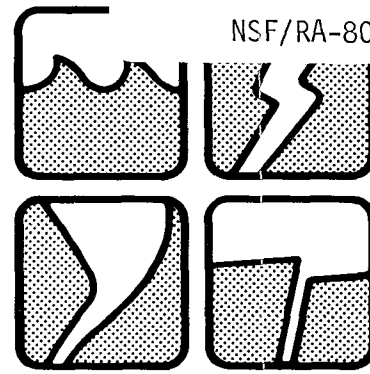


# Natural Hazards OBSERVER



VOLUME V

NUMBER 1

September, 1980



IT DID HAPPEN HERE  
—an invited comment

The violent eruption of Mt. St. Helens on the morning of May 18, 1980, had impacts reaching beyond the limits of shock waves, pyroclastic flow, mudflow and ashfall. Direct effects of the explosion and the lesser eruptions during subsequent weeks will be counted in lives lost, landscape destruction, the clogging of rivers and roads, agricultural declines and similar damages. But there will be at least two other repercussions from the blast.

The great demolition of the top of the mountain is a dramatic reminder that a rare event known to be possible but highly improbable can in fact occur here and now. When confronted with a scientific conclusion that a high-magnitude, low-frequency phenomenon may some day take place, many a person has difficulty translating that information into practical action. The flood or hurricane or earthquake of .5% frequency seems exceedingly remote. It may come only once in the span of a score of generations, and the economic cost of taking it into account looms large. Making an effective response to the information is not easy; it would be unwise to evacuate permanently the slope of every volcano that might some day become active. It would be equally foolhardy to assume that there would not be another eruption during the lifetime of the youngest among us. Mt. St. Helens underlines the need to keep the extreme occurrence in mind.

It further enhances respect and sympathetic understanding for scientific forecasts of natural hazards. It is not often that knowledge permits a scientist to predict exactly when and where the great tornado or earthquake or blizzard will occur. Inevitably, the resulting warning must be hedged by uncertainty. The geological forecasts for Mt. St. Helens were properly cautious and some

## CONTENTS

|                         |   |                                      |    |
|-------------------------|---|--------------------------------------|----|
| Workshop Summary .....  | 2 | Grants .....                         | 8  |
| On The Line .....       | 6 | Conferences .....                    | 9  |
| Washington Update ..... | 7 | Liability for Earthquake Damage..... | 10 |
|                         |   | Recent Publications .....            | 10 |

local residents disregarded them. Those who survived will not do so again.

Mt. St. Helens' performance will make all of us more ready to keep the highly improbable in our thinking and to listen attentively to scientific speculation as to when it will come.

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

## NATURAL HAZARDS WORKSHOP

The mood of the fifth annual Natural Hazards Research Workshop, held July 20-23, 1980 in Boulder, Colorado, reflected a major shift in the type of research on which the hazards community is and will be focusing. From efforts directed at understanding natural hazards and their effects on human and economic systems, researchers are moving to an emphasis on discovering how present knowledge can be used to reduce hazard losses by all appropriate means.

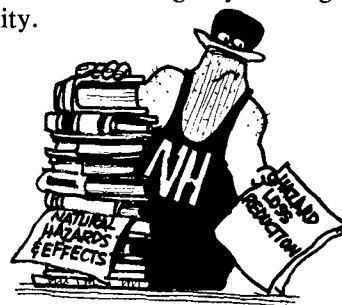
In his summary statement on the final morning of the workshop, Gilbert F. White, Director of the Information Center, suggested that the research community should be asking itself whether or not research on some aspects of natural hazards has reached the point of diminishing returns. It was generally agreed that more does need to be known about the medical dimensions of disasters, about mental health problems during an emergency period and the recovery stage, and about insurance, for example, the feasibility of a national earthquake insurance program and the potential conflicts between dual systems of public and private insurance. However, for some hazards enough information is already in hand as a result of many successfully completed research projects. Scientists and decision makers now possess the ability to predict human behavior and natural phenomena in a variety of situations, and this newly developed ability is being converted to policies designed to mitigate the effects of disasters. It was recognized that the major goal of research in those areas now should be to ascertain ways to implement successfully those policies and to observe their effectiveness.

Enough is now known about hazard warnings to enable users to structure a warning which will be effective in producing the desired response among its recipients by regulating the message's content, format, and distribution. Rather than continuing to investigate the need for warnings or the need for certain types of warnings, researchers should now be exploring methods for wider dissemination of warnings, ways for communities to improve their warning capability, and observation of real situations in which warnings play a role. Other fields in which this shift in research focus is coming about include earthquake prediction, flood plain management and hazards awareness.

White reviewed several means, some of them already taken, by which the new goals of hazards research can

be advanced. More attention should be given to increasing the involvement in hazard mitigation of special groups throughout the country which have hitherto been uninvolved—the financial community, including banks, savings and loans associations and mortgage companies; real estate appraisers; and large industrial corporations whose decisions about major plant locations affect the selection of home sites for some segments of the population. There should be a continuing emphasis on education and training of people in disaster preparedness, response, recovery and mitigation. A variety of public interest groups across the nation are renewing their efforts in this regard. Finally, work should be done to develop a centralized data base on all aspects of natural hazards. This collection of information should permit temporal and spatial comparison of data about disasters, allowing users to glean as much knowledge as possible from the country's collective experience.

Overall, the workshop was marked by a vitality of cooperation between researchers and practitioners. Users are learning to articulate the problems they face daily in their efforts to improve emergency management, and researchers are attempting to understand how their work can be made more applicable to real problems. During the past year, as FEMA has begun its immense task, members of the hazards community have become more aware of the difficulties involved in developing an integrated, centralized instrument for improving emergency management, and researchers have realized the role they must play in cooperating with the changes. The question still remains whether genuine integration of policy at the federal, state and local levels can be achieved, but the willingness of the research community to adapt its work to meet the changing needs of users reflects a spirit of cooperation which will be essential if comprehensive emergency management is to become a reality.



Copies of abstracts which were distributed at the workshop, and of summaries of each session, are available from the Information Center. Listed below are five categories of materials: abstracts of user presentations; discussions of completed research projects; abstracts of new projects and trends; descriptions of other natural hazards activities; and summaries of workshop sessions. Individual abstracts and summaries are free upon request; a workshop packet (all abstracts, participant list, program) is available for \$3.50; and a workshop packet plus all the session summaries is available for \$5.00. All abstracts include the name and address of the person connected with the program described therein who may be contacted for more information.

## LIST OF USER PRESENTATIONS

- U-1 RECONSTRUCTION IN RAPID CITY  
Leonard F. Swanson, Director of Public Works and  
Community Development, Rapid City
- U-2 SOLDIERS GROVE COMMUNITY  
REVITALIZATION PROGRAM  
Thomas Hirsch, Office of Community Development,  
Soldiers Grove
- U-3 ILLINOIS FLOOD MANAGEMENT EFFORTS  
French Wetmore, Illinois Department of  
Transportation, Division of Water Resources
- U-4 RESEARCH AND THE EMERGENCY  
MANAGEMENT INSTITUTE  
David McLoughlin, Federal Emergency Management  
Agency
- U-5 OPPORTUNITIES AND OBSTACLES  
FOLLOWING THE BIG THOMPSON FLOOD 1976  
Nona Thayer, Larimer County Commissioner
- U-6 MARYLAND'S FLOOD PLAIN MANAGEMENT  
PROGRAMS  
Marguerite M. Whilden, National Flood Insurance  
Program
- U-7 FLOODPLAIN MANAGEMENT IN COLORADO  
Larry F. Lang, Colorado Water Conservation Board
- U-8 DISASTER RECOVERY IN ARIZONA  
Pat Harrington, Arizona Division of Emergency  
Services
- U-9 COMPREHENSIVE EMERGENCY  
MANAGEMENT  
George L. Jones, Arizona State Office of Emergency  
and Energy Services

## LIST OF COMPLETED RESEARCH PROJECTS

- CRP-1 MANAGING FLOOD PLAIN LAND USE:  
SELECTED FINDINGS FROM A NATIONAL  
STUDY  
Raymond J. Burby, University of North Carolina
- CRP-2 FLOOD HAZARD MANAGEMENT AND  
NATURAL RESOURCE PROTECTION—A  
TRAINING PROGRAM  
Clem L. Rastatter, The Conservation Foundation
- CRP-3 MENTAL HEALTH ASPECTS OF DISASTERS  
James N. Logue, GEOMET Technologies, Inc.
- CRP-4 EMERGENCY MITIGATION: SETTING  
PRIORITIES FOR THE FUTURE  
James Morentz, Research Alternatives
- CRP-5 THE PAN AMERICAN HEALTH  
ORGANIZATION AND THE RESEARCH ON  
HEALTH ASPECTS OF DISASTERS  
Claude de Ville de Goyet, Pan American Health  
Organization
- CRP-6 PLANNING LONG-TERM RECOVERY FROM  
NATURAL DISASTERS  
Claire B. Rubin, The Academy for Contemporary  
Problems
- CRP-7 COMMUNITY RESPONSE TO NATURAL  
HAZARDS WARNING  
T. Michael Carter, John P. Clark, Robert K. Leik,  
University of Minnesota
- CRP-8 SOCIAL RESPONSE TO EARTHQUAKE  
PREDICTION INFORMATION: ATTITUDES  
TOWARD PREDICTION CAPABILITY AND  
GOVERNMENT ACTION  
Denise H. Paz, UCLA

## LIST OF NEW PROJECTS AND TRENDS

- NPT-1 THE IMPACT OF DISASTER AID PROGRAMS  
ON LONG-TERM FAMILY RECOVERY  
Robert Bolin, New Mexico State University
- NPT-2 RESEARCH ON VOLCANIC HAZARDS IN EL  
SALVADOR  
Payson D. Sheets, University of Colorado
- NPT-3 NATURAL DISASTER RECOVERY AND  
MITIGATION  
Claire B. Rubin, The Academy for Contemporary  
Problems
- NPT-4 PUBLIC RESPONSE TO MT. ST. HELENS  
VOLCANO HAZARD WARNINGS  
Thomas F. Saarinen, University of Arizona
- NPT-5 ESTIMATION OF THE SIZE OF PAST FLOODS  
ON BOULDER CREEK  
William C. Bradley, University of Colorado
- NPT-6 ASSESSING VULNERABILITY TO VOLCANIC  
ASHFALL IN EAST CENTRAL WASHINGTON:  
DECISION-MAKING AND ADJUSTMENT IN  
THE AGRICULTURAL SECTOR  
Richard A. Warrick, Clark University
- NPT-7 FLOOD PLAIN REGULATIONS AND  
RESIDENTIAL LAND VALUES IN OREGON  
Keith W. Muckleston, Oregon State University
- NPT-8 CATALOG OF EQUIPMENT FOR FLOOD  
WARNING AND PREPAREDNESS PROGRAMS  
H. James Owen, Flood Loss Reduction Associates
- NPT-9 EMERGENCY EVACUATION OF BARRIER  
ISLANDS  
James K. Mitchell, Rutgers University
- NPT-10 EMERGENCY RESPONSE TO THE MT. ST.  
HELENS ERUPTION: MARCH 20 TO APRIL 10  
John H. Sorensen, University of Hawaii
- NPT-11 NOAA'S FLASH FLOOD INITIATIVE  
R. L. Carnahan, National Weather Service
- NPT-12 IMPROVING THE SCIENCE OF IMPACT  
STUDY: A METHODOLOGICAL REVIEW OF  
CLIMATE IMPACT ASSESSMENT  
Robert W. Kates, Clark University
- NPT-13 PARALYZING WINTER STORMS  
Nicholas Helburn, University of Colorado
- NPT-14 EARTHQUAKE MITIGATION POLICY  
FORMULATION PROCESSES  
Thomas E. Drabek, Alvin H. Mushkatel, University  
of Denver
- NPT-15 A CASE STUDY OF THE SEARCH AND  
RESCUE ACTIONS FOLLOWING THE MOUNT  
ST. HELENS ERUPTION OF MAY 18, 1980  
Thomas E. Drabek, Thomas S. Kilijanek,  
University of Denver
- NPT-16 1981 FLOODPLAIN MANAGEMENT  
WORKSHOP  
Timothy Maywalt, Water Resources Council
- NPT-17 OMB DIRECTIVE ON FLOOD DISASTER  
RECOVERY  
Frank Thomas, Water Resources Council
- NPT-18 RECONNAISSANCE TRIP TO MT. ST. HELENS,  
MAY 18-21, 1980  
Thomas F. Saarinen, University of Arizona
- NPT-19 FLOOD WARNING IN ARIZONA  
Leslie A. Bond, Arizona Department of Water  
Resources

## LIST OF NATURAL HAZARDS ACTIVITIES

- NHA-1 WYOMING WINTER DRIVING BOOKLET  
Willard A. Reiling, Wyoming Disaster and Civil Defense
- NHA-2 HAZARD ANALYSIS AND MITIGATION STUDY  
Willard A. Reiling, Wyoming Disaster and Civil Defense
- NHA-3 NGA EMERGENCY MANAGEMENT PROJECT  
Hilary Whittaker, National Governors' Association
- NHA-4 DISASTER BIBLIOGRAPHY  
Joseph Scanlon, Carleton University
- NHA-5 GIRL SCOUTS "QUAKE-SAFE" PROGRAM  
Margaret Masdeo, Santa Clara County Girl Scout Council
- NHA-6 NEIGHBORHOOD PLAN FOR COOPERATION DURING AN EARTHQUAKE DISASTER  
Margaret Masdeo, Los Altos, California
- NHA-7 ASSESSMENT OF THE EFFECTS OF HURRICANE ON HEALTH (DOMINICA 1979)  
Claude de Ville de Goyet, Pan American Health Organization
- NHA-8 TUMACO DISASTER: EFFECTS ON THE POPULATION'S HEALTH  
Claude de Ville de Goyet, Pan American Health Organization
- NHA-9 EARTHQUAKE HAZARD MITIGATION THROUGH LAND USE MANAGEMENT: A GUIDE FOR PLANNERS AND PUBLIC OFFICIALS  
Martin Jaffe, American Planning Association
- NHA-10 A PLANNER'S GUIDE TO LANDSCAPE PROBLEMS  
Duncan Erley, American Planning Association
- NHA-11 MINORITY ELDERLY ADAPTATION TO LIFE THREATENING EVENTS  
Spero Manson, National Center for American Indian and Alaskan Native Mental Health Research
- NHA-12 DEFINITION OF THE HAIL HAZARD IN THE UNITED STATES  
Joseph E. Minor, Texas Tech University
- NHA-13 THE KALAMAZOO TORNADO OF MAY 13, 1980  
Kishor C. Mehta, Texas Tech University
- NHA-14 VALUABLE INFORMATION FROM WIND-CAUSED DAMAGE IN HURRICANE FREDERIC  
Kishor C. Mehta, Texas Tech University
- NHA-15 STUDIES CURRENTLY FUNDED BY THE FEDERAL INSURANCE ADMINISTRATION  
Federal Insurance Administration, Federal Emergency Management Agency
- NHA-16 LOCAL GOVERNMENT DISASTER PROTECTION  
Marie Hayman, International City Management Association
- NHA-17 CEAS IMPACT ASSESSMENTS OF MAJOR CLIMATIC AND OTHER NATURAL EVENTS  
Joan Hock, Environmental Data and Information Service, NOAA
- NHA-18 SOME THOUGHTS ON A CONCEPTUAL FRAMEWORK FOR LOCAL PLANNING FOR MASS CASUALTY CARE  
Cressy Goodwin, North Central Connecticut Emergency Medical Services Council
- NHA-19 A GRASSROOTS MOVEMENT IN GLENDORA, CALIFORNIA  
DeLaine Morgan, Sandburg Junior High School
- NHA-20 MUDFLOW HAZARD AND MITIGATION: CITY OF LOS ANGELES  
Rachel Gulliver Dunne, FEMA

## LIST OF SESSION SUMMARIES

- SS-1 STRENGTHENING STATE FLOOD HAZARD MITIGATION—WHAT IS BEING DONE TO IMPROVE FLOOD MANAGEMENT IN STATES AND COMMUNITIES?
- SS-2 WHAT WOULD IT TAKE TO IMPROVE MUNICIPAL EMERGENCY MANAGEMENT (BESIDES MONEY)?
- SS-3 HOW CAN WE HANDLE PROBLEMS THAT PLAGUE LONG-TERM COMMUNITY DISASTER PLANNING AND RECONSTRUCTION EFFORTS?
- SS-4 HOW CAN THE FLOW OF HAZARD INFORMATION TO THE FINANCIAL COMMUNITY BE INCREASED?
- SS-5 WHAT DOES IT TAKE TO ACHIEVE COMPREHENSIVE EMERGENCY MANAGEMENT?
- SS-6 WHAT RESEARCH FINDINGS ARE NEEDED FOR THE 1981 CONGRESSIONAL ACTION ON REAUTHORIZATION OF THE FLOOD INSURANCE PROGRAM?
- SS-7 WHAT CAN BE DONE TO IMPROVE PUBLIC RESPONSE TO EARTH SCIENCE INFORMATION?
- SS-8 HOW DO RESEARCH NEEDS AND FINDINGS GET CHANNLED TO THE NEW FEMA INSTITUTE FOR TRAINING?
- SS-9 WHAT IS THE RESPONSE TO NOAA'S COASTAL HAZARDS INITIATIVE?
- SS-10 COMMUNITY FLOOD HAZARD MITIGATION
- SS-11 MENTAL HEALTH ASPECTS OF DISASTERS
- SS-12 HAZARDS WARNING STUDY
- SS-13 DISASTER RECOVERY: A SIMULATION TRAINING PROGRAM
- SS-14 THE MASS MEDIA AND DISASTER—A NAS STUDY OF HURRICANE DAVID
- SS-15 ALL-RISK INSURANCE: IS IT WORTH CONSIDERING?
- SS-16 POST-FLOOD RECOVERY: OBSTACLES AND OPPORTUNITIES
- SS-17 MEDICAL ASPECTS OF DISASTERS
- SS-18 FACTORS AFFECTING COMMUNITY EVACUATION PLANS
- SS-19 SOCIAL RESPONSE TO EARTHQUAKE PREDICTION INFORMATION
- SS-20 METHODS FOR ASSESSING THE VALUE OF HAZARDS INFORMATION
- SS-21 80 NGA/FEMA MULTIPLE RISK MITIGATION CASE STUDIES



### NEW CENTER FOR STUDY OF MIDWEST EARTHQUAKES

Funded earthquake research projects at Purdue University totalling \$900,000 have recently been brought together to form a Center for Earthquake Engineering and Ground Motion Studies. The Center's work includes the development of instrumentation, analysis of equipment and structures, geophysical surveying, and plotting ground motion records.

Besides conducting projects on traditional earthquake engineering problems, the Center also must deal with the special problems of an area in which the return period between earthquakes is very long. Some of the most severe earthquakes in the United States occurred in the Midwest in the early 1800's, but because of their infrequency, most people are unaware of the seismic hazard. Although mitigative measures are difficult to generate, the recent earthquake centered in northeastern Kentucky will increase awareness of the hazard. The Center hopes to educate the technical community and work towards developing methods to improve seismic response of structures.

For more information, contact *Anshel J. Schiff, Director, Center for Earthquake Engineering and Ground Motion Studies, Purdue University, Lafayette, IN 47907.*

### QUICK RESPONSE TO DISASTER

The Natural Hazards Research and Applications Information Center is concluding its management of a small pilot project which has enabled researchers to carry out studies during the immediate post-disaster period. Within the past 18 months, nine groups of researchers from fields as diverse as anthropology and law, business and geography, and sociology and communications research have examined six different disasters. Issues considered included perception of tornado hazard and elderly response and recovery patterns, flood plain management practices before and after large-scale flooding in Jackson, Mississippi, the activities of the mass media during Hurricane David, and response to warnings issued for Hurricane Frederic.

The project wound up with a flurry of activity as

several researchers made the pilgrimage to Mt. St. Helens to investigate emergency organizational response, warning dissemination, and risk perception and comparative impacts from the eruption.

A total of \$18,000 supported all these studies, many of which have generated new proposals for larger, more long-term projects (see *Observer*, IV, No. 3, p. 6). Final reports detailing field procedures and data analyses are being prepared for each project and several will be published in the Natural Hazards Research Working Paper series. Their availability will be announced in future issues of the *Observer*.

### FLOOD PLAIN MANAGEMENT

Results of a national study of flood plain land use management are presented in three interim reports by the Center for Urban and Regional Studies at the University of North Carolina, Chapel Hill. Begun nearly two years ago with funds from the National Science Foundation, the study determined the state of the art of flood plain management in over 1500 communities, evaluated local program effectiveness in specific communities, and developed a conceptual framework for describing and assessing the efficacy of local strategies for flood plain management.

*Managing Flood Hazard Areas: The State of Practice*, by Steven P. French and Raymond J. Burby, describes management programs in use by local, regional, state and federal governmental entities. Through two mail surveys, one to communities and one to regional councils, perceptions of the effectiveness of specific programs were elicited, as were judgments on the major obstacles to better flood plain management.

*Managing Flood Hazard Areas: A Field Evaluation of Local Experience*, by Steven P. French, Todd L. Miller, Raymond J. Burby, and David H. Moreau, explains briefly the model for evaluation that was devised, and details its application to three communities: Raleigh, North Carolina; Jackson, Mississippi; and Littleton, Colorado. Finally, it analyzes the successes and failures of the programs studied by examining the causes for decisions to develop or control growth in the flood plains, by noting important influences on each program, and by plotting the impacts of the programs.

*Managing Flood Hazard Areas: A Conceptual Framework for Evaluating Program Effectiveness*, by Raymond J. Burby, Steven P. French, and Edward J. Kaiser, spells out reasons for the inclusion of the various criteria in the evaluative model. Major considerations are how to define effectiveness, how to measure all potential socioeconomic impacts, determination of target groups—individuals or groups who affect decisions—understanding the dynamics of those decisions, and intergovernmental influence on those decisions.

Inquiries on the availability of these reports, and of the final report due in November, may be addressed to *Raymond J. Burby, Center for Urban and Regional Studies, The University of North Carolina at Chapel Hill, Hickerson House 067A, Chapel Hill, NC 27514, (919) 933-3074.*

---

## ON THE LINE



### DISASTER PREPAREDNESS: A NEW ROLE FOR THE FAMILY

The growing reliance on technical and policy measures to reduce hazards leads one to ask whether planners and decision makers are developing similar strong programs which will enable families to better cope with disasters. In my opinion, the answer is NO. The American family, capable of effective responses to emergencies, represents an enormous resource that should be explored in disaster research and included in planning. However, that family is not yet trained to perform as a primary adaptive-protective unit in any stages of disaster.

My area of interest is the development of family/household preparedness and coping abilities through training and education. Public emergency preparedness education, as opposed to public information, is an active process involving both adults and children. Its goal is changed behavior, its purpose to prevent victims, where possible, through foreknowledge and preparation.

Four needs can be identified when assessing the current status of hazard research and planning as it applies to the family/household. First, much research relevant to households lies buried among reports, charts, and graphs. The educator must have concise research translations and summaries that will provide the material for effective instructional programs. Researchers from such fields as engineering, social and geosciences, and physical and mental health need to anticipate the educational applications of their findings and synthesize them. As a result of a research-application gap, only a few systematic programs now exist to disseminate usable life-saving techniques from the researcher to the public.

Second, we need better packaging for our life-saving communications. The lack of public response to much of our urgent information indicates we have not yet found the right mix of techniques for motivating a significant proportion of the population to participate in preparedness.

Third, public educators and grass roots groups alike need a well-publicized national clearinghouse for family hazard knowledge, providing a comprehensive perspective. This type of resource center could encourage and integrate educational programs complementary with government activities. It would put dollars into disaster prevention rather than disaster relief.

Fourth, and most alarming of all, is the continued absence of visible national leadership for home preparedness as a necessity of life in a highly inter-

related, technological society. We have put much emphasis on providing post-impact services for disaster victims; we should now apply more resources to preparing humans before impact.

Shirley Smith  
Emergency Preparedness Project  
Family Research Institute  
Purdue University

---

### THE RESEARCHERS WENT OVER THE MOUNTAIN

With grants from the National Science Foundation, seven social science studies are underway to assess various impacts of Mt. St. Helens' eruption. The first four projects listed below were funded through the Division of Problem Focused Research under the provisions of Notice 82, a rapid response program initiated by NSF on May 30, 1980.

"Estimating the Cost of Community Ash Cleanup," \$8,156, 6 months. Principal Investigator: *William Hallagan, Department of Economics, Washington State University, Pullman, WA 99164, (509) 335-4987.*

"Adaptive Response to Transportation Service Interruption by Volcanic Fallout: Data for Local Government Pre-disaster Mitigation Planning," \$5,756, 6 months. Principal Investigator: *Jack Kartez, Department of Regional Planning, Washington State University, Pullman, WA 99165, (509) 335-1546.*

"The Impact of Volcanic Ash Fallout on Eastern Washington: Perceptions and Behaviors Related to Health and Housing," \$11,564, 6 months. Principal Investigator: *Marsha Roberts, Child and Family Studies, Washington State University, Pullman, WA 99164, (509) 335-8066.*

"Assessing Vulnerability to Volcanic Ashfall in East-Central Washington: Decision-Making and Adjustment in the Agricultural Sector," \$9,885, 6 months. Principal Investigator: *Richard Warrick, Center for Technology, Environment and Development, Clark University, Worcester, MA 01610, (617) 793-7283.*

Of the following projects, the first two are supplements to already existing grants, and the final one was funded through normal award procedures.

"Search and Rescue Missions in Natural Disasters and Remote Settings." Principal Investigator: *Thomas Drabek, Department of Sociology, University of Denver, Denver, CO 80208, (303) 753-3278.*

"Factors Affecting the Design and Implementation of Community Disaster Evacuation Plans." Principal Investigator: *Ronald Perry, Battelle Human Affairs Research Centers, 4000 NE 41st Street, Seattle, WA 98105, (206) 525-3130.*

"Public Response to Mt. St. Helens Volcano Hazard Warnings," \$58,895, 18 months. Principal Investigator: *Thomas Saarinen, Department of Geography, University of Arizona, Tucson, AZ 85705, (602) 626-1526.*

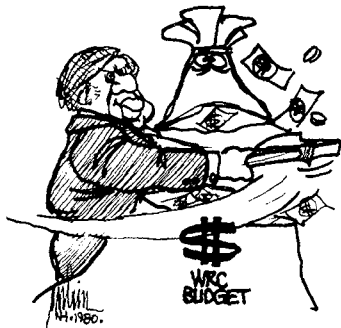
## WASHINGTON UPDATE

---

### FLOOD INSURANCE PROGRAM REDIRECTION

The Federal Insurance Administration has undertaken certain initiatives to provide more technical assistance to state and local governments, and to prompt more local activity in flood plain management. Initially, the NFIP had designated any area subject to a 100-year flood as a "special flood hazard area" and had directed much effort to mapping in all areas. However, not all the areas have much development therein, and so are not candidates for significant flood losses. To reduce costs and increase the effectiveness of the program, FIA has accelerated the conversion of communities with low flood risk into the Regular Program, and turned new attention to communities with considerable development in their flood plains. Upwards of 9,000 communities will be put into the Regular Program and the funds which would have been spent on mapping and studying them can be diverted to very detailed studies of more hazardous communities and to more vital technical assistance.

### WRC STATE PROGRAM BUDGET CUT



The 1980 Supplemental Appropriations and Rescission Bill, recently passed by the House and Senate, cuts \$11 million from the Water Resource Council's grant program to states for water resources planning for FY 1980. As part of his anti-inflation strategy, the President requested that Congress rescind part of the program's budget, originally set at \$21 million for the fiscal year. Applications from the states, the District of Columbia, and the Virgin Islands and Guam totaled approximately \$26 million; as a result of the budget cuts, applicants have received somewhat less than half the funding they requested.

In a related development, the Council is considering revised guidelines for the grant program to the states. Since neither legislation to authorize the Council's existence in FY 1981, nor, therefore, legislation to appropriate it any funds had been passed at recess on August 1st, the Council will draft new guidelines under its extant authority. The guidelines are needed to conform with current federal grants management procedures.

### WATER RESOURCES COUNCIL

The U.S. Water Resources Council has announced the availability of the final report of the Second National Water Assessment (see *Natural Hazards Observer*, Vol. III, No. 4, p. 9). *The Nation's Water Resources, 1975-2000*, provides basic data on 1975, 1980 and 2000 water use and supply for the entire United States. The information is useful for establishing water resources policy at local, state and regional levels. The publication consists of four basic volumes totaling 29 separate books. For a press release which describes each volume and lists stock numbers and prices, contact *Wanda Phelan, U.S. Water Resources Council, 2120 L Street, N.W., Washington, DC 20037, (202) 254-8290*.

Another publication, *The State of the States: Water Resources Planning and Management*, has been released as a preliminary report which examines the range of agency structures in states and regions which administer water resources programs. An early revision is planned to include additional information on river basin commissions, interstate compacts and interagency agreements. The report assists the Water Resources Council in responding to each state's programs and needs. Single copies are available free from *Water Resources Council, 2120 L Street, N.W., Washington, DC 20037, (202) 254-8290*.

### STATE DISASTER RESPONSE

According to a recently released report by the Comptroller General, *States Can Be Better Prepared to Respond to Disasters*, most state agencies do not have adequate procedures established to implement tasks assigned them under their state's emergency/disaster plan. After reviewing preparedness plans in seven states—Massachusetts, Connecticut, Georgia, Mississippi, Missouri, New Hampshire, and Oklahoma—the GAO found that states encounter problems responding to disasters because state and local agencies do not know how to do what their plans call for. Additionally, many community emergency plans are not compatible with their state plans, and frequently plans do not indicate clearly who is to do what.

To remedy the confusion, the report makes the following recommendations to the Director of FEMA: set minimum standards for disaster training for state and local personnel; request all state governors to require their civil preparedness agency and other pertinent agencies to develop standard operating procedures for disasters; and request all governors to urge local communities to develop or revise emergency plans so that they are compatible with state plans.

Single copies are available free from *U.S. General Accounting Office, Distribution Section, Room 1518, 441 G Street, N.W., Washington, DC 20548*.

## GRANTS



**Research dissemination.** "Natural Disaster Mitigation and Recovery: Enhancing the Dissemination of Research Results to State and Local Officials," National Science Foundation jointly with the Federal Emergency Management Agency, \$195,000, 12 months. Project director: *Claire B. Rubin, Academy for Contemporary Problems, 400 N. Capitol Street, N.W., Suite 3901, Washington, DC 20001, (202) 638-1445.*

The project is aimed at identifying and serving the information needs of state and local officials in order to improve their ability to recover quickly and effectively from natural disasters and to mitigate the future effects of natural hazards on people and structures. To meet this goal, the project will assess the existing research findings on disaster recovery and mitigation from the point of view of state and local officials and then work to improve the exchange and dissemination of information to those officials.

The following tasks will form a part of this effort:

- a review of the existing literature on the impact of natural hazards on people and structures from the standpoint of its use for public officials;
- an assessment of the public policy relevance of a select group of disaster recovery and mitigation studies;
- preparation of short summaries of significant studies for public practitioners;
- conduct on-site interviews and post-audits of disaster recovery to analyze local planning and management and intergovernmental problems; and
- preparation of case studies describing disaster recovery for future use in training sessions and materials.

In addition, the project will operate a Resource Referral Service to serve as a clearinghouse for disaster information for public officials, professional associations, researchers and other interested persons. Written sources as well as referrals to experienced officials or researchers will be available.

**Barrier islands.** "Emergency Evacuation of Barrier Islands," Office of Coastal Zone Management, \$15,000, 2 years. Principal Investigator: *James K. Mitchell, Department of Environmental Resources, Cook College, Rutgers University, New Brunswick, NJ 08903, (201) 932-7809.*

The project will evaluate constraints on the effectiveness of existing evacuation programs for barrier islands, and assess the utility of available alternatives. Study sites will be barrier islands and adjacent low-lying areas in New Jersey's four oceanfront counties. The end results of the project will be an evacuation handbook for public officials in state and local agencies, a report on the advantages and disadvantages of alternative evacuation approaches, and a model information brochure for barrier island residents.

**Earthquake response.** "Methods and Costs of Maintaining Hospital Functions in Earthquakes," National Science Foundation, \$187,466, 18 months. Principal Investigator: *Christopher Arnold, Building Systems Development, Inc., 120 Broadway, San Francisco, CA 94111, (415) 434-3830.*

Since the two serious hospital failures during the San Fernando Earthquake of 1971, high priority has been placed on providing for the structural and functional survival of hospitals following an earthquake in order to ensure the effectiveness of rescue, relief and recovery activities. The interaction of a hospital's intricate electrical, mechanical and life support systems during extreme shaking, and the impact of non-structural failure on the functions of the hospital are not well understood. The research will develop measures for the reduction of non-structural damage in new and existing hospitals and assess the costs involved in alternative damage control strategies.

**Earthquake mitigation.** "Earthquake Hazard Mitigation Through Land Use Management: A Guide for Planners and Public Officials," National Science Foundation, Earthquake Hazard Mitigation Program, \$87,000, 12 months. Project director: *Martin Jaffe, American Planning Association, 1313 E. 60th Street, Chicago, IL 60637, (312) 947-2087.*

The objective of the project is to gather information on land use techniques for earthquake hazard mitigation and to prepare a guidebook for use by professional planning staffs in local agencies. The manual will serve as both a primer on earthquake hazards and as a reference book for methods of avoiding or lessening the impacts of those hazards. The project will survey existing literature and research and contact planning agencies, institutions and local governments which are currently engaged in land use activities to mitigate earthquake hazards.

**Earthquake insurance.** "Earthquake Insurance Study," Federal Emergency Management Agency Engineering and Insurance Branch, \$123,748, 300 days. Project manager: *William J. Petak, J. H. Wiggins Co., 1650 South Pacific Coast Highway, Redondo Beach, CA 90277, (213) 378-0247.*

To ascertain the feasibility of a national earthquake insurance program to protect against losses, this project will investigate six areas of concern: the current market for earthquake insurance; the present coverage of insurance against earthquake damages; potential roles of earthquake insurance in mitigation activities; effects of earthquake prediction on insurance; reasonable methods of earthquake damage distribution assessment; and overall problems with such insurance for the public and for the insurance industry.

An important part of the project is the convening of a workshop in August at which will be present representatives of governmental and private groups which have a stake in an earthquake insurance program, of financial institutions, of seismic safety commissions, and of consumer groups, as well as policy researchers and hazards consultants.



*Land values.* "Floodplain Regulations and Residential Land Values in Oregon," Oregon State University Water Resources Research Institute, \$20,000, 15 months. Principal Investigator: *Keith W. Muckleston, Department of Geography, Oregon State University, Corvallis, OR 97331, (503) 754-3141.*

Uncertainty about the relationship between flood plain regulations and residential land values has probably impeded the implementation of a comprehensive program of flood hazard mitigation. The project will seek to narrow this knowledge gap by analyzing the relationship between regulation implementation and appreciation rates of residential land values, and by investigating the effect an assessor's perception of regulations may have on the appreciation rates. The project's hypothesis, that regulations have a negative effect on land value appreciation, will be tested by applying multiple regression analysis and by comparing mean rates of land value appreciation over a 10-20 year period. Questionnaires and interviews will be employed to determine assessors' perceptions of flood plain regulations.

#### FLOOD MANAGEMENT IN MARYLAND

The Maryland General Assembly enacted a bill in April creating a Flood Management Grant Program to assist local jurisdictions with the implementation of capital projects that are part of their comprehensive flood management plans. Seven and one-half million dollars have been authorized for use by the program.

The act (Senate Bill 978), specifically acknowledging that recurrent flooding within the state is detrimental to the health, safety, welfare and property of its citizens and incurs substantial costs to those citizens, recognized the need for managing flood hazard areas while preserving their value as natural resources. Although the grant funds must be used for capital projects, such are interpreted in the act to include flood warning systems, public acquisition of flood-prone properties, flood proofing, zoning, and any other practical methods.

#### PUTTING IT ALL IN ONE PLACE

A new monthly publication performs a much needed service of describing the preceding month's major abnormal climatic and geological events, and noting their impacts on U.S. social and economic activities. *Impact Assessment of Major Climatic and Other Natural Events*, prepared by the Center for Environmental Assessment Services of NOAA's Environmental Data and Information Services, began in February to chronicle weather/geological causes and their socioeconomic effects. A qualitative assessment is given of the effects in eight broad categories: construction, economics and commerce, energy, food and agriculture, government and taxes, recreation and services, society (fatalities, injuries, health), and transportation and communications.

Data gathered from the Environmental Data and Information Services, the National Weather Service and

the National Environmental Satellite Services are used to determine the month's unusual natural phenomena. Impact estimates come from many sources, notably FEMA, abstracts from the *New York Times* Information Bank, and the National Weather Service.

For more information, or to sign up for your copy, write or call *Impact Assessment, CEAS/CIAD-CAB, Page Building 1, Room 416, Washington, DC 20235, (303) 634-1822.*



## CONFERENCES

*Disasters: Problems and Solutions in Their Management, Florida Chapter, American College of Emergency Physicians. Orlando, Florida: October 28-30, 1980.* This specialty conference will address itself to all manner of natural and human-caused disasters. Among the topics to be covered are the collapse of the St. Petersburg bridge, evacuation and treatment at Mt. St. Helens, the 1980 Miami riots, organizing mass casualty sites, EMS response to terrorists, medical preparations for earthquakes, and the crash of Flight #191. Further information can be had from *Registrar, Disaster Conference, 600 Courtland Street, Suite 420, Orlando, FL 32804, (305) 628-4800.*

*Who's Minding the Coast, University of Washington Institute for Environmental Studies. Seattle: October 17-18, 1980.* The conference, with exhibits and a film festival, will examine the future of the coast to the year 2000. Among the many topics to be addressed in the sessions are use conflicts, law and public programs, energy and natural resource development, redevelopment and revitalization, planning and regulation approaches, and local, regional, and state roles in managing coastal use. For more information, contact *Polly Dyer, Institute for Environmental Studies, University of Washington, FM-12, Seattle, WA 98195, (206) 543-1812.*

*Second World Congress on Emergency and Disaster Medicine, University of Pittsburgh School of Medicine. Pittsburgh: May 31-June 3, 1981.* To foster and facilitate communication among individuals and organizations involved in emergency medical services and disaster medicine, and to encourage research, the Congress will address the following topics: emergency care measures; planning and organizing emergency medical services; medical operations in earthquakes, environmental disasters, floods, fires, and other natural and unnatural catastrophes; roles of disaster relief organizations; and priorities for Third World Countries. For information about the meeting and about presenting a paper (abstract due November 1, 1980), contact *Division of Continuing Education, 1022 Scaife Hall, University of Pittsburgh School of Medicine, Pittsburgh, PA 15261, (412) 624-2653.*

## LIABILITY FOR EARTHQUAKE DAMAGE

Since the completion of its 1978-1979 study of the legal liability of local governments for earthquake damage, funded by the National Science Foundation (see *Natural Hazards Observer*, Vol. IV, No. 2, p. 4), the Association of Bay Area Governments (ABAG) has worked closely with the California State Seismic Safety Commission and the State Office of Emergency Services to get two bills passed by the legislature and signed into law. Senate Bill 445 authorizes cities and counties to adopt ordinances which set building standards for the reconstruction of hazardous buildings. Before the bill's passage, buildings built before the code was enacted did not have to comply with its provisions. Senate Bill 555 provides that a city or county is immune from liability for actions performed or not performed as a result of the hazardous building assessment or evaluation allowed by SB 445. The new statute also establishes immunity from liability for public officials acting in response to the issuance or nonissuance of a governor's earthquake warning, and establishes the right of local governments to declare a state of emergency based on a governor's earthquake warning. Copies of the statutes are available free from ABAG.

ABAG has also released two new publications. *A Guide to ABAG's Earthquake Hazard Mapping Capability* describes a computer-based hazard mapping capability that ABAG now can provide to local governments in the bay area. The report is designed to be expanded and upgraded as the hazard mapping capability changes. Sections include a description of each of the basic data map files, a description of each of the hazard map files and a description of the several applications for them. The report is available from ABAG, Hotel Claremont, Berkeley, CA 94075, (415) 841-9730, at \$3.00 plus 75¢ book rate postage or \$1.75 for first class.

*We're Not Ready for the Big Quake* is a guide for local governments describing what can be done to better prepare for a damaging earthquake. In an appealing format, the book informs local officials what to expect from such a quake, what other governments are doing to prepare for it, and lists problems that should be anticipated in attempting to implement preparedness and mitigation measures. Order the guide from ABAG for \$3.00 plus 75¢ postage.



## RECENT PUBLICATIONS

*Volcanic Activity and Human Ecology.* Payson D. Sheets and Donald K. Grayson, Editors. New York: Academic Press. 1979. 672 pp. \$49.50.

In this volume, a multidisciplinary approach is taken to explore the effects volcanic activity has had on a wide variety of cultures. The initial chapters explain the basic geophysical and chemical phenomena associated with volcanos, while the remaining studies offer insights into how various eruptions have affected human society. Major themes include 1) volcanic eruptions can have beneficial as well as deleterious social effects; 2) some eruptions precipitate the entire disappearance of a specific culture, while others cause only short-term dislocation before recovery begins; and 3) the archaeological record can produce valuable observations on how societies respond to a catastrophic event. Eruptions studied on the North American continent are Mt. Katmai (Alaska), Paricutin (Mexico), Ilopango (El Salvador), Sunset Crater (Arizona), and Mt. Mazuma in the Cascade Range.

*Drought in the Great Plains: A Bibliography.* Compiled and edited by Donald H. Wilhite and Richard O. Hoffman. University of Nebraska-Lincoln, Institute of Agriculture and Natural Resources, Agricultural Experiment Station. Publication MP 39. 1980. 75 pp. Single copies are free, but multiple orders will be assessed a nominal fee. Send requests to Donald Wilhite, Center for Agricultural Meteorology and Climatology, University of Nebraska-Lincoln, Lincoln, NB 68583

During the course of assembling a bibliography for a workshop on drought in the Great Plains, it was discovered that a rich and abundant literature existed specifically relating to this important American agricultural region. There are 1249 entries that refer to materials already published and 134 citations pertaining to current research projects. The citations have been drawn from popular magazines and newspapers as well as from scientific papers, thus adding to the usefulness of the bibliography. Many printed sources were consulted for pre-1970 entries, while computerized data bases provided most of the recent citations. An author index and a key word subject index are included.

*The Beaches Are Moving: The Drowning of America's Shoreline.* Wallace Kaufman and Orrin Pilkey. Garden City, NY: Anchor Press. 1979. 326 pp. \$10.95.

Beaches are in dynamic equilibrium, and this well-written book explains both the natural causes and the potentially disastrous effects of that cycle. Starting with the consequences of rising sea level, the authors proceed to elucidate the geological, hydrological, and meteorological processes at work on every beach. Laced with stories of particular beaches from Maine to the Gulf to the Pacific Northwest, the book illustrates the roles of barrier islands and plant growth in protecting beaches, shows the various hazards a beach is heir to, and discusses the complex question of engineering works for protection.

The book concludes with practical advice for individuals and governmental entities on living with beaches and a helpful guide to especially interesting beaches in the United States.

*Disaster Prevention and Mitigation: A Compendium of Current Knowledge, Volume 9—Legal Aspects. GE.80-I-0254(0805)—UNDRO/22/76 Vol. IX. Available from the Office of the United Nations Disaster Relief Coordinator, Palais des Nations, CH-1211, Geneva 10, Switzerland.*

This volume in the UNDRO series discusses the legal strategies most likely to prevent or mitigate disasters and highlights the legal tensions between the interests of the individual and the community which may arise when such techniques are adopted. Legal measures designed to control land use, for example, may constitute significant infringements of vested property rights. Chapters deal specifically with disaster preparedness legislation, legal implications of technological developments such as weather modification or satellite remote sensing, compensation of the individual for disaster losses, and international implications of disaster relief.

*Evacuation Decision-making and Emergency Planning. Ronald W. Perry, Michael K. Lindell and Marjorie R. Green. Battelle Human Affairs Research Centers, 4000 NE 41st Street, P.O. Box C-5395, Seattle, WA 98105, (206) 525-3130. 1980. 326 pp. \$5.00. A 40-page summary is free of charge.*

This document presents the final results of a two-year study, funded by NSF, of the design and implementation of community disaster evacuation plans. The two major goals of the project were to develop empirically an integrated framework of factors important in citizens' decisions to evacuate in response to a flood warning, and to suggest ways to amend existing evacuation plans or create new ones to enhance the likelihood of citizen cooperation. Chapters address the problem of evacuation, describe specific communities studied, discuss what is known about individual behavior in response to evacuation warnings, present evacuation plans that incorporate what is known about human reactions to disasters, and detail findings and recommendations.

*A Weekend in September. John Edward Weems. College Station, Texas: Texas A & M University Press. 1980. 180 pp. \$10.95.*

Although the hurricane that swept Galveston Island early in September, 1900, is nearly a century in passing, it remains the standard against which the ferocity and destructiveness of other hurricanes are measured. The storm that destroyed two-thirds of Galveston's buildings and killed over 6,000 people remains a reminder of the potential havoc wind and water can wreak. This well-written book recreates the events of the weekend, as experienced by those who were there. Written 20 years ago and reissued now, the book draws upon interviews with survivors as well as documents of the time and news reports.

*A Bibliography of Recent Works Regarding Climatic Variation and Its Effect in Historic Times (1980 Supplement). Robert H. Claxton. Department of History, West Georgia College, Carrollton, GA 30118, (404) 834-1345. 1980. 24 pp. Mimeographed. Available at no cost.*

This fourth annual climate and history bibliography was compiled as part of an ongoing project on climate reconstruction funded by the National Science Foundation. Research in all disciplines which is relevant to climatic impacts is cited, as are treatments of the topic appearing in professional and technical journals and in popular magazines. Proceedings of conferences and meetings are also included in this thorough listing.

*Post-Flood Recovery and Hazard Mitigation: Lessons from the Massachusetts Coast, February, 1978. Rutherford H. Platt and George M. McMullen. Water Resources Research Center, University of Massachusetts, Amherst, MA 01003. Publication #115. 1980. 101 pp. \$3.00.*

The blizzard and coastal flooding that struck New England in February, 1978, combined to produce one of the most devastating natural disasters to hit the area in modern times. In Massachusetts alone, over 25,000 homes were affected, some 300 of these totally destroyed. Private domestic losses were valued at \$172 million, while the Federal Disaster Assistance Administration contributed \$190 million for disaster coordination and relief and recovery programs. The report consists of three sections: Part I provides an overview of past federal policy towards flood management; Part II examines the storm's impact on Massachusetts together with the public response; and Part III presents a case study of post-disaster recovery in Scituate. Among the concluding remarks, the report states that the public interest is best served by limiting coastal reconstruction, not by encouraging it, and that local municipalities are frequently instrumental in responsible execution of federal and state mitigation policies.

*City of East Grand Forks, Minnesota Civil Defense Flood Fight Plan. Orley Gunderson and Gary Sanders. U.S. Army Corps of Engineers, St. Paul District, 1135 U.S. Post Office and Custom House, St. Paul, MN 55101. 235 pp. Inquire about cost and obtaining with District Engineer, at address shown above.*

The Red River of the North crested in 1979 at a height which would eventually initiate the area's worst flood of this century. A massive mobilization of resources and volunteers was conducted in order to combat the flood. This emergency plan of action originated as part of a larger Corps of Engineers' water resources study in the area. The plan is divided into two basic parts: Section I contains a rationale and a description of how the Civil Defense organization functions during a flood emergency and of the proposed plan of action; Section II contains information on 23 flood-fighting units which can be activated for mitigative duties. Included is a description of the unit's usefulness and control hierarchy, and suggested standard operating procedures for each unit before, during, and after a flood emergency.

*Hurricanes and Coastal Storms. Earl J. Baker, Editor. Florida State University, Florida Sea Grant Program. Florida Sea Grant College Report #33. 1980. 219 pp. Single copies are free, but larger requests will be assessed a nominal charge. Order from the Marine Advisory Program, G022 McCarty Hall, University of Florida, Gainesville, FL 32611.*

During May 29-31, 1979, a group of natural hazard researchers and preparedness managers met in Orlando, Florida, under collective state and federal sponsorship in order to consider past progress and the future direction of hurricane preparedness and response. The papers presented offer a wide spectrum of insight and experience into this evolving field. Of the 31 contributions, 11 papers deal with adequately warning and evacuating the ever-increasing populace congregating on or near America's coastline. Other papers offer expertise on subjects as diverse as computer modelling, public participation in policy formation, hurricane perception and awareness, and the policies of the National Flood Insurance Program. The selections evaluate many of the pressing questions which affect a rational policy towards our burgeoning coastal population at risk from hurricane threat.

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.

STAFF

Jacquelyn Monday ..... Editor  
 Sarah Nathe ..... Editor  
 Gilbert F. White ..... Director  
 Nicholas Helburn ..... Associate Director  
 Susan K. Tubbesing ..... Staff Associate  
 Morna Scott ..... Secretary  
 Dave Morton ..... Librarian  
 Joanna Regulska ..... Research Assistant

*If you have a change of address, a suggestion for a recipient for the Observer, or are getting duplicate copies, please use the coupon below.*

Please send the OBSERVER to:

NATURAL HAZARDS OBSERVER  
 IBS #6  
 UNIVERSITY OF COLORADO  
 BOULDER, COLORADO 80309  
 (303) 492-6818

Name \_\_\_\_\_  
 Affiliation \_\_\_\_\_  
 Address \_\_\_\_\_  
 \_\_\_\_\_

Address correction  *Please attach copy of incorrect label*

Published quarterly

Reproduction with credit permitted



Natural Hazards Research and Applications  
 Information Center  
 Institute of Behavioral Science #6  
 University of Colorado  
 Boulder, Colorado 80309

Non-Profit Org.  
 U.S. Postage  
 PAID  
 Boulder, Colorado  
 Permit No. 257

RETURN POSTAGE GUARANTEED