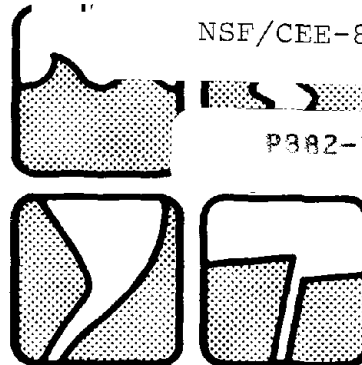


# Natural Hazards OBSERVER

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## DROUGHT IN THE GREAT PLAINS: WHERE DO WE STAND?

—an invited comment

For those of us interested in drought and agriculture in the Great Plains, and increasing numbers of us are, it is time to reflect on the events of the '70s and on the policy research issues which have emerged.

The Great Dust Bowl of the '70s never transpired. Although 1976-77 was a period of extreme desiccation in the far West, much of the Great Plains was favored with drought-breaking rains at the most opportune moment in the agricultural cycle. However, isolated, brief periods of drought conditions *did* occur throughout the '70s. Portions of the southern and central plains were

dry early in the decade. The mid and late '70s brought intermittent droughts to the northern plains: 1974 was particularly troublesome, as was 1980, which capped the decade with scorching temperatures and parched soil in Texas, Arkansas, Missouri, and the Cornbelt. Though not as severe as the Great Dust Bowl of the '70s, these events did give us a taste of drought, a sample of the adverse consequences, and a test of our response capability.

Three critical issues emerged which demand attention. First, how sensitive are Great Plains wheat and

### CONTENTS

Land Use Maps .....	2	On The Line .....	9
Action on Earthquake Preparedness .....	3	Corporate Preparedness .....	10
Washington Update .....	4	Conferences .....	11
Grants .....	6	Recent Publications .....	13

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other grains to climatic events like drought? Until the 1970s, consistently high yields led many to assume that improved technologies, cultivation techniques, and management practices had effectively minimized risk from the vagaries of climate. However, experts are now split on the issue. Agronomists argue that technology has overcome much of the problem, reaffirming the efficacy of agricultural research. Climatologists argue that unusually good weather has accounted for the good yields of the past and that yields are still vulnerable. Both camps produce statistical studies to support their claims, but the ambiguity remains.

Second, what are the social and economic consequences of a major drought in the modern Great Plains? What are the appropriate strategies for dealing with them? The flurry of drought research planning and strategy formulation sessions prompted by the '70s implicitly assumed that drought impacts would be similar to those of the past: crippled yields, crippled bank accounts, and crippled economies. We must, however, dismiss our Dust Bowl image of poverty-stricken caravans of bankrupt agriculturalists abandoning dust-covered farms and migrating to California. Today, many farmers have other options, although California may not be one of them. What happens in this country when the grains and livestock in the Great Plains can no longer be watered by the Ogallala aquifer? The problems must be correctly identified before the appropriate solutions can be applied.

Third, what would be the global consequences of a recurrence of a severe, prolonged drought in the Great Plains? The '70s sensitized us to the fact that the agricultural systems of the world have become more interdependent. If a 1930s-type drought enveloped the Great Plains, how might the well-being of people be affected in developing countries which are dependent upon imported grain?

The answers to all the questions are not yet clear, but the policy implications are enormous.

Richard A. Warrick  
National Center for Atmospheric Research

## LAND USE MAPS

When heavy rains from Hurricane Agnes in 1972 caused landslides and mine subsidence in the Pittsburgh region, the U.S. Geological Survey prepared a series of earth science studies of the area to aid the Appalachian Regional Commission and local planners in reducing future damages from such occurrences. The land use and land cover information has now been released as a 48 x 49 inch map at a scale of 1:125,000 (about two miles per inch) in twelve colors. Text and tables on the map margins demonstrate the application of data to environmental problems.

The Pittsburgh map demonstrates several features intended to enhance understanding of the metropolitan region and to increase the usefulness of land use information. Different colors represent different categories of land use—from non-urban to transitional to fully ur-

banized areas—so that the visual representation of urbanized areas nearly corresponds to that delimited by the Bureau of the Census which used different criteria. A unique table for highly urbanized Allegheny County shows the amount of land cover converted from one level of urbanization to another in the four years ending in 1973.

Order Map I-1248, "Land Use and Land Cover, The Greater Pittsburgh Region, 1973," 1:125,000, from *Branch of Distribution, U.S. Geological Survey, 1200 South Eads Street, Arlington, VA 22202. \$1.50.*

## SHAKING SUNFLOWERS

Although Kansas is famous for its twisters, the state is also at risk from other hazards, among them earthquakes. In recognition of that fact, the Kansas Geological Survey has made available a public information brochure on the dynamics of earthquakes in general, and the kinds of damage they are likely to cause in Kansas in particular. The clear wording and lucid presentation make it accessible to any lay person.

After a discussion of the causes of earthquakes and the areas in which they most typically occur, the historical record of earthquakes in the state is given. At least 25 quakes have stricken Kansas since the largest, a Mercalli VIII, in the Manhattan area in 1867. Though the chances of great damage are not large, the sheet makes it clear that precautions with building codes, dam construction and nuclear plant siting should be taken.

How seismologists measure earthquakes and what they learn from their instruments is explained, as is the purpose of Kansas' seismograph network. The seven-page brochure is amply furnished with maps, charts and photographs. "Earthquakes in Kansas" won't elevate the Nemaha Ridge to the same level of notoriety as the Yellow Brick Road, but it fills the need to apprise the public of an infrequent, yet real, hazard.

Single copies can be had at no cost from the *Kansas Geological Survey, 1930 Avenue "A", Campus West, The University of Kansas, Lawrence, KS 66044, (913) 864-3965.*



## ACTION ON EARTHQUAKE PREPAREDNESS

With a fiat to encourage and accelerate preparedness in the private and public sectors for a catastrophic earthquake, the Southern California Earthquake Preparedness Project began operations in late 1980. Through planning partner arrangements with such entities as governments, businesses, institutions, and neighborhood groups—to name a few—SCEPP will assist in the development of plans and policies to be coordinated with existing emergency preparedness and disaster response activities. Additionally, the Project will develop an earthquake prediction information and preparedness program to promote public understanding of predictions and to support the making of enlightened policies for dealing with them. Task forces with the financial community and the media will establish policies to apply after predictions are made.

The sort of effort long recommended for California, SCEPP was created with matching state and federal funds. The California State Legislature provided \$750,000 to the California Seismic Safety Commission to set up the Project, contingent upon the receipt of matching federal funds; the Federal Emergency Management Agency has granted \$800,000. Though this funding is for two years, it is estimated that three to five years will be necessary for the formation of a full program for SCEPP's planning region—Los Angeles, San Bernardino, Riverside, Orange and Ventura counties.

On April 21st, SCEPP entered into its first planning partnership by signing a memorandum of understanding with San Bernardino County. Under the agreement, SCEPP will help the county assess its earthquake vulnerability, develop mitigation/preparedness plans for specific sites within the county, integrate those plans into that for the entire county, and formulate policies for response to an earthquake prediction/warning. The county will contribute personnel and data to accomplish the tasks. SCEPP is now negotiating its next partnership with the city of Los Angeles.

SCEPP's director, Carl S. Ledbetter, was formerly Executive Assistant to the President and Dean of Academic Planning at Sonoma State University. With a Ph.D. in mathematics from Clark University, Ledbetter brings planning as well as problem-solving expertise to his challenging new position.

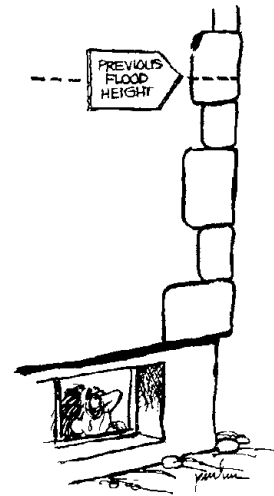
More information can be had from *Richard Andrews, Education/Evaluation Officer, Southern California Earthquake Preparedness Project, 6850 Van Nuys Boulevard, Suite 110, Van Nuys, CA 91405, (213) 787-5103.*

## RETRENCHING IN THE FLOOD PLAIN

Effective flood plain management does reduce flood hazard losses and costs, and generally benefits the communities involved, according to a recent study. *Evaluation of the Economic, Social and Environmental Effects of Floodplain Regulations* reports the findings from an analysis of 23 communities selected according to location, flood hazard type, population size, and economic conditions. Performed by Sheaffer and Roland, Inc.,

the study was funded by the Department of Housing and Urban Development and the Federal Emergency Management Agency (see *Observer* Vol. I, No. 1, p. 5).

The effects of regulating the 100-year flood plain in each community were evaluated by projecting development for 1980 and 1990 under three scenarios: 1) no regulations, allowing the free market to determine the use; 2) moderate regulations, similar to those of the FIA; and 3) stringent regulations, forbidding new development and substantial improvement. Conditions in the case study communities were similar to those in other urban flood hazard areas: the 100-year flood plain constitutes 20% of the total land area, and 14% of the population lives there in 13% of the housing.



After chapters on the needs for and approaches to flood plain management, and the research process and methods, the findings are presented and the implications assessed. Disposed according to area of impact, effects were indicated as follows:

- When no regulations are applied, average annual monetary losses increase sharply (29% by 1980, 71% by 1990); under moderate regulations, the aforementioned losses are decreased by 87% in 1980 and by 85% in 1990.
- With no regulations, the total number of housing units in the flood plain would increase 13% by 1980 and 35% by 1990; population would increase 12% by 1980 and 29% by 1990.
- No regulations would allow a continuing, unlimited conversion of flood plain land to urban uses—37% more by 1990; moderate regulations would hold development just about the same as it is.

In short, the study shows that moderate regulations will greatly reduce the rate of increase in flood loss, but will not cause those losses to decline. Only the stringent regulations of Scenario III, in various mixes and degrees, show promise to bring about the decrease in flood losses desired for some time in this country.

Single copies of *Evaluation* can be gotten at no cost from *Gary Johnson, Acting Assistant Administrator for the Office of Flood Plain Management, FEMA/FIA, Washington, DC 20472, (202) 755-5581.*

SECTION 1362 ALTERNATIVES

The Federal Emergency Management Agency has released a report which investigates the status of flood plain property acquisition for the purpose of relocating vulnerable structures to safer sites. The study includes:

- an evaluation of the effect under §1362 of property acquisition on the individual owners and occupants and on the communities in which they lived;
- identification of the economic, social, legal and environmental considerations inherent in the acquisition of flooded property;
- an estimate of the cost to the federal government of acquiring damaged property;
- case studies of the probable effects of property acquisition on four communities; and
- policy and program recommendations for the implementation of §1362.

The report concludes that acquisition and relocation will reduce federal disaster-related expenditures and promote public safety.

Single copies of *Evaluation of Alternative Means of Implementing Section 1362 of the National Flood Insurance Act of 1968* are available free from Paula Lyons, Room 5268 HUD, Federal Insurance Administration, Federal Emergency Management Agency, 1725 I Street, N.W., Washington, DC 20472, (202) 755-5581.

NONSTRUCTURAL FLOOD DAMAGE REDUCTION

The Water Resources Council has issued the report of a study it commissioned to review actions taken by the construction agencies of the Departments of Agriculture, Army and Interior in support of Executive Order 11988, emphasizing nonstructural measures to reduce flood damages. The report observes, for example, that there is great uncertainty among management and planning personnel about federal funding for nonstructural measures such as floodproofing and evacuation. There is confusion about cost-sharing formulas, levels of protection, and the term "primarily nonstructural." However, planners and managers at all levels are enthusiastic about the use of nonstructural measures as tools in a comprehensive program of flood damage reduction.

Recommendations include that the WRC report to the White House, Council on Environmental Quality, and the Office of Management and the Budget that progress is being made in the nonstructural area; that a clear policy statement be made regarding the funding of nonstructural measures; and that the public be educated about the benefits of nonstructural measures.

Single copies of the report, *Nonstructural Measures in Flood Damage Reduction Activities*, are available at no charge from the Water Resources Council, 2120 L Street, N.W., Washington, DC 20037, (202) 254-6453.

In a recent examination of the federal government's role in providing assistance to disaster victims, the General Accounting Office offers suggestions for what that role and its guiding principles might be. In *Federal Disaster Assistance: What Should the Policy Be?*, the GAO notes two principles that can contribute to the goals of equity and efficiency:

- Federal disaster relief should vary with the severity of the loss, not with the terms on which the programs are subsidized.
- The severity of a natural disaster should be measured by the extent of individual losses, not by the extent of the physical phenomenon.

The report reviews the five extant programs through which assistance is given to the private sector, and discusses the forms that assistance takes—loans, grants, and insurance. The GAO finds insurance the most equitable and efficient method, although ways must be investigated to control for the tendency of some insured individuals and groups to disregard other possible loss prevention activities. Among the recommendations made are the following:

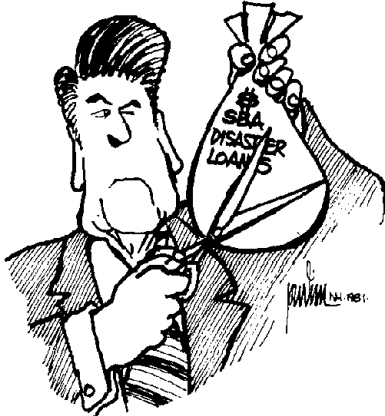
- All assistance programs should be designed to minimize incentives for poor locational decisions.
- No individual or group should be able to improve its status after a disaster as a result of assistance unless such an improvement brings about less cost to the government in future disaster.

Single copies of the report are available at no cost from the U.S. General Accounting Office, Distribution Section, Room 1518, 441 G Street, N.W., Washington, DC 20548, (202) 275-6241.

NEW FEMA DIRECTOR AND DEPUTY

Louis O. Giuffrida has been nominated as Director of the Federal Emergency Management Agency. Formerly of the California Specialized Training Institute in San Luis Obispo, California, Giuffrida is an authority on terrorism and civil emergency management. After action in the Pacific World War II and in Korea, Giuffrida served in the Office of the Joint Chiefs of Staff, taught at the Army Command and General Staff College, and was in command of the Army Combat Developments Command Military Police Agency. Upon retirement from active duty in 1971, he was requested by California's governor to organize the Special Training Institute; the Institute has subsequently earned a reputation for innovative training in dealing with terrorism, earthquakes, civil disorders and hazardous materials.

Selected to serve as Deputy Director, a new position at FEMA, was Fred J. Vilella. He also comes to his post from the California Specialized Training Institute, where he served since 1976 as chief of the Academic and Administrative Divisions and chief of staff. Vilella's career has included 20 years with the Armed Forces and a variety of activities with community relations, systems engineering, planning, and law enforcement.



### SBA DISASTER LOANS REDUCED

Because the drought assistance given last summer placed a strain on the Small Business Administration's budget, the President directed that the SBA adopt policies to guarantee that the Disaster Loan Fund operate within its designated resources of \$2.379 billion for the 1981 fiscal year. Effective March 19, 1981, rule changes reduce the amounts of physical disaster loans (other than home loans) to not more than 60% of verified loss. Economic injury loans will not exceed \$100,000, and business disaster loans will be made only to concerns unable to obtain assistance elsewhere.

The amended regulations provide that disaster declarations will be made by SBA only if at least 25 homes and/or businesses in any county or other political subdivision have suffered uninsured losses of at least 40% of their estimated fair replacement value, or if at least three businesses have been damaged to the same extent and at least 25% of the workforce in the community would be unemployed for at least 90 days as a result of the damage. The rules for disaster home loans are unchanged.

### IF ANYTHING CAN GO WRONG . . .

Companion publications recently released by the New England Municipal Center give a comprehensive description of the full complement of natural and technological hazards to which New England is at risk, and offer concise advice to local government officials on how to proceed should threat ever become actuality. The analysis and handbook were prepared by NEMC as

part of a program supported by FEMA to assist New England cities and towns to develop comprehensive emergency management systems.

*A Hazard Analysis for New England* introduces the concepts of *hazard*, *vulnerability*, and *disaster*, and details activities proper to various time phases, from planning for mitigation and response to recovery from disaster. It then presents general and regional information on each of the following hazards: drought, earthquake, energy shortage, fires, floods, hazardous materials, hurricane, military action, nuclear accident, pollution, tornadoes and windstorms, winter storms, and transportation accidents. Four appendices set forth the average annual effects of natural hazards in the U.S. and the disaster assistance requests by New England governors between 1970 and 1980, explain how to conduct a hazard analysis in a city or county, and list state emergency management agencies in New England.

*You Are Never Completely Safe . . . Emergency Management Handbook for Local Government Officials*, taking as its inspiration some of Murphy's more salient and incontrovertible laws, discusses the principles of emergency management (time phases, coordination, basic elements), mitigation, preparedness/planning, emergency response, and the process of recovery.



The latter section also describes assistance available from federal and state agencies.

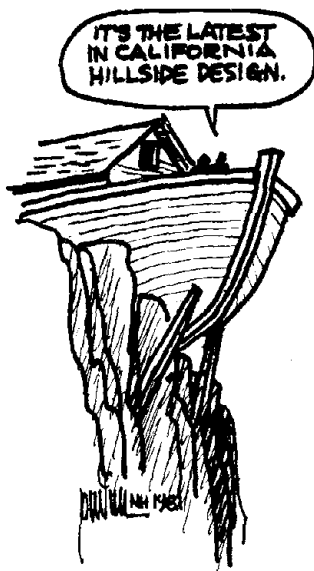
NEMC is a private, non-profit local government resource center created in 1971; the consortium is sponsored by the Connecticut Conference of Municipalities, Maine Municipal Association, Massachusetts Municipal Association, New Hampshire Municipal Association, Rhode Island League of Cities and Towns, and the Vermont League of Cities and Towns. *A Hazard Analysis* (@ \$5.00) and *You are Never Completely Safe* (@ \$2.00) can be obtained from the *New England Municipal Center, Pettee Brook Offices, P.O. Box L, Durham, NH 03824, (603) 868-5000.*

## WHEN THAR'S WATER IN THEM THAR HILLS

The consequences of the growing habitation of canyons and arroyos in Southern California were tragically illustrated last year by a violent flash flood in the Topanga area, about 30 miles northwest of Los Angeles. In an effort to reduce property damages and loss of life from future similar events, the National Weather Service has installed at Topanga the first component in a flood warning data system which eventually may cover the entire southern California region.

Rain-producing storm fronts moving in from the Pacific Ocean automatically activate the data system, which reports each millimeter of precipitation as measured by many gauges located throughout the area. The data are transmitted by radio to a computer at the NWS forecast office in Los Angeles, and to the flood warning center of the Ventura County Flood Control District. The rainfall information and predictions drawn from it are then relayed by computerized and conventional telecommunications to concerned local, state and federal agencies. Because the network instantly and continuously profiles advancing storm fronts, forecasting will be simplified and more advance warning can be given of approaching flood waters.

Similar systems have been successful in other parts of California, and are being installed in many areas of the United States and abroad. For more information, contact Bob Bates, Sabre Communications International, 2081 Business Center Drive, Suite 180, Irvine, CA 92715, (714) 955-2552.



## GRANTS

*Earthquake risk.* Earthquake Risk Analysis for Land Use Planning," National Science Foundation, \$173,890, 15 months. Principal Investigator: Charles R. Savino, Rice Center, Nine Greenway Plaza, Suite 1900, Houston, TX 77046, (713) 965-0100.

For planners and policy makers, there is a need for more comprehensive and standardized approaches to seismic risk assessment. This research will attempt to resolve problems of risk definition, and of transferring risk information to policy makers for applications. The study will involve a review and evaluation of available techniques for estimating seismic hazard and risk; it will develop a procedure whereby specific risk analysis techniques can be combined into a larger framework. A major component of this procedure will be a microzonation scheme allowing display of the magnitude and spatial distribution of expected risk. Regulatory uses for the procedure will also be examined.

*Hazard warnings and minority groups.* "Minority Citizen Warning Response and Involvement in Community Hazard Planning," \$307,542, 2 years. Principal Investigator: Ronald W. Perry, Battelle Human Affairs Research Centers, Social Change Study Center, 4000 N.E. 41st Street, Seattle, WA 98105, (206) 525-3130.

The study will examine group differences in disaster warning response and involvement in community emergency preparedness planning, and will suggest ways to enhance adaptive response on the part of minority groups. The analysis of warning response will consider important elements in minority definitions of personal risk, warning belief, and interpretations of message content. Social networks through which warnings are received will also be looked into. The study will survey the evacuation responses of whites, blacks, and Mexican-Americans in three communities, as well as their patterns of hazard planning activities.

*Earthquake preparedness.* "Planning Environment Report," California Seismic Safety Commission, \$19,550, 4 months. Project director: Linda Nilson, The Social Research Advisory, P.O. Box 291, Yucaipa, CA 92399, (714) 794-1946.

Intended to provide background information and serve as a continuing reference source for members and staff of the Seismic Safety Commission and its Southern California Earthquake Safety Advisory Board, the report will review and evaluate what is known about social behavior in disasters, summarize studies projecting losses from earthquakes occurring under specified conditions, and analyze public attitudes about the earthquake threat and hazard mitigation measures. In addition, state and local programs for earthquake response will be critically examined.

*Climate impact.* "Improving the Science of Climate Impact Study," International Council of Scientific Unions, Scientific Committee on Problems of the Environment, \$175,000, 2 years. Review coordinator: *Robert W. Kates, Center for Technology, Environment, and Development, Clark University, Worcester, MA 01610, (617) 793-7318.*

Part of an effort by the World Meteorological Organization's World Climate Program, this study will be an authoritative and critical review of current climate impact assessment methods. Three issues, central to improving scientific studies of climate impact, will be dealt with: 1) models assumed to underlie the relationships between climate, biological life, and human activity; 2) elements integral to studies of climate impact; and 3) useful and appropriate analytical techniques. Corresponding to those issues, papers will be prepared by scientists from a number of countries. Review papers of historical and current assessments will evaluate climate impact assessments already completed. A workshop in September of 1981 will assemble all the authors for in-depth discussions; final versions of the papers will be presented in conjunction with the SCOPE General Assembly in May of 1982. The coordinating staff at Clark University will bring together researchers and decision makers throughout the study.

*Mental health after Mt. St. Helens.* "Project Ashlift," National Institute of Mental Health, \$110,368, 6 months. Project coordinator: *William Peckham, State Department of Social and Health Services, Mental Health Division, Mail Stop OB 42F, Olympia, WA 98504, (206) 753-5414.*

The psychological traumas of the May 1980 eruption of Mt. St. Helens and the stress of coping with the ash that still overlies some areas of the state are continuing to disrupt the lives of approximately 1,500 persons. Frustration, depression, and irritability are affecting both victims of the initial eruptions and those residents who are anxious about a more devastating future eruption. This project will assess the mental health needs of the area people, provide counseling services for them through seven county health departments, and train local counselors to recognize and cope with the special psychological problems the volcano has caused.

*Earthquake maps.* "Using Earthquake Maps for Lifeline Networks—San Francisco Bay Area," U.S. Geological Survey, \$79,950, 1 year. Project manager: *Jeanne Perkins, Association of Bay Area Governments, Hotel Claremont, Berkeley, CA 94705, (415) 841-9730.*

The project is the third in a series using BASIS (the Bay Area Spatial Information System) to develop maps of earthquake hazards and apply the maps to seismic safety problems. This segment extends the program into developed urban areas, focusing on lifelines—highways, electrical and gas networks, water and solid waste systems and communication systems. The new BASIS map files will help local governments analyze the vulnerability of vital services and develop their strategies for responding to earthquake damage.

*Planning for flood damage mitigation.* "A Handbook of Procedures for Flood Disaster Mitigation Planning," Federal Emergency Management Agency, \$92,643, 6 months. Project manager: *Leo M. Eisel, Wright-McLaughlin Engineering, 2420 Alcott Street, Denver, CO 80211, (303) 458-6201.*

The project will prepare a handbook for use by the FEMA official in charge of response to a flood disaster and the hazard mitigation team which will be sent into the affected area in accord with the interagency agreement signed in December, 1980 (see *Observer*, Vol. V, No. 3, pp. 1, 2, and 4). The manual will help the team determine what mitigation measures are available to the community, which are feasible, what the role of state and local governments should be in the mitigation effort, and how federal funding can be used to prevent future losses. To prepare the book, the project staff will conduct a literature review, and use case studies of successful and unsuccessful mitigation efforts after four disasters.

*States and hazard mitigation.* "The Role of States in Earthquakes and Natural Hazard Mitigation at the Local Level," National Science Foundation, \$199,172, 30 months. Principal Investigator: *W. Henry Lambright, Syracuse Research Corporation, Applied Social Research, Merrill Lane, Syracuse, NY 13210, (315) 425-5100, x381.*

The study will examine what role states can and do play in the adoption and use at the local level of innovative hazard mitigation strategies, for instance, land use management, preparedness, and public education. Comparative case studies will be done in California, Nevada, Texas and South Carolina; in each state a case in which an innovation adoption went smoothly will be compared to one in which there were problems. Intergovernmental relations will be analyzed for each of the stages—problem awareness, innovation adoption, and implementation. Data will be collected by interviewing key actors in the decision-making process at each level of government.

*Earthquakes and the economy.* "A Model for Measuring Regional Economic Responses to Earthquakes and to Earthquake Predictions," National Science Foundation, \$195,374, 1 year. Principal Investigator: *R. Blaine Roberts, College of Business Administration, University of South Carolina, Columbia, SC 29208, (803) 777-7044.*

The objectives for this study are to develop a method of modeling the economic effects of catastrophic events and warnings in a regional context, and to demonstrate that such a model can be used by policy makers to evaluate the costs and benefits of earthquake prediction and hazard mitigation strategies. The general method will concentrate on supply side elements—transportation, housing, and utility systems—likely to be affected by dramatic change, and their alteration over time. The model is intended to be a prototype for use in any region to simulate the effects of disaster on the economy.

## DESIGNING FOR FLOODS

Because damage to buildings and their contents is the most common cause of financial loss in a flood, opportunities for mitigating such damages fall in large part to those who design buildings in areas vulnerable to flood hazards. Accordingly, the American Institute of Architects Research Corporation began in 1979, with funding from the Federal Insurance Administration of the Federal Emergency Management Agency, to develop a manual for architects on the vagaries of the flood hazard and the different ways to cope with it.

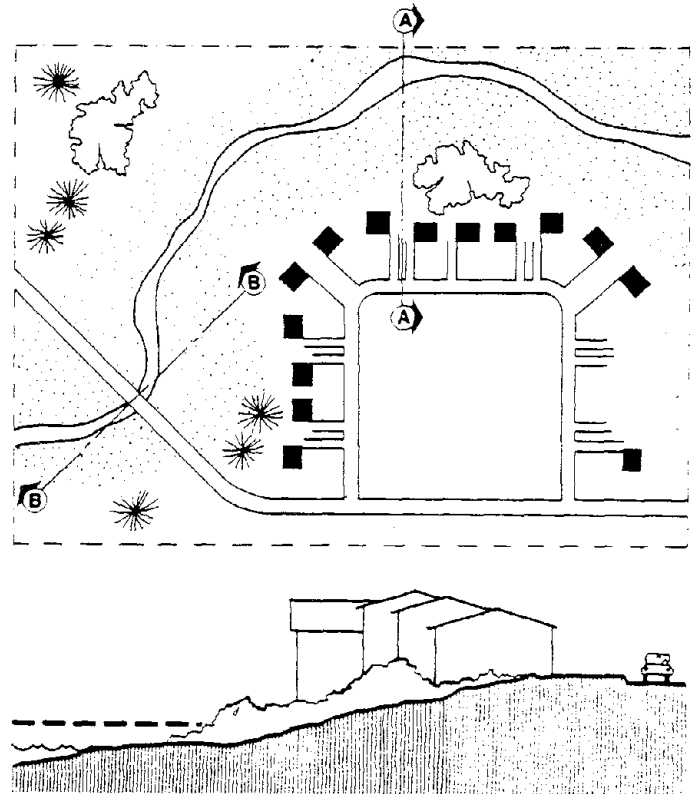
The newly published manual, *Design Guidelines for Flood Damage Reduction*, is a tripartite guide for building designers who wish to serve their clients and community by making an effort to reduce flood damages. The first section introduces flooding as a natural phase of the hydrologic cycle, distinguishes between riverine and coastal flooding, and discusses the incompatibility of the natural process and human settlements and eventual urban development. Various means of coping with floods are discussed, including channel improvements, dams and levees, reservoirs, and the current comprehensive flood plain management philosophy that combines structural measures with other approaches such as warning systems, land use planning, relocation of flood-prone buildings, and floodproofing.

Section two focuses on the role architects can play in reducing flood damages, outlining the information needed to begin the design analysis of a flood-prone project: applicable local, state and federal regulations; hydrologic data; information on site conditions; and a survey of existing development. Design alternatives are suggested for the architect's consideration, and their applicability to various situations is indicated. Such techniques as wet and dry floodproofing, elevating buildings, eliminating or protecting openings in buildings, and using special building materials are discussed.

A 43-page collection of resources makes up the final section of the manual, includes a glossary, addresses of regional federal offices involved in flood hazard mitigation, Executive Orders 11988 and 11990, National Flood Insurance Program rate information, and a bibliography.

For information on the manual's availability, contact *Donald E. Geis, AIA Research Corporation, 1735 New York Avenue, N.W., Washington, DC 20006, (202) 626-7421.*

*Streets should be located to approach buildings from the direction away from the floodplain so that access is less likely to be blocked and vehicles are not damaged by flood water. Road crossings should be perpendicular to streams, with adequate culverts or bridge openings to permit unimpeded flow of water.*



## PLANNING FOR THE CANADIAN ENVIRONMENT

The nature of environmental problems and planning is considered in a thorough new publication from the Lands Directorate of Environment Canada. *Environmental Planning Resourcebook*, by Reg Lang and Audrey Armour, examines current environmental planning and management initiatives and illustrates the trends with 99 case studies drawn from across Canada. The

special planning problems presented by floods, earthquakes and coastal hazards are included in the analysis.

The book provides an impressive collection of references and information sources—books, pamphlets, published and unpublished reports, agencies and individuals—including, in most cases, complete addresses and ordering information. Available from *Multiscience Publications Limited, 1253 McGill College, Suite 175, Montreal, Quebec, Canada H3B 2Y5. \$15.50 plus \$1.50 postage and handling in Canada and the USA, \$2.50 in all other countries.*



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## ON THE LINE



### ENCOUNTERS OF THE BEST KIND

One topic that has come up repeatedly at the NHRAIC workshops is "dissemination"—how to move the observations and findings of social researchers out of the files and off the bookshelves into the real world of disaster planners and responders.

The American Red Cross, which has been involved with disaster researchers as a target of research, as adviser or consultant, critic, skeptic and enthusiast (by turns and sometimes all at the same time), is making a strong effort to bring research findings to its disaster services volunteer and staff leadership, not just through integrating information into printed materials and training courses, but also through face-to-face involvement.

A major effort along these lines took place last February at the Donaldson Brown Center for Continuing Education in Blacksburg, Virginia, where the Eastern Field Office of the Red Cross assembled more than 100 of its disaster service leaders from the northeastern states for a bi-annual meeting. Disaster research was right there, in the persons of Dr. E. L. Quarantelli from the Ohio State University Disaster Research Center, and Dr. Michael Carter of the Environmental Research Laboratory in Boulder (and most recently associated with the University of Minnesota study on warnings response.)

The two researchers were asked to tell the Red Cross audience how they see the Red Cross planning and operations efforts after years of disaster studies, some of them on organizational behavior, some on human behavior, and others on warning systems. They were asked to be candid, specific, and ready to deal with tough or unbelieving questions. All of this they did. Dr. Q. gave a comprehensive presentation on disaster planning, stressing the fact that planning is not management, and vice versa, and decrying the tendency to deify the "written plan." His ten principles of disaster planning were widely discussed within a variety of contexts during the next two and a half days.

Dr. C. dealt in the specifics of what he had observed in several hurricane and flood threat or disaster situations, noting problems of Red Cross/civil defense communications and coordination and cautioning the Red Cross not to use its "expectations" of what people should do as the basis for response planning. He also questioned why the Red Cross waits for a go-ahead

from local government before opening shelters when people begin moving out on the basis of weather reports rather than civil defense orders.

Both had a chance to further expound their findings, defend their views and argue with questioners in smaller panel sessions. The three of us then summarized our panel sessions in a plenary session. The discussion was not confined to formal sessions by any means, but went on in informal groups and at meals.

With Drs. Quarantelli and Carter as catalysts, dissemination of research findings was very much the order of the day; we would all do well to make it the order of many other days.

Roy S. Popkin  
Deputy Director, Disaster Services  
American Red Cross

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### BOOK BONANZA

Just in time for leisurely hammock reading, the Information Center has published two new working papers, one new monograph and the latest annual bibliography.

*"Our Usual Landslide": Ubiquitous Hazard and Socioeconomic Causes of Natural Disaster in Indonesia*, 1981, 50 pp., by Susan E. Jeffery, describes how social, political and economic processes have increased the vulnerability of Lembata and Flores, Indonesia, to disaster. The paper discusses historical developments; aspects of land use, settlement and migration; and indigenous and imposed agricultural practices with relation to hazard risk.

*Mass Media Operations in a Quick-onset Natural Disaster: Hurricane David in Dominica*, 1981, 55 pp., by Everett M. Rogers and Rahul Sood, outlines the operations and efficacy of the local communications networks—radio, television and newspapers—before, during and immediately after Hurricane David's strike on the Caribbean island-nation in August of 1979. Both working papers cost \$4.50.

Monograph #32, *Real Estate Agents and Special Studies Zones Disclosure: The Response of California Home Buyers to Earthquake Hazards Information*, is authored by Risa Palm. The volume reports the methods and results of a study to evaluate the effectiveness of the Alquist-Priolo Special Studies Zones Act, which requires California real estate agents or home sellers to inform prospective buyers that the property lies within one-eighth mile of a trace of an active earthquake fault. Although most agents comply with the letter of the law, there has been no measurable change in buyer behavior or housing price trends. The monograph is 145 pages long and costs \$8.00.

*A Selected, Partially Annotated Bibliography of Recent (1979-1980) Natural Hazards Publications*, compiled by David R. Morton, lists 271 citations and is indexed by subject and principal author. This year's edition features numerous studies occasioned by Mt. St. Helens' disruptive activities. The cost is \$4.50.

## VALUE OF EARTHQUAKE HAZARDS INFORMATION

A report has recently been released which summarizes a project to investigate for the USGS the qualitative and quantitative value of earthquake hazards information to public utilities, households, financial institutions, consulting firms, professional bodies, and state and local governments (see *Observer*, Vol. IV, No. 2, p. 5).

Interviews were conducted with home owners, decision makers from the financial community, and earthquake engineering experts—public utility representatives, professional engineers and consultants. As a first step in the interview, information was presented about the effects of an earthquake and related hazards and the expected damages from a theoretical R 8.3 quake along the San Andreas fault. The subjects were then asked a series of questions to determine their awareness of the hazard and to obtain a valuation of the risks.

For the quantitative portion of the study, a method was developed to provide a preliminary estimate of the annual benefits to Los Angeles County of reduced damage to structures and increased safety from current building codes. Using hedonic price analysis, the effect on the housing market of the Alquist-Priolo Special Studies Zones Act was also estimated.



Results of the study indicate that:

- households value earthquake hazards information, respond in a manner that supports the Alquist-Priolo program, and would seek emergency preparedness information if a hazards watch were issued;
- the financial community believes earthquake hazard information is useful to the public for developing building standards and zoning ordinances, but that such information would not affect loan policy for single family dwellings;
- with some qualifications, seismic-resistant building codes are justified for Los Angeles County; and

- on a preliminary basis, for one community in California, houses in riskier areas (i.e., risk of fault rupture) cost less than homes not subject to the risk.

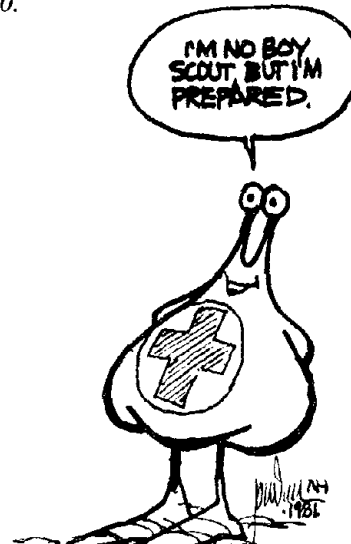
*Methods Development for Valuing Hazards Information* will be distributed through the National Technical Information Service. For information on its availability, contact *David Brookshire, Department of Economics, College of Commerce and Industry, University of Wyoming, University Station, Box 3985, Laramie, WY 82071, (307) 766-4890.*

## CORPORATE PREPAREDNESS

In response to increasing requests from businesses and industries for aid in preparing disaster response plans, the Golden Gate Chapter of the American Red Cross has established a Business Disaster Resource Center, and has recently made available two helpful publications. The materials in the library of the Center and the publications have grown out of disaster planning orientation meetings conducted over the last two years by the Golden Gate Chapter with large corporations such as Levi Strauss, Fireman's Fund, Pacific Gas and Electric, Bank of America, and Woodward-Clyde Consultants.

For use by any members of the business community in the beginning stages of writing their disaster plan, the library has reference materials and copies of completed plans donated by companies that participated in the meetings. A summary of the 16 most comprehensive corporate disaster plans has been published as *Prototype Business/Industry Emergency and Disaster Plan* (@ \$3.00). It provides an excellent checklist for businesses to use for direction and comparison. Also available is *Emergency Equipment Vendors List* (@ \$2.00), which outlines procedures for organizing an emergency preparedness committee and reports on how to obtain emergency equipment.

For more information on the Center, or to purchase the publications (make checks payable to the Disaster Resource Center), contact the *Red Cross Disaster Service, 1550 Sutter Street, San Francisco, CA 94109, (415) 776-1500.*



## CONFERENCES



*Fourth Conference on Hydrometeorology, American Meteorological Society and the American Geophysical Union Precipitation Committee. Reno, Nevada: October 7-9, 1981.* The conference, intended to foster dialogue between meteorologists and hydrologists, will discuss such topics as prediction of precipitation, application of precipitation forecasts, precipitation climatology as the basis of hydrologic design and planning, and floods and flash floods in the western United States. A proceedings volume will be printed and distributed at the meeting. For additional information, contact *Ulrich Kappus, Program Chairman, Dames and Moore, 1626 Cole Boulevard, Golden, CO 80401, (303) 232-6262.*

*Workshop on Earthquakes and Earthquake Design of Facilities in the Eastern United States, Building Seismic Safety Council, Department of Energy, Earthquake Engineering Research Institute, and the Seismological Society of America. Knoxville, Tennessee: September 16, 1981.* This workshop, demonstrating the principles of earthquake-resistant design for buildings, will be held on the last afternoon of the conference, *Earthquakes and Earthquake Engineering: The Eastern United States*, (see *Observer*, Vol. V, No. 3, p. 11). Five experienced, practicing engineers will demonstrate design techniques for buildings constructed of masonry, structural steel, and precast and cast-in-place concrete. Each of the speakers will explain how design requirements vary with seismic zoning. Interested persons may register for this five-hour workshop or for the entire conference. Information is available from *James E. Beavers, Union Carbide Corporation, Nuclear Division, Bldg. 9106, MS 003, Post Office Box Y, Oak Ridge, TN 37830, (615) 574-9786.*

*Flood Predictions, Estimations and Forecasting, Research Institute of Colorado in cooperation with Colorado State University. Fort Collins, Colorado: June 29-July 3, 1981.* Well-known, popular methods of predicting floods based on statistical, empirical transfer of information from a similar basin, and watershed modeling will be described. The emphasis will be on understanding of various methods rather than detailed mathematical derivations. Obtain more information from *H. W. Shen, Hydrology and Water Resources Program, Colorado State University, Fort Collins, CO 80523, (303) 491-8552.*

*Training for Flood Hazard Management and Natural Resource Protection, Conservation Foundation. Leesburg, Virginia: July 8-10, 1981; Boulder, Colorado: July 16-19, 1981.* The training programs, developed by Conservation Foundation specialists, will train participants to run flood plain management and natural resources protection programs in their states and communities. Suggestions will be offered on tailoring the model programs to accommodate local circumstances. Each participant will receive a detailed manual containing case studies, mapping exercises, and guidelines for every aspect of the program. Obtain more information from *Conference Manager, The Conservation Foundation, 1717 Massachusetts Avenue, N.W., Suite 300, Washington, DC 20036, (202) 797-4300.*

*Tenth World Congress of Sociology, International Sociological Association. Mexico City, Mexico: August 16-20, 1982.* At least two sessions of the meeting will be devoted to discussion of the sociology of disasters, and one will deal specifically with cross-cultural aspects. One-page abstracts for papers relevant to the general topic should be submitted no later than August 30, 1981. Authors whose abstracts are accepted must submit finished papers by June 30, 1982. Obtain more information and submit abstracts to *E. L. Quarantelli, Disaster Research Center, 128 Derby Hall, The Ohio State University, Columbus, OH 43210, (614) 422-5916.*

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### WHAT IT TAKES

Stronger state programs are needed to improve flood plain management and carry out the goals of a Unified National Program for Flood Plain Management, according to a report recently issued by the U.S. Water Resources Council. *Strengthening State Floodplain Management*, prepared by the Association of State Flood Plain Managers, gives an overview of existing state flood plain management, makes suggestions for reinforcing existing programs, and provides a framework for developing new ones.

The first two chapters analyze state flood plain management statutes and describe the varied means to im-

plement them. One chapter is devoted to an examination of court cases which have tested the state laws. The final chapter provides specific recommendations of ways states can improve their own programs and expand their roles in the federal-state-local partnership.

Material for the report was gathered through a detailed examination of each state's programs and publications; discussions were held with state personnel involved in various aspects of the program. From the information submitted, a profile was compiled of each state's program, and these are included as appendices along with a bibliography of the state materials.

For information on the availability of the report, contact the *Water Resources Council, 2120 L Street, N.W., Washington, DC 20037, (202) 254-6453.*

## HAZARD AWARENESS AND PROTECTIVE BEHAVIOR

Flood plain residents do not respond any more adaptively than cigarette smokers to information that they are at risk, according to a recent study done for the Illinois Department of Transportation, Division of Water Resources. In fact, most public education programs that expect people to react correctly once they are told what is good for them have failed.

To aid them in designing an effective, economical way to inform Illinois residents of the implications of their living on flood plains, the Division of Water Resources directed a consulting firm to review all available research on warnings and risk advice, and to determine which schemes worked and which did not. Planning and Management Consultants, Limited, of Carbondale, Illinois, pored over some 200 studies on subjects as diverse as hurricane warnings, seat belt campaigns and dental hygiene programs.

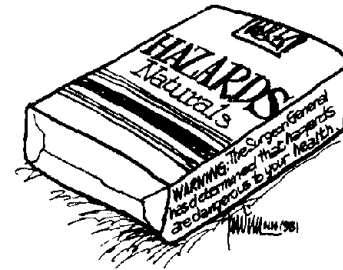
Among the problem areas common to all the literature, and discussed in the final report, are 1) education and preventive response, 2) experience and preventive response, 3) characteristics of warnings, 4) the role of authorities, and 5) imposed measures of prevention. Part II of the report presents the conclusions drawn from the review, the questions raised, and the implications for the Division's educational methods.

In a pithy 29 pages, *Notifying Floodplain Residents* identifies the field's greatest, yet most enduring, incorrect assumption: "education causes awareness causes right behavior." The learning process in question can be more accurately characterized with a number of qualifiers: "Sometimes, under highly specified conditions, and if properly presented, with certain target publics, information *may* lead to awareness and awareness *may* lead to behavior." The link between hazard experience and appropriate response is similarly complicated: "The point is that people can be misled by their experience because that experience is limited or biased; it doesn't constitute an adequate sample."

In spite of all the stubborn facts, however, certain approaches to public information programs have been more efficacious than others; the report suggests that the following contribute to more adaptive response:

- specific, personalized information
- information on the costs and benefits of the damage mitigation activities possible
- unambiguous information
- credible, authoritative sources of information
- social reinforcement of the proper activities, especially at the local level
- the use of several media to deliver the message

*Notifying Floodplain Residents*, and its companion 178-page *Annotated Bibliography* of all the literature reviewed, are available in limited quantities from French Wetmore, Illinois Department of Transportation, Division of Water Resources, 300 North State Street, Room 1010, Chicago, IL 60610, (312) 793-3864.



## ENDANGERED SPECIES

A combined program of regulation, public acquisition, and removal of federal subsidies for development is the only fair and effective way to protect undeveloped barrier islands, according to a recent study. It analyzed the development history of communities located on or near several islands acquired during the last four decades by the federal government for national seashores. Case studies were made of Cape Hatteras, North Carolina; Cumberland Island, Georgia; Padre Island, Texas; Dauphin Island, Alabama; and Pensacola Beach, Florida. Particular attention was paid to land values in the adjacent communities, and to the role of federal subsidies in the development and expansion of the towns.

Some of the major findings explained in *Barrier Island Development Near Four National Seashores* include:

- impacts on real estate in adjacent communities which were directly attributable to the creation of the national seashore were not immediately measureable;
- factors such as road access, availability of utilities, and location of naval bases had a more immediate effect on land values;
- depending upon the rate of growth of the communities, effects on land values due to acquisition may be delayed for decades;
- in all instances studied, *initial* development of road, bridge, or causeway systems was financed by private, local or state interests, with federal participation coming later; and
- with the exception of South Padre Island, the availability of water from island or mainland sources has not been a constraint on development.

The study concludes that some barrier island development will be forestalled, but not prevented, by protection measures such as regulations on access and building requirements, and removal of federal subsidies such as disaster relief and flood insurance. Only a strengthened bridge permit program, coupled with removal of federal bridge construction funds, is likely to protect islands from development, and then only those with no other means of access. Of all the available measures, the surest means to protect the undeveloped barrier island is public acquisition.

The report will be distributed through the National Technical Information Service. For information on its availability, contact H. Crane Miller, Sheaffer & Roland, Inc., 1735 I Street, N.W., Washington, DC 20006, (202) 659-3030.



## RECENT PUBLICATIONS

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

*Summaries of Technical Reports: National Earthquake Hazards Reduction Program, Volume XI.* Compiled by Jessie F. Reeves, et al. Department of the Interior, U.S. Geological Survey. Open-File Report #81-167. 1981. 477 pp. For cost and availability, contact the Open-File Services Section, Branch of Distribution, USGS, Box 25425, Federal Center, Denver, CO 80225, (303) 234-5888.

This volume presents summaries of work performed under contract to the USGS, or by USGS employees, during the period April 1 to September 30, 1980. Most of the entries are highly technical reports dealing with studies in the field of seismology. A few of them, however, report the progress of investigations related to the impact earthquakes have, or are anticipated to have, on a heavily urbanized and industrialized society. A number of studies currently in progress are attempting to establish the seismic risk in less-publicized regions of the country. The volume is indexed by principal investigator and performing institution.

*"Preparing for Earthquakes: Where Does California Stand?"* Robert A. Olson and Stanley Scott. *California Data Brief 4* (October, 1980). 6 pp. Single copies available at no cost from the Institute of Governmental Studies, University of California, Berkeley, CA 94720, (415) 642-6722.

Most California cities and counties have codes that include earthquake safety standards, but there is no way to know whether the standards are effective, whether the codes are enforced, or the magnitude of the hazard posed by older buildings. Since California has not suffered a large, onshore earthquake in 30 years, none of the new earthquake-resistant buildings has been tested. Another question is the degree to which local, regional and state governmental units are prepared to cope with an earthquake emergency. This brief recommends some realistic measures governments can take to reduce hazards significantly over time, for instance, the hazard-reduction priorities established by the City of Los Angeles.

*"Loss Associated with a Natural Disaster."* Michael A. Crabbs and Edward Heffron. *The Personnel and Guidance Journal* 59 (February, 1981) 7:378-382.

The article describes short and long-term mental health problems suffered by children and adults who have survived a natural disaster. The author's experiences indicate that the severity and duration of these problems can be minimized if counselors, psychologists, mental health workers and other "helping professionals" are trained to recognize and respond to these special mental health needs. Examples are given of innovative and effective techniques for assisting victims through the recovery period.

*The Benefits of Flood Alleviation: A Manual of Assessment Techniques.* Edmund C. Penning-Rowell and John B. Chatterton. Westmead, Farnborough, England: Saxon House. 1977. 297 pp. £35 (\$77.00 U.S.).

The benefits of protecting both urban areas and agricultural land from flood damage are presented in two distinct but related forms: 1) nationally applicable standard flood damage data is provided for a wide variety of urban land uses, and 2) two comprehensive computer models are described which estimate total benefits accruing from the protection of agricultural and urban regions. The models, which can be leased from or run at Middlesex Polytechnic, incorporate a wide variety of options that greatly increase their usefulness. Data appearing in the *Manual* are based on detailed knowledge of the effects of floods from case studies of flooded areas, and from professional loss-adjusters and insurance valuers.

*Managing Climatic Resources and Risks. Panel on the Effective Use of Climate Information in Decision Making, Climate Board, Assembly of Mathematical and Physical Sciences, National Research Council.* 1981. 51 pp. No cost. Available from The Climate Board, 2101 Constitution Avenue, N.W., Washington, DC 20418, (202) 389-6102.

The Panel was charged to undertake this report because of the Climate Board's impression that climate information is not effectively used in many policy decisions on food, energy, water resources, housing, and other human activities. Presented in the report are the results of the Panel's investigation of the following areas of concern: 1) the present system of providing climate information for typical climate-related decisions, 2) the process of decision making in the typical situations, 3) possibilities for improving either the provision system or the decision processes, and 4) the development of effective case studies describing the efficacious use of climate information in real decisions and the distribution of those studies. Three appendices illustrate the case study approach described above.

*Evacuation: A Briefing Paper.* Snohomish County Department of Emergency Services. 1981. 80 pp. \$5.00. Available from Snohomish County Department of Emergency Services, County Courthouse, Everett, WA 98201.

A compendium of several evacuation studies conducted by a local agency, the paper is one of a series designed to provide county-wide continuity in emergency management planning and operations. Part one reviews evacuation as a tool for reducing injuries and damage during an emergency and includes discussions of legal considerations in an evacuation, warning, transportation and security. Part two is a planning guide to assist local jurisdictions in developing standardized plans for evacuation. Part three is an emergency operations checklist for quick reference in an actual emergency.

*"Federal Participation in Land Use Decisionmaking at the Water's Edge—Floodplains and Wetlands."* Beatrice Hort Holmes. *Natural Resources Lawyer* 13 (Spring, 1980) 2:351-410.

Because the federal government has no constitutionally granted power to regulate the use of private or state land, such authority was limited until the preservation and protection of the environment became a major federal concern in the late 1960s. Since that time, federal regulation of nonfederal lands has increased markedly. The article discusses policy changes, statutes, administrative regulations, and case law which define federal authority over flood plains and wetlands, and advances the theory that a comprehensive federal program is evolving for the regulation of lands adjacent to bodies of water.

*Seismic Protection for Mobile Homes. California Seismic Safety Commission. CSSC Document #SSC-46. 1980. 28 pp. Available from the CSSC, 1900 K Street, Suite 100, Sacramento, CA 95814, (916) 322-4917.*

Mobile home communities are, unfortunately, often planned without due regard for nature's more violent moods. Experience gained from recent California earthquakes indicates that mobile homes sustain considerably more damage than does wood-frame housing in the same area. This study analyzes the types of damage that usually occur, discusses unresolved legal questions, examines corrective measures for structural deficiencies, and identifies socioeconomic problems related to ameliorating the situation. The study recommends that the CSSC adopt an official position on whether or not seismic resistance measures be required by law, and that a certification process be started for bracing systems currently offered for sale.

*Equipment for Flood and Flash Flood Warning Systems, U.S. Department of Commerce, National Oceanic and Atmospheric Administration; the Army Corps of Engineers, Los Angeles District; and the Arizona Department of Water Resources. 1981. 450 pp. Single copies may be obtained free of charge from the National Weather Service, Warnings Coordination Staff, OA/Wx5, 8060 13th Street, Room 421, Silver Spring, MD 20910.*

Following a general discussion about planning for local flood warning systems, appropriate equipment from 30 manufacturers is described. Since integrally designed warning systems are few and far between, most of the equipment should be considered as components rather than ready-to-be installed products. Items listed include warning sirens, communications and telemetry equipment, remote recording precipitation gauges, and water level recorders. The cost of the equipment, shipping time, and routine maintenance procedures are given for most items.

*Colorado Snow-Avalanche Area Studies and Guidelines for Avalanche Hazard Planning. Arthur I. Mears. Colorado Geological Survey, Department of Natural Resources. Special Publication #7. 1979. 123 pp. \$6.00. Order copies from the Colorado Geological Survey, 1313 Sherman Street, Room 615, Denver, CO 80203.*

Without resorting to involved engineering calculations, this document conveys the basic concepts of avalanche dynamics and applies them to safe land use planning practices. The topics discussed include the magnitude/frequency relationship in avalanche release, structural defenses, hazard zoning, and avalanche hazard analysis techniques. Also mentioned is the one-percent probability event, or design avalanche, which can prove useful in calculating the magnitude/frequency factor for runout zone estimates. A separate chapter contains avalanche hazard maps for selected areas in 15 Colorado counties, together with a discussion of their applications and limitations.

*Jet Stream 1 (March 15, 1981) 1, 16 pp. Monthly. P. B. Wright, ed. Personal subscription rates for one year are £13.70 in the United Kingdom, £15.00 in Europe, and £16.00, or \$38.00 anywhere else. Westwind Services, 60 Talfourd Avenue, Reading RG6 2BP, United Kingdom.*

*Jet Stream* presents a summary of the preceding month's weather over as many parts of the world as possible, and describes notable weather events and anomalies. It includes tables of monthly mean temperature and rainfall for many stations, obtained from Monthly Climatic Data for the World. Each month there will be a short article on topical matters, the inaugural issue's being "Blocking: The Cause of Much Unusual Weather"; additionally, there are reviews of recent research.

*Crisis Intervention Programs for Disaster Victims: A Source Book and Manual for Smaller Communities. Kathleen J. Tierney and Barbara Baisden. U.S. Department of Health, Education, and Welfare, Public Health Service, National Institute of Mental Health. 1979. 203 pp. \$4.50. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock #017-024-00918-1.*

In recent years, most disaster-related mental health research has concentrated on problems related to densely populated urban areas. This volume examines emergency mental health assistance to America's smaller communities and rural areas. Findings indicate that 1) comparatively isolated regions are not as lacking in mitigative resources as is generally construed by larger and more centralized bureaucracies, and 2) disaster planning is as important in rural America as it is in New Orleans or San Francisco. A selected, annotated bibliography contains over 125 useful citations on rural mental health needs, crisis intervention, community mental health, and the mental health consequences of disaster.

*The Hurricane and Its Impact. Robert H. Simpson and Herbert Riehl. Baton Rouge: Louisiana State University Press. 1981. 398 pp. \$20.00.*

This well-written book presents a tasteful blending of meteorological science and socioeconomic information about severe tropical storm hazards. In addition to five chapters which specifically treat planning for coexistence with these great storms, supplemental information about the social impact of hurricanes is interspersed throughout the technical material. Topics discussed include threat assessment and risk reduction, prediction and warning, scenarios, and hazard awareness. The science overview examines subjects ranging from the origin and life-cycle of hurricanes to the thermodynamic processes that occur in a hurricane cell.

*Selective Guide to Climatic Data Sources. Keith D. Butson and Warren L. Hatch. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data and Information Service, National Climatic Center. Key to Meteorological Records Documentation #4.11. 1979. 142 pp. Copies are available free while supply lasts from the National Climatic Center, Federal Building, Asheville, NC 28801, (704) 258-2850.*

Users of climatological data should find this volume helpful in the identification of about 65 serials and intermittent publications. The various climatological tables, charts, and graphs included in each publication are listed and many examples are shown. Information is given on the availability of back issues and on data catalogs and indexes which describe the abundance of materials not available in published form. A subject index aids in identifying materials by climatological element, such as precipitation, ocean waves, floods, and hurricanes and cyclones.

*"Britain Has Destructive Twisters." Derek M. Elsom. The Geographical Magazine 53 (February, 1981) 5: 328-333. London, England.*

Contrary to widely held opinion, Great Britain is subject to an average of 60 damaging tornadoes every year, as evidenced by the 1970-79 data presented in this lucid article. The author describes recent tornado incidents and assesses their impacts and costs. He explains the formation of tornadoes from supercell storms, and details the funnels' dynamics as they scythe their way across the landscape. Using historic tornado occurrences in the country, lesser known characteristics of the storms are discussed, for instance, phenomenal deluges, ball lightning, and luminous vortices.

*"Legal, Socio-economic and Environmental Significance of Land Subsidence."* Papers presented at a special session of the ASCE convention, October, 1979. *Journal of the Irrigation and Drainage Division* (June, 1981). \$6.50. Copies available from the American Society of Civil Engineers, Publications, 345 East 47th Street, New York, NY 10017.

During this era of rapid development of ground water resources, problems created by land subsidence become more and more serious. All papers presented at the session are assembled in this volume, among them the following: "Subsidence due to Ground-Water Withdrawal—A Summary for the United States"; "Legal Aspects of Subsidence due to Well Pumping"; "Economic Consequences of Land Surface Subsidence in Santa Clara Valley, California"; "Subsidence in Harris and Galveston Counties, Texas"; and "Induced Sinkholes—A Continuing Problem Along Alabama Highways."

*Hurricane Hazard Mitigation at the Local Government Level: The Roles of the Building Code and Other Development Management Strategies.* Florida Department of Community Affairs, Bureau of Disaster Preparedness, and Florida State University. 1980. 269 pp. \$6.90. Available from the Bureau of Disaster Preparedness, 1720 South Gadsden Street, Tallahassee, FL 32301, (904) 488-1900.

The report provides guidance to local governments on ways to apply regulations on building, construction, and land use to mitigate damages from hurricanes. The emphasis is on the need for integrating nonstructural methods, primarily an effective building code, into a comprehensive plan to reduce losses. Appendices discuss the vulnerability of Florida to hurricanes and associated hazards, results of a survey about building code enforcement and coastal construction practices, and a brief description of shoreline processes.

*"Tsunami Hazard and Community Preparedness in Alaska."* George W. Carte. NOAA Technical Memorandum #NWS AR-29. February 1981. 20 pp. \$3.00. Available from the Environmental Science Information Center, Environmental Data and Information Service, NOAA, 3300 Whitehaven Street, N.W., Washington, DC 20235, (202) 634-7281.

The memorandum is the report of an evaluation of Alaska's tsunami warning system, conducted by the National Weather Service's Alaska Tsunami Warning Center. Questionnaires were distributed to officials of coastal communities, to the school principal or teacher in communities too small to have organized municipal governments, and to several logging camps, to determine the population at risk, elevation of structures, communication facilities available, and the level of awareness of the NWS tsunami warning system. Many smaller communities were found to need outside help to achieve minimal preparedness levels. Plans were developed to distribute tsunami awareness information and "safe area" maps in local phone books.

*Coastal Zone 80. Proceedings of a conference sponsored by the American Society of Civil Engineers, November 17-20, 1980. 1,718 pp. in three volumes. \$82.50 for ASCE members, \$110 for non-members. Available from the American Society of Civil Engineers, 345 East 47th Street, New York, NY 10017.*

The volumes consist of the papers submitted for presentation at the conference, and cover a wide range of disciplines involved in coastal zone management and ocean resources (see *Observer*, Vol. IV, No. 4, p. 5). A table of contents and key word index are included to help the reader locate papers of particular interest.

*"Mayo Seminars in Psychiatry: The Psychological Aftermath of Disaster."* Barbara C. Chamberlin. *Journal of Clinical Psychiatry* 41 (July, 1980) 7: 238-244.

The physical and psychological traumas of mass disasters are not limited to the immediate time of the event; there is evidence of long-term deterioration in health patterns and development of specific syndromes after such disasters. The article reviews research findings on the above processes and discusses the psychodynamic theories about stress reactions. Both environmental and psychological determinants of stress behaviors are discussed, as are incidence statistics and the comparative vulnerability of special populations.

*The Peel Regional Police Force and the Mississauga Evacuation: How A Police Force Reacted to a Major Chemical Emergency.* Joseph Scanlon, et al. Prepared for the Canadian Police College. 1980. 112 pp. For information on availability contact Research and Program Development Branch, Royal Canadian Mounted Police, N Division, Canadian Police College, P.O. Box 8900, Ottawa, Ontario, Canada K1G 3J2, (613) 993-9500.

After a train derailment near Toronto resulting in an explosion, a fire, and a chlorine gas spill in November, 1979, more than 100 agencies and private companies responded to the emergency. This document describes the role played by the Peel Regional Police Force—its organization, functions, jurisdiction and disaster plan—and how it aided in the effective evacuation of 217,000 people. Not intended as a model but rather as a discussion of what went right and what went wrong, the book should be useful to local, state and regional government agencies in planning a coordinated response to a natural or technological hazard requiring mass evacuation.

*The Woodstock Tornadoes (August 7, 1979): Event Reconstruction and Organizational Response.* O.T. Coomes, M.S. Ruldolph and J.P. Wilson. Working Paper ERR-10. 1980. 48 pp. \$2.50. Institute for Environmental Studies, University of Toronto, Toronto, Ontario, Canada M5S 1A4, (416) 978-2995.

The two tornadoes that swept the southern Ontario community of Woodstock were the worst in Canada in 1979 and caused record death, injury and property destruction. This report describes the events of the disastrous evening, the damages wrought, and the response of organizations to the emergency. Analysis of the response is broken down into three categories: the warning phase, the emergency proper, and the immediate and long-term clean-up and restoration. The information was gathered in face-to-face or telephone interviews with members of the participating organizations.

*"The California Drought: A Quasi-experimental Analysis of Social Policy."* W. Stewart Agras, Rolf G. Jacob, and Melissa Lebedeck. *Journal of Applied Behavior Analysis* 13 (Winter, 1980) 4:561-570.

The article evaluates the effect of fines for failure to conserve water during the California drought of 1976 to 1978. For the three San Francisco Bay Area communities studied, the data showed that, overall, water was saved whether fines were assessed or not. However, fines did appear to have an effect on private individuals, if not on commercial or industrial users. The authors conclude that the atmosphere of crisis during the early months of the drought may have been more significant in reducing consumption than the imposition of fines later in the drought, and higher fines may be more effective in inducing a water savings by all types of consumers.

The NATURAL HAZARDS RESEARCH AND APPLICATIONS INFORMATION CENTER is intended to strengthen communication between research workers and the individuals, organizations, and agencies concerned with public action relating to natural hazards. Please let us know of any research or research needs or other information which should be brought to the attention of the Center. The Center is funded by the Corps of Engineers, the Federal Emergency Management Agency, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey, acting through the National Science Foundation.

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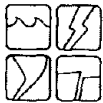
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