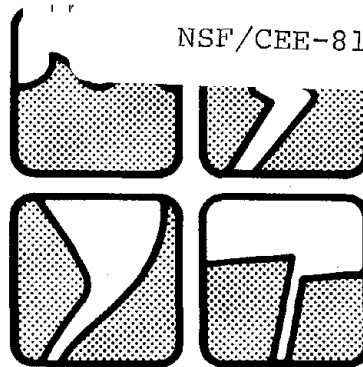


Natural Hazards OBSERVER



VOLUME VI

NUMBER 1

September, 1981



NATURAL HAZARD REDUCTION— WILL IT CHANGE ITS COURSE?

—an invited comment

The year 1981 is witnessing a remarkable and possibly disastrous confluence of activities affecting the nation's vulnerability to natural hazards. Research on the problem has attained full flow. Programs to translate the new understandings into practical action are under way widely. Recent shifts in federal fiscal and administrative policy could either strengthen or weaken these efforts.

Looking back over the past seven years, it is clear that a whole new stream of research has brought deepened insights into major aspects of natural hazards and the ways people adjust to them. Physical and social scien-

tists have contributed fresh knowledge on vulnerability estimates, the creation of public awareness, human response to warnings, ways of fostering disaster preparedness, the process and consequences of reconstruction, the promotion of mitigation through land use, and a variety of other issues. The current need is to bring the newly accumulated knowledge to bear on short-term, highly focused investigations in which the users are deeply involved.

In the same seven years, the responsible government agencies, drawing upon both earlier and recent research,

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have enlarged the flow of actions to foster sane use of vulnerable areas. These include cooperative flash flood warning systems in Pennsylvania, evacuation preparedness along the hurricane coasts, a mammoth program of flood insurance, technical assistance to states in flood plain management, metropolitan earthquake damage mitigation planning in both northern and southern California, inter-agency teams to assist localities in post-disaster action, and new cooperative programs to deal with landslides and volcanoes. Many more activities could be noted.

Launched into these streams is the new federal policy of fiscal conservatism and divestment of federal activity. This could enhance the trend toward decentralization of responsibility for land use, preparedness and reconstruction. It could place an appropriately heavier financial burden on the people who knowingly occupy risky sites. It could inspire larger support for the conduct of mitigation programs from citizens groups, private industry and local government.

However, it will not do so unless the impacts of the new policies are timed and directed so as to strengthen the flow of action in established, constructive channels. Programs cannot be turned around overnight without risk of losing their benefits. Unless carefully designed, new policies can either halt the current efforts or divert them into unproductive directions, just as a new constriction on a river can either deepen the channel or dissipate it in shallow overbank flow and backwaters. The next six months should reveal how the stream will narrow or branch.

Gilbert F. White
 Director
 Natural Hazards Research and
 Applications Information Center

SIXTH ANNUAL HAZARDS WORKSHOP

Application of current knowledge to the solution of existing problems was the call that resounded through the meeting rooms at the Natural Hazards Workshop held in Boulder July 19-22. With the prospect of fewer research funds, and tighter federal expenditures in general, it was pointed out that much has already been learned in recent years that can be used to lessen hazard risk and cope with disasters. Quoting from Lord Rutherford, Gilbert White summed up the challenge: "There is no money; we will have to think."

Copies of abstracts distributed at the workshop, and recorders' summaries of each separate session, are available from the Information Center. Abstracts address issues in three areas: summaries of research findings and implications; plans for new research investigations; and discussions of successful hazard-mitigation, public education, or recovery programs underway in states, regions and cities across the country. Also available is a paper, "Appraisal of the Status of Natural Hazards Research," prepared by the Information Center staff for discussion at the workshop, and

an accompanying bibliography, "Natural Hazards Research: An Outline of Recommendations and Actions 1974-1980."

Individual abstracts or summaries are free upon request; "Appraisal" is \$1.00; "Outline" is \$1.50; and a workshop packet (all abstracts and summaries, program and participant list) can be obtained for \$5.00. All abstracts include the name and address of the person connected with the study or program described therein who may be contacted for further information.

RESEARCH SUMMARIES

- RS-1 STUDIES OF EVACUATION BEHAVIOR AND PROBLEMS
 E. L. Quarantelli, The Ohio State University
- RS-2 THE GUATEMALAN EARTHQUAKE STUDY
 Frederick L. Bates, University of Georgia,
 W. Timothy Farrell and JoAnn K. Glittenberg
- RS-3 EARTHQUAKES AND SOLVENCY OF FINANCIAL INSTITUTIONS
 Frank G. Steindl, Oklahoma State University
- RS-4 THE IMPACT OF AID PROGRAMS ON FAMILY RECOVERY: A LONGITUDINAL COMPARISON OF A RURAL AND AN URBAN SITE
 Robert Bolin, New Mexico State University
- RS-5 DESIGN GUIDELINES FOR FLOOD DAMAGE REDUCTION
 Don Geis, American Institute of Architects Research Corporation
- RS-6 HURRICANE RELOCATION PLANNING FOR BRAZORIA, GALVESTON, HARRIS, FORT BEND AND CHAMBERS COUNTIES, TEXAS
 Carlton Ruch, Texas A&M University
- RS-7 HUMAN RESPONSE TO MOUNT ST. HELENS
 Marjorie Greene, Battelle Human Affairs Research Centers
- RS-8 FLOOD FORECASTING AND WARNING: THE SOCIAL VALUE AND USE OF INFORMATION IN WEST BENGAL
 Robert Schware, National Center for Atmospheric Research
- RS-9 PUBLIC SERVICE SCIENCE RESIDENCY PROGRAM
 Rolland B. Bartholomew, University of Texas
- RS-10 FLOOD PLAIN REGULATIONS AND RESIDENTIAL LAND VALUES IN OREGON
 Keith Muckleston, Oregon State University
- RS-11 AWARENESS OF EARTHQUAKE THREAT AND HUMAN ADJUSTMENT: A COMPARISON OF U.S. AND JAPANESE DATA
 Shunji Mikami, The Ohio State University
- RS-12 PLANNING FOR LONG-TERM RECOVERY FROM NATURAL DISASTERS: THE RIVERINE AND COASTAL SETTINGS
 Claire B. Rubin, Academy for Contemporary Problems
- RS-13 NATURAL DISASTER RECOVERY AND MITIGATION
 Claire B. Rubin, Academy for Contemporary Problems

- RS-14 SEISMIC SAFETY AND PUBLIC POLICY PROCESSES
Richard Stuart Olson & Douglas C. Nilson,
University of Redlands
- RS-15 GUATEMALAN EARTHQUAKE STUDY
JoAnn Glittenberg, University of Colorado Medical
Center
- RS-16 NATURAL HAZARD RISK ASSESSMENT
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- NR-1 EMERGENCY ASSISTANCE RESOURCE NETWORK (EARN)
Alex M. Hunter, Boulder County
- NR-2 NATURAL DISASTERS IN PREHISTORY
Payson Sheets, University of Colorado
- NR-3 EMERGENCY GROUPS IN DISASTERS
Jane Gray, The Ohio State University
- NR-4 THE ROLE OF STATES IN EARTHQUAKE AND NATURAL HAZARD INNOVATION AT THE LOCAL LEVEL: A DECISION MAKING STUDY
W. Henry Lambright, The Maxwell School and Syracuse University
- NR-5 JUDGMENTS OF RISKS ABOUT NATURAL AND MAN-MADE HAZARDS IN THE DENVER METROPOLITAN AREA
Kathy R. Widmer and Gary McClelland, University of Colorado
- NR-6 COMMITTEE ON EMERGENCY MANAGEMENT
Charles E. Fritz, National Academy of Sciences
- NR-7 HAZARD MITIGATION TEAM PROCEDURES HANDBOOK
Leo M. Eisel, Wright Water Engineers, Inc.
- NR-8 MINORITY CITIZEN WARNING RESPONSE AND INVOLVEMENT IN COMMUNITY HAZARD PLANNING
Ronald W. Perry, Batelle Memorial Institute
- NR-9 DISASTER NOVELS: HOW CAN WE MEASURE THEIR INFLUENCE ON PUBLIC AWARENESS?
Diana Liverman, National Center for Atmospheric Research
- NR-10 PARALYZING WINTER STORMS
Nicholas Helburn, University of Colorado
- NR-11 A MODEL FOR MEASURING REGIONAL ECONOMIC RESPONSES TO EARTHQUAKES AND EARTHQUAKE PREDICTIONS
Blaine Roberts, University of South Carolina

HAZARDS PROGRAMS ABSTRACTS

- HP-1 USGS HAZARD BIBLIOGRAPHY
Robert M. Alexander, University of Colorado
- HP-2 CONFERENCE ON EVALUATION OF REGIONAL SEISMIC HAZARDS AND RISK
Walter W. Hays, U.S. Geological Survey
- HP-3 DISASTER MENTAL HEALTH PLANNING
Linda Pasekoff, Research for Social Change, Inc.

- HP-4 HURRICANE PLANS IN INDUSTRY
George Kramig, Dow Chemical
- HP-5 A PILOT STUDY OF GEOLOGIC HAZARDS INFORMATION DISSEMINATION PROCESS
Marjorie Greene, Battelle Human Affairs Research Centers
- HP-6 COOPERATIVE FLOOD LOSS REDUCTION: A TECHNICAL MANUAL FOR COMMUNITIES AND INDUSTRY
Timothy E. Maywalt, U.S. Water Resources Council
- HP-7 FLOODPLAIN MANAGEMENT HANDBOOK
Timothy E. Maywalt, U.S. Water Resources Council
- HP-8 STRENGTHENING STATE FLOODPLAIN MANAGEMENT
Timothy E. Maywalt, U.S. Water Resources Council
- HP-9 STATE AND LOCAL ACQUISITION OF FLOODPLAINS AND WETLANDS
Timothy E. Maywalt, U.S. Water Resources Council
- HP-10 WETLANDS EVALUATION METHODOLOGIES
Timothy E. Maywalt, U.S. Water Resources Council
- HP-11 MANAGING FLOOD HAZARD AREAS TO REDUCE FLOOD LOSSES
Timothy E. Maywalt, U.S. Water Resources Council
- HP-12 JUDICIAL REACTION TO THE REGULATION OF FLOOD HAZARD AREAS
Timothy E. Maywalt, U.S. Water Resources Council
- HP-13 LOCAL INNOVATION IN FLOODPLAIN MANAGEMENT
Timothy E. Maywalt, U.S. Water Resources Council
- HP-14 COPING WITH STRESS FOLLOWING A NATURAL DISASTER
Shirley A. Murphy, University of Oregon
- HP-15 SOUTHERN CALIFORNIA EARTHQUAKE PREPAREDNESS PROJECT
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- HP-16 PROTOTYPE BUSINESS/INDUSTRY EMERGENCY AND DISASTER PLAN
Pete Ashen, American Red Cross Golden Gate Chapter
- HP-17 COMMUNITY MENTAL HEALTH PROBLEMS AFTER MOUNT ST. HELENS
Thomas Arthur, Cowlitz County Human Resources Department
- HP-18 MARYLAND'S COMPREHENSIVE EMERGENCY MANAGEMENT REVIEW
James Solyst, Maryland Department of State Planning
- HP-19 HAZARD PERCEPTION, EMERGENCY PLANNING AND RESPONSE TO DISASTER IN THE EAST CARIBBEAN
Anne Whyte, University of Toronto

SESSION SUMMARIES

- SS-1 HOW CAN WE ACHIEVE WIDER AND MORE EFFECTIVE DISSEMINATION OF WARNINGS?
- SS-2 WHAT CAN BE DONE MOST EFFECTIVELY TO STIMULATE LOCAL GOVERNMENT ADOPTION OF EARTHQUAKE HAZARD REDUCTION MEASURES?

- SS-3 WHAT APPROACHES ARE AVAILABLE TO IMPROVE EDUCATION AND TRAINING FOR DISASTER PREPAREDNESS, RESPONSE, RECOVERY AND MITIGATION, AND HOW CAN THEY BE USED MORE EFFECTIVELY?
- SS-4 WHAT CAN WE LEARN FROM FOREIGN EXPERIENCE THAT MIGHT IMPROVE U.S. POLICY AND METHODS?
- SS-5 WHAT, IF ANY, PROBLEMS ARE COMMON TO ALL EVACUATION EFFORTS AND WHAT STEPS CAN WE TAKE TO AVOID THEM IN THE FUTURE?
- SS-6 WHAT DO WE NOW KNOW ABOUT HOW THE TYPE AND AVAILABILITY OF INSURANCE AFFECTS OTHER HAZARD ADJUSTMENTS? WHEN IS INSURANCE FEASIBLE?
- SS-7 EARTHQUAKE PREDICTION: WHAT PROBLEMS ARE LIKELY TO ARISE, BASED ON U.S. RESEARCH AND THE JAPANESE EXPERIENCE, AND DO WE KNOW ENOUGH TO DEAL WITH THEM?
- SS-8 WHAT ARE THE SOCIAL AND ECONOMIC COSTS AND BENEFITS OF MITIGATION AND HOW DO THEY COMPARE WITH DISASTER COSTS?
- SS-9 WHAT CAN WE SUGGEST FROM THE MOUNT ST. HELENS EXPERIENCE TO IMPROVE PREPAREDNESS FOR AND SUSTAIN AWARENESS OF SIMILAR INFREQUENT BUT DESTRUCTIVE EVENTS?
- SS-10 DOES HAZARD DESIGNATION OR PREDICTION CARRY NEGATIVE ECONOMIC IMPLICATIONS FOR REAL ESTATE AND FINANCIAL INTERESTS AND, IF SO, WHAT POLICY OR PROGRAM CHANGES ARE IMPLIED?
- SS-11 RECOVERY FROM A NATURAL OR MAN-MADE DISASTER: WHAT PROBLEMS HINDER SUCCESSFUL INTERAGENCY AND INTERGOVERNMENTAL PARTICIPATION IN POST-DISASTER MITIGATION ACTIVITIES? WHAT CAN REALISTICALLY BE DONE TO PROMOTE COOPERATION AND SUCCESSFUL IMPLEMENTATION?
- SS-12 WHAT LESSONS FROM CLIMATE RESEARCH ARE RELEVANT TO NATURAL HAZARDS RESEARCH?
- SS-13 HOW CAN PRIVATE INDUSTRY BALANCE RESPONSIBILITY TO THE COMMUNITY, EMPLOYEES AND STOCKHOLDERS?
- SS-14 CHALLENGE FOR FINANCIAL INSTITUTIONS: RESPONSIBILITY TO SERVE COMMUNITY AND MAINTAIN INTERNAL SECURITY IN TIME OF EMERGENCY.
- SS-15 DISASTER SIMULATION AND RISK ASSESSMENT: WORKING WITHIN THE LIMITS OF CURRENT KNOWLEDGE AND DATA AVAILABILITY.
- SS-16 WOULD IMPROVED KNOWLEDGE HELP OR HINDER THE BUILDER?
- SS-17 IS LIMITED KNOWLEDGE A PROBLEM FOR REALTORS AND APPRAISERS?
- SS-18 WHAT TOOLS, POLICIES OR TECHNIQUES ARE AVAILABLE TO THE LOCAL PLANNER FOR LAND MANAGEMENT AND HAZARDS PLANNING?
- SS-19 HOW WILL STATE AND LOCAL FLOOD PLAIN MANAGEMENT BE AFFECTED IF TECHNICAL ASSISTANCE AND FEDERAL ACQUISITION AND RELOCATION EFFORTS ARE CURTAILED?
- SS-20 HOW DOES THE DISASTER PLANNER DEAL WITH COMMUNITY MENTAL HEALTH PROBLEMS ESPECIALLY WHEN SOCIAL SERVICES ARE CUT BACK?
- SS-21 URBAN DROUGHT MANAGEMENT: WHOSE RESPONSIBILITY?
- SS-22 COORDINATION AND COMMUNICATION PROBLEMS AT THE DISASTER SCENE.
- SS-23 LIMITED RESOURCES AND POLITICAL REALITIES: FRUSTRATIONS IN DEVELOPING A COMPREHENSIVE STATE EMERGENCY MANAGEMENT PROGRAM.
- SS-24 EMERGENCY MEDICAL PROBLEMS FACING COMMUNITIES.

GREAT LAKES SWAN SONG

An excellent special issue of the *Great Lakes Communicator* is part of the legacy which will be left by the Great Lakes Basin Commission when it and the other regional commissions cease operations on September 30, 1981. The February, 1981, issue of the newsletter was devoted to an examination of the flooding and erosion problems which face owners of shoreline property. It discusses the expense and effectiveness in reducing damages from coastal processes of the various projects undertaken by land owners, including the construction of breakwaters and seawalls, planting vegetation, relocating buildings, and depositing refrigerators and junked cars into the Great Lakes.

General advice is offered to potential property owners about the need to consult experts for estimates of the feasibility of erosion protection measures; obtaining opinions on the financial risk of purchasing property which may require substantial reinvestment to protect it from erosion or which may prove difficult to resell; finding accurate information on the availability of insurance for the various hazards to which the property is exposed; and the wisdom of consulting adjoining property owners as to existing or contemplated structures, or the effect of one neighbor's efforts may have on the others.

Copies of this issue of *Communicator* are available free from the *Natural Hazards Research and Applications Information Center*.



DISASTER BENEFITS QUESTIONED

Federal emergency assistance was provided to several Massachusetts counties in 1978 after a severe blizzard resulted in a major disaster declaration. The General Accounting Office has reviewed the distribution of loans and grants for home repairs and the issuance of food stamps to victims by the Small Business Administration, the Federal Emergency Management Agency, the Department of Housing and Urban Development, the Department of Agriculture, and the Commonwealth of Massachusetts.

GAO's review discloses that

- inadequate coordination resulted in duplicative and questionable benefits;
- grants were awarded without adequate determination of financial eligibility; and
- emergency food stamps were issued without evidence of need or sufficient controls.

The GAO recommends, and the Department of Justice concurs, that the agencies involved should review all the payments made after the 1978 blizzard to uncover improper or fraudulent claims, and then pursue civil or criminal action to recover those payments. The agencies have advised GAO that they would not follow such a course of action because of the expense involved, but that steps have been taken to resolve the coordination among the agencies in future disasters.

Up to five copies of the report, *Poor Controls Over Federal Aid in Massachusetts After the 1978 Blizzard Caused Questionable Benefit Payments*, are available free from U.S. General Accounting Office, Document Handling and Information Services Facility, P.O. Box 6015, Gaithersburg, MD 20760, (202) 275-6241.

MIF DISCONTINUED

The Federal Insurance Administration has announced the demise of its telephonic Map Information Facility (MIF). Insurance agents, lenders, and community officials can no longer call a toll-free number to obtain such information about a flood-prone property as base flood elevation or flood hazard zone. The system was established with the intent to eliminate the need for flood hazard maps (see *Observer*, Vol. IV, No. 4, p. 3), but the results over the past year indicate that the telephone information system cannot supplant the maps entirely and that the eventual costs of the MIF are not justified by the level of use. A telephone service is still available for answers to questions about the availability of flood insurance in a county or community.

FEMA REALIGNMENT

Effective June 8, 1981, the Federal Emergency Management Agency has been reorganized by its new director, Louis O. Giuffrida. Intended to make FEMA more responsive to the needs of state and local emergency managers, the most substantive changes are the elimination of two administrative units—"Mitigation and Research" and "Disaster Response and Recovery"—and the addition of "State and Local Programs and Support" and "Resource Management and Administration."

The state and local directorate will subsume the activities of response and recovery and population protection, in addition to including the newly created Emergency Information and Coordination Center. The resource management directorate oversees financial support and evaluation of programs. Other directorates have been restructured in various ways. According to Giuffrida, "The changes are not cosmetic—they represent a new philosophy and a new beginning."

Since the importance of cosmetics can not be overlooked, however, FEMA has adopted a new symbol too. The American Bald Eagle and smaller civil defense symbol make manifest the message of the Latin motto: "Service in Peace and War." The seal has a light blue background, and a dark blue band around the perimeter.



OUR MISTAKE

Equipment for Flood and Flash Flood Warning Systems is not available free from the National Weather Service as reported in the last issue of the newsletter (*Observer* Vol. V, No. 4, p. 14). It may be ordered, instead, from the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. Hardback copies are \$29.00, microfiche are \$3.50.



ON THE LINE

WHOSE FLOOD PLAIN?

The public as well as local officials have difficulties accepting the validity of a flood insurance study, the accuracy of the flood plain maps, and the existence of a genuine flood hazard because of differing perceptions of what a flood plain is.

Whereas the geomorphological flood plain is a fact and can generally be identified in the field by landform, vegetation, or alluvial soils, the "engineered" flood plain in a flood insurance study is a statistical probability and may bear little resemblance to the features mentioned above. Engineered flood plains derived by discharge-frequency curves, step-backwater models, synthetic regression equations, or other technical means are usually much more extensive than the coincident geomorphic channel and overbank area usually assumed to be flood plain. Regularly or intermittently sodden ground is usually recognized by the local populace as being flood-prone to some degree, but when the "100-year" flood plain is presented to them for the first time, many people do not accept the possibility the map may indeed be accurate (or at least represent the area having a reasonable chance of being flooded). This incredulity, however, does not usually result from lack of perception of a genuine flood hazard in the community.

Most people will acknowledge the existence of a flood hazard along unregulated streams where no flood control work or other structural "improvement" is present. The extent of the possible flooding is usually the controversial issue. "If it floods way up where I am, the whole town will be under water," is a common rejoinder to the flood insurance study's results. Unfamiliarity with the sophisticated methods involved in a flood insurance study, lack of confidence in engineering (or engineers), or a misunderstanding of the term "100-year flood" are more responsible for the failure to accept a flood plain map than outright refusal to admit there is a flood hazard.



However, individual and collective perceptions are influenced by memory, and that plays tricks. The "100-year" flood elevation or other significant flooding events may occur with the same or even lower discharges than were experienced in the past. Upstream watershed development, flood plain encroachments, increased friction in the channel and peri-channel area during high flows, and blockage of hydraulic structures may yield higher stages than were achieved by floods-of-record having greater discharges. The community may have experienced a "100-year" or greater storm, and the area inundated by the resultant flood was smaller than that shown on the flood insurance study maps.

Sometimes, only the intervention of nature or luck enables the map to be accepted. Once in a great while, meteorology, topography, soil moisture balance, existing development, hydrology, and hydraulics all combine in just the right prescription to generate a condition that matches the results of the engineer's and cartographer's efforts. However, vindication is not sweet when property and perhaps lives are at risk.

David L. Schein
Floodplain Management Specialist
FEMA—Region V

THE REAL CAUSE FOR ALARM

The perplexing scientific and political saga that began late last year with the prediction of large earthquakes near Peru this summer had two new chapters added in late July. In one, Brian Brady, the geophysicist in the U.S. Bureau of Mines who made the prediction along with William Spence of the U.S. Geological Survey, announced that he was wrong. In a July 28th AP wire story, Brady was quoted as explaining that, since the R7.5-8 quake predicted for June 28th never occurred, the subsequent two predicted for August 10th (R9.2) and September 10th (R9.9) would not happen either. "I'll never do this again," he said. "I never wanted to make this thing public."

The second chapter is still being written as the prediction continues to cause significant disruption to the economic and social systems of Peru. Economist Carlos F. Pomareda, a Peruvian working with the I.I.C.A. in Costa Rica, reported on July 13th that, among other problems, there have been massive land sales and refusals by the populace to work or live in high-rise buildings. Earlier indications by the government of Peru were that the prediction had caused panic and psychoses among the citizens.

In response to a request from the president of Peru for help in dealing with the consequences, the National Earthquake Prediction Evaluation Council had its first meeting in January to review Brady's prediction. Concluding that the prediction was totally unfounded, the Council apologized to the Peruvian government and people for any distress it might have caused.

Apparently, the official reassurance was not enough to alter the plot line already evolving.

WHEN THE WINDS BLOW

Two new publications from the Sea Grant College Program should help the media, local officials and emergency planners improve awareness of the hurricane hazard in Texas, and increase the effectiveness of evacuation procedures.

Hurricane Relocation Planning for Brazoria, Galveston, Harris, Fort Bend and Chambers Counties, Texas, by Carlton E. Ruch, provides information on regional coordination of evacuation before hurricanes. To determine how soon evacuation should begin in certain areas, an official can find data on a particular area such as 1) possible surge penetration for hurricanes of varying intensities; 2) critical sites along roads where inundation or wind intensity will force closure of the road, and at what hour before landfall such closure should be expected; and 3) the number of hours required to evacuate residents who have indicated they would leave if evacuation was optional, as well as the length of time needed to evacuate all persons if necessary.

Data are also supplied for the Freeport and Texas City levee systems and for Galveston Island. Explanations are included to assist the media in interpreting and using the information. A glossary of hurricane terms provides a final useful touch.

ESTIMATED EVACUATION TIMES BY COUNTY AND ZONE

County	Partial Evacuation of Evacuation Zones ¹	Total Evacuation of Both Contiguency and Evacuation Zones
Brazoria	14 Hours (B ₁ , B ₂ , B ₃ , B ₄ , B ₅)	20 Hours (B ₁ , B ₂ , B ₃ , B ₄ , B ₅ , B ₆ , B ₇)
Galveston	14 Hours (G ₁ , G ₂ , G ₃ , G ₄ , G ₅ , G ₆)	26 Hours (G ₁ , G ₂ , G ₃ , G ₄ , G ₅ , G ₆ , G ₇)
Harris	3 Hours (H ₁)	4 Hours (H ₁)
	14 Hours (H ₂)	26 Hours (H ₁ , H ₂ , H ₃)
	3 Hours (H ₃)	4 Hours (H ₂ , H ₃ , H ₄)
Chambers	3 Hours (C ₂ , C ₃)	4 Hours (C ₂ , C ₃ , C ₄)
	2 Hours (C ₁)	3 Hours (C ₁)

¹ TIMES WERE COMPUTED ONLY FOR PERSONS WHO INDICATED THEY WOULD EVACUATE

Hurricane Message Enhancement, by Carlton E. Ruch and Larry B. Christensen, is the final report of a study to determine why some persons respond to hurricane warnings while others do not. Group experiments and interviews were conducted with persons to determine their psychological responses to simulated hurricane warnings, radio and television programs on hurricane destruction, advice from neighbors and authority figures, testimony from survivors of hurricanes, and information designed to produce fear of the storms.

The results of the study are interpreted statistically and summarized in a hurricane response model. Recommendations are made for using hurricane information more effectively.

The reports are available for \$5.00 each from *Sea Grant College Program, Texas A&M University, College Station, TX 77843*. Please make checks payable to *Texas A&M University*.

FLOOD PREPAREDNESS VISUALS

A film and slide show recently made available to the public describe the innovative way in which Lycoming County, Pennsylvania, developed a flood warning system. Produced by SEDA-Council of Governments of Lewisburg, Pennsylvania, and by the U.S. Water Resources Council, the excellent film and slide show were funded jointly by the National Weather Service, the Corps of Engineers, and by FEMA-Federal Insurance Administration.

"Watch Along the Watershed," a 22-minute color film, shows how one industry and one community in the county cooperated to organize the flood warning system in order to give residents and businesses time to move valuable possessions to higher ground and their families to safety.

The slide show, "Early Flood Warning," is a 12-minute, sync-pulsed program that indicates how Lycoming County used existing community organizations, some technical assistance from government agencies, volunteer help—and very little money—to put an effective flood warning system into operation.

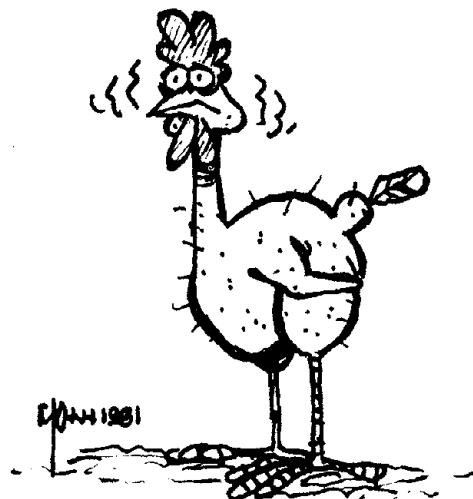
The film (@ \$115 for one print and \$95 for two-six) and the slide show (@ \$15) can be obtained from *SEDA-COG, R.D. #1, Lewisburg, PA 17837, (717) 524-4491*.

RESEARCH FINDING OF THE DECADE

(B. Vonnegut, *Weatherwise, Boston, 28(5): 217, October, 1975*)

Loomis' experiment to determine the air speed required to remove all the feathers of a chicken to estimate the wind speed in a tornado vortex was conducted in a wind tunnel instead of using a dead chicken as a ball shot out of a six pounder. In view of the fact that the force required to remove the feathers from the follicles varies over a wind range in a complicated and unpredictable way, and depends on the chicken's condition and its reaction to its environment, the plucking is of doubtful value as an index of tornado wind velocity.

Well then, what about sheepshearing?





GRANTS

Black media in disasters. "The Role of the Black Media in Disaster Reporting to the Black Community," National Science Foundation, \$115,451, 12 months. Principal Investigators: *Phillip Carey, Morgan State University, Baltimore, MD; Robert Bolin, Department of Sociology, New Mexico State University, Las Cruces, NM 88001, (505) 646-3610.*

This project will examine the role of the Black media in Mobile, Alabama, and the ways in which it got disaster information to the Black community during Hurricane Frederic in 1979. Assessments will be made of the kinds of information Black radio stations and newspapers relayed to their audiences; these will be compared to similar assessments for non-minority radio stations and newspapers. Attention will be given to coverage before, during, and after the disaster. The study will culminate in recommendations for more effective use of minority media to provide vital disaster information.

Cooperative seismic research. "Development of a Cooperative Research Program Between the United States and New Zealand on the Seismic Resistance of Highway Bridges," National Science Foundation, \$68,161, 12 months. Principal Investigator: *Ronald L. Mayes, Applied Technology Council, 2150 Shattuck Avenue, Suite 806, Berkeley, CA 94704, (415) 540-0223.*

A team of twelve U.S. researchers will visit New Zealand in December of 1981 to plan and coordinate seismic research areas to be examined in both the United States and New Zealand. The U.S. team will review current research efforts and design and construction practices in New Zealand. The team members will be selected by the Applied Technology Council Board of Directors; researchers and designers who wish to participate should send a brief resume, indicating experience with seismic design or highway bridges, to the ATC by October 1, 1981.

Hazard abatement ordinances. "Evaluation of Ordinances for Earthquake Hazard Abatement in Existing Buildings," National Science Foundation, \$148,613, 12 months. Principal Investigators: *Arthur Atkisson, University of Wisconsin, Green Bay, WI; William J. Petak, J.H. Wiggins Company, 1650 South Pacific Coast Highway, Redondo Beach, CA 90277, (213) 378-0257.*

In order to increase hazard mitigation activities, Long Beach, California, in 1971 adopted the ordinance, "Earthquake Hazard Regulations for Rehabilitation of Existing Structures within the City." The ordinance required that building owners and responsible government units take certain actions to strengthen the earthquake resistance of their structures. Ten years after, this study seeks to determine the degree to which the regulation has been effective, and what the impediments to its enforcement have been.

Hazards and cultural objects. "Seminar on Reducing the Vulnerability of Cultural Objects to Earthquakes and Other Natural Hazards," National Science Foundation, Division of Problem-Focused Research, \$98,218, 18 months. Principal Investigator: *James L. Haecker, Architectural Research Center Consortium, Department of City and Regional Planning, 1735 New York Avenue, N.W., Washington, DC 20006, (202) 626-7500.*

This project collects research findings on identifying, protecting and preserving historic architectural and engineering works, and historic and cultural objects in areas at risk to earthquakes and other hazards. A seminar for relevant professionals (engineers, architects, museum directors, curators of historic property) serves as the basis for the development of a handbook on reducing the vulnerability of cultural objects to various natural hazards. The handbook will address destruction of artifacts and structures, assessment of the hazard, protection measures, repairing damage, and necessary actions at federal, state, and institutional levels.

Disaster relief. "Problems in Formulating Disaster Relief," National Science Foundation, \$39,695, 15 months. Principal Investigator: *Peter May, Department of Political Science, University of Washington, Seattle, WA 98195, (206) 543-9842.*

This case study will identify influences—both positive and negative—on the nature of federal and state relief efforts following Mount St. Helen's eruption. The particular dynamics ascertained will be compared to those identified for other disasters in the United States, for instance, the San Fernando earthquake. Common problems will be indicated and suggestions for avoiding them offered.

MENTAL HEALTH PLANNING

Because knowledge of the psychological impact of disasters on victims has only recently become readily available, few states have incorporated mental health components into their disaster preparedness plans. With a research and demonstration grant from the National Institute of Mental Health, training programs have been held during the past year for state planners and emergency preparedness personnel in the headquarter cities of FEMA Regions I through V.

Readings for the course are compiled in *Disaster Mental Health Planning Workshop Manual*. The book includes articles on disaster-related behavior from research reports, journals, and newspapers; approaches to psychological intervention; anecdotal material; and planning guidelines and regulations. Mental health planning and training policies are suggested which are useful not only to disaster managers in the United States, but also are easily adaptable to other countries.

Obtain copies of the manual for \$12.50, along with further information, from *Linda Pasekoff, Research for Social Change, Inc., 1320 South Dixie Highway, Suite 101, Miami, FL 33146, (305) 665-6604.*

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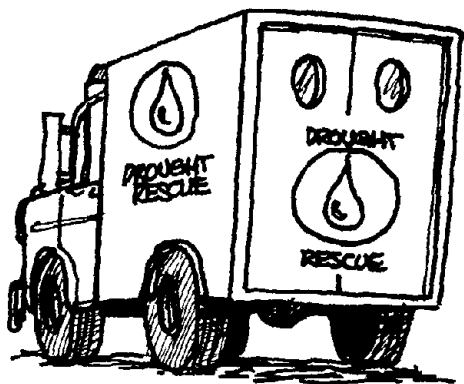
In answer to recent shortages of precipitation and increases in water use, the State of Colorado put into effect its new *Drought Response Plan* at the end of May. The plan details the data collection and assessment system that was developed to monitor conditions, and sets forth the tasks for many state agencies in a potential drought and the manner in which the agencies are to work with local governments, private organizations, and federal departments. The state's Division of Disaster Emergency Services (DODES) is the lead agency in managing and coordinating the plan.

The assessment system relies on two indices to show drought intensity and geographical extent: the National Weather Service's Soil Moisture Index (the Palmer Index), and the Colorado Division of Water Resources' Water Availability Index, which indicates the status of snowpacks, stream flows, reservoir storage, and precipitation. DODES monitors the indices and publishes the data on a regular basis.

When the data show that drought conditions are continuing, the governor activates Impact Assessment Task Forces to determine unmet needs and inform responsible agencies to begin dealing with them. The task forces oversee the following areas: water availability, municipal water, wildfire protection, agricultural industry, commerce and tourism, wildlife, energy loss, health, and review and monitoring. If unmet needs exceed the resources of the response agencies, the governor proclaims a drought emergency so resources can be reallocated or newly committed.

Additional considerations in the design of the plan are to have clearly identified information contacts (the task forces) for the public, the media, and local governments; to be prepared to present a well-documented case should a presidential declaration be needed; and to have on file a continuously updated plan to enable rapid reaction and compress the learning curve at any time in the future.

A limited number of copies are available for \$1.00 to defray the costs of mailing. Make checks payable to the *Colorado Division of Disaster Emergency Services, Camp George West, Golden, CO 80401.*



CONFERENCES



Applied Geography Conference, Arizona State University, Kent State University, and State University of New York at Binghamton. Tempe, Arizona: October 22-25, 1981. One session of this fourth annual meeting will be devoted to such natural hazards topics as warnings, flood insurance, and post-disaster housing. Other panel discussions will cover water conservation, land use planning, and stormwater management. Obtain more information from *John F. Lounsbury, Arizona State University, Department of Geography, Tempe, AZ 85287, (602) 965-7533.*

Lessons from Recent Earthquakes: Structure, Seismicity, Planning; Society for Earthquake and Civil Engineering Dynamics. London: November 11, 1981. The meeting will give practicing civil engineers and researchers an opportunity to discuss structural design for earthquakes, earthquake risk management, and urban planning and design for areas subject to seismic risk. Each session will consist of a keynote paper from a recognized expert, short written contributions from participants, and discussion. Proceedings will be published in a future issue of the journal *Engineering Structures*. Send paper abstracts of 250-400 words to, and obtain more information from, *Janet E. Hodgkinson, IPC Science and Technology Press, Ltd., P.O. Box 63, Westbury House, Bury Street, Guildford, Surrey, GU2 5BH, England.*

Achievements of the 70's, Prospects for the 80's, Seventh Annual Conference of the Coastal Society. Galveston, Texas: October 11-14, 1981. The meeting will assess achievements in coastal management over the last decade and define directions for the future. Session topics will reflect interest in scientific, technical and institutional aspects of coastal zone management. Inquiries should be addressed to *Neils West, Coastal Society Conference, Department of Geography and Marine Affairs, University of Rhode Island, Kingston, RI 02881, (401) 792-2147.*

International Symposium on Hydrometeorology, American Water Resources Association. Denver: June 13-17, 1982. Paper sessions, panel discussions, poster sessions and field trips will cover drought, flood forecasting, climatic trends, weather modification, acid rain, and hydrometeorological aspects of energy development. An exhibit of international hydrometeorology equipment, books and services is planned. Papers are invited and will be published in a proceedings volume. Additional details are available from *A. Ivan Johnson, Woodward-Clyde Consultants, 2909 West 7th Avenue, Denver, CO 80204, (303) 573-7882.*

EARTHQUAKES AND PEOPLE

Complete documentation is now available of the design, methods, findings and conclusions of a wide-ranging research project which identified and interpreted public attitudes and actions with regard to earthquake risk. Begun in 1976 with funds from the National Science Foundation (see *Observer*, Vol. I, No. 3, p. 5; Vol. II, No. 4, p. 2; Vol. IV, No. 2, p. 6), the study has culminated in the publication of a 10-volume report, *Community Response to Earthquake Threat in Southern California*, by Ralph H. Turner, et al.

Part One provides background readings on earthquake risk, prediction, and preparedness problems, and describes the objectives and design of the study. For three years, the project kept records of media coverage in earthquakes and of key governmental and organizational responses. The researchers conducted a series of surveys of Los Angeles County residents, and examined localized responses to earthquake risk. From these data were drawn the analyses of the responses of the media, organizations and schools, and grass roots collaborations—Parts Two, Three and Eight, respectively. Part Four shows the level of public awareness and concern

revealed by the research, Part Five the actions actually carried out by the people, and Part Nine the events that seemed to alter the public's level of earthquake awareness and activities.

Ethnic and racial differences in response to earthquake threat are explored in Part Six by examining different communication patterns, support systems, and attitudes toward the social and political establishment held by the Black and Mexican-American populations in the Los Angeles area. Part Seven analyzes the possible relationship between zones of special vulnerability to earthquake damage and neighborhoods in which awareness, concern, and preparedness are high.

An extensive set of recommendations and a brief summary of all components of the work are found in Part Ten. Each volume contains its own comprehensive bibliography. All the interview schedules used during the course of the study are collected in a separate appendix.

Although it has not been catalogued yet, the report will be available soon through the *National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161*.

RECENT

PUBLICATIONS



Dams and Public Safety. Robert B. Jansen. U.S. Department of the Interior, Water and Power Resources Service. 1980. 332 pp. \$11.00. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, or the Water and Power Resources Service, Engineering and Research Center, Denver Federal Center, P.O. Box 25007, Denver, CO 80225, Attention: 922. Stock No. 024-003-00138-4.

Throughout history, dams have collapsed due to some combination of natural defects and human mistakes. This book collects the lessons learned from dam failures and explains practical methods for the care and treatment of dams. Part I traces the history of dams from the sixth millennium B.C., since many of the experiences of the early peoples are still relevant today. Most of the volume is devoted to a discussion of the kinds of problems faced in constructing safe dams, and techniques for preventive and remedial engineering. An interesting inclusion is a description and analysis of each of forty-one significant accidents and failures worldwide.

Environmental Hazards in the British Isles. A. H. Perry. Winchester, MA: George Allen & Unwin. 1981. 191 pp. \$27.50 (hardbound), \$14.95 (paperbound).

This volume provides a comprehensive review of the range of hazards which affect the British Isles. Themes emphasized in the study include societal risk, the estimated frequency of hazardous events, and the impact of hazards on both the individual and society. The author provides an overview of pollution and biological hazards in addition to those of meteorological or geologic origin. Of particular interest is an extensive chapter given to the incidence, costs, and effects of snow, cold, and frost hazard in Great Britain.

Emergencies in Water Delivery. Roland Schinzingler and Henry Fagin, et al. Contribution #177. 1979. 131 pp. University of California, Water Resources Center, 2102 Wickson Hall, Davis, CA 95616, (916) 752-1544. Copies are available free.

A municipal water district associated with the San Diego County Water Authority was studied to determine its vulnerability to disaster and its capacity to respond to a sudden, unpredictable interruption of its water supply. The area has no local water resources and depends almost exclusively upon water imported via aqueducts. Emphasis is placed upon contingency planning before the disaster preparations and during the emergency period, including communication and coordination, allocation policies, rate structures, mutual assistance, and restoration policies. Recommendations are offered for forming and implementing a program of emergency preparedness.

Hawaii Coastal Zone Management Program: Shoreline Property Boundaries in Hawaii. Doak C. Cox, Environmental Center, University of Hawaii. Technical Supplement #21. 1980. 132 pp. No cost. Available from the Hawaii State Department of Planning and Economic Development, Honolulu, HI 96813, (808) 548-4025.

The question of how far seaward the ownership of private real property extends in Hawaii is much debated. However, the significance of the question to coastal zone management might not be as large as it seems because use of even privately owned land may be subject to extensive governmental regulation. This study reviews some of the major court decisions in recent cases, and discusses necessary historical background to the issues and arguments. Pertinent provisions of the state constitution, legislative statutes, and regulations and practices are presented. Conflicting or controversial terms and meanings are detailed and elucidated, and legislation is suggested that would resolve problems and enable coherent, consistent management of the coastal lands.

"Flood Forecasting and Warning: The Social Value and Use of Information in West Bengal." Robert Schwarc. *United Nations Research Institute for Social Development, Food Systems and Society Working Paper*. 1981. 33 pp. Copies are available from the author at the National Center for Atmospheric Research, P.O. Box 3000, Boulder, CO 80303, (303) 494-5151 x347, or from the United Nations Research Institute for Social Development, UN Annexe, Petit Saconnex, CH-1211, Geneva-10, Switzerland.

Recent flooding in West Bengal provided a good example of a flood warning system that is not making use of people's observations and has failed to adapt its message to the local cultural and social setting. After examining the accuracy and usefulness of meteorological forecasts produced for the flood-prone area, the author describes some socioeconomic constraints on the transmission of basic data and the communication of flood warning messages. Among the recommendations made for the improvement of the warning system are that wider use be made of technology such as satellite data, self-recording and transmitting rain gauges, and radio communications between all rain gauge and river discharge stations; and that better use be made of the "folk" communication network, both to improve dissemination of information and to prevent complete reliance by the population on the "official" warning system.

The Kalamazoo Tornado of May 13, 1980. Prepared for the Committee on Natural Disasters, Commission on Sociotechnical Systems, National Research Council. 1981. 70 pp. Copies may be obtained at no cost from the Committee on Natural Disasters, National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, DC 20418, (202) 389-6486.

Property damage in Kalamazoo was estimated at \$50 million after a funnel cloud carved a path eight miles long through residential areas, the downtown business district, and industrial areas. This report analyzes how various buildings held up, or failed to, and concludes, in part, as follows: 1) damage to buildings was caused by wind forces and wind-borne debris, not by any change in atmospheric pressure; 2) in more modern buildings three to fifteen stories high, significant damage came from broken window glass; and 3) in spite of extensive damage, buildings offered safer shelter than none at all (all deaths occurred outside of buildings).

Hurricane Allen: A Post-Impact Survey of a Major Tropical Storm. John Oliver and D. H. Trollope. *Centre for Disaster Studies, James Cook University of North Queensland. Disaster Investigation Report #3*. 1981. 63 pp. A \$5.00 (plus postage). Order from G. R. Walker, Department of Civil and Systems Engineering, James Cook University, Post Office, Townsville, Queensland, Australia, 4811.

This post-impact report utilizes field observations of Hurricane Allen's passage through St. Lucia, Jamaica, and southern Texas. General comments are offered on structural and agricultural damage, building codes, evacuation problems, the efficacy of the warning systems, post-hurricane relief and recovery, and community response. The authors' experiences confirmed their belief that solidly constructed shelters close to people's homes are preferable to the mass evacuation of a hurricane-threatened populace. They also noted that hurricane awareness among the Texans was considerably higher than that displayed by Australian residents along the Queensland coast. Although precautionary construction practices lessened damage caused by the storm, it was found that coastal inundation from high tide levels was still the largest single cause of financial loss or damage on the Texas coast.

Protecting Wetlands: What You Should Know. American Littoral Society. 1981. 8 pp. Address requests to Wetlands Booklet, American Littoral Society, Highlands, NJ 07732, or call Paul Dritsas at (201) 291-0055. Copies are free.

In compiling this attractive booklet, the American Littoral Society has produced a concise introduction to the ecological value of wetlands and to the Army Corps of Engineers permit program that regulates further wetland development. Emphasis is placed on two important aspects of wetland preservation: legal responsibilities of the Corps, and the opportunities for citizen involvement during the regulatory procedure. Although written with the mid-Atlantic seaboard in mind, the information about the Corps' permit process is relevant wherever wetlands are threatened.

Proceedings of the Mount St. Helens Scientific Workshop, November 13-14, 1980. National Science Foundation and the Federal Emergency Management Agency. 1981. 235 pp. A limited number of copies are available free from George James, NSF Communication Program, Office of Planning and Resources Management, National Science Foundation, 1800 G Street, N.W., Washington, DC 20550.

Six months after Mount St. Helens erupted, NSF and FEMA sponsored a workshop to address scientific and technological questions raised since the eruption. Workshop objectives included improving the information flow to researchers and users, identifying further research opportunities, and eliminating duplicative programs. The proceedings present the results of programs undertaken by some of the agencies participating in the Mount St. Helens Technical Information Network (TIN), and reports for workshop discussions on topics such as environmental concerns, health and medical problems, and emergency management. A valuable addition to the document is an appendix containing TIN's 33 information bulletins.

Prolonged Psychosocial Effects of Disaster: A Study of Buffalo Creek. Goldine C. Gleser, Bonnie Green and Carolyn Winget. *New York: Academic Press*. 1981. 176 pp. \$19.00.

Following the Buffalo Creek slag dam collapse and flood of February 26, 1972, a law suit was initiated by more than 600 survivors who claimed some form of psychic impairment. The litigation occasioned interviews by mental health professionals retained by both sides during the proceedings. Data collected at that time have been supplemented by follow-up studies to produce a long-term assessment of the legal settlement's impact on the survivors. Written by faculty members of the Department of Psychiatry, University of Cincinnati College of Medicine, this study utilizes statistical methods to determine which aspects of a disaster and its aftermath are most likely to cause long-term impairment.

"Helping Behavior in Large-Scale Disasters." Russell R. Dynes and E. L. Quarantelli. *In Participation in Social and Political Activities*, David Horton Smith, Jacqueline Macaulay, and Associates, eds. *San Francisco: Jossey-Bass*. 1980. 712 pp. \$27.95.

This piece views helping behavior in social and organizational terms, positing that, because such behavior is guided by norms and occurs in the context of certain relationships, it is not qualitatively different from any other behavior. After a review of disaster dynamics and disaster research to date, the authors describe what is known about helping in disasters and then set that behavior in a social-organizational perspective, arguing that aid and aiders are directed through various elements of an emergency social system—existing, extending, expanding, and emergent organizations.