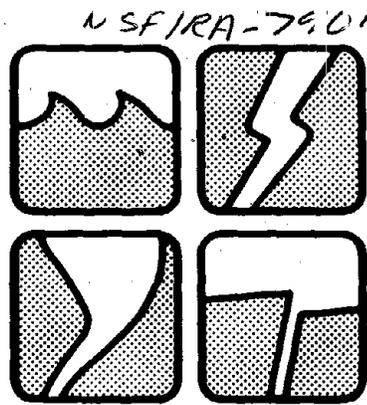


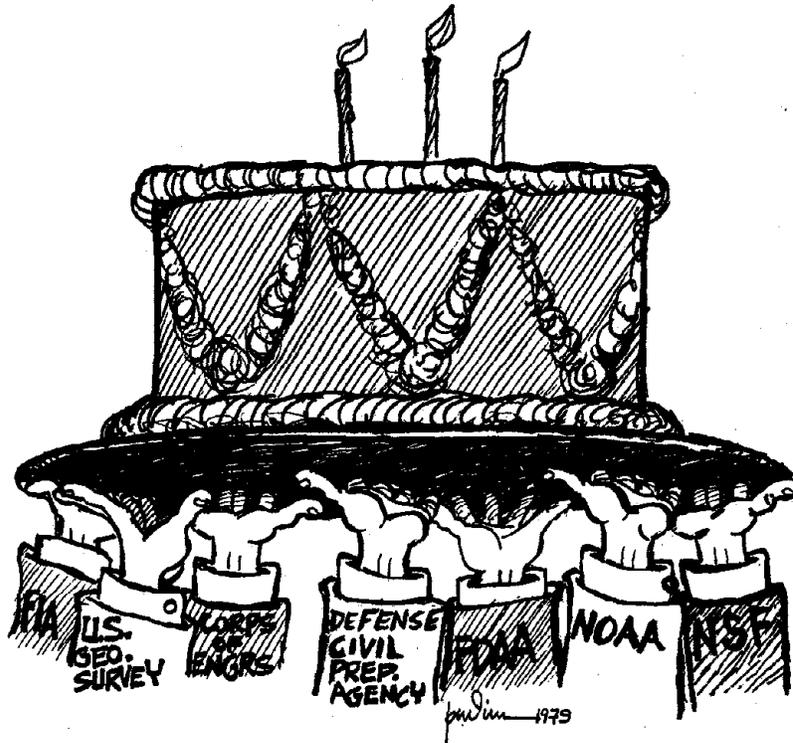
Natural Hazards OBSERVER



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THE CENTER MOVES INTO ITS FOURTH YEAR

As national programs to deal with natural hazards move into a new framework, the Natural Hazards Research and Applications Information Center is changing its status. During recent months arrangements were completed by seven federal agencies to continue the Center on a different financial basis.

During its first three years the Center was supported by a grant from the National Science Foundation. This made possible the publication of the *Natural Hazards Observer*, the annual invitational workshop, and assistance in other workshops. The circulation of the *Observer* increased, and the outreach to users and producers of hazards research expanded. But a major test of whether or not the effort warrants the expenditure is the willingness of interested groups to pay for it. This

now is demonstrated by the agreement of the Corps of Engineers, the Defense Civil Preparedness Agency, the Federal Disaster Assistance Administration, the Federal Insurance Administration, the National Atmospheric and Oceanic Administration, and the U.S. Geological Survey, acting through the National Science Foundation, to join in bearing the expenses for as long as five years. The costs will continue at the present level with provision for a small amount of aid to auxiliary research.

With this assurance we shall explore ways of enhancing the usefulness of the Center in assisting in the reshaping of national, state and local activities. The need to speed up the translation of research findings into public policy and practice is becoming more acute. If

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the new Federal Emergency Management Agency is to achieve its promise of unified governmental effort it will have to draw heavily upon what is being learned about the effects of different warning and administrative systems. If the vision of genuine mitigation of the continuing surge of earthquake and flood vulnerability is to be realized our growing understanding of how communities cope with hazard must be applied in field advice and procedures.

The Center will be on the lookout for better, quicker ways of getting scientific insight into practical use and of alerting the research community as to the practitioner's needs.

G F W

EARTHQUAKE EDUCATION

San Francisco State University has initiated a teacher training program in earthquake education as part of the National Science Foundation's Precollege Teacher Development in Science Project. The objective is to promote a student awareness of, and an interest in, the environment through the study of earthquakes. This program will aid elementary school teachers by providing:

- 1) background information necessary for an understanding of earthquakes,
- 2) assistance in the development of an interdisciplinary curriculum on earthquakes,
- 3) laboratory and field experience for a greater understanding of earthquake effects and
- 4) continuing guidance and support to enable teachers to serve as resource personnel within their school or district.

For information about this program contact *Raymond Sullivan, Department of Geology, San Francisco State University, San Francisco, CA 94132, (415) 469-2080.*

REQUEST FOR PUBLICATIONS ON FLOOD FLOW ESTIMATION FOR URBAN AREAS

The Hydrology Committee of the U.S. Water Resources Council will initiate in the near future a study of techniques for determining flood flow frequency estimates at un-gaged urban locations. In order to develop a set of guidelines that will provide some uniformity in flood flow estimates, a review of the literature describing techniques and results of their application is currently being undertaken. The Committee would like to have as much input as possible from anyone involved in making flood flow estimates at un-gaged urban locations, and thus is soliciting both published and unpublished reports that describe such techniques.

Anyone having such reports is requested to forward them as soon as possible to *Dr. Walter J. Rawls, Hydrologist, USDA-SEA-FR, Room 139, Building 007, BARC-West, Beltsville, MD 20705.*

WASHINGTON UPDATE

EVALUATION OF NONSTRUCTURAL MEASURES FOR FLOODPLAIN MANAGEMENT

The Corps of Engineers has proposed rules for evaluation of the economic feasibility of using certain nonstructural measures for prevention of flood damages (*Federal Register*, Vol. 44, No. 66, April 4, 1979, pp. 20350-20352). This regulation addresses the evaluation of the National Economic Development benefits and costs resulting from two of the nonstructural measures identified in Section 73 of Public Law 93-251—evacuation and relocation. The rules outline measures for determining the net benefits of the flood plain with and without the specified alternatives. The rules lay out the types of benefits and costs which must be taken into account and the procedures for making the calculations. As for evaluation of other programs affecting water and related land resources the proper benefit standard is the willingness of users, i.e. benefiting activities, to pay for implementation of the plan. Comments on these proposed rules were due by May 21 and final rules are expected to be published by mid-summer.

This can be seen as one more step in the present national effort to give increased consideration to nonstructural floodplain management strategies. This effort was given impetus with the issuance of the President's Executive Order 11988 on Floodplain Management. Many agencies have already issued regulations for implementation of that Executive Order. (See *Observer* Vol. II, No. 4, p. 8; Vol. III, No. 1, p. 9; and Vol. III, No. 2, p. 9.)

FEMA IS OFFICIAL

Executive Order 12127, signed by President Carter on March 31, 1979, officially established the new Federal Emergency Management Agency, effective April 1. Carter's action transferred to FEMA the functions of the U.S. Fire Administration and the Federal Insurance Administration. Still to be added to FEMA are the responsibilities of the Defense Civil Preparedness Agency, the Federal Disaster Assistance Administration, and the Federal Preparedness Agency. Those transfers are expected by October 1979.

President Carter has announced his intention to submit to Congress the name of his nominee to fill the post of Director of FEMA—John W. Macy, Jr. Macy, presently a public management consultant in Washington, D.C., and formerly Chairman of the Civil Service Commission during the Johnson administration, would bring a high degree of administrative expertise to the new agency. He served formerly as President of the American Society of Public Administration.

Gordon Vickery of the U.S. Fire Administration will continue to serve as acting director until Macy's appointment is final.

INDEPENDENT WATER PROJECT REVIEW

President Carter has directed the U.S. Water Resources Council (WRC) to conduct an impartial technical review of all federal and federally assisted water projects (E.O. 12113, January 4, 1979). The review will evaluate each report, proposal or plan for compliance with

- a) the Council's Principles and Standards,
- b) the planning manual of each agency as prepared by the WRC,
- c) relevant federal laws and regulations, and
- d) the President's directives for expanded public participation.

In accordance with the guidelines set out by the President in an accompanying memorandum, the Water Resources Council issued its Proposed Rules and Procedures of Implementation of the Water Projects Review Function in the *Federal Register*, Volume 44, No. 34, February 16, 1979, pp. 10316-10320. This statement outlines the scope of the planning review, the information which must be included in agency reports, the procedures for transmittal of reports, and the general content of the water project review findings.

Among other issues the reviews will consider

- whether a reasonable array of alternative plans has been considered,
- beneficial effects on national economic development,
- environmental impacts,
- public involvement and support, and
- water conservation measures.

Final rules are to be established by August, 1979.

EMPHASIS ON MITIGATION

The Federal Disaster Assistance Administration (FDAA) has proposed rules (*Federal Register*, Vol. 44, No. 69, April 9, 1979, pp. 21216-21223) for the implementation of Section 406 of the Disaster Relief Act Amendments of 1974 (PL 93-288). Section 406 states that as a condition of any loan or grant made as a result of a Presidentially declared disaster the state or local government must evaluate the natural hazards in the affected area and plan appropriate actions to mitigate such hazards. Further, the state will be required to furnish evidence of compliance with these conditions.

The proposed implementation guidelines prescribe the actions and procedures which will fulfill FDAA's mitigation mandate and detail the responsibilities of local, state and federal governments. FDAA hopes these procedures will provide a framework for close cooperation of all levels of government and will encourage state and local governments to take initiative to mitigate further losses. FDAA's commitment to mitigation will be made clear to the states from the beginning of the disaster relief period through an amendment to the federal/state agreement in which states will agree to consider damage reduction actions as they proceed with recovery and reconstruction planning.

The majority of actual mitigation planning will take place at the local and state level with federal involvement primarily in an advisory role, bringing technical expertise in such matters as hazard mapping and model building codes and construction practices. Basic policy guidance for hazard mitigation will be provided by the hazard mitigation element of the Federal Emergency Management Agency.

Building on the present relationship between state and federal disaster assistance teams, it is proposed that a hazard mitigation survey team be established incorporating all three levels of government. This team would a) identify significant hazards in the affected areas, b) evaluate the impacts of these hazards and measures which will mitigate these impacts, and c) recommend appropriate hazard mitigation measures and target dates for their implementation.



At the state level, the Governor's authorized representative will be ultimately responsible for state performance of hazard mitigation activities. FDAA and the state shall rely primarily on the survey team to observe and report on compliance.

If coordination and encouragement fail to produce acceptable mitigation alternatives, FDAA may withhold grants and loans to eligible applicants until mitigation actions have been taken.

For copies of these proposed rules, contact *Charles Stuart, Office of Public Assistance, FDAA/HUD, Washington, DC 20410, (202) 634-7835.*

DISASTER INSURANCE

February 8, 1979 a bill (HR 1922) was introduced by Representative G. Danielson (D-California) into the House of Representatives to create a Federal Disaster Insurance Corporation to provide all citizens an opportunity to obtain adequate insurance against losses sustained from natural disasters. The corporation could condition the issuance of disaster insurance upon the adoption and implementation by the state or local government of adequate measures to minimize or eliminate danger from the hazard. The bill has been referred to the Committee on Banking, Finance and Urban Affairs.



CONFERENCES

The Urban Flooding Conference held in Tulsa, Oklahoma, April 15-17, 1979 was cosponsored by Oklahoma State University and the University of Tulsa and endorsed by the Oklahoma Municipal League and the American Planning Association, Oklahoma Chapter. The conference centered around the main issues facing urban floodplain managers and presented examples of innovative programs and unique alternatives in floodplain management. The conference concluded with a discussion of how to develop and implement a flood control strategy at the local level. For information contact *Earl J. Reeves, Urban Studies, University of Tulsa, 600 South College, Tulsa, OK 74107, (918) 939-6351.*

Over the past few months the U.S. Water Resources Council has held two public workshops and a number of interagency technical seminars to examine the integration of wetlands and floodplain management. The decision to explore possible integration of wetlands protection and management and floodplain management was made due to the growing multi-agency involvement in the programs. Additionally most wetlands are located in floodplain areas, making integration of the programs a logical consideration. For information about the meetings contact *U.S. Water Resources Council, 2120 L Street, N.W., Washington, DC 20037, (202) 254-8290.*

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 annual convention of the National Association of Search and Rescue will be held in Baton Rouge, Louisiana on September 13-16, 1979. Program topics will include Rural Emergency Medical Service, Underwater Search and Rescue, State Planning Coordination, and Media Relations. For information write *NASAR '79, Northwestern State University, Natchitoches, LA 71457.*

The National Conference on Hurricanes and Coastal Storms was held May 29-31, 1979 in Orlando, Florida. The meeting was a cooperative endeavor of several Florida agencies, Florida State University, the Sea Grant Program, and the Federal Disaster Assistance Administration. Papers were presented on hurricane evacuation and hazard mitigation research and policy. Special seminars were held on organizing and hosting hazard awareness meetings, public participation in policy formation, local disaster response planning alternatives and the Wharton community disaster model for policy evaluation.

Information on how to obtain a copy of the proceedings is available from *Earl J. Baker, Department of Geography, Florida State University, Tallahassee, FL 32306, (904) 644-1865.*

The Hawaii Symposium on Intraplate Volcanism and Submarine Volcanism will be held in Hilo, Hawaii, July 16-22. Continental and submarine volcanism will be discussed, with special emphasis on the Hawaiian Islands. Participants will share data and interpretations of field observations. Current magma energy research on Hawaii will also be examined. For information regarding the program, contact *Robert Decker, Dartmouth College, Department of Geology, Hanover, NH 03755, (603) 646-3403.* For registration information, contact *Lois Elms, Meeting Administrator, 1140 Pearl Street, Boulder, CO 80302, (303) 447-8361.*

A Natural Hazards Awareness Workshop was held in Corpus Christi, Texas, March 21-23, 1979. The workshop, funded by the National Oceanic and Atmospheric Administration, was jointly sponsored by the Texas Coastal and Marine Council and the Natural Hazards Research and Applications Information Center, with Texas A & M University acting as the host institution. The conference participants exchanged information on approaches which have been used to improve hazard awareness and discussed steps which might be taken to improve the effectiveness of future awareness efforts. A "Handbook of Dos and Don'ts" will be available shortly. Contact: *Sally Davenport, Texas Coastal and Marine Council, Hurricane Awareness Program, P.O. Box 13407, Austin, TX 78700, (512) 475-5849.*

The Scientific Symposium on Snow in Motion will be held in Fort Collins, Colorado, August 12-17, 1979. The Conference is sponsored by the U.S. Forest Service, the Rocky Mountain Forest and Range Experiment Station and the International Glaciological Society and will consist of sessions on four topics: snowcover stability and avalanche prediction, snow and avalanche mechanics, avalanche zoning, and wind transport and deposition of snow.

Information about the symposium is available from *R. A. Sommerfield, Rocky Mountain Forest and Range Experiment Station, 240 West Prospect Street, Fort Collins, CO 80526.*

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.*

Social Science Contributions to Natural Hazards Research: An Assessment was the theme of a conference held May 18-20, 1979, in Washington, D.C. The conference reported the findings of a University of Massachusetts research project examining the long-term effects of natural disasters and the politics of disaster mitigation. There was a discussion of the lessons learned from social response disaster studies and a critique of the current social science disaster research agenda.

For information about the conference and the availability of proceedings, contact *Peter Rossi, Social and Demographic Research Institute, W-34 Machmer Hall, University of Massachusetts, Amherst, MA 01003, (413) 545-3417.*

Proceedings are now available from the Canadian Hydrology Symposium on Floods, held August 29-31, 1977 and sponsored by the National Research Council of Canada's Associate Committee on Hydrology. The volume presents 31 papers from the workshop on topics ranging from public awareness of floods to design criteria. Also included are the findings and recommendations on specific issues which participants were asked to consider. For example, participants felt that no compensation should be made for flood damage until a flood risk map and comprehensive damage reduction plan have been prepared. Also of much concern was the need to develop some measure of the value of intangibles such as life and environmental quality to assure their consideration in economic analyses.

The proceedings are available from *National Research Council of Canada, Ottawa, Ontario, Canada K1A 0R6, \$10.00.*

The Engineering Foundation will hold a conference on Water Conservation—Needs and Implementing Strategies in Rindge, New Hampshire, July 8-13, 1979. Sessions will deal with such topics as institutional and economic consequences of drought and conservation, data support for conservation research, urban and nonurban water conservation potentials, and hydrologic planning for conservation. Information is available from Engineering Foundation Conferences, 345 East 47th Street, New York, NY 10017, (212) 644-7835.

The report of a Conference on the Impact of Climate on Australian Society and Economics has recently been released. The Conference, held November 27-30, 1978, was jointly sponsored by the Department of Science, the Commonwealth Scientific and Industrial Research Organization (CSIRO), the Academy of Technological Sciences and the Academy of Social Sciences, and brought together representatives from a wide spectrum of Australian life to discuss what is known about climatic impacts on such activities as agriculture, manufacturing, recreation and tourism, transportation, building design and insurance. Participants focused on determining the extent to which each enterprise or activity is aware of its vulnerability to climate, what specific information is still needed, and how that information might best be developed.

Overall, the conference revealed the need for a greater awareness in government and industry of potential impacts of climate on productivity, efficiency and national welfare. Participants felt strongly that the national climate data bank should be expanded and upgraded. Finally, while recognizing the present technological limitations to such capability, those present emphasized the need for meaningful and accurate seasonal forecasts of climatic conditions.

Copies of the report may be obtained from *CSIRO Division of Atmospheric Physics, P.O. Box 77, Mordialloc, Victoria, Australia 3195.*



WETLANDS NEWSLETTER

The *National Wetlands Newsletter*, a new monthly publication from the Environmental Law Institute, provides a forum for the exchange of information, problems and ideas about wetlands and floodplain management. The newsletter will keep readers informed of private wetland protection efforts, federal, state and local regulation and acquisition of wetland and floodplain areas, pertinent litigation and legislation, and current research. Also covered are workshops and symposia for persons concerned about wetlands, and recent literature dealing with wetlands problems.

Subscriptions may be ordered from *National Wetlands Newsletter, Environmental Law Institute, Suite 600, 1346 Connecticut Avenue, N.W., Washington, DC 20036. \$25.00 for one year.*



GRANTS

Building practices for multi-hazard mitigation. "Introduction of Earthquake Hazards Mitigation Through Multi-Hazard Mitigation Techniques in Areas of Low Concern for Seismic Risk," National Science Foundation, \$29,067, 12 months. Principal Investigator: *John Loss, Architecture Program, North Carolina State University, Raleigh, NC 27650, (919) 737-2204.*

In areas susceptible to moderately damaging but infrequent earthquakes, seismic planning may stand a better chance of acceptance and implementation if introduced as part of a multi-hazard mitigation technique for preparedness planning. A new project at North Carolina State University will examine ways to reduce damage to low rise and residential buildings and transportation/communication structures through multi-hazard building codes, zoning ordinances and construction practices. By comparing the current state of the art in earthquake-resistant construction techniques with codes and practices presently utilized to reduce the impact of hazards more common to North Carolina—flash flood, thunderstorm and hurricane—it is hoped that a multi-hazard technique can be identified that will capitalize on those design requirements that are the same and identify those that are unique to individual hazards. Although the research will be conducted in North Carolina and the findings tested in South Carolina, it is anticipated that the results will be applicable to other mid-Atlantic and southeastern states.

Uncertainty and risk. "The Value of Data in Relation to Uncertainty and Risk," National Science Foundation, \$71,598, 30 months. Principal Investigator: *Leo R. Beard, Director, Center for Research in Water Resources, University of Texas, 10100 Burnet Road, Austin, TX 78758, (512) 836-0440, ext. 3112.*

In many studies of natural phenomena, an assessment of risk is determined from observations of past occurrences. The more information which can be obtained, the less uncertainty there is in probability estimates of events of varying magnitudes. The Center for Research in Water Resources is attempting to establish generalized criteria that can be used to judge the value of additional data in refining risk estimates. This criteria would be useful in planning structural and nonstructural projects for natural disaster management, with the project's primary work focusing on streamflow data and alternative flood control projects.

Emergency Management. "New England Municipal Governments Emergency Preparedness Program," Defense Civil Preparedness Agency, \$100,000, 12 months. Contact *Lorrie Webb, New England Municipal Center, Pettee Brook Offices, P.O. Box L, Durham, NH 03824, (603) 868-5000.*

This project will respond to some of the problems identified in a previous study conducted by the New England Municipal Center to assess the technical assistance and planning needs of local government in preparing for natural disasters. The recommendations emerging from that assessment are available (from the above address) in "Emergency Preparedness in New England Municipal Government Needs."

Three New England municipalities varying in population characteristics and governmental form will be selected to serve as demonstration communities to develop comprehensive emergency management systems with emphasis on all phases of disaster planning—mitigation, preparedness, response and recovery. In addition to providing information necessary for the formulation of management plans, the demonstration projects will allow an opportunity for the development of a training package for city officials. This package will be tested through a series of training and information workshops to be conducted throughout New England. The New England Municipal Center anticipates close coordination between this effort and the various similar, complementary projects going on currently in other public interest groups.



Hazard information. "Public Response to Geologic Hazard," U.S. Geological Survey, \$31,349, 6 months. Co-principal Investigators: *Thomas F. Saarinen, Department of Geography, University of Arizona, Tucson, AZ 85721, (602) 884-1842, and Gilbert F. White, Natural Hazards Research and Applications Information Center, Institute of Behavioral Science, Box 483, Boulder, CO 80309, (303) 492-6818.*

This study will analyze the effectiveness of USGS and state geological surveys as sources of information that may assist communities and individuals to make appropriate adjustments to geologic hazards.

An examination of the results of USGS hazard announcements to state and local governments at several locations over the past two years will form the basis of the analysis. One site will be selected for detailed study of the community's response to the hazard notification. Based on this prototype, a methodology will be developed for similar later studies. In addition, internal information flow at USGS will be examined to determine how that organization reaches consensus on severity of hazards and notification of public officials.



PAST VOLCANIC ERUPTIONS IN CENTRAL AMERICA

Geologists have long recognized Central America as one of the most volcanically active areas of the world. Recent information indicates that it is one of the most hazardous as well. Research at the University of Colorado has encountered evidence of a massive volcanic disaster circa 300 AD. When Ilopango volcano erupted in what now is the center of El Salvador, thousands of square kilometers of fertile Mayan farmland were rendered uncultivable. This research has studied the process of recovery from that disaster: recovery of soils by weathering, recovery of vegetation, and human recolonization. Soils have yet to fully recover their pre-Ilopango fertility. Vegetation recovery was somewhat more rapid, largely occurring within a century or two after the eruption. Human recovery was well underway in the research area by 500 AD when another eruption struck. Although more localized than Ilopango, the ash from Laguna Caldera volcano deposited 5m of sterile overburden on villages and farmhouses in the area. Evidence was encountered of two still later eruptions (1000 AD, Volcan San Salvador, and in 1658 AD, Volcan El Playon), indicating the hazardous nature of the Salvadoran environment in prehistory and contemporary times.

PUBLIC INFORMATION IN CANADA

The adoption of new technology has improved emergency response capability in Canada. A multiple access telephone feed system, established by the Manitoba Information Services Branch, to feed prepared materials on topics of current interest directly to radio stations, is capable of serving as an efficient dispenser of up-to-date information during an emergency. It can provide a crucial link between officials and the

media. For example, when a flood is imminent, ten different stations could phone in and simultaneously receive recorded statements of broadcast quality on latest developments and suggested precautions. An adjunct to this is a similar system at the Citizen's Inquiry Service which provides several incoming lines for general use by the population providing continuous, updated information.

In another effort to keep the population informed of hazardous situations, the Atmospheric Environment Service is introducing Weatheradio to Canada. The system, based in large part on the NOAA Weather Radio system, provides continuous weather broadcasts. Advance warning of hazardous weather conditions affecting public safety and welfare receive prompt distribution. Four installations are already broadcasting and if these prove effective new facilities will be established during the next five years to serve all major population centers.

For more information about these activities see *Emergency Planning Digest*, Vol. 5, No. 4, pp. 13-14 and Vol. 5, No. 3, pp. 2-4, *Emergency Planning Canada*, Ottawa, Ontario, Canada, K1A 0W6.



TORNADO ADVICE FROM NWS

If you've been taught to open a window as a safety precaution when a tornado is imminent, forget it. It could be dangerous.

That's the advice of the National Weather Service (NWS) as the result of a recent study by Texas Tech University commissioned by the National Oceanic and Atmospheric Administration (NOAA).

Texas Tech researchers found that merely the act of trying to open a window as a tornado approaches is dangerous in itself. You run the risk of serious injury from flying glass and debris if a wind-borne missile should hit the window while you're at it.

Additionally, while an open window could help relieve some pressure on the roof, according to the NOAA study, it adds additional pressure on the walls of the house facing the storm.

The researchers found that most buildings, both residential and commercial, have enough natural venting to take care of the rapid pressure change brought on by the passing of a tornado.

And finally, the researchers conclude grimly, if natural venting isn't enough, the tremendous winds and flying debris brought by the storm reach the building before the low pressure center of the tornado, with a good chance that window breakage and other structural damage would "open" the structure to a far greater degree than any opened window would. *Excerpted from NOAA NEWS*, Vol. 4 (March 23, 1979), No. 6, p. 2.

CONFERENCE ON CLIMATE CHANGE

A World Climate Conference in Geneva on February 12-23, 1979 brought together experts concerned with the question of whether or not climate is changing and if so, what are human implications of that change. A number of problems canvassed will be of interest to people dealing with natural hazards.

Convened by the World Meteorological Organization and other intergovernmental agencies, specialists from meteorology, geography, oceanography, economics and related fields joined in preparing a declaration and supporting documents on climate data, applications of climatic knowledge, possible human impacts on climate, impacts of climate change and variability on society, and needed research on these topics.



It is not clear that a significant climate change is under way. There is evidence of increasing variability, as measured by departures of temperature or precipitation from historical means, in some regions but not in others. There also is evidence that if a warming or cooling of global systems were to occur, or perhaps is occurring, it would not affect all parts of a hemisphere uniformly; change would be large in one place and small in another.

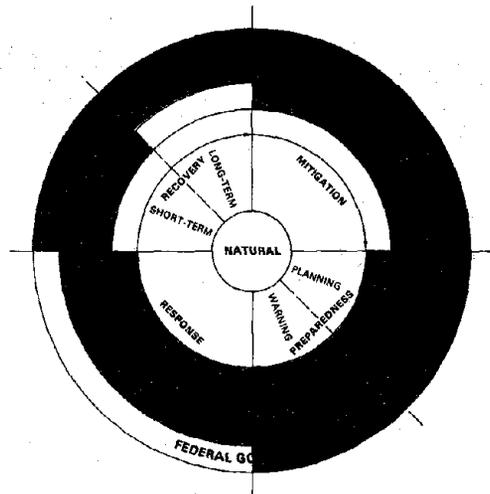
The Declaration and Supporting Documents for the Conference, 50 pages, have been published by *World Meteorological Organization, Case postale No. 5, CH-1211 Geneve 20, Switzerland.*

STATE EMERGENCY PREPAREDNESS

The National Governor's Association Disaster Preparedness Project has completed its analysis of the strengths and weaknesses of state disaster preparedness programs (see *Natural Hazards Observer*, Vol. II, No. 2, p. 6). Field visits and investigations carried out in 25 states over the past year have revealed the need for more centralized coordination and management of the diverse activities of state emergency offices. Responsibility for problems created by natural and man-made disasters is currently fragmented among various state and federal

offices and agencies, as well as private enterprises and military operations. Such fragmentation seriously hampers the capabilities of states to cope with disasters and to protect citizens and institutions. Only a few states have coordinated their planning, preparedness and response processes so that the state emergency office can provide centralized management.

The project recommends the development of Comprehensive Emergency Management (CEM) within each state. Guidelines were developed for assisting governors in establishing CEM to cope with mitigation, preparedness, response and recovery for all risks.



The project produced a series of useful publications including a Governor's guide for comprehensive emergency management, domestic terrorism and national emergency assistance programs; a compilation of federal emergency statutes, executive orders and regulations; and the project's final report which summarizes the findings and recommendations.

Copies of the report will be available on or about July 15 from *Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.*

INTERNATIONAL NEWSLETTER PUBLISHED

The first issue of *Disaster Preparedness in the Americas*, published by the Emergency Preparedness and Relief Coordination Unit of the Pan American Health Organization (PAHO), contains information about the activities of PAHO and of other organizations involved in disaster planning and assistance. In addition, the newsletter invites readers to submit news about disaster planning activities in member countries. Monthly searches of world literature are conducted by PAHO and particularly relevant publications are noted in the newsletter. To be added to the mailing list write: *Emergency Preparedness and Disaster Relief Coordination Unit, Pan American Health Organization, Regional Office of the World Health Organization, 525 23rd Street, N.W., Washington, DC 20037, (202) 233-4700.*

WATER RESOURCES ASSESSMENT

The U.S. Water Resources Council has released the final edition of its second national water assessment, *The Nation's Water Resources 1975-2000*, (see the *Natural Hazards Observer*, Vol. III, No. 1, p. 9). The assessment has yielded a comprehensive, nationally consistent data base for the water resources of the United States. It promises to be a significant source of information upon which Congress and administrative agencies can base decisions about the management of water resources, problems of quality and quantity, future directions of water research, and related land resources issues.



The report of the assessment comprises four volumes. The first is a summary volume which gives an overview of the nation's water supply, use, and significant problems. Volume 2 analyzes the adequacy of known water supplies to meet current and projected demand, discusses water allocation concepts, and describes the present status and future requirements of each of the twenty-one water resources regions. Included therein are discussions of floodplain management and other flood-related problems. Volume 3 sets forth the methods used to collect, analyze and describe the data used in the assessment. The fourth volume consists of a separately published report on each region (summarized in Volume 2).

Copies of the summary volume may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 052-045-0051-7, \$3.25. The other volumes are expected to be available in August, 1979.

COASTAL STORM DAMAGE IN CALIFORNIA

Between December 1977 and March 1978, high waves, tides and storm surge resulted in \$18 million damage to man-made developments along the California coast. The California Coastal Commission carried out a study of the storm damages and associated costs in order to evaluate existing public policy on coastal development.

The study found that \$6 million of last winter's losses resulted from damage to or destruction of private property such as seawalls, bulkheads, stairs, decks and building foundations as well as general interior flooding. The protection and repair of such private property was publicly subsidized at an average rate of \$12,000 per property. Most of the remaining repair costs were met by disaster relief loans from the Small Business Administration.

A disturbing finding was that neither local governments nor owners of private coastal property are prepared to cope with damaging waves which will attack the coast repeatedly in the future. Although damage to private development by coastal storms can be shifted through subsidization by local, state and federal sources, such subsidies may indirectly encourage such development by lessening the financial risk to the private owner.

The study recommends

- limitation of the amount of subsidized aid awarded in areas of recurring wave damage,
- closer regulation by local governments of coastal development, and
- preparation of local wave disaster contingency plans.

Copies of the study are available from the California Coastal Commission, 631 Howard Street, San Francisco, CA 94105 (415) 543-8555.

EFFECTS OF EARTHQUAKE PREDICTIONS

A report of the work of the Committee on Socioeconomic Effects of Earthquake Predictions of the National Academy of Sciences (chaired by Launor Carter and commissioned by the National Science Foundation) presents a thorough examination of the possible consequences arising from earthquake predictions and outlines a strategy for future socioeconomic research. Earthquake prediction is discussed in terms of individual, household, and social group response; economic consequences; government responsibilities; and legal problems. Priorities for research in monitoring, theory building and policy analysis are set.

Copies of the report, *A Program on the Socioeconomic Effects of Earthquake Predictions*, (ISBN 0-309-02789-6, 1978, 161 pages, \$8.50) may be obtained from the National Academy of Sciences, Office of Publication, 2101 Constitution Avenue, N.W., Washington, DC 20418.

QUICK RESPONSE

After a quiet beginning the Quick Response Project at the Natural Hazards Information Center (see *Natural Hazards Observer*, Vol. II, No. 2, p. 5) has undergone a flurry of activity. Before April only one project had been funded to examine flood hazard perception as influenced by race in Charlotte, North Carolina in February 1979. However, the violent tornadoes and severe flooding which swept across the South in April of this year resulted in five additional Quick Response investigations. Two researchers entered Wichita Falls to look at various factors affecting response and survival. Three additional research projects were funded to study impacts of the Jackson, Mississippi flood on the mortgage market and to examine land use regulations before and after the flood.



The extreme events in both Wichita Falls and Jackson have stimulated a great deal of interest, causing numerous researchers from centers and universities throughout the country to converge on the impacted communities. These recent experiences have served to remind us of the importance of maintaining close communication throughout the research community. We welcome information from researchers who plan to enter the field in a quick response situation in order to prevent duplication and minimize over-examination of a single disaster population.

To coordinate efforts or to obtain information regarding specific funded Quick Response projects contact *Susan K. Tubbesing, Natural Hazards Research and Applications Information Center, Institute of Behavioral Science, Box 483, University of Colorado, Boulder, CO 80309, (303) 492-6818.*

NEW HAZARDS CENTER IN AUSTRALIA

A Centre for Information and Research on Disasters and Natural Hazards has been established at the Caulfield Institute of Technology in Victoria, Australia. Initially the Centre will serve as a broad-based, multi-disciplinary clearinghouse for information and research relating to disasters throughout Australia, with the expectation of eventually expanding its operation to include information from other countries. The emphasis is on psychological, social, economic and human geographic aspects of disaster mitigation and recovery. The Centre welcomes information about similar work in other countries and will send a description of its activities upon request. *Ian G. Murray, Acting Coordinator, CIRDNH, Caulfield Institute of Technology, 900 Dandenong Road, P.O. Box 197, Caulfield East, Victoria, 3145, Australia.*

RECENT PUBLICATIONS



NOTE: The publications listed below should be obtained from the author, organization or publisher cited. They are *not* available through the *Natural Hazards Observer*.

Earthquake Reconstruction Program for Managua, Nicaragua. Aaron J. Benjamin and Michelle Swallow. Vance Bibliographies, P.O. Box 229, Monticello, IL 61856. Public Administration Series Bibliography #P 193. 1979. 48 pp. \$5.00.

Nearly 175 citations relating to the reconstruction efforts that followed the 1972 Nicaragua earthquake are included in this bibliography. Approximately one-half of the titles cited are in Spanish, but all annotations are in English. The largest number of entries falls under the following topics: construction standards, housing policy and programs, evaluation, and reconstruction planning and programming. Other sections deal with transportation, markets, sociology, satellite and secondary cities, and economic and financial studies.

"Classification of Earthquake Prediction Information for Practical Use." Tsuneji Rikitake. *Tectonophysics* 46 (1978): 175-185.

This study proposed a system by which three relatively short prediction time windows are combined with three information reliability rankings to produce nine segments of earthquake prediction criteria. The reliability factors were arrived at by statistically weighting sixteen different earthquake precursors. The prediction criteria would provide decision-makers with necessary information for instituting emergency measures when a damaging earthquake is believed imminent. This criteria would allow decisions about what range of actions would be appropriate—activating civil defense units, slowing high speed-trains, shutting down nuclear power facilities, or evacuating high risk areas.



Flood Forecast and Warning System Evaluation: Susquehanna River Basin, New York, Pennsylvania, and Maryland. U.S. Department of Defense, Army Corps of Engineers, Baltimore District. 1979. 94 pp. plus appendices.

Following Tropical Storm Agnes, the U.S. Congress directed the Corps of Engineers to conduct a Flood Control Review Study of the Susquehanna Basin. This report, prepared for the Corps by the Susquehanna River Basin Commission, provides a detailed description of the existing flood forecasting and warning system, including a review of its performance, and assesses ways to improve the system's operation. Findings indicate that the existing river forecasting system is too slow to provide timely flood forecasts for upstream areas on main rivers, and that its most serious deficiency is the failure of the telephone communications network and its subsequent disruptive effect on the river forecast system.

Proceedings of the National Wetland Protection Symposium. U.S. Department of the Interior, Office of Biological Services, Fish and Wildlife Service. 1978. 255 pp. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 024-010-00504-1. \$4.50.

Conducted by the Environmental Law Institute with funding from the U.S. Fish and Wildlife Service, this Symposium was held in Reston, Virginia, June 6-8, 1977. National leaders in wetland protection, water resources, and environmental law met with state and local leaders to discuss key issues such as flood insurance, the rehabilitation and restoration of wetlands, and the "taking issue". A number of state programs are examined and federal responses and initiatives are analyzed. Among the conclusions mentioned: 1) the burden of proof for modifying wetlands has shifted to those who wish to make modifications, 2) the local role in implementing wetlands management is increasingly important, and 3) there is broader need for regional and watershed planning approaches.

"Bureaucracy, Community, and Natural Hazards." William I. Torrey. *Human Organization* 37 (Autumn, 1978) 3:302-308.

The author, a Research Fellow in Anthropology at the University of California, Berkeley, argues that disaster welfare frequently acts, itself, as an agent of disaster by nurturing long-term risks through short-term remedies. Two factors contribute to this situation: 1) sizeable capital outlays and institutional intervention from the state weaken local support structures and 2) as the local autonomy for adjustments shrinks, the ensuing dependencies on remote, unpredictable, bureaucratic solutions to disaster management prevail. As a result, the disparity between rich and poor is often encouraged and the traditional modes of self-help can be severely eroded. Predictive models need to be developed that will allow welfare planners to forecast how, when, and where particular types of assistance are likely to affect standards of living and resilience to future shocks.

Design for Tropical Cyclones. James Cook University of North Queensland, Department of Civil Engineering, Townsville, Australia. 1978. Approximately 440 pp.

Twenty-seven papers that were delivered at a Vacation School held at the James Cook University of North Queensland, September 4-7, 1978, are presented in this two-volume set. Two contributions by Joseph Minor—"Impact of Tropical Cyclones" and "Future Trends: The Field of Natural Hazards"—and one by John Oliver—"Socio-Economic Effect of Tropical Cyclones"—specifically treat societal aspects of cyclone hazard. Technical items of interest include papers on engineering and architectural design for cyclones, wind loading, wind-resistant walls and roof structures in domestic housing, stability of foundations, and survival and serviceability of major facilities during a cyclone.

Climate Change to the Year 2000: A Survey of Expert Opinion. U.S. Department of Defense, National Defense University, Washington, DC 20319. 1978. 109 pp. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 008-020-00738-2. \$3.75.

The National Defense University, the Department of Agriculture, and the National Oceanic and Atmospheric Administration jointly sponsored this study conducted under the aegis of the University Research Directorate. In an attempt to quantify perceptions of global climate change to the year 2000, twenty-four climatologists were asked to comment on ten major questions, which were then statistically weighted and averaged. Five possible climate scenarios were constructed from the results, each one given a "probability of occurrence". The scenarios suggest a slight warming trend, while the 20- to 22-year drought cycle in the U.S. High Plains was given a fairly strong credence. Evaluation of the scenarios includes a discussion of the importance of climatic variability as opposed to global temperature and precipitation trends.



Home Construction on Shrinking and Swelling Soils. Wesley G. Holtz and Stephen S. Hart. U.S. National Science Foundation and the American Society of Civil Engineers. 1978. 18 pp. Available from the Office of the Colorado State Geologist, 1313 Sherman Street, Denver, CO 80203. Send 25¢ in stamps to cover the cost of mailing.

It is claimed that shrinking and swelling soils inflict more than twice the annual dollar damage to houses, buildings, roads, pipelines and other structures than that caused by hurricanes, tornadoes and earthquakes combined. This pamphlet, written and published under a NSF grant, describes the composition of swelling soils, indicates the kinds of damage it usually causes to homes, discusses problems associated with landscaping and drainage and suggests solutions that will circumvent or mitigate the situation. Also discussed are the legal means to recover repair costs and the advantages of obtaining the expertise of a soils engineering consultant. Although written specifically for the Colorado area (a region particularly susceptible to expansive soil problems), the material may be applied wherever unstable soil conditions exist.

"British Columbia's Tsunami Warning System: An Evaluation." Harold D. Foster and Vilho Wuorinen. *Syesis* 9 (1976): 113-122. British Columbia Provincial Museum, Victoria, B.C., Canada.

This paper draws attention to many implicit assumptions underlying British Columbia's Tsunami Warning System and the weaknesses they create in its potential performance. Serious problems could result from poor communications with the International Tsunami Information Center in Honolulu and from any delay in watch or warning bulletins issued by the Center. On the local level, only one coastal community on Vancouver Island has a local tsunami warning plan; Vancouver Island's warning system has not been thoroughly tested; and the legal chain of command for warning many small, isolated communities may be in such a state of confusion that the dissemination of an official warning would be inhibited. An extensive public education program is essential to fully inform the public about tsunami hazards and an effective response to warnings.

The NATURAL HAZARDS RESEARCH AND APPLICATIONS INFORMATION CENTER is intended to strengthen communication between research workers and the individuals, organizations, and agencies concerned with public action relating to natural hazards. Please let us know of any research or research needs or other information which should be brought to the attention of the Center. The Center is funded by grant No. ENV 76-05682 from the National Science Foundation. Any opinions, findings, conclusions or recommendations expressed in this newsletter are those of the authors and do not necessarily reflect the views of NSF.

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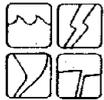
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16. Abstract (Limit: 200 words) Recent and future conferences are described as well as the latest grants and publications in the field of natural hazards. Two new newsletter publications, the National Wetlands Newsletter and Disaster Preparedness in the Americas, are described. The latter, published by the Emergency Preparedness and Relief Coordination Unit of the Pan American Health Organization (PAHO), contains information about the activities of PAHO and of other organizations involved in disaster planning and assistance. Monthly searches of world literature are conducted by PAHO, and particularly relevant publications are noted. The National Wetlands Newsletter from the Environmental Law Institute provides a forum for the exchange of information, problems and ideas about wetlands and floodplain management. It will keep readers informed of private wetland protection efforts, federal, state, and local regulation and acquisition of wetland and floodplain areas, pertinent litigation and legislation, and current research. Articles in this issue of the Observer cover the following topics: earthquake education; disaster insurance; tornado advice; climate change; state emergency preparedness; water resources assessment; coastal storm damage; effects of earthquake predictions, and public information in Canada.			14.		
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SUITE 250
ROCKVILLE, MARYLAND 20852