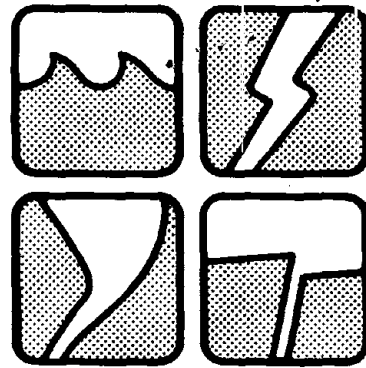


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16. Abstract (Limit: 200 words) This newsletter is intended to strengthen communication between research workers and the individuals, organizations, and agencies concerned with public action relating to natural hazards. The feature article concerns flash flood warnings and the need to improve the ability to deliver forecasts in time to prevent or minimize loss of lives by increasing community involvement. Other articles describe a comprehensive reorganization of the federal government's emergency preparedness and disaster response programs, a new federal water policy, seismic safety incentives, consumer response to drought, flood insurance emphasis, a new flood policy proposed for France, new research at FDAA, and NFIP constitutionality. Announcements of national and international conferences, symposia, and workshops to be held are listed as well as the availability of newly published proceedings. This issue also reviews recent publications in the field of natural disasters. Descriptions of newly awarded grants include: research evacuation plans, earthquake risk and damage in central U.S., community decision-making, improving flood insurance studies, and animal behavior and earthquake prediction.		13. Type of Report & Period Covered  Newsletter	
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## FLASH FLOOD WARNINGS--FEDERAL PLUS LOCAL ACTION -- an invited comment

The flash flood has recently become the most dangerous weather phenomenon of them all. In this decade an average of 180 lives per year are being lost in flash floods. People are living, working and camping in flood plains to an extent never seen before.

The National Weather Service is making strenuous efforts to improve its ability to deliver forecasts and warnings of flash floods in time to prevent, or at least minimize, loss of life. Yet an average weather station is responsible for warnings covering 10,000 square miles of cities, mountains, canyons, campgrounds and flood plains. In an effort to do the job we have a comprehensive weather radar net, automatic river and rain gages and cooperative weather reporters.

Yet the small scale of flash flood producing storms (20 miles) and their short lifetime (a few hours) make the job extraordinarily difficult. In addition, most flash floods occur at night, often when people have gone to bed and can't be reached except by sirens or even a door to door effort by the police.

To make the warning process effective we need local action to make local rain measurements, to install and monitor flash flood alarm devices, to exchange data with the nearest Weather Service Office, in many places to employ a local river forecasting algorithm, and to activate locally planned and controlled warning and evacuation measures. Only with strong local participation can we hope to reverse the increasing loss of life from these storms.

While the Weather Service can provide flash flood watches (notices that conditions favor flash floods), much data, and often accurate warnings, we can't be completely effective without strong community involvement.

The job of providing local organization and technical guidance is formidable, but has to be done. We are looking forward to an improved federal-state partnership in the next few years in a selected area of the Appalachians. This should set the pattern for possible subsequent actions on a national basis.

No one level of government can do it alone. We have to make this partnership work.

-- George P. Cressman  
Director, National Weather Service  
National Oceanic and Atmospheric Administration

### ASRA INFORMATION RESOURCES NATIONAL SCIENCE FOUNDATION

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## REORGANIZATION PLAN GOES TO CONGRESS

President Carter on June 19, 1978 proposed a comprehensive reorganization of the federal government's emergency preparedness and disaster response programs. The reorganization provides for the consolidation of five existing agencies and six additional disaster-related responsibilities into a single structure.

The reorganization is designed to achieve the following objectives:

--make a single agency, and a single official, accountable to the President and Congress for all federal emergency preparedness, mitigation and response activities;

--create a single point of contact for state and local governments, who have strongly urged consolidation of federal emergency programs;

--enhance the dual use of emergency preparedness and response resources at all levels of government by taking advantage of the similarities in planning and response activities for peacetime and attack emergencies; and

--provide an improved basis for determining the relative benefits--and cost-effectiveness--of spending for hazard mitigation, preparedness planning, relief operations, and recovery assistance.



The reorganization program consolidates five existing agencies into a combined unit:

--The Defense Civil Preparedness Agency (Defense Department),

--The Federal Disaster Assistance Administration (Housing and Urban Development),

--The Federal Preparedness Agency (General Services Administration),

--The Federal Insurance Administration (Housing and Urban Development),

--The National Fire Prevention and Control Administration (Commerce Department).

The reorganization transfers several other, closely-allied functions to the new Federal Emergency Management Agency:

--The community preparedness programs for weather emergencies, administered by the National Weather Service (Commerce);

--The Earthquake Hazard Reduction Program, Office of Science and Technology (Executive Office of the President);

--The Dam Safety Coordination Program, Office of Science and Technology (EOP); and

--The Federal Emergency Broadcast System oversight responsibility, Office of Science and Technology (EOP).

The consolidated agency, reporting directly to the President, will also have two emergency functions not now assigned to any specific federal agency: (1) coordination of emergency warning and (2) federal response to consequences of terrorist incidents.

The reorganization takes the form of a reorganization plan, submitted to the Congress, and a series of executive orders to be issued when the plan becomes effective. It establishes a Federal Emergency Management Agency. It provides for the transfer to this agency of the National Fire Prevention and Control Administration (Commerce Department), the Federal Insurance Administration (HUD) and oversight responsibility for the Federal Emergency Broadcast System (EOP). Under special reorganization authority adopted by the Congress in April 1977, a reorganization plan goes into effect unless either House votes to disapprove it within 60 legislative days.

Upon the plan becoming effective, the President will issue an executive order assigning to the agency the authorities that previous Presidents have delegated to the Defense Civil Preparedness Agency (Defense Department), the Federal Disaster Assistance Administration (HUD) and the Federal Preparedness Agency (General Services Administration). These transfers will permit the elimination of these agencies.

The President will conduct the transfer to the consolidated agency of functions relating to community preparedness for weather emergencies, administered by the National Weather Service (Commerce Department), the Earthquake Hazard Reduction Program and the Dam Safety Coordination Program. The President will direct that the agency also be assigned the capability to plan and coordinate the management of (1) emergency warning systems and (2) preparedness efforts to reduce the consequences of terrorist involvement. These two functions are not now specifically assigned to any federal agency.

*Excerpted from a White House Fact Sheet, issued from the Office of the White House Press Secretary, June 19, 1978.*

## FEDERAL WATER POLICY

On June 6, 1978, President Carter sent to Congress a new water policy intended to improve efficiency of federal water programs, emphasize water conservation, and focus attention on environmental quality. One of the chief means suggested by the President to implement the new policy was the explicit formulation and consideration of at least one non-structural alternative during the planning for any water project or program. The message also emphasized the need for floodplain management and the importance of swift implementation of Executive Order 11988.

A report issued in April, 1978 and authored by Clark F. Norton of the Congressional Research Service is of special interest now that an emergency preparedness reorganization plan has been submitted to Congress. Emergency Preparedness and Disaster Assistance: Federal Organization and Programs traces the changes that have been made in federal agencies during the past 6 decades to enable the government to cope better with natural and man-made dangers.



Since 1916 disaster preparedness and relief activities have been assigned to a wide variety of departments and agencies. Attempts have been made to improve the administration of these functions and to bring about overall coordination. Acts, amendments and executive orders have created new agencies and programs, terminated existing ones, and transferred responsibilities with considerable frequency. Previous Presidential reorganization initiatives as well have had impacts on the disaster preparedness and relief structure.

Norton concludes with several policy questions to focus thinking on the advantages and disadvantages of consolidating the administration of disaster preparedness and response--which is the thrust of the current plan which Carter submitted to Congress June 19, 1978. Available from *Congressional Research Service, Library of Congress, 10 First Street, S.E., Washington, DC 20540, (202) 426-5700.*

#### SEISMIC SAFETY INCENTIVES

A recently completed study at the Earthquake Engineering Research Center investigated the political feasibility of providing financial, legal and informational incentives to encourage property owners to improve the seismic safety of their buildings. After an analysis of the results of a survey of San Francisco residents, the researchers recommend that a package of incentives be pursued. Although financial incentives are essential, they must be supplemented by legal means to ensure compliance, and with information programs to provide technical data and to increase the general level of awareness and support. Seismic Safety of Existing Buildings and Incentives of Hazard Mitigation in San Francisco: An Exploratory Study, UCB/EERC-77/28, is available from Earthquake Engineering Research Center, University of California, 47th Street and Hoffman Boulevard, Richmond, CA 94804.

Beginning with the assumption that residential water conservation will become increasingly necessary in the future, especially in the semi-arid West, William H. Bruvold conducted a survey in California to assess consumer attitudes toward residential water conservation programs in the Bay area and to evaluate the effectiveness of those programs. The results of this National Science Foundation funded study have important implications for public policy.

1) Consumers perceive that the most equitable way to ration water is to base allotments on the number of people in the household and not on the previous year's use, average yearly use, size of property, or ability to pay.

2) Not only were the most strictly enforced programs shown to be the most effective, but they were also perceived by consumers to be the fairest and most effective.

3) There is a need to develop programs which encourage conservation, yet do not lead to serious revenue shortages for the water districts (a problem encountered during the summer of 1977 by San Francisco water districts).

Please contact *William H. Bruvold, School of Public Health, University of California, Berkeley, CA 94720, (415) 642-4690.*

#### FLOOD INSURANCE EMPHASIS

The Natural Resources Defense Council has recently issued a paper describing the National Flood Insurance Program. "You Lose if the National Flood Insurance Program Increases Flood Loss", written by Gloria Helfand, provides a concise overview of flood plain problems, the establishment and modification of the NFIP, and information on past and current legislation which has affected or may affect the Program. The pamphlet concludes that "the National Flood Insurance Program is a sound process to avoid increasing flood losses in the future. In as strong a form as possible, it should receive the complete support of those who wish to prevent lives from being lost and property from being destroyed in years to come." Available from *The Natural Resources Defense Council, Inc., 917 Fifteenth St. N.W., Washington, DC 20005, \$1.00.*

#### INFORMATION NEEDED

SEDA-Council of Governments, with the assistance of the Flood Plain Management Service Branch, the Baltimore District, Corps of Engineers, is preparing a flood hazard reduction strategy for 55 mobile home parks in the Central Pennsylvania portion of the Susquehanna River Basin. Those having information describing successful (or unsuccessful) emergency evacuation plans, land use management techniques, the use of flood resistant materials, permanent relocation strategies and other pertinent hazard reduction measures are urged to contact *Tom Bresenhan, SEDA-COG, R.D. #1, Lewisburg, PA (717) 524-4491 or Dan Hitchings, COE, P.O. Box 1715, Baltimore, MD (301) 962-2650.*



## CONFERENCES

The American Water Resources Association's Fourteenth Annual Conference will be held in Lake Buena Vista, Florida, November 6-10, 1978. Papers on all aspects of water resources planning, development, management, education, and information systems will be presented. Bent Christensen, Department of Civil Engineering, University of Florida, Gainesville, FL 32601, (904) 392-0952.

A special National Symposium on Wetlands will be held in conjunction with this conference. Wetland ecology, hydrology, social and economic problems, legislation, planning, and management will be discussed. Eugene Odum, Institute of Ecology, University of Georgia, Athens, GA 30602, or Joseph Larson, Holdsworth Hall, University of Massachusetts, Amherst, MA 01003.

The U.S. Geological Survey sponsored a Workshop on Earth Scientists' Perspectives of Climate Change in December, 1976 as part of an ongoing research program on climate coordinated by NOAA. Research scientists from the USGS, the National Science Foundation, and the National Center for Atmospheric Research agreed that more earth science information is needed before problems of climatic variability can be handled adequately.

Conclusions and proposals generated by the workshop are now available as a three-part Circular entitled Climate Variation and its Effects on Our Land and Water. Part A, "Earth Science in Climatic Research," USGS Circular 776-A, edited by George I. Smith; Part B, "Current Research by the Geological Survey," USGS Circular 776-B, edited by George I. Smith; Part C, "Geological Survey Climate Plan," USGS Circular 776-C, edited by Keith A. Howard and George I. Smith are available free from Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202.

The Fifth International Conference on Wind Engineering will be held July 8-13, 1979, to promote international communication of knowledge on wind engineering among engineers, meteorologists and fluid dynamicists, and between these researchers and practicing engineers, architects and planners. The call for papers (deadline December 15, 1978) invites contributions on the economic and social impact of windstorms, as well as papers on wind characteristics and the effect of wind on the built environment. For information about the conference and about paper requirements, write Dr. J.E. Cermak, Fluid Mechanics and Wind Engineering Program, Department of Civil Engineering, Colorado State University, Fort Collins, CO 80523, (303) 491-6696/6686.

Second International Conference on Microzonation for Safer Construction Research and Application, November 26-29, 1978, San Francisco, CA. The conference is sponsored by the National Science Foundation, UNESCO, American Society of Civil Engineers, Earthquake Engineering Research Institute, Seismological Society of America and the Universities Council for Earthquake Engineering Research.

The conference will bring together persons from such diverse backgrounds as geophysics, geology, seismology, engineering, economics, sociology, architecture, urban planning, government administration and insurance. Knowledge concerning earthquake microzonation techniques will be summarized and future research needs identified. Contact: M.A. Sherif, Conference Chairman, 132 More Hall, FX-10, University of Washington, Seattle, WA 98195, (206) 543-6777.

An International Symposium on Earthquake Prediction will be held in Paris, April 2-6, 1979. Sponsored by the United Nations Educational, Scientific and Cultural Organization (UNESCO), the symposium will deal with several aspects of earthquake prediction in the physical and social sciences. Sessions are planned to discuss earthquake precursors, methods of prediction, response to prediction, the role of institutions in the predictive process, and the communication of predictions and warnings. For information about the symposium or proceedings, contact The Director, Division of Earth Sciences, UNESCO, Place de Fontenoy, 75700 Paris, France.



Proceedings of the National Workshop on Earthquake Resistant Masonry, sponsored by the National Science Foundation and held in Boulder, Colorado, September 13-16, 1978, are now available. The meeting gave recognized contributors in masonry research an opportunity to present their findings and to report their achievements and future plans. The proceedings are published as Earthquake Resistant Masonry Construction: National Workshop, National Bureau of Standards Building Science Series #106, 1977, 361 pp., available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock #003-003-01872-4, \$6.00.

Proceedings of the Second Symposium on Research Applied to National Needs, November 7-9, 1976, Washington, DC are now available as RANN 2: Realizing Knowledge as a Resource. Volume IV: Coping with Man-Made and Natural Hazards is a collection of papers presented at the conference describing hazards research funded by the National Science Foundation. Papers include the following topics: earthquake damage reduction, societal response to natural hazards, environmental design, and environmental risk assessment and evaluation. Available from: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock #038-000-00343-7, six volumes, \$17.



#### NEW FLOOD POLICY PROPOSED FOR FRANCE

A major appraisal of flood problems in France has resulted in a proposal for a new, integrated policy for flood management.

The report was formulated under the general direction of M. Estienne, Chief Engineer, Bridges and Embankments, Ministry of the Central Service for Hydrology and the Environment. The working group included representatives of the Ministries concerned with agriculture, interior, culture and environment, transport, economics and finances, reinsurance, and the Institute of Geography. M. Paul Simeon, economist with the Bureau Central d'Etude pour les Equipements d'Outre-Mer (BCEOM), served as the reporter-general.

About 2 million hectares of land in France, or 3-4% of the total territory, are subject to inundation, with nearly 2 million people living in the zones at risk. Annual damages are estimated at 1,400 million francs (\$32,200 million) of which 60% occur in urban areas. Annual costs of preventive actions are estimated at 86 million francs (\$19,780,000) for the central government, and 65 million (\$14,950,000) for local authorities, with relief expenditures at 32 million francs (\$7,360,000) for central government, with probably more than this sum borne by local government.

The new policy recommends:

- Continued short term actions of structural protection and relief, and
- A longer-term policy, using both information and regulation, designed to modify individual occupancy of the area at risk.

For immediate measures, the group suggests:

1) a synthesis of hydrological and economic information regarding floods, collected on a uniform basis;

2) the use of a methodology proposed by the group for assessing the efficiency of a given project in the reduction of vulnerability;

3) an estimate of flood-related investments and their impact to be made from the budgets of the various departments of the Ministries concerned.

For implementation of the longer-range policy, a flood insurance program is expected to be ready for use in five years.

This new policy is expected to accomplish two aims; the long-term reduction of losses, and the disengagement of the state from heavy investment in preventative measures and relief. It is based on the assumption that greater efforts by private interests are a necessary condition for effective reduction of losses.

Approche rationnelle des decisions concernant la lutte contre les nuisances dues aux inondations. 1977. Ministere de l'Equipement et de l'Amenagement du Territoire, Direction de Ports Maritimes et des Voies Navigables, Service Central de l'Hydrologie et de l'Environnement.

For further information contact M. Paul Simeon, BCEOM, 15, Square Max-Hymans, 75741 Paris, France.

#### NEW RESEARCH AT FDAA

The Academy for Contemporary Problems is preparing a compilation of existing federal programs potentially useful to state, sub-state, municipal, and community development agency officials in dealing with the long-range recovery problems after a natural disaster. This Compendium of Federal Assistance for Long-Range Recovery After a Disaster is being funded by the Federal Disaster Assistance Administration, Department of Housing and Urban Development. Project Director: Claire B. Rubin, Fellow in Public Management, The Academy for Contemporary Problems, 444 North Capitol Street, N.W., Washington, DC 20001, (202) 638-1445.

FDAA is also conducting a study of the socioeconomic effects of requests for federal disaster assistance that were denied. The objective of the study is to determine individual, business, and community needs that were met without federal assistance. Field interviews will be conducted in a sample of geographic areas covered by requests that were denied since enactment of PL 93-288. Dr. Russell Dynes, Executive Officer, American Sociological Association, is acting as a consultant to FDAA. For more information, contact Ugo Morelli or Lynn Murray, FDAA, Dept. of HUD, 1111 18th Street, N.W., Washington, DC 20036, (202) 634-7848.

#### NFIP CONSTITUTIONALITY

In a decision handed down May 31, 1978, the Federal District Court, District of Columbia, ruled in favor of the Department of Housing and Urban Development that the National Flood Insurance Program is constitutional. The lawsuit, which had been filed in November of 1977 by the Texas Landowners Rights Association and others, claimed that the NFIP was unconstitutional on the grounds that it violated state sovereignty provided in the Tenth Amendment and constituted a taking of property without just compensation.

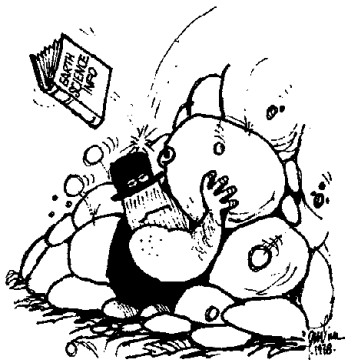
## NFIP Constitutionality (cont.)

The Court concluded, however, that the NFIP uses the acceptable "carrot and stick" approach to induce community participation in the Program by offering attractive incentives. Further, the Court held that the flood plain lands in question are not directly appropriated by the federal government and hence there is no taking of property. The restrictions placed upon use of private flood property are necessary to protect public health and safety, according to the Court.

Terry Keeling, President of the Texas Landowners Rights Association indicated that the plaintiffs have instructed their attorneys to begin appeal proceedings to the Circuit Court of Appeals. So far, no date has been set for the hearings.

## PLANNING WITH EARTH SCIENCE INFORMATION

The U.S. Geological Survey has recently issued a publication which demonstrates how earth science information can be put to better use in urban and suburban planning and decision-making. The book takes its title, "Nature to be Commanded...", from a quotation by Francis Bacon, "Nature to be commanded must be obeyed." "It is the 'obey' part that this book emphasizes," according to G.D. Robinson, an editor of the volume and a USGS geologist at Menlo Park, California. "To be obeyed, nature must be understood--which is where earth scientists come in."



Failure to use earth science information is apparent in the rapid growth of man-made and man-aided geological hazards. Losses from these hazards, which include collapse of slopes due to excavation, land subsidence, and damage from expansive soils, can be eliminated or reduced if planners and decisionmakers are armed with information that indicates the nature, degree, and location of potential hazards. "Nature to be Commanded..." shows how some plans and decisions in six urban or suburban environments across the nation have been affected by the use of earth science information. For example, in San Mateo County, California, earth-science data and maps were used in developing land use regulations in areas subject to sea cliff erosion, landsliding and fault movement.

The attractive 100-page volume contains several hundred color illustrations, is written in non-technical language and is designed for use

by anyone interested in urban planning, design, management and development. Copies are available from *Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202. USGS Professional Paper 950, \$6.25 pre-paid.*

## AN INTERACTIVE MODELING SYSTEM FOR DISASTER POLICY ANALYSIS

Howard Kunreuther  
John Lepore  
Louis Miller  
Joseph Vinso  
John Wilson  
Bradley Borkan  
Brogan Duffy  
Norman Katz



## NEW MONOGRAPH

The Institute of Behavioral Science announces a new monograph in its Program on Technology, Environment and Man series. An Interactive Modeling System for Disaster Policy Analysis, 1978, 140 pp., introduces the reader to a system for studying the relative benefits and costs of alternative hazard mitigation and recovery programs. The interactive computer-based modeling system differs from existing systems in having the capability to deal with sets of individual homeowners and businesses. This enables users to construct representations of hazard-prone communities and examine impacts of mitigation and recovery programs on residents of a community as well as on local, state, and federal agencies. The interactive system is designed with the user in mind. It is extremely flexible and is relatively easy to extend or modify.

This monograph is the result of an interdisciplinary project at the University of Pennsylvania under the auspices of the National Science Foundation. Team members are Howard Kunreuther, John Lepore, Louis Miller, Joseph Vinso, John Wilson, Bradley Borkan, Brogan Duffy, and Norman Katz.

For individual orders (@\$5.00) or for subscription information: *Natural Hazards Research and Applications Information Center, Institute of Behavioral Science #6, University of Colorado, Boulder, CO 80309, (303) 492-6818.*





## GRANTS

*Evacuation Plans.* "Factors Affecting the Design and Implementation of Community Disaster Evacuation Plans," National Science Foundation, \$238,000, 18 months. Principal Investigator: Dr. Ronald W. Perry, Battelle Memorial Institute, 4000 N.E. 41st Street, Seattle, WA 98105, (206) 525-3130.

The project focuses upon pre-impact, short-term evacuation as a tool for managing the consequences of natural disaster. Based upon data collected following three flood disasters, a model of factors involved in individual's decisions to evacuate will be developed. The implications of this model for several issues related to evacuation--e.g., construction of warning messages, shelter planning, etc.--will be examined.

A second aspect of the project addresses the problem of evacuation from the standpoint of authorities or officials who must design and implement evacuation plans. A thorough review of theoretical and empirical literature will be conducted to isolate factors which have been or might be used as incentives to evacuate--for example, providing transportation to evacuees, establishing information-location services for families, establishing means of insuring the security of evacuee homes, etc. Data will be collected upon evacuees' reactions to these various possible incentives, as well as their reactions to and suggestions regarding their particular evacuation experience.

*Earthquake Risk and Damage in the Central U.S.* "Earthquake Risk and Damage Functions--An Integrated Preparedness and Planning Study for the Central USA," National Science Foundation, \$105,493, 12 months. Principal Investigator: Ben-chteh Liu, Midwest Research Institute, 425 Volker Boulevard, Kansas City, MO 64110, (816) 753-7800.

An examination of earthquake risk and probable social and economic impacts from a damaging earthquake in the central United States is underway at the Midwest Research Institute. The study, which focuses on the region known as the New Madrid Seismic Zone, will develop information essential to establish public policies which incorporate seismic hazard considerations in developing land use planning, construction regulations, and emergency response.

A simulation model which, given specific magnitudes and probabilities of occurrence, can predict consequences of earthquake events will be developed. The results of this model will be used to generate cost effective estimates for protection measures.

*Community decision-making.* "Extensions and Utilization of Community Flood Model," National Science Foundation, \$192,930, 12 months. Principal Investigators: Louis W. Miller and Joseph D. Vinso, Department of Decision Sciences, The Wharton School, University of Pennsylvania, Philadelphia, PA 19174, (215) 243-6727.

This study will explore ways in which physical and economic features of communities affect their decision-making processes for hazard mitigation and recovery. Investigators plan to utilize the Community Flood Model developed previously at the University of Pennsylvania to analyze policy alternatives as an aid in preparation of disaster legislation.

They expect to use the Community Flood Model to expand existing knowledge of the financial impact of disasters on households, to examine the role of financial institutions in mitigation and recovery, and to determine the impact of a disaster on regional economies. The model will identify ways in which a community can minimize the consequences of a disaster, and will be useful in regional planning for disaster mitigation and recovery. The model is currently being used by the Senate Select Committee on Small Business in its effort to draft comprehensive disaster legislation to replace current recovery measures.

*Improving flood insurance studies.* "The Development, Test and Demonstration of Improved Methods for Performing Flood Insurance Studies," Department of Housing and Urban Development, \$283,606, 30 months. Principal Investigator: Jerome Degen, Anderson-Nichols and Company, Inc., 150 Causeway Street, Boston, MA 02114 (617) 742-3400.

In order to develop methods for performing flood insurance studies which are faster and less expensive than the current methods, the project will document and analyze:

- 1) HUD and community needs;
- 2) current NFIP scientific and technical methods, community participation procedures and legal considerations related to flood insurance studies;
- 3) existing methods, technologies, and procedures that have the potential for increasing cost-effectiveness and reducing time.

Specific methods and approaches to improve flood insurance studies will be formulated and then tested for technical validity, cost-effectiveness, practicality, and speed of use in field studies. A users manual describing the new methods and guidelines for use will be prepared for distribution to contractors.

*Animal behavior and earthquake prediction.* "Biological Premonitors of Earthquakes: A Validation Project," U.S. Geological Survey, \$49,908, 12 months. Principle Investigators: Leon S. Otis and William H. Kautz, SRI International, 333 Ravenswood Avenue, Menlo Park, CA 94025, (415) 326-6000.



Folk wisdom and current seismological reports lend credence to the notion that many animals act abnormally prior to earthquakes. An attempt to document such behavior or the absence of any noticeable abnormalities is underway at SRI International. The program depends on a team of qualified observers organized to report daily on the behavior of animals within a 10 kilometer segment on either side of seismically active fault lines along the coastal regions of California. It is hoped that a large number of farmers, ranchers, breeders, and other persons who are around animals daily will volunteer their services. Only reports received before actual seismic events will be useable data. Interested volunteers should write *Earthquake Watch Project*, P.O. Box 2995, Stanford, CA 94305.

*Climatic Fluctuations.* "Climatic Fluctuations and Social Well-Being," National Science Foundation, \$75,200, 18 months. Principal Investigators: M.J. Bowden, Department of Geography, H.A. Gould, Department of Physics, D.L. Johnson, Department of Geography, R.W. Kates, Department of Geography, R.A. Warrick, Department of Geography, Clark University, 950 Main Street, Worcester, MA 01610, (617) 793-7318.

Population and climate change interact in a complex fashion to affect the well-being of a society. Explanations for the growth and decline of population have often been simplistic, either treating climate change as the single crucial variable or ignoring its impact altogether.

Recent work in the physical and social sciences makes it possible to recreate past settlement histories with considerable confidence, providing the opportunity to reexamine the human ecology of population and climate change. Two contrasting case studies, the Tigris and Euphrates lowland of Iraq, and the Great Plains of the United States, have been selected to provide the setting for an examination of the interaction of climatic fluctuations, population dynamics, and social vulnerability in two irrigation societies.

Two central hypotheses will be tested in the research: 1) the thrust of persistent and adaptive societies is to moderate and lessen the impacts of recurrent climatic fluctuations of similar magnitude; and 2) these coping mechanisms eventually may cause societies to become either more vulnerable to catastrophic disruption from climate change and social disorder, or to export such vulnerability to previously unrelated areas and societies. Confirmation of these hypotheses would be a significant explanation of the wide variability in impact of climatic fluctuations on social well-being. Whatever the outcome, the analysis itself will provide a framework in which to place the growing knowledge of climatic fluctuation and its effect on social systems.

The Applied Science and Research Applications Directorate of the National Science Foundation is soliciting proposals for earthquake hazards mitigation research. Research proposals must address siting, design, policy or utilization of research findings. Approximately 40 awards totaling \$4 million will be distributed by January, 1979. Send proposals by September 28, 1978, or write for more information to William A. Anderson, Program Manager, Problem-Focused Research Applications, National Science Foundation, 1800 G Street, N.W., Washington, DC 20550, (202) 632-7396.

#### VOLUNTEERS AND EARTHQUAKE RESEARCH

The United States Geological Survey convened a meeting February 2-3, 1978, to discuss methods to involve volunteers in a meaningful way in earthquake research and public education programs. The participants, including representatives from the research community, the National Weather Service, the American National Red Cross, and a wide variety of organizations such as 4-H Clubs, Girl Scouts, and educational institutions, agreed that in many important areas volunteers can be used beneficially. With the use of volunteers, large numbers of observations can be made over wide areas at low cost and information can be disseminated through personal contacts to a very large audience. To complement current earthquake prediction programs specific activities--such as collecting well water samples, measuring water levels in wells and lakes, measuring local tilt of the ground and observing abnormal animal behavior--could be carried out easily by volunteers.



Many suggestions for mobilizing volunteers were offered. It is important to use existing organizations to provide established leadership structures, communication channels, and incentive systems and to ensure long-term continuity. Since the data collection for earthquakes can be a long process with no immediate feedback, it might be advantageous to include other activities, possibly relating to other natural hazards, so that a variety of results can be observed through time. Volunteers must be brought into the effort in such a way that they feel the work they do will contribute to the mitigation of the hazard.

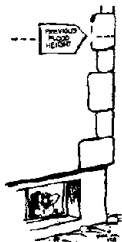
Believing that effective organizational structures for accumulating and utilizing data are essential for productive volunteer efforts, the USGS has decided to encourage the development of a few pilot projects which, if proven successful, could be expanded. Researchers who have a need for volunteers and representatives of organizations that wish to provide volunteers are encouraged to discuss their interests with *Peter L. Ward, USGS, Office of Earthquake Studies, 345 Middlefield Road, Menlo Park, CA 94025, (415) 323-8111, ext. 2838*. A summary of the conference and the collected papers of the participants are available as Proceedings of Conference IV: The Use of Volunteers in the Earthquake Hazard Reduction Program, Open File Report 78-336, USGS, Open File Section, Box 25425, Federal Center, Denver, CO 80225, (303) 234-3832, \$41.25 for paper copy and \$3.50 for microfiche.

## WASHINGTON UPDATE

### IMPLEMENTATION OF EXECUTIVE ORDERS

Executive Orders 11988 (Floodplain Management) and 11990 (Wetlands Protection) direct executive agencies to incorporate appropriate measures into their planning procedures to ensure that protection and management of wetlands and floodplains will be a part of existing programs and will not cause unnecessary duplication or delay in government operations. In an effort to comply with these orders, many executive agencies have published proposed rules in the Federal Register for consideration and comment. These include certain common factors:

- Facilities of agencies to be located in floodplains must conform to the standards of the National Flood Insurance Program.
- As part of the citizen information and participation requirements, agencies must post past and probable flood heights on property used by the public.



- When selling federal property, disclosure of flood hazards must be made.

Each of these agencies has also outlined general agency responsibilities for implementation of these rules.

The agencies which have published their regulations and the dates of publication in the Federal Register are given below.

May 24, 1978: Small Business Administration; Army Department, Corps of Engineers; General Services Administration, Public Buildings Service; Treasury Department (pp. 22298-22311)

June 2, 1978: Agriculture Department, Soil Conservation Service (E.O. 11988 only); Interior Department, Fish and Wildlife Service; Tennessee Valley Authority (pp. 24223-24229)

June 9, 1978: National Aeronautics and Space Administration; Interior Department, Office of the Secretary; Agriculture Department, Office of the Secretary (pp. 25317-25324)

June 22, 1978: Transportation Department, Office of the Secretary (pp. 27148-27150)

June 30, 1978: Department of Agriculture, Soil Conservation Service (E.O. 11990 only) (pp. 28787-28788)

July 14, 1978: United States Section, International Boundary and Water Commission (pp. 30494-30495)

### NEW FEDERAL GUIDELINES FOR STREAM CHANNELIZATION

The Soil Conservation Service and the Fish and Wildlife Service recently issued guidelines for use by their personnel in identifying when and where channel modification may be used as a technique for implementing water and related land resource projects. All practical alternatives must be considered first and "thus, channel modification will normally emerge as the last resort measure."

Three broad types of alternatives to channel modifications should be considered:

- 1) soil and water conservation practices;
- 2) nonstructural measures including land use regulation, floodplain zoning, floodproofing, flood forecasting and warning, flood insurance, tax adjustments, emergency assistance, and relocation; and
- 3) structural measures such as dams, flood ways, dikes, levees, flood walls, pumping plants, diversions and wetland development, maintenance, and restoration.

See Federal Register, Vol. 43, #41, March 1, 1978, pp. 8276-8280.

### WATER RESOURCES ASSESSMENT

A preliminary edition of a report prepared under the authorization of the Water Resources Planning Act of 1965 now is being circulated. The Nation's Water Resources: the Second National Water Assessment, prepared by the U.S. Water Resources Council, contains a large amount of data on functional water uses, water management problems, water supply and quality considerations, and regional assessments. The statistics and descriptions most relevant to natural hazards problems relate to flooding and include estimates of areas that are subject to agricultural or urban damages, and estimates of flood damages projected from 1975 to 2000 on various alternative management scenarios. Information is also provided on water induced erosion and sedimentation and on shoreline erosion. For information contact *Frank Thomas, U.S. Water Resources Council, 2120 L Street, N.W., Washington, DC 20037, (202) 254-6352*.

IMPLEMENTATION PLAN FOR EARTHQUAKE  
HAZARD REDUCTION

On June 22, 1978 the President transmitted to Congress a plan for a National Earthquake Hazards Reduction Program in accordance with the Earthquake Hazards Reduction Act of 1977 (PL 95-124). The plan names the new Federal Emergency Management Agency (if it is approved by Congress) as the lead agency. It also specifically lists milestones and federal agency responsibilities for action over the next three years. Among the highest priorities identified for immediate action are:

- 1) establishment of the National Earthquake Prediction Evaluation Council by the U.S. Geological Survey;
- 2) completion of federal, state, and local contingency plans for responding to earthquake disasters in densely populated areas of highest seismic risk;
- 3) development of seismic resistant design and construction standards for application in federal construction, and encouragement for the adoption of improved seismic provisions in state and local building codes; and
- 4) estimation of the hazard posed to life by possible damage to existing federal facilities from future earthquakes.

The funding for the programs will come from monies already targeted for these purposes in the FY 1979 budget or by reprogramming funds. The initial funding required will be modest but sharply focused on the highest priorities. In addition the comprehensive research program begun in FY 1978 will be continued in FY 1979. Requested appropriations for the U.S. Geological Survey and the National Science Foundation to carry out this work are \$31.5 million and \$32.4 million respectively.

## FDAA SOLICITS COMMENTS ON HAZARD MITIGATION

The Federal Disaster Assistance Administration is considering expanding its regulations under Section 406 of the Disaster Relief Act of 1974 (PL 93-288) which requires that states and local governments which receive federal disaster assistance evaluate the natural hazards in disaster areas and take appropriate actions to mitigate those hazards. FDAA has issued an advance notice of proposed rulemaking and encourages comments from state and local officials, civic leaders and individual citizens. These comments will be used with the findings from a study on the implementation of Sec. 406 being conducted by HUD's Office of Policy Development and Research, working with FDAA and the Federal Insurance Administration, to develop rules to further FDAA efforts in hazard mitigation. For more information see *Federal Register*, 43, #134, July 12, 1978, pp. 30030-1, and the discussion in the *Natural Hazards Observer*, II, #3, March, 1978, p. 5.

The Natural Hazards Research and Applications Information Center announces two additions to the Natural Hazard Research Working Paper series.

#33, Natural Hazard Response and Planning in Tropical Queensland, John Oliver, 1978, 63 pp., analyzes the problems of natural hazard response and planning in tropical Queensland, Australia. Concepts and findings developed by natural hazard studies, particularly in the U.S., are examined to determine their applicability in tropical Queensland.

#34, Human Response to Hurricanes in Texas--Two Studies, Sally S. Davenport, 1978, 43 pp., examines human adjustment, response, and perception of the hurricane hazard in several extremely vulnerable Texas communities. One study centers on Galveston Island, which has not experienced a major hurricane since 1961. Results indicate that, although the community of Galveston is fairly progressive in its emergency preparedness efforts, there remain certain people in the city who will, in all likelihood, refuse to evacuate. The second study surveys the perception, response and future actions of selected south Texas coastal residents in three communities that experienced the threat of the near-miss Hurricane Anita in September of 1977. The level of preparedness for Anita was high in all three communities, and most residents indicate that they will make the same preparations the next time a hurricane threatens their community.

Working papers are available on a subscription basis for \$2.00 apiece or individually for \$3.00 apiece prepaid from the *Natural Hazards Research and Applications Information Center*, IBS #6, University of Colorado, Boulder, CO 80309, (303) 492-6818.

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*.

*Disaster Insurance Protection: Public Policy Lessons*. Howard Kunreuther et al. New York: John Wiley & Sons. 1978. 400 pp. \$16.95.

This study provides a greater understanding of the decision processes employed by individuals in dealing with low probability events in nature which cause severe losses to themselves and society. Findings reveal that most homeowners in hazard prone areas possess limited knowledge of mitigation measures and relief programs. In addition, most people do not view insurance as a mechanism for transferring risk from themselves to others, but consider insurance an investment, and purchase it only if they expect a return. Insurance agents potentially are a valuable information dissemination link with the public, but the financial incentive is presently too low to encourage agents to pursue this market.

Guidelines for Determining Flood Flow Frequency. United States Water Resources Council, 2120 L Street, N.W., Washington, DC 20037. Hydrology Committee Bulletin #17A. Revised 1977. 162 pp. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock # 052-045-00049-5. \$4.00.

The Guidelines revise and update the Water Resources Council's Bulletin #17 of March, 1976. It refines and expands statistical methods used to define flood flow potentials in terms of peak discharge. Flood data from systematic records, historic data, comparison with similar watersheds, and flood estimates from precipitation are discussed. Since statistical analysis alone will not resolve all flood frequency problems, user decisions must be based on properly applied procedures and proper interpretations that incorporate elements of risk and uncertainty.

"Emergency Decision Making: A Theoretical Analysis of Responses to Disaster Warnings." Irving L. Janis and Leon Mann. *Journal of Human Stress* 3 (1977) 2:35-48.

This study investigates why many people fail to follow sound recommendations for personal safety when confronted with an authentic disaster warning. The investigators present a theoretical model that proposes criteria, which, when met, optimize the opportunity for effective emergency decision making. Positive responses to the questions 1) Are the risks serious if protective action isn't taken? 2) Are the risks serious if the most available protective action is taken? 3) Is it realistic to hope to find a better means of escape? and 4) Is there sufficient time to search out and evaluate additional information? lead to "vigilance", a desirable awareness for coping with an emergency. Conversely, a negative response to any of the questions produces undesirable effects such as defensive avoidance or hypervigilance, each of which diminishes coping effectiveness.

NOAA Products and Services of the National Weather Service, National Environmental Satellite Service, Environmental Data Service, and the Environmental Research Laboratories. Volumes I (NWS), III (EDS), and IV (ERL); Peter T. Larson and Frank Evangelista, Editors. Volume II (NESS) Dennis C. Dismachek, Editor. U.S. Dept. of Commerce, NOAA. November 1977. 434 pp. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock # 003-017-00413-9.

Volume I (277 pp.) surveys the NWS and contains the information most useful to the natural hazard/disaster field. There is a comprehensive list of NWS publications, films, filmstrips, bulletins, weather advisories, warning systems, etc., that are available to the public. For each item a schedule of issuance, dissemination information (i.e., radio frequency, teletypewriter, mail), and availability directions are given. Useful telephone numbers and addresses are listed. A few of the disaster oriented services are: Storm Tide Height Reports, Flood Potential Outlook, Emergency Radio Network, and Flash Flood Warnings.

Shore and Beach 46 (January, 1978) 1:3-17. American Shore and Beach Preservation Association, 412 O'Brien Hall, University of California, Berkeley, CA 94720.

Three papers presented at the ASBPA annual meeting in Washington, DC, October 17, 1977, are printed in this issue of the Association's journal. In "The Application of NOAA's Coastal Wave Monitoring Program to Coastal Erosion," Marshall D. Earle reports that the urgent need for wave data in view of extensive projected developments in coastal areas will be partly met by the Coastal Wave Monitoring Program. D. Earl Jones, Jr., in "Housing and Related Coastal Problems: Current Practices Offer Improved Solutions," suggests that programs should be designed that consider shoreline hazards in the aggregate instead of narrowly focused programs to avoid or mitigate individual hazard effects. Gilbert F. White contributes "Natural Hazards Management in the Coastal Zone," in which he notes that state coastal zone agencies have the opportunity to take action in four major directions which will have significant effects upon adjustments to hazards: 1) delineation of hazard areas, 2) defining and evaluating options, 3) improving citizen participation, and 4) organization and coordination.

Guidelines for Disaster Prevention and Preparedness in Tropical Cyclone Areas. League of Red Cross Societies, Economic and Social Commission for Asia and the Pacific, World Meteorological Organization. Geneva/Bangkok. 1977. 125 pp. Available from UniPub, Box 433, Murray Hill Station, New York, NY 10016, \$11.00 + applicable sales tax.

The Guidelines, prepared for officials whose responsibilities include disaster prevention and preparedness, is an overview of the problems related to tropical cyclones and associated floods and storm surges. The need for viable warning system organization is emphasized. Other topics include: legislative recommendations for disaster prevention and preparedness; a discussion of relocation, resettlement, and damage assessment; and sample organizational flow charts for an inter-agency communications network, a hydrologic forecast system, and a local emergency operations system.

Geology in the Urban Environment. Russell Utgard, Garry McKenzie, and Duncan Foley, Editors. Minneapolis, MN: Burgess Publishing Company, 7108 Ohms Lane, Minneapolis, MN 55436. 1978. 355 pp. \$9.95.

Thirty-one selected papers and articles are used to illustrate aspects of the interaction of human society and the physical environment in urban areas. The book is designed as a basic text for courses in urban geology or as a supplement to related courses. Eleven selections specifically treat natural hazards. Among them are: "Seismic Hazards and Land Use Planning," by D.R. Nichols and J.M. Buchanan-Banks; "The Status of Earthquake Prediction," by Robert Hamilton; "Land Subsidence," by Frank Forester; "Extent and Development of Urban Flood Plains," by William Schneider and James Goddard; and "Engineering-Geological Maps for Urban Development," by Robert F. Leggett.

Use of Concrete Demolition Waste as Aggregates in Areas That Have Suffered Destruction. A Feasibility Study. Stamatia A. Frondistou-Yannas and Herbert T.S. Ng. Massachusetts Institute of Technology, Dept. of Civil Engineering, 1977. 173 pp. Available from NTIS, 5285 Port Royal Road, Springfield, VA 22161, Acquisition # PB-275 888/8CA. Paper: \$8.00, microfiche: \$3.00.

Millions of tons of concrete debris are annually generated by natural disasters such as earthquakes, and disposal has created problems. The authors suggest that recycling of debris as aggregate for new concrete structures is a technically feasible and economically attractive answer, as well as an environmentally desirable solution.

Guidelines for Field Studies in Environmental Perception. Anne V.T. Whyte. UNESCO, 7 Place de Fontenay, 75700 Paris. MAB Technical Notes #5. 1977. 117 pp.

Subjective as well as objective factors determine man's perception of his relation to the environment. Environmental perception research has developed guidelines for planning field investigations. Techniques in direct and indirect observation, the art of interviewing, and the design of verbal and graphic tests are presented here. Simplicity, honesty and diversity in testing methods are stressed. These guidelines should be useful to any scientist dealing with man's interaction with various types of ecosystems, who wishes to undertake a perceptual study. In addition, the techniques should be understood by administrators who may be asked to formulate and implement policy based in part on perceptual studies. An extensive bibliography is included.

"Management Guidelines for Parks on Barrier Beaches." Paul J. Godfrey. *Parks* 2 (1978) 4:5-10.

The National Park Service (NPS) manages twelve parks in the coastal zone and is able to draw from its past mistakes and successes in offering coastal management recommendations to others. The NPS experience indicates that for most purposes, it is better to let natural processes occur than to interfere with them. Groins and jetties often create greater problems than those they were designed to alleviate. Overwash flooding is a necessary part of the ecosystem, and building dune dikes to protect permanent installations only postpones the inevitable damaging flood. The article includes practical recommendations for problems relating to beach erosion, pedestrians, and off-road vehicles.

#### NEWSLETTER FROM THE FDAA

Disaster Information is a newsletter recently released by the Federal Disaster Assistance Administration. The first issue features excerpts from testimony given during oversight hearings on the disaster relief program, May 16-18, 1978, conducted by the House of Representatives' Subcommittee on Investigations and Review of the Public Works and Transportation Committee. Disaster Information will be issued on an irregular basis and may be obtained, free of charge, from the Federal Disaster Assistance Administration, Department of Housing and Urban Development, 451 Seventh Street, SW, Room B-133, Washington, DC 20410.

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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