

States alone. In many cases, advanced technologies such as sophisticated weather tracking and warning systems were able to provide critical information that helped reduce the death toll and mitigate damage. But some emergency managers and decision makers do not have the technological capability to access or use the data available from these advanced information systems. As a result, the federal government is considering establishing a disaster information network to link disaster managers with hundreds of government, university, and private databases.

The government should continue laying plans for an integrated national disaster network, which could be a powerful tool in saving lives and minimizing losses from natural disasters, says *Reducing Disaster Losses Through Better Information*, a new report by the NRC's Board on Natural Disasters. The network should be designed to provide timely data in formats most useful for disaster managers. Once a national network is proved effective, it could be expanded to include other countries.

New sensors, communication technologies, and modeling programs have greatly improved efforts to monitor weather-related events, evaluate hazard areas, and take inventory of critical infrastructure such as buildings, roads, and power systems. However, emergency managers often are called on to make decisions with incomplete information, the report says. Many regional or local agencies may not have access to costly, sophisticated computers and other technologies. In some cases, critical basic data is not widely available because of technological limitations in generating or accessing it. Data are generated by a variety of different sources with inconsistent standards for presenting the information, making it difficult to interpret and use.

The board identified several priorities in establishing a national network to overcome these obstacles:

Combining data from different sources into timely, meaningful information for disaster managers. Data on an approaching hurricane, for example, could be integrated well beyond current capabilities with models that predict storm tracks, maps of population distribution, evacuation routes, and plans for emergency personnel and supplies. Those who will use the data should help design the system and define how information will be presented. In addition, government agencies, universities, and private organizations that provide data should assist in designing standards for sharing and linking vital information.

Assuring that information is accurate and reliable. The network will need to develop mechanisms that would allow emergency managers to quickly evaluate information. Quality-assurance methods—such as noting a posting date on materials generated by government agencies—should be built into the network.

Developing an effective plan for disseminating data. Although the Internet could be a useful tool in

providing access to information, it is likely to be overwhelmed by large numbers of many kinds of users during emergencies, making information difficult to obtain. Private net systems should be considered to allow access only to specific users, and other communication systems should be set up as backups.

Obtaining resources and commitment from data users and providers. Although establishing the network will be a significant effort, the databases that are needed already are well underway, the board said. Maintaining an integrated network will require additional funding and human resources.

The study was funded by the U.S. Department of Commerce on behalf of several agencies participating in the Global Disaster Information Network Transition Team. BOND's chair Prof. Wilfred (Bill) Iwan of the California Institute of Technology led the study and preparation of the report, which should be available from the National Academy Press at 800-624-6242 in December. For further information, contact BOND staff at 202-334-2857.

Hydrologic Hazards Science at the U.S. Geological Survey *by Stephen Parker*

Losses of life and property in the United States—and throughout the world—resulting from hydrologic hazards, including floods, droughts, and related phenomena, are significant and increasing. With over three-quarters of federal disaster declarations resulting from water-related events, national interest in having the best-possible hydrologic data, information, and knowledge as the basis for assessment and reduction of risks from hydrologic hazards is clear. The U.S. Geological Survey (USGS) plays a variety of unique and critical roles relevant to hydrologic hazard understanding, preparedness, and response. The agency's data collection, research, techniques development, and interpretive studies provide the essential bases for national, state, and local hydrologic hazard risk assessment and reduction efforts. A new report from the WSTB Committee on USGS Water Resources Research aims to help shape a strategy and improve the overall framework of USGS efforts in these important areas.

The USGS is well known as the nation's primary supplier of reliable streamflow and water-level data, and this role is essential. But, the report concludes that the USGS should also expand its efforts to document and analyze extreme hydrologic events, both during and after their occurrence. The agency is ideally positioned to collect and archive the critical hydrologic information necessary to improve our understanding of how and why such extreme events happen and to improve our ability to predict them. The report recommends that the agency's

scientific work in hydrologic hazards should proceed according to a strategy that features (1) maintenance of the integrity and continuity of the national stream gaging network; (2) improved stream gaging network design, measurement techniques, and instrumentation for the measurement of streamflow and stream stage; (3) postaudits of the technical response and prediction of major floods; (4) improved discharge measurements of extreme floods; (5) improved approaches for regional flood-frequency estimation; (6) improved methods for drought forecasting; (7) investigations of the long-term stationarity of floods and droughts; and (8) improved techniques for low flow frequency analysis and its relevance to instream flow management and ecologically-based regulatory criteria.

Further, the report concludes that the USGS should build on its experience in managing and disseminating water resources data as a critical part of the hydrologic hazards program. In particular, the agency should place new emphasis on rapid data acquisition and retrieval during extreme events and explore new methods for integrating datasets over several scientific disciplines. Geographic information systems technology may offer techniques for integrating, analyzing, and displaying dissimilar datasets for improved analyses of hydrologic hazards.

Rapid expansion of Internet use has had a great influence on the USGS's approach to disseminating hydrologic data and related information. The agency is currently offering real-time data on the Internet for more than 3,900 stream gaging stations, and the number will continue to grow. This capability of acquiring and disseminating data in real time expands the "customer-base" and "products" of the USGS. The principal customers are no longer only researchers, planners, and designers; customers now include emergency managers and the public. Beyond the expansion of real-time monitoring networks, the USGS is encouraged to add risk-based interpretation to its hydrologic data, such as comparison with historical data and simulated visualizations of flood inundation areas. The report recommends that the USGS consider giving significant new attention to outreach activities.

The report concludes that the USGS should play a prominent role in risk-based decision making with respect to hydrologic hazards. Specifically, in addition to being a provider of data, the USGS should conduct research on techniques for estimating the probability and magnitude of extreme hydrologic events in the context of risk-based decision making. The USGS should couple its role in the analysis of risk to its outreach role in communicating to the general public what that risk means. The ultimate goal of the hydrologic hazards program is to assist in protecting the lives and property of citizens from naturally occurring hazards while at the same time

maintaining and protecting ecological communities. This goal requires that hazards information and research results be communicated to the public and to public officials in a timely and understandable manner.

The report should be available in book form from the WSTB office by mid-December. Please call 202-334-3422 to order a copy.

UPDATE:

CURRENT PROJECTS

U.S. Army Corps of Engineers (USACE) Water Resources Planning

The Corps is faced with the dual challenge of reducing costs and streamlining its planning process while adequately addressing stakeholder concerns for thoroughness. These challenges are particularly acute in the field of environmental restoration, which is a relatively new arena for the Corps. The Committee to Assess the USACE Water Resources Project Planning Procedures examined the appropriateness and effectiveness of the Corps's planning procedures and decision-making criteria. In addition to internal planning processes, the committee assessed other related issues including ongoing Corps environmental restoration projects (namely Central and South Florida and the Upper Mississippi), the federal Principles and Guidelines, and the implications of cost-sharing arrangements between the Corps and its local sponsors. The committee has completed its meetings, and its draft report has gone through the external review process and is awaiting clearance for release. David Moreau of the University of North Carolina, Chapel Hill chairs the committee. For more information, contact study director Jeffrey Jacobs at 202-334-3422 or jjacobs@nas.edu.

Indicators for Monitoring Aquatic and Terrestrial Environments

The Committee to Evaluate Indicators for Monitoring Aquatic and Terrestrial Environments is assessing a range of issues surrounding the selection of indicators useful for monitoring ecosystems. The study is sponsored by the U.S. EPA. With primary responsibility for protecting the nation's natural resources, the EPA needs accurate information about environmental conditions and trends. The committee is addressing the potential value of biological indicators and indices, key ecosystem properties for establishing indicators, and different sources and methods used in identifying useful indicators.