, Silver Spring, MD 20910.*

The paper describes the "total warning system" concept, with emphasis on the current relationship between the National Weather Service (NWS) and the media. A number of interesting problems involving storm warnings and media are discussed: 1) forecast credibility (just whose forecast is being broadcast?), 2) who interprets the television station's color radar display? (it is a potentially dangerous tool in the hands of an inexperienced or untrained weathercaster), and 3) how effective is the implementation of written plans and weather emergency operating procedures at television and radio stations? The author suggests that NWS personnel need to better understand the media's operations and broadcast procedures, while the media need to better understand the NWS's operational capabilities and limitations.

Fragmentation of Public Authority over Floodplains: the Charles River Response. *Rutherford H. Platt and George M. McMullen. University of Massachusetts, Water Resources Research Center, Amherst, MA 01003. Publication #101. 1979. 112 pp.*

This report examines the extent to which overlapping public jurisdictions have cooperated in forming an integrated flood management program for the Charles River Watershed. Cooperative undertakings, both of a structural and non-structural nature, raise problems of coordination: 1) joint regulation of land use and water resources, 2) joint acquisition of land and facilities, and 3) extraterritorial authority. The study concludes that state coordination has been deficient, particularly in the regulation of areas still to be purchased. Because the key to the project's long-term success lies in a continuous commitment by all parties, any delay in the acquisition schedule contributes to the vulnerability of land with development potential.

Assessing International Disaster Needs. *National Academy of Sciences, National Research Council, Committee on International Disaster Assistance, 2101 Constitution Avenue, N.W., Washington, DC 20418. 1979. 146 pp. $6.00. Available from the Office of Publications, National Academy of Sciences, at the above address.*

This report focuses on the role of science and technology in supplying information in the assessment of disaster damage and needs in developing countries. Questions addressed include 1) what methods are most effective for collecting information under different social, political, and technological contexts, and 2) how can information be made most useful to decision makers in both the impacted area and to the international disaster mitigation community. A recommendation is made for the establishment of a multidisciplinary, multinational roster of disaster experts who are prepared to participate in post-disaster assessment teams.

Industrial Flood Preparedness: Proceedings of the Flood Warning and Flood Proofing Seminar for Industry. *Thomas P. Bresenhan, Editor. SEDA-Council of Governments, Timberhaven, R.D. #1, Lewisburg, PA 17837. 1979. 148 pp. Soon to be available from the Pennsylvania Department of Community Affairs, Floodplain Management Division, South Office Building, Room G20, Harrisburg, PA 17120.*

The seminar, sponsored by a group of local, state, and federal agencies, was held in Williamsport, Pennsylvania on April 16-17, 1979. Presentations contributed to the seminar include seven papers on flood warning, five on industrial floodproofing, four essays on pertinent federal and state regulations, and three papers on flood preparedness. Summary essays indicate that non-structural measures, when implemented with vigorous and effective local self-help, can prove economically advantageous to industrial interests. Industrial flood insurance and a successful flood preparedness program of the Sprout-Waldron Division, Koppers Company, Inc. are among the specific topics discussed.

Protecting the Golden Shore: Lessons from the California Coastal Commissions. *Robert G. Healy, Editor, John S. Banta, John R. Clark, and William J. Duddleson. Available from the Conservation Foundation, 1717 Massachusetts Avenue, N.W., Washington, DC 20036. 1978. $7.95.*

California's coastal program is analyzed, beginning with the campaign for passage of Proposition-20, which created the coastal commissions, and ending with passage of the 1976 Coastal Act. Different aspects of the program are examined in each chapter, including the movement of the citizens to save the coastal resource by establishing a coastal management program, the role of the permit system in the coastal strategy, the interaction of the newly created regional coastal commissions with existing state agencies, economic effects of regulation of the coastal area, and the role of science in the coastal planning process. The study reaches a number of conclusions about the successes and failures of the California experience, but notes that the permanence of its accomplishments cannot be assessed at least until the planned local coastal programs have been implemented.

Planning for People in Natural Disasters. *Joan Innes Reid, Editor. James Cook University of North Queensland, Department of Behavioral Sciences, Townsville, Q. 4811, Australia. 1979. 207 pp.*

During 1977-78, the Department of Behavioural Sciences of James Cook University organized three regional seminars on the relation of natural disaster to the human community. Proceedings from the seminar, augmented by several additional research papers, comprise the thirty-odd selections in this volume. The papers represent a socially oriented, multi-disciplinary approach to the study of disasters with contributions from both the academic research community and the managerial sector. Problems of disaster planning are examined in the areas of regional emergency services, the physical environment, medical emergencies, disaster welfare, psychological services, communication networks, and local emergency authority. Selections of special interest are "Cyclone Tracy: Psychological and Social Consequences", by G. Milne, and "The Media and Community Morale", by J. Oost.

Evaluation of Flood Forecasting-Response Systems II. Roman Krzysztofowicz, Donald R. Davis, et al. Department of Hydrology and Water Resources and the Department of Systems and Industrial Engineering, University of Arizona, Tucson, AZ 85721. Reports on Natural Resource Systems No. 33. 1979. 151 pp. $5.00.

This report modifies and refines a previous study with the same title. Report II confirms that mitigating action taken by the flood plain dweller to reduce flood losses is cost-effective, but notes that the full potential of the flood forecast-response system for cutting flood losses is not being realized and that the system could be improved. Recent findings indicate that 1) information about flood losses is deficient for all types of non-residential structures, 2) large commercial and industrial organizations are more likely to be able to devise and utilize efficient response strategies than individuals, and 3) the potential for improving the effectiveness of flood forecast-response systems is greatest when the forecasts provide short lead times.

Fifth International Conference on Wind Engineering—preprints. *Fluid Mechanics and Wind Engineering Program, Department of Civil Engineering, Colorado State University, Fort Collins, CO 80523. 1979. Two volumes, approximately 1400 pp. The proceedings will be published by Pergamon Press after January 1, 1980.*

Sixteen public and private organizations sponsored this conference held at Colorado State University in Fort Collins, July 8-14. Over 100 papers were delivered on a wide range of topics associated with wind engineering and its applications. Five papers were presented in the technical session dealing with the social and economic impact of wind storms, among which were "Economic Impact of Wind Storms in the United States," by Don Friedman, and "Damage and Decision Making in Wind Engineering," by William Petak and Gary Hart. Several presentations were made on standards and codes for wind engineering. Also addressing the problem of wind hazard is "Tornado Track Characteristics and Hazard Probabilities," by J. T. Schaefer, *et al.*

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