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This issue contains brief articles covering the following topics: hazards research in the U.S. Geological Survey; earthquake prediction, warning, and planning; flood emergency planning, including a description of a homeowner's flooding handbook and information on simplifying flood insurance; relocation planning in the United States in the event of an international crisis; how Australia looks at flood risk; flood damage in New South Wales; and geologic faults in Texas. Project summaries are presented for grants on hurricane evacuation and flood design guidelines for architects. Other studies reported include U.S. Geological Survey papers describing efforts in the San Francisco Bay area to develop and apply earth science information to land use planning and decisionmaking; and socioeconomic effects of denied requests for major disaster declarations. The newsletter also provides descriptions of recent publications concerned with natural hazards.

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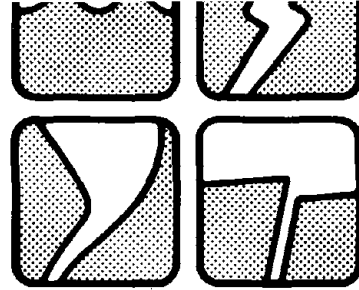
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THE CHALLENGE OF HAZARDS RESEARCH IN THE U.S. GEOLOGICAL SURVEY

—an invited comment

Advances in the ability of earth scientists to identify potential natural hazards, and the public and governments' vastly increased concerns about potential hazards, have led to increased pressures for the timely release of hazard-related earth science information. But we have found, as many have warned, that releasing hazard information can, in itself, create problems affecting an area's social and economic stability.

One example, although in some ways an extreme one, occurred in the city of Kodiak, Alaska, as a result of a U.S. Geological Survey (USGS) warning to state and local authorities of a potential hazard. Observations made by USGS scientists and others indicate that an actively moving landslide is located on Pillar Mountain above Kodiak Harbor. Experience with similar landslides leads to the interpretation that it might begin to move rapidly downslope into Kodiak Harbor, possibly generating a wave capable of destroying the docks and other structures in the city. The city's concerns are that this warning disrupted plans for expanded port facilities (fishing is its livelihood), yet the warning did not tell them precisely how likely the event is, when it might occur, or how much damage it might cause. A further significant concern was that the USGS, although it recommended further study, was not prepared to do the study itself, and the city could not afford it.

The city, state, and USGS are working together to resolve these concerns. Yet, the general questions remain. What should be the USGS's responsibilities in such situations? Should we refrain from issuing warnings unless we can precisely specify the probability, severity, and timing of the catastrophe? Should we fund any studies needed to determine these elements?

Unfortunately, probability estimates or even valid procedures for estimating probability often are not

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INFORMATION RESOURCES
NATIONAL SCIENCE FOUNDATION

available. Also, the USGS is not funded to do site-specific studies of every potential hazard it identifies, and to do so might even create a conflict of interest. Further, federal agencies do not have specific predisaster mitigation authority.

The USGS itself cannot officially express opinions to the public. We can give only facts and their logical interpretation. Even this creates difficulties because the earth sciences are built on facts that are particularly subject to differing interpretations. Earth scientists are often asked to provide answers from inadequate data; not surprisingly, new data sometimes invalidate prior conclusions.

Despite these challenges, the USGS's mission is clear. We must continue to provide the best scientific analysis of the earth science data. And, with the continued help of other natural hazards researchers and information specialists, we will better avoid problems that our warnings may create for the communities affected.

H. William Menard
Director
U.S. Geological Survey

FROM FOREWARNED TO FOREARMED

On January 28-30, a group of researchers and decision makers met in Los Angeles for a Conference on Earthquake Prediction Information, sponsored by the California Division of Mines and Geology, Office of Emergency Services, Seismic Safety Commission, the City of Los Angeles, the Federal Emergency Management Agency, and the USGS. The meeting was intended to present basic information about earthquake warning and prediction, and to provide a forum for discussing it.

As part of the conference, participants were asked to identify necessary steps to increase the future utility of earthquake predictions. Researchers discussed what they could do, or what could be done, to make their research findings more useful; decision makers specified what additional information they would need to respond more effectively to an earthquake prediction.

An important area of concern was the prediction itself. In addition to indicating time, place, magnitude and probability, and having been validated by a reputable body, a prediction should also carry information on the appropriate responses to the predicted event. Desirable as precise predictions are, however, official "messy" predictions were also recognized as having value. Though scientists are reluctant to issue information that is less than exact, certain messy predictions can heighten awareness of earthquake risk and stimulate preparedness activities and long-term mitigation programs.

Additionally, participants recommended the development of response plans, the creation of an earthquake information center, and increased public education programs.

- The response plan should provide step-by-step guidance for governmental officials, projecting the reactions of societal sectors to various time

windows and different levels of severity.

- An information center would be the place to which public officials could turn for technical assistance, materials, research findings, and building code guidelines. The center would be a liaison between officials and researchers.
- Programs are needed to improve public understanding of both the earthquake hazard and earthquake predictions. An educated public is integral to all successful predictions and mitigation plans.

Proceedings of the conference will be available at the end of July from *Jessie Reeves, Office of Earthquake Studies, USGS, 345 Middlefield Road, Menlo Park, CA 94025, (415) 323-8111.*

HOMEOWNER'S FLOODING HANDBOOK

The Office of Federal Insurance and Hazard Mitigation of the Federal Emergency Management Agency has issued a manual which provides guidance to homeowners, contractors, and local government officials for minimizing injury and property damage from floods.

Flood Emergency and Residential Repair Handbook, prepared by the National Association of Homebuilders Research Advisory Board of the National Academy of Science, details preparedness work that can be done in the home before a flood strikes, and describes the step-by-step clean-up procedures and repairs for household goods and appliances that can be accomplished by the resident after flooding occurs. Suggestions are made for structural alterations that can be made to a building to afford temporary or permanent resistance to flood damage. Additional sections of the manual are devoted to explanations of the National Flood Insurance Program and ways in which communities may cooperate to decrease their vulnerability to flooding.

The manual is available from *The Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock number 023-000-00552-2. \$3.50.*

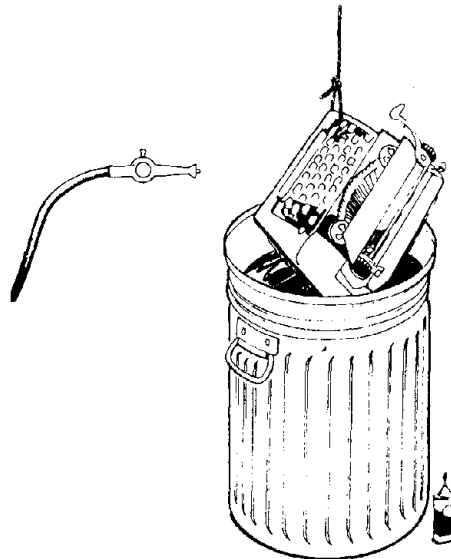


Figure 4-11
Air Blowing A Typewriter After Dipping

PLANNING FOR REGIONAL EVACUATION

Work has begun in the Tampa Bay area to carry out recommendations of the Regional Disaster Preparedness Needs Study (see *Natural Hazards Observer*, Vol. IV, No. 2, p. 7) that regional hurricane evacuation plans be prepared. The Tampa Bay Regional Planning Council, under contract to the U.S. Army Corps of Engineers Jacksonville District, and with support from the National Oceanic and Atmospheric Administration's Coastal Hazards Mitigation Office, is engaged in a 14-month effort to create a Tampa Bay Flood Emergency Evacuation Plan—a regional pilot project to provide the local governments with a quantitative guide for ordering evacuations upon the approach of a hurricane.

The project will draw upon the basic methods used in the Lee County Flood Emergency Evacuation Plan (see *Natural Hazards Observer*, Vol. IV, No. 2, p. 10), and incorporate more sophisticated planning tools to analyze the complex physical configuration of the Bay and its surrounding transportation network. NOAA's recently developed numerical storm surge model will also be incorporated into the work.

Besides providing the area with a workable evacuation plan, it is anticipated that the quantitative findings will also serve as the basis for specific hazard mitigation recommendations for land use planning and building codes in the area.

For more information contact *David A. Griffith*, Tampa Bay Regional Planning Council, 9455 Koger Boulevard, St. Petersburg, FL 33702, (813) 577-5151.

WASHINGTON UPDATE

SIMPLIFYING FLOOD INSURANCE INFORMATION

The Federal Insurance Administration has put into pilot operation a new procedure for providing information to communities participating in the National Flood Insurance Program. The Map Information Facility is currently being used by insurance agents and brokers in regular program communities in Arizona, Louisiana, Nevada, New Mexico and Oklahoma. By calling a toll-free number and supplying FIA with the address or a description of the location of the property in question, agents can obtain information which ordinarily would have been gotten from a map, such as base flood elevation at that location, flood hazard zone, or status of the community.

FIA plans that eventually the Map Information Facility will make information about flood insurance requirements more accessible and reduce the need for distribution of maps.



AGREEMENT BETWEEN FEMA AND NOAA

The Federal Emergency Management Agency and the National Oceanic and Atmospheric Administration have agreed to coordinate their programs to improve efficiency and eliminate duplication. A memorandum of understanding signed by both agencies provides for the establishment of compatible systems for warning and communications work; development of a comprehensive and coordinated approach to providing assistance to local governments for planning and preparedness; and joint efforts on coastal zone management, risk and damage assessment and hazard mitigation.

The agencies plan to establish an information exchange to keep each other informed of research and activities which may be of mutual benefit.

FEMA'S RESPONSE TO JACKSON FLOODING

A December, 1979 review by the General Accounting Office of the Federal Emergency Management Agency's response to the flooding in Jackson, Mississippi found that flood fighting efforts had been hindered by a lack of coordination among federal, state and local agencies involved. GAO found that communication between the Corps of Engineers and the manager of the upstream reservoir was not established until two days after the initial flood warning, that three federal agencies reported three different crest estimates to the mayor, and that the agency estimates of flow into the reservoir varied by as much as 20,000 cfs.

The review concluded that the problems encountered in Jackson with regard to coordination and flood preparation are those which FEMA was created to resolve, and that in the future FEMA should actively emphasize and coordinate the emergency planning of federal, state and local agencies. After receiving GAO's recommendations, FEMA agreed that its mission should be to resolve such difficulties and efforts to do so are continuing.



ON THE LINE

CAN WE COMMUNICATE AN EARTHQUAKE WARNING?

The drive to make an earthquake prediction eventually seems irresistible. Eminent seismologists are giving higher and higher odds for major earthquakes within a shorter and shorter time frame in California. China is making earthquake predictions. Millions of dollars are spent on research on predictions. National and state councils to evaluate earthquake predictions are being formed. Regardless of reliable scientific techniques known and tested, events, history and the accumulated forces of national expectations are going to force some respected authority, person or agency to make an earthquake prediction and chaos will break loose—or will it?

I submit that these predictions will be so hedged with qualifiers, so awash in a sea of euphemisms, and so couched in esoteric terms known only to a small group of initiates that local government decision makers and planners will not even recognize that they have received a prediction—much less rationally respond to the warning or dissolve in chaos.

In California, state agencies have received warnings from reputable federal agencies regarding potential dangers that have never been referred to local governments because the state officers did not recognize them as warnings. The Palmdale Bulge, or Southern California Uplift, has elicited statements from experts that there is a “higher level of danger” but since no one knows the base level of that danger or the increments of “higher”, it is difficult to assign priorities, allocate resources or take appropriate corrective action.

One of the first programs for handling predictions should be a system of specific statements which can be released that are understood by scientists and political and private sector decision makers alike. This is not a simple or natural communication skill; it will take study, contemplation, research, and education.

Predictions can radically change land use plans, building standards and emergency response programs, but we must depend upon our research community to bridge these disciplines and communicate effectively in order to make an effective prediction structure. With communication and understanding between scientists and decision makers potential disasters can be transformed into problems in management to which management tools can be applied and solutions proposed,

evaluated and adopted. Without such cooperation, experts will merely throw out the bits and pieces of bright knowledge from their own specialities and expect the local officials to integrate them. The decision makers will reach for the colorful bits of information like children entranced with their possibilities; but without adequate instructions and plans, they cannot build a stable structure of safety in this shaky world.

Robert B. Rigney
Administrator,
Environmental Improvement Agency
San Bernardino County

CRISIS RELOCATION PLANNING

The effectiveness of an effort to relocate Americans selectively during an international crisis will depend largely upon citizen response to evacuation warnings. In order to improve its program on Crisis Relocation Planning (CRP), the Federal Emergency Management Agency (then DCPA) funded in 1978 a project to examine human response to warnings. Findings have now been released in *The Implications of Natural Hazard Evacuation Warnings Studies for Crisis Relocation Planning* by Ronald W. Perry, Michael K. Lindell, and Marjorie R. Greene. To achieve its goal, the study 1) reviewed social science theories about collective behavior and described their applications to CRP; 2) discussed the comparability of human response to warnings of natural and nuclear hazards; 3) developed a framework of factors significant in evacuation decision making; and 4) evaluated the implications of such factors for warnings issued under CRP.

Drawing from earlier research on human behavior in natural disasters which revealed that significant factors in evacuation response include belief that the threat is real, a clear perception of personal risk, and a readily available plan of adaptive action, the study concluded that an effective program of CRP should meet these criteria:

- it must have a defined structure which is disseminated to the public;
- provision must be made for role-training and preparation of key personnel;
- the public must be educated to recognize and interpret the warning message which is meant to signal the need to begin evacuation; and
- it must be highly visible and perceived as an effective way of coping with the crisis.

The research demonstrates that the same conceptual and analytical framework can be used for any type of disaster. It emphasizes the importance of prior exposure to potential crisis effects, education about preparedness plans, and community involvement in receipt and confirmation of warning information.

A summary of the report is available free from *Ronald W. Perry, Battelle, Human Affairs Research Centers, 4000 N.E. 41st Street, Seattle, WA 98105, (206) 525-3130.*



CONFERENCES

The International Symposium on Drought, held in New Delhi in early December, 1979, was convened by the Indian National Committee for the International Hydrological Program, with the cooperation of UNESCO, WMO, and the International Association of Hydrological Sciences. Subjects addressed include trends and other long-term statistical studies of droughts, influence of droughts on the soil and groundwater, desertification, water systems management during and after droughts, and droughts and water quality. Proceedings may be had from Professor Subhash Chander, Organising Secretary for ISHAD, Department of Civil Engineering, Indian Institute of Technology, Hauz Khas, New Delhi 110029, India or Director, Division of Water Sciences, UNESCO, 7 Place de Fontenoy, 75700 Paris, France.

Health Aspects and Relief Management: Natural Disasters, World Health Organization and Center for Research on the Epidemiology of Disasters. Brussels, Belgium: October 12-25, 1980. The invitational course is intended for senior health officials from disaster-prone countries who are involved in the planning and provision of health services following disasters. It will provide training of health service personnel on medical and nursing care, epidemiological surveillance, food supply and nutrition, sanitation, medical supplies, preparedness and international assistance. Additional information may be obtained from Centre for Research on the Epidemiology of Disasters, School of Public Health, University of Louvain, Clos Chapelle aux Champs, 30-1200 Brussels, Belgium.

Canberra, Australia was the site in December, 1979, for the International Symposium on Hydrology of Areas of Low Precipitation, sponsored by the International Association of Hydrological Sciences and the Australian National Committee for Hydrology. Discussed at the conference were theory, laboratory and field research, and case histories on the following subjects: streamflow characteristics, quantitative and qualitative aspects of the relationship between surface and subsurface water, and the effects on sediment production of land use and management. Proceedings, published as IAHS Publication #128, are available for \$60 from W. W. Hastings, Treasurer, International Association of Hydrological Sciences, 2000 Florida Avenue, N.W., Washington, DC 20009.

Utilization of Science in the Decision-Making Process, The Coastal Society. San Diego: October 13-15, 1980. The Sixth Annual Conference will concentrate on the transfer of scientific information into the public forum and public policy formulation. Many sessions will involve the presentation of papers that identify the linkages from basic inquiry about a topic to the utilization of the results to resolve a public policy issue. Among the topics are barrier islands, urban waterfronts, shoreline management, and technology transfer. Inquiries should be directed to The Coastal Society Annual Conference, c/o Dr. Norbert P. Psuty, Center for Coastal and Environmental Studies, Rutgers University, 104 Doolittle Hall, Busch Campus, New Brunswick, NJ 08903, (201) 932-3140.

Coastal Zone '80, American Society of Civil Engineers and the National Oceanic and Atmospheric Administration Office of Coastal Zone Management. Hollywood, Florida: November 17-20, 1980. The multidisciplinary specialty conference will provide a forum for discussion of coastal zone management and ocean resource issues, including beneficial use, protection and development, leading to a better understanding of the relationships between the environmental, socioeconomic, engineering and regulatory decisions involved. Scientists, engineers, planners, decision makers and citizens are invited to attend. For information contact Billy L. Edge, Coastal Zone 80, Dames and Moore, 7101 Wisconsin Avenue, Washington, DC 20014.

FROM THE LAND OF SKY-BLUE WATERS

How to go about removing existing buildings from designated flood plains is the topic of a booklet recently released by the Minnesota Department of Natural Resources. *Reducing Flood Damages by Acquisition and Relocation: The Experiences of 4 Minnesota Communities* briefly describes the problem faced by each community, the manner in which each was solved, and whom to contact for more details on the solutions.

The city of East Grand Forks, perennial prey to the Red River of the North, received a HUD Discretionary Grant in 1979 to acquire a number of flood-damaged properties, and to assist occupants in relocation. The removal of some single-family homes, one four-plex and one six-plex, and the acquisition of 12 acres will result in the floodway consisting entirely of open space by April of 1980.

In addition to such accounts, the booklet also suggests funding sources for acquisition and relocation monies, and indicates where to turn for further information on such programs as the NFIP, HUD Community Development Block Grants, and the Land and Water Conservation Fund.

For copies of the brochure, contact the *Department of Natural Resources, Division of Waters, Centennial Office Building, Box 32, St. Paul, MN 55155, (612) 296-4800.*



GRANTS

Hurricane evacuation. "Model Hurricane Flood Relocation Plan," Office of Coastal Zone Management through Texas Council on Energy and Natural Resources and Texas A & M University Sea Grant College Program, \$95,000, 21 months. Project leader: *Carlton Ruch, Center for Strategic Technology, Texas A & M University, Box 83 FM, College Station, TX 77843, (713) 845-5711.*

The project will develop a hurricane flood relocation plan for a three-county area along the Texas Gulf Coast. Based on existing road systems, flooding vulnerability, transportation and census data, the region will be divided into 30 to 60 zones. Residents will be surveyed to determine the percentage of people likely to evacuate each zone, the number of vehicles that would be used, and the proportion of evacuees that would need public shelter. From this information it will be possible to designate evacuation routes and their capacities, and to estimate shelter requirements for each zone under differing storm conditions. Zone-specific brochures and public information materials will be developed for distribution to area residents and for use by the media.

Development of the plan, which is expected to serve as a model for other areas of the state and nation, will be a coordinated effort involving the cooperation of local officials, the Governor's Division of Disaster Emergency Services, the National Weather Service, Texas Coastal and Marine Council, Texas State Department of Highways and Public Transportation, Texas Department of Public Safety, and the American Red Cross.

Building for floods. "Flood Design Guidelines for Architects," Federal Insurance Administration, Federal Emergency Management Agency, \$187,000, 11 months. Project Manager: *Donald E. Geis, AIA Research Corporation, 1735 New York Avenue, N.W., Washington, DC 20006, (202) 785-7800.*

The project will develop a practical manual of guidelines for architects to use in designing buildings in areas vulnerable to flood hazard. Recognizing that the design of a building is only one factor in a system of interrelated elements in the process of land development, the research will incorporate a review of existing technology, an examination of case studies, and a survey and analysis of flood hazard issues, including the various adjustments such as warnings, emergency preparedness, insurance, structural control measures and floodproofing. The completed manual, expected to be ready by August, 1980, will present an architectural viewpoint of the full scope of development issues as related to flood hazard.

SEEING HOW THE CAT JUMPS

If Bossy suddenly stops munching the alfalfa and gives out some earthshaking moos, does she have indigestion or is she announcing that the earth is indeed about to move under her feet? Such a question is posed frequently to over 1200 people in California who pay what might seem to be excessive attention to the habits and quirks of the animals with which they live or work.

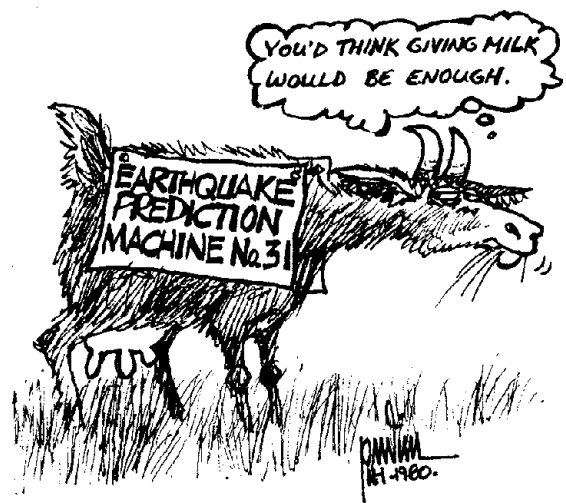
These volunteer observers are part of a reporting network set up nearly two years ago by SRI International of Menlo Park. With funds from the Earthquake Hazards Reduction Program of the U.S. Geological Survey, Leon Otis and William Kautz began Project EARTHQUAKE WATCH to test the hypothesis that many types of animals behave abnormally prior to earthquakes.

The observers—who number in their ranks pet owners, farmers, zookeepers, guide dog owners, and dolphin trainers from Marine World—keep a daily log on the behavior of their animals and report weekly to SRI. However, they are to call in any unusual activities immediately on a special hotline, as did one volunteer near El Centro last October with a very distressed cat clinging to her neck. The times of the calls are recorded and then correlated with earthquake occurrences and intensities.

In addition to notices of nervous ponies, impatient hens, violent geese, and silent katydids, the project also receives accounts from volunteers on the amount of milk their goats give on a daily basis, the variations in fat content in the milk of Sonoma County cows, and the honey production of bees in Silverado.

To date there has not been a sufficiently large (Richter 6) earthquake in an area with many observers, so the hypothesis goes untested. Additionally, the earthquake has to have the precursors to which animals are sensitive. If these conditions are met, the project may be able to determine finally if there's more to horse sense than we figured.

For more information, or to volunteer your services, contact *Project EARTHQUAKE WATCH, SRI International, Ravenswood Avenue, Menlo Park, CA 94025, (415) 326-6200.*



The Department of National Development and Energy of the Australian Water Resources Council has funded a study to assess the perception of flood risk by residents and business owners in the Torrens floodplain in Adelaide, South Australia.

The project, entitled "The Role of Flood Inundation and Floodplain Maps in Local Perception and Community Response to Flood Risks," will be carried out in two steps. First, residents and businesses will be surveyed to determine their knowledge of flooding problems in the area and their attitude toward flood risk. This stage will be completed before fall of 1980, at which time a government agency will issue flood maps for the Adelaide area. After the distribution of the maps, interviews will again be conducted to determine the response, if any, of individuals and enterprises to the official flood hazard information. The project is expected to be completed by early 1983.

Information may be obtained from *Jennifer McKay, Project Officer, Department of Geography, University of Melbourne, Parkville, 3052, Victoria, Australia.*

FLOOD DAMAGE IN NEW SOUTH WALES

Frequent flooding of the Richmond River in New South Wales, Australia results in extensive damage to urban and rural settlements, services and agriculture in the valley. Major flooding in 1974 led to a request by the Richmond River County Council for a comprehensive investigation of the local flooding problem. Accordingly, a governmental Inter-Departmental Committee was formed which funded a study completed by the Northern Rivers College of Advanced Education and the Centre for Resource and Environmental Studies of the Australian National University. The objective of the study was to provide estimates of flood losses both from the 1974 flood and, by estimating mean damages using available records of past floods, to provide a basis against which decisions about future flood mitigation strategies could be assessed.

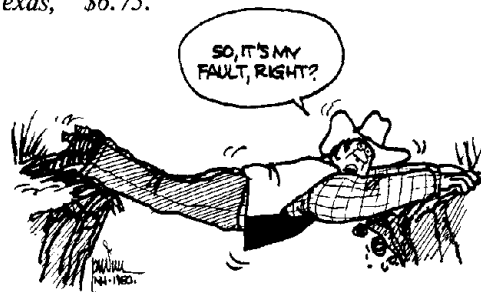
Flood damage in the Richmond River Valley, New South Wales: An assessment of tangible and intangible damages, by D.I. Smith, et al., the final report of the study, details the purposes, methods and findings of the project. Estimates of flood losses included tangible damage to property and agriculture as well as qualitative assessments of intangible damage. Data were also gathered on perception of the flood hazard, community response and insurance. Besides providing a damage assessment upon which future planning decisions can be based, the report also suggests that since the community would like further assistance with its flood problem, but is uncertain what form such assistance should take, future flood mitigation measures should be undertaken with maximum community involvement and with emphasis on public education.

For further information contact *D.I. Smith, Centre for Resource and Environmental Studies, The Australian National University, Box 4, P.O., Canberra, A.C.T., 2600, Australia.*

The U.S. Geological Survey has notified officials in Texas of the discovery of surface faults in the metropolitan Houston area. Descriptions of the faults are given in two USGS Open File Reports; one fault extends for at least 12.5 km below a rapidly growing area on the western fringe of Houston and may be moving at a slow rate. Another system of faults is located in the southeastern Houston area but does not appear to have moved in recent history.

Movement along any of the faults is likely to damage buildings, roads or pipelines and, therefore, the faults should be taken into consideration in decisions on further development in the area. The USGS is offering to provide technical assistance in interpreting the reports.

Copies of the reports are available from: *U.S. Geological Survey, Open-File Service Section, Box 25425, Federal Center, Denver, CO 80225. OFR 79-947, "Clodine fault, southwestern Houston metropolitan area, Texas," \$4.74. OFR 78-797, "Map showing surface faults in the southeastern Houston metropolitan area, Texas," \$6.75.*



REMINDER

The National Science Foundation's Division of Problem-Focused Research issues a quarterly brochure which lists and explains all grants awarded during the previous quarter of the current fiscal year. Such announcements are valuable to both researchers and users of research since they provide a comprehensive view of work underway in a variety of fields. Persons who wish to receive *Recent Awards* free of charge may be added to the mailing list by notifying *National Science Foundation, Professional Assistant, Division of Problem-Focused Research, Room 1134A, 1800 G Street, N. W., Washington, DC 20550.*

CONFIDENTIAL TO P. IN PISCATAWAY

We, too, were perturbed, and not a little embarrassed by the absence of holes in the last issue of the *Observer*. It is, of course, highly unlikely that there will be such a blunder ever again, and we are determined that there will not. However, should the impossible come to pass, we suggest that you avoid scissors and the unacceptable risk of injury; try a pole barn nail with a five-pound hammer instead.

PLANNING WITH EARTH SCIENCE INFORMATION

Four U.S. Geological Survey professional papers recently released as part of the results of a study jointly funded by the USGS and the Department of Housing and Urban Development describe efforts in the San Francisco Bay area to develop and apply earth science information to land use planning and decision making. Work done during the San Francisco Bay Region Environmental and Resources Planning Study has focused on a problem of national concern—how best to accommodate orderly development and growth while avoiding hazards and reducing damage. Each of the reports includes examples of actual applications of earth science information to deal with challenges that face planners and local officials nationwide.

Seismic Safety and Land-Use Planning—Selected Examples from the San Francisco Bay Region, California. M.L. Blair and W.E. Spangle, William Spangle and Associates. USGS Professional Paper 941-B. 1979. 82 pp. \$5.50, describes a method whereby the degree of seismic risk in an area can be expressed in terms of potential dollar loss, deaths, injuries, population exposure, or in scenarios describing probable effects. Plans and regulations can then be formulated to reduce risk to an acceptable level.

Flatland Deposits of the San Francisco Bay Region, California—Their Geology and Engineering Properties, and Their Importance to Comprehensive Planning. E.J. Helley and K.R. Lajoie, U.S. Geological Survey, and W.E. Spangle and M.L. Blair, William Spangle and Associates. USGS Professional Paper 943. 1979. 88 pp. \$2.75, shows how a region can be analyzed by dividing it into geologic units such as alluvial fan, channel, levee, dune or beach deposits. Each unit can then be rated for relative fitness for agriculture, residential development, groundwater recharge or sand and gravel extraction. Three examples illustrate the use of such geologic studies to foster safe and economical land use decisions.

Relative Slope Stability and Land-Use Planning in the San Francisco Bay Region, California. T.H. Nilsen and R.H. Wright, U.S. Geological Survey, and T.C. Vlastic and W.E. Spangle, William Spangle and Associates. USGS Professional Paper 944. 1979. 96 pp. \$3.75, describes the preparation of the region's first standardized relative slope-stability maps (scale 1:125,000) based on a knowledge of geology, slope and the incidence of landslide deposits. The maps have a variety of potential uses in long-range regional planning for transportation and communication networks, nuclear reactor sites and urban growth.

Quantitative Land-Capability Analysis—Selected Examples from the San Francisco Bay Region, California. R.T. Laird, J.B. Perkins, D.A. Bainbridge, J.B. Baker, R.T. Boyd, Daniel Huntsman, P.E. Staub, and M.B. Zucher, Association of Bay Area Governments. USGS Professional Paper 945. 1979. 115 pp. \$4.00, explains a new method of analyzing land capability by estimating the costs of converting the land to housing, commerce or transportation use. Those costs represent the total expenditure attributable to geologic conditions, regardless

of who pays, and include damage potential from natural hazards, fees for special investigations, designs or construction practices, and losses of valuable resources such as sand and gravel. The total costs for a specific use indicate the capability of that area to accommodate the use and thus aid in planning decisions.

Copies may be ordered from the *Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202.*

NOTICE

Analysis of Adoption and Implementation of Community Land Use Regulations for Floodplains is no longer available from Woodward-Clyde Consultants (see last issue of *Observer*). Order it from the *National Technical Information Service, Springfield, VA 22151.*

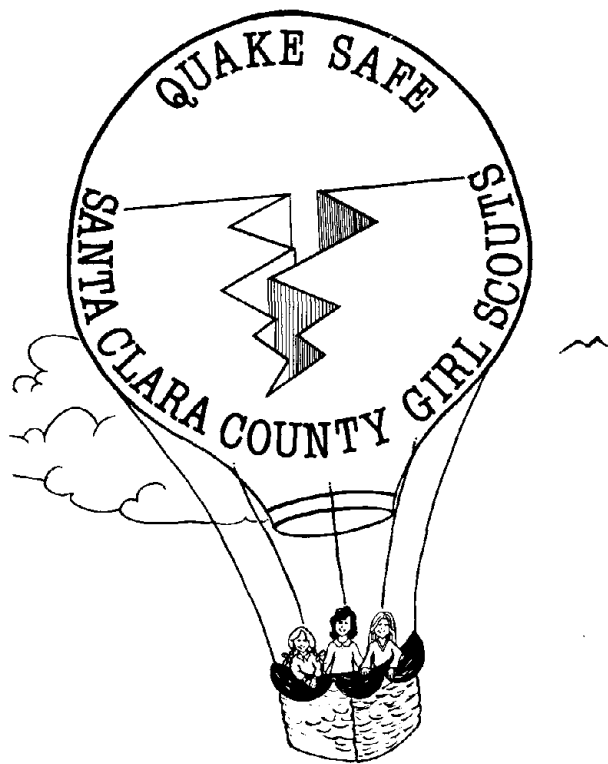
WHEN DISASTER DECLARATIONS ARE DENIED

Stricken areas become eligible for federal assistance programs under the Disaster Relief Act of 1974 only when a disaster declaration is made by the president. However, not all declaration requests result in this formal action. A recently completed study examined the ability of individuals and state and local governments to cope with their losses and execute recovery plans when major disaster declarations were denied.

Socioeconomic Effects of Denied Requests for Major Disaster Declarations, by Lynn C. Murray, was prepared to provide an information base for the Federal Emergency Management Agency's Office of Disaster Response and Recovery. It surveyed a representative sample of individuals, business owners and local government officials in nine areas which had been denied disaster declarations between 1974 and 1977. Two main conclusions were drawn from the work: 1) most respondents were able to cope with their losses by using alternative sources of assistance such as family, neighbors, or the Small Business Administration; and 2) local governments appeared to have suffered no major long-term consequences as a result of having been denied major disaster aid.

The study is being reviewed by FEMA to determine its implications for federal programs. Its conclusions have not yet been endorsed, nor have any changes been made in FEMA's policies or procedures for recommendations on declarations or denials of major disaster designations.

Copies of the paper may be obtained from *Federal Emergency Management Agency, Office of Disaster Response and Recovery, Office of Federal Response Coordination, 1725 Eye Street, N.W., Washington, DC 20472, (202) 634-7860.*



SCOUTING FOR QUAKES

The Santa Clara County Girl Scouts are prepared for an earthquake. "Quake-Safe", this year's project for the Girl Scout County Council, has involved over 7,000 Girl Scouts, their families, and their friends in an earthquake awareness program. By learning what to do at home to minimize hazards from an earthquake, Brownie, Junior, Cadette, and Senior Girl Scouts can earn a Quake-Safe Patch.

The Quake-Safe program was begun on a smaller scale some years ago with the cooperation of the U.S. Geological Survey, the Red Cross, and the local Office of Emergency Services. Through the coordinative efforts of Margaret Masdeo—the Earthquake Lady of Los Altos who also has organized her neighborhood to develop an earthquake emergency plan—and the work of other County Council members, the program grew quickly. The San Jose Kiwanis Club contributed funds for the printing of a flyer on earthquake preparedness which the Girl Scouts distribute to their friends.

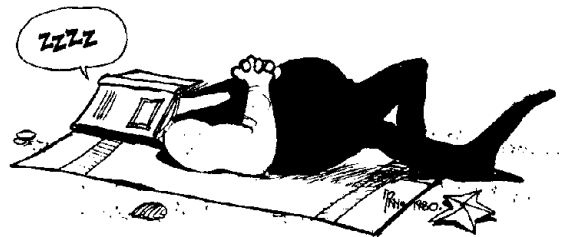
To earn their patches, the scouts complete requirements that vary from having Brownies name three actions that would be dangerous in the wake of a strong earthquake, to having Senior Girl Scouts complete Red Cross first aid courses and Emergency Shelter Management training. Regardless of their level, the scouts are required to make emergency plans with their families and to set aside a place to store food, water, flashlights and transistor radios.

For more information on this public education program, contact the *Santa Clara County Girl Scout Council, Inc.*, 1543 Parkmoor Plaza, P.O. Box 25827, San Jose, CA 95195, (408) 287-4170.

Two new publications are available from the Information Center, a monograph and a bibliography.

Intergovernmental Management of Floodplains, 1980, 330 pp., by Rutherford H. Platt, et al., addresses the complications which arise from the fact that one river or creek frequently flows through two or more jurisdictions. It analyzes the sorts of conflicts that arise in intergovernmental management of a flood plain, details the ways to achieve varying degrees of coordination among governments, and presents seven case studies of regional management successes and failures. From enlightened plans in the Twin Cities to transcendent approaches on the Charles River, the case studies describe the particular problems of each area, and the process by which they were solved (or exacerbated). Among the conclusions is that flood plain management is more successful when integrated with other related regional planning concerns such as wastewater management, housing, parks and open space, and coastal zone management. The cost of the monograph is \$6.00.

The *Selected, Partially Annotated Bibliography of Recent (1978-1979) Natural Hazards Publications*, 1980, 125 pp., compiled by David Morton contains 225 entries on articles, reports, books and studies. Indexed by author and subject, the bibliography is divided into six sections: earthquakes and tsunamis; floods; hurricanes, tornados and severe storms; volcanos; multi hazards; and miscellaneous hazards. The cost of the bibliography is \$3.50.



RECENT PUBLICATIONS

What Decisionmakers Need to Know: Policy and Social Science Research on Seismic Safety. Stanley Scott, Editor. Institute of Governmental Studies, University of California, 109 Moses Hall, Berkeley, CA 94720. Research Report #79-5. 1979. 33 pp. \$2.65.

Based on a workshop convened by the Earthquake Engineering Research Institute in 1979, this publication includes the nine presentations given by the engineers, geologists, architects, political and social scientists present. Each speaker indicates issues of seismic safety in particular need of attention from public policy and social science researchers. Among the topics dealt with are 1) social costs of future earthquakes, 2) failures in public policy research, 3) research needs relative to land use planning, 4) types of seismic safety policies and politics, and 5) prospects for policy research under the Earthquake Hazards Mitigation Program at the National Science Foundation.

Program and Plans of the U.S. Geological Survey for Producing Information Needed in National Seismic Hazards and Risk Assessment: Fiscal Years 1980-84. Walter W. Hays. U.S. Department of the Interior, U.S. Geological Survey. USGS Circular 816. 1979. 40 pp. A copy may be obtained free of charge upon application to the Branch of Distribution, USGS, 1200 South Eads Street, Arlington, VA 22202.

Acting to meet the provisions of the Earthquake Hazards Reduction Act of 1977 (Public Law 95-124), the USGS has developed comprehensive plans for producing information needed to assess seismic hazards and risk on a national scale in fiscal years 1980-84. The text provides a general discussion of seismic risk research and the need for this research by federal agencies, state and local governments, and various professionals in the private sector. User concerns and recommendations include 1) the Survey should help in the education of public officials and other users of seismic hazards and risk assessment products, and 2) the Survey should develop and implement a process for introducing change into seismic hazard and risk maps, ensuring that the entire scientific and engineering community is involved in that process.

Earthquakes and the Urban Environment. G. Lennis Berlin. Boca Raton, FL: CRC Press Inc. Due for publication in 1980. Volume I: Introduction and Overview, Earthquake Parameters, Earthquake Hazards. c. 224 pp. Catalog no. 5173BZ, approximately \$56.95. Volume II: Earthquake Prediction, Earthquake Control, Earthquake-Resistant Provisions for Structures, Building and Lifeline Responses During Earthquakes. c. 272 pp. Catalog no. 5174BZ, approximately \$64.95. Volume III: Earthquake Risk, Disaster Preparedness and Recovery, Social Aspects, Summary and Conclusions. c. 320 pp. Catalog no. 5175BZ, approximately \$69.95.

Both the physical and social sciences must lend their expertise to solving the growing number of problems that earthquake hazard poses for human society. Interdisciplinary efforts are already being utilized to propose and implement solutions in areas such as land use zoning, earthquake prediction, and earthquake risk and hazard perception. Yet, enormous difficulties exist because society persists in building on or near active seismic zones; because seismic building codes are either outdated, not enforced, or simply non-existent; because there is overall apathy on the part of the populace towards earthquake hazards; and because cultural pressures often inhibit change towards safer and more realistic social patterns. These three volumes attempt to sum up the current state of knowledge about the threat that earthquakes pose to a rapidly urbanizing world.

Disasters: the Anatomy of Environmental Hazards. John Whittow. London: Alan Lane/Penguin Books Ltd. 1980. 411 pp.

Thoughtfully written with many excellent illustrations, this book provides an introduction to natural hazards and natural disasters. Although there is a tendency to stress the geographical and meteorological causes of hazards, the human element in hazard mitigation and awareness is woven throughout the text. Part Five of the book is entitled "Will We Ever Learn" and consists of the chapters "Hazard City—A Case History of Los Angeles," and "Disaster Research." Compared with similar publications, Whittow's effort is particularly useful in its extensive treatment of the problems associated with sinking coastlines, landslides and avalanches, snow and fog hazard, and ground surface collapse (subsidence). A global perspective is taken by the author, who currently holds the position of senior lecturer in geography at the University of Reading.

Earthquake Engineering and Hazards Reduction in China. Paul C. Jennings, Editor. National Academy of Sciences. Committee on Scholarly Communication with the People's Republic of China (CSCPRC) Report #8. 1980. 189 pp. \$11.50. Available from the Office of Publications, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, DC 20418.

This report presents the findings of the Earthquake Engineering and Hazards Reduction Delegation following their three-week visit to the People's Republic of China during the summer of 1978. The primary purpose of the delegation—the third earthquake research-related group to visit China under a joint scientific exchange program—was to learn about earthquake engineering research and practice in China. In addition, earthquake prediction, and other mitigative measures, as well as the effects of the disastrous Tangshan earthquake were to be investigated. Basically an engineering document, the report includes material on structural research, the prediction of the strong Sungpan-Pingwu earthquakes of August, 1976, the "Earthquake-Resistant Design Code for Industrial and Civilian Buildings of 1974," and the Chinese Earthquake Intensity Scale. Many photographs illustrate structural damage sustained during the Tangshan earthquake.

Geographical Analysis of Fenwick Island, Maryland, a Middle Atlantic Barrier Island. Robert Dolan, Harry Lins, and John Stewart. U.S. Department of the Interior, U.S. Geological Survey, USGS Professional Paper 1177-A. 1980. 24 pp. \$2.75. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock # 024-001-03275-9.

In an attractive format reminiscent of the Survey's popular *Nature To Be Commanded* . . . this publication analyzes the natural processes and hazards peculiar to coastal barrier islands. Fenwick Island, the site of Ocean City, Maryland, was selected for study because its urbanized environment typifies the fate of so many barrier islands developed by man in potentially hazardous locations. Among the topics discussed in the report is the dynamic nature of barrier islands, the "usefulness" of structural measures, a history of the island's urbanization, projected changes in the island's geomorphology, and various mitigative measures proposed for the future. The fact that a severe storm in 1962 covered much of the island for two days with as much as eight feet of water should cause many of the inhabitants at least a few moments of sober thought.

Flood Damage Mitigation in Utah. L. Douglas James, et al. Utah Water Research Laboratory, Utah State University, Logan, UT 84322. Publication UWRL/P/80/01. 1980. 106 pp. \$5.00.

One of the objectives of this study was to determine what role the Utah state government could and should play in insuring effective flood programs. To that end, it examines the nature of the flood hazard in Utah, types of existing flood control approaches, particular problems in specific communities, and governmental involvement—local, state and federal—in the flood control activities. The study offers a conceptual framework with which to define a useful program. The study finds that Utah's flood hazard is chiefly in small basins at the foot of mountains, basins too small to have been mapped by the NFIP and, therefore, of unknown hazard dynamics. Among the recommendations are that the state provide a forum for interaction between federal agencies and local communities, that the state provide technical support to local communities, and that the state help in determining measures suited to Utah's conditions.

"Drawing the Line at the Oceanfront: The Role of Coastal Construction Setback Lines in Regulating Development of the Coastal Zone." Frank E. Maloney and Anthony J. O'Donnell, Jr. *University of Florida Law Review* XXX (1978): 383-418.

The article describes the coastal features and processes—wave action, erosion, sand beaches, wetlands, dunes—which combine to dictate the need for comprehensive environmental protection, and proposes a model ordinance designed to assist coastal communities in implementing planning programs to regulate burgeoning coastal development. The ordinance contemplates the division of coastal property into two zones: a preservation-setback zone which would extend from the existing setback line seaward and on which no excavation or construction would be permitted without a variance, and a conservation-permitting zone extending from the setback line landward. Construction in that zone would be regulated to minimize adverse effects upon dunes, bluffs, wetlands and vegetation unprotected under current setback lines. Legal issues regarding the constitutionality of regulating the use of private property in this way are discussed.

Preliminary Analysis of Gubernatorial Emergency Declarations in California, 1950-1975. Robert A. Stallings. *University of Southern California, School of Public Administration, Los Angeles, CA 90007. Working Paper #30.* 1979. 28 pp.

The paper describes a project which conducted an exploratory analysis of the role of partisan politics self-interest in governors' decisions to declare an official state of emergency, thereby making victims eligible for additional forms of disaster relief. The study focused on several possible variables, including proximity to the election, political party of the incumbent, position of the disaster in the fiscal cycle and the severity of the event. Tentative findings suggest that political considerations may play a significant role in the decision. Recommendations are made for further exploration.

Danger From Below. Seymour Simon. *New York: Four Winds Press.* 1979. 86 pp. \$7.95.

Intended for readers between 8 and 14, this book mixes technical information about earthquakes with attention-holding descriptions of some important quakes. Other chapters discuss earthquake zones, appropriate actions after an earthquake strikes, and the future of earthquake prediction. Illustrations and photographs supplement the clear and concise prose.

"Injuries from the Wichita Falls Tornado: Implications for Prevention." Roger I. Glass, et al. *Science* 207 (February 15, 1980) 4432: 734-738.

Despite the widespread dissemination of public safety guidelines concerning severe storms, their effectiveness in reducing the toll of deaths and injuries has never been adequately assessed. Findings from an investigation following the 1979 Wichita Falls tornado indicate that 1) more than half of the traumatic deaths and serious injuries occurred to people who, despite ample warning, tried to drive their cars out of the storm's path; 2) mobile-home dwellers were by far the greatest at-risk populace; 3) people who survived the initial impact of the storm ran little risk of death thereafter; and 4) both serious and fatal injuries were more common in women than men, particularly in the over-60 age group. Considering the magnitude of this tornado, both the length of the warning lead-time and the hazard awareness of the residents must be credited with keeping the death toll remarkably low.

"The Role of Citizen Advisory Groups in Water Resources Planning." Madge O. Ertel. *Water Resources Bulletin* 15 (December 1979) 6:1515-1523.

Research has recently been conducted to analyze the operation of three citizen advisory groups established in conjunction with Level B Studies of the New England River Basins Commission. The studies, performed over a four-year period, have examined the criteria and procedures used for selection of members, the relevant personal characteristics of the members, the procedures employed for carrying out their responsibilities, and the relative importance of group functions as perceived by both citizen advisors and professional study participants. Basic findings indicate that although citizen advisory groups can provide a uniquely valuable source of information and opinion, such select groups cannot be considered representative of the public at large. Because of this, other strategies must be used to inform and involve the general public in water resources planning.

Reducing Drought Effects on Croplands in the West-Central Great Plains. B.W. Greb. *U.S. Department of Agriculture, Science and Education Administration. Agriculture Information Bulletin* 420. 1979. 31 pp. \$1.75. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock # 001-000-03978-4.

Although drought is a normal part of the climatic environment, society too often has reacted to the phenomenon with a negative "Act of God" attitude rather than by making adjustments in population density, water use, farming, forest utilization, or the siting of industrial enterprises. This study addresses the issue of Great Plains management from two directions: 1) the maximization of soil water intake, and 2) maximizing water use efficiency. Strategies are discussed for improved water intake efficiency, including systems to upgrade the quality of summer fallow, snow control, reducing runoff water, irrigation, and deep plowing. Additional strategies are presented for improving water use by crops through soil fertility, better plant stock, and improved timing of irrigation. Results indicate that significant progress in research is beginning to be transferred to commercial farming and that current economic and energy constraints will hasten the transfer of water conservation concepts and practices to the agricultural user.

Disasters and the Mass Media. National Academy of Sciences, Committee on Disasters and the Mass Media, Commission on Socio-technical Systems, National Research Council, 2101 Constitution Avenue, N.W., Washington, DC 20418. 301 pp. \$9.75. Available from the Office of Publications, National Academy of Sciences at the above address.

The sixteen essays presented in this publication comprise the proceedings of the Committee on Disasters and the Mass Media Workshop, held in Washington in February, 1979. Discussion at the workshop revealed three particularly important concerns: 1) the inappropriate use of persons with prestige and expertise but no special knowledge about disasters, 2) the too-frequent use of these same persons as information sources, and 3) the misleading representation of some news persons as experts themselves. Among the many observations that were informally made at the workshop, it was suggested that few reporters can anticipate the personal trauma of participating in a disaster, which can lead in turn to impaired editorial judgment; that the commercial interests of a media outlet may easily prejudice future disaster preparedness planning; and that perhaps the Federal Communications Commission should impose legal strictures that would make disaster readiness a prerequisite to broadcast licensing. Contributors include Alcira Kreimer, William R. Ritz, Joseph Scanlon, Ralph H. Turner, E.L. Quarantelli, and H. Michael Mogil.

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 the Corps of Engineers, the Federal Emergency Management Agency, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey, acting through the National Science Foundation.

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