

# NATURAL HAZARDS Observer

Volume XXIX Number 6

July 2005

## Wildfire Management in the U.S. Forest Service A Brief History

— an invited comment

*Editor's Note: In recognition of the U.S. Forest Service's centennial, the Natural Hazards Center thought it appropriate to reflect back upon the agency's 100 years of wildfire management.*

Forest and rangeland fire was once a common land management tool. Native Americans as well as early settlers and prospectors used fire for various purposes. But as the country gradually filled with more settlers, and as forest resources became more precious, fire began to be viewed as more of a problem than a tool.

In the late nineteenth century, a series of severe fire seasons in the Northeast and the lake states, plus the failure of local efforts to adequately respond to these events, contributed to a call for the federal government to manage wildfire suppression on public land. This responsibility initially fell to the U.S. Department of the Interior, which received help from the U.S. Army. However, in 1905 President Theodore Roosevelt transferred responsibility for wildfire suppression to the U.S. Department of Agriculture's Bureau of Forestry, which soon became the U.S. Forest Service, headed by his friend Gifford Pinchot. Watershed protection and provision of a secure timber supply were the main missions of the new agency.

### Managing the Risk

Although there was general agreement on the values at risk from wildfire, there was considerable debate about the best way to manage the risk. One approach, often referred to as light burning, advocated fire use to achieve a variety of objectives, including hazardous fuels reduction, land conversion for agriculture, and the improvement of game habitat. Light burning was particularly prevalent in the Southeast. A contrasting approach supported by Pinchot advocated a policy of fire control that emphasized fire suppression and had no place for fire use.



This debate over the role of fire on public lands might have continued for longer or resulted in a different outcome had it not been for the 1910 fire season, during which five million acres of national forest land burned and 78 people were killed. This extreme fire season impelled the Forest Service to adopt a policy of strict fire protection and influenced a generation of foresters.

### A Policy Takes Shape

This new policy was principally intended to protect timber. Timber values therefore provided the basis for deciding which of the Forest Services' vast array of tim-

ber stands would be protected, as well as how much would be spent protecting them. The economic principle that suppression expenditures should be commensurate with values at risk—first formally presented by R. Headley of the Forest Service in 1916 and later refined by W. N. Sparhawk in 1925—became known as the “least-cost-plus-loss” model. Simply put, the most efficient level of fire management expenditure is the one that minimizes the sum of all fire-related costs and damages.

The late 1920s and early ‘30s saw more extreme fire seasons, the losses from which led fire managers to the conclusion that they had not been sufficiently aggressive in fighting fires. They reasoned that because the values at risk from wildfire were so high, a more aggressive fire suppression effort, with a focus on strong initial attack, would be consistent with the least-cost-plus-loss model.

This shift in attitudes might not have been sufficient to fundamentally alter wildfire management had it not coincided with the Great Depression and President Franklin D. Roosevelt’s subsequent New Deal. The New Deal had two profound impacts on wildfire management. First, the Forest Service acquired significant new land holdings. Second, the Civilian Conservation Corp (CCC) provided a huge increase in manpower available for wildfire suppression, which allowed the Forest Service to extend fire protection to unprotected and newly acquired land. However, much of this land had little if any market value at the time, as it was often abandoned farmland or cutover forestland. Therefore, for the Forest Service to make use of the influx of manpower provided by the CCC, it often had to set aside the economic principal of protecting land commensurate with the values at risk. This example of the resource availability tail wagging the policy dog was succinctly summarized by Stephen Pyne: “...the means at hand were often so powerful as to dictate to some extent the ends to which they might be applied.”<sup>1</sup>

This change of policy was codified in 1935 by the 10 AM policy:

The approved protection policy of the National Forests calls for fast, energetic, and thorough suppression of all fires in all locations, during possibly dangerous fire weather. When immediate control is not thus attained, the policy calls for prompt calculating of the problems of the existing situation and probabilities of spread, and organizing to control every such fire within the first work period. Failing in this effort, the attack each succeeding day will be planned and executed with the aim, without reservation, of obtaining control before ten o’clock the next morning.

The new policy of aggressive suppression mentioned neither suppression costs nor resources at risk—the implicit assumption being that keeping fires small minimized costs and damages. This policy was embodied in 1944 by the successful Smokey Bear public education campaign and was accompanied by the authority to use emergency firefighting funds to pay for presuppression. (Presuppression expenditures are those occurring prior to the start of a fire season including, for example, the purchase of a fire engine. The Forest Service had been granted the authority to use deficit spending to fund suppression in 1908.) A more emotive example of the prevailing attitudes

to wildfire was provided by the death of Bambi’s mother in the 1943 film.

The period following the Second World War provided an additional example of resource availability driving wildfire policy and practices. The Forest Service received numerous war-surplus vehicles and aircraft under the federal excess equipment program and was able to increase its use of fire engines and bulldozers. In 1955, converted aircraft were used to drop fire retardant for the first time. As with the earlier use of the CCC, this increased use of vehicles and aircraft was driven by resource availability, not by any formal analysis showing that these increased expenditures would result in a commensurate reduction in resource damages. As with the adoption of the 10 AM policy, there was a belief that any expenditures that kept fires small were justified.

### **Change Comes to the Forest Service**

Not until the 1960s did the Forest Service waver from its policy of aggressive wildfire suppression. As indicated by the passage of the Multiple-Use Sustained-Yield Act (1960), the Wilderness Act (1964), and the National Environmental Policy Act (1970), attitudes concerning public land management had begun to shift. These changes in public attitudes may or may not have been sufficient to change Forest Service suppression policies. However, the agency was also facing scrutiny for a more prosaic reason—decades of increasing suppression expenditures had not resulted in a decrease in resource damages. The inability of the agency to demonstrate a sufficient return on its investment in fire suppression resulted in a series of policy changes in the 1970s.

In 1971, the 10 AM policy was amended to contain all fires before they reached 10 acres. In 1978, the entire policy was scrapped. That same year, Congress eliminated emergency funding for presuppression. Although the agency still relied on emergency funds to pay for large fire suppression, the new protocol required the Forest Service to conduct a cost-benefit analysis on all future presuppression budget requests. This led to the 1979 development of the National Fire Management Analysis System (NFMAS), a computerized fire planning and budgeting tool. Other public land management agencies either adopted all or part of the NFMAS (Bureau of Land Management and the Bureau of Indian Affairs) or developed their own tools (National Park Service and the U.S. Fish and Wildlife Service). The NFMAS was the first widely adopted computerized fire management tool.

The realization that not all suppression expenditures could be economically justified, along with an increasing awareness of the ecological importance of wildfire, led the Forest Service to adopt the Wilderness Prescribed Natural Fire Program in 1972. Under the program, some wildfires in wilderness areas were allowed to burn. Four years earlier, in 1968, the National Park Service recognized the “natural role of fire,” and adopted a wildfire use program that debuted in Sequoia Kings Canyon National Park. Since then, several high profile prescribed burns and wildfires that were managed for resource benefit escaped management control and became destructive wildfires (e.g., Yellowstone in 1988 and Los Alamos in 2000).

These well-publicized incidents have tempered enthusiasm for wildfire use both within the agency and among the public at large.

### Fire Management in the Twenty-first Century

The success of decades of fire suppression has deprived fire-dependent forests of their natural fire cycle and has led to an accumulation of fuels in many locations. Furthermore, the country has seen a dramatic increase in the number of houses and other structures being built in the forest, expanding the extent of the wildland/urban interface. Both of these stresses have tended to make fires more difficult and expensive to control. And recently, a severe drought in the western United States exacerbated the situation. Forest Service wildfire suppression expenditures exceeded \$1 billion in 2000, 2002, and 2003—not including the roughly \$500 million spent each year on presuppression.

In recent years, appropriated dollars for fire suppression have fallen far short of total suppression expenditures. In addition, emergency appropriations, which take place after final appropriations bills have been released, often failed to make up the shortfall. As a result, agencies have often been forced to borrow money from other programs to fund their suppression activities.

Scientific evidence of the important role that fire plays in the healthy functioning of ecosystems and of the problems caused by continual fire suppression, has continued to accumulate. Responding to the mounting evidence, the Federal Wildland Fire Management Policy of 1995 emphasized the natural role of fire in wildland management and recognized the need for prescribed fire and for allowing some lightning fires to burn, and not just in wilderness areas. Fire management plans are now being written that will allow wildland fire use under specified conditions. Yet use of fire is still very uncommon, for obvious reasons: letting fires burn or setting prescribed fires is risky and the costs of a mistake are immediate and potentially acute, whereas the benefits occur largely in the future. In addition, air quality regulations and citizen concerns about smoke often limit the use of fire as a management tool.

In 2000, the National Fire Plan began a well-funded effort to, among other things, reduce hazardous forest fuels. The plan allows for prescribed burning but focuses on mechanical treatments, especially thinning. The Healthy Forest Restoration Act of 2003 expedited the planning and approval process for carrying out the work. There is also increased emphasis on the wildland/urban interface. Homeowners are being encouraged, albeit often with the help of federal grants, to accept some responsibility for fuel reduction near their houses, and some insurance companies are beginning to consider wildfire risk when deciding whether to insure or how much to charge.

The future remains unclear. While the recent efforts are helping to address the wildfire problem facing U.S. forests, the need for fuels management is staggering and the limited funds available for fuel treatment and the difficulties of wildfire are hurdles the Forest Service must overcome. Much will depend on future weather conditions. The prospects of increased climatic extremes asso-

ciated with global climate change suggest that wildfire risk will continue to present a formidable challenge to public land managers and the public they serve. Their work is far from done.

Geoffrey H. Donovan  
Pacific Northwest Research Station  
U.S. Forest Service

Thomas C. Brown  
Rocky Mountain Research Station  
U.S. Forest Service

<sup>1</sup> Pyne, S.J., P.L. Andrews, and R.D. Laven. 1996. *Introduction to wildland fire*. New York: John Wiley and Sons.

### Internet Resources

<http://www.fs.fed.us/fire/>  
U.S. Forest Service Fire and Aviation Management

<http://www.fs.fed.us/pnw/>  
U.S. Forest Service Pacific Northwest Research Station

<http://www.fs.fed.us/rm/>  
U.S. Forest Service Rocky Mountain Research Station

## Natural Hazards Center Announces the Gilbert F. White Web Site

The Natural Hazards Center is pleased to announce an important new addition to its Web site: a site dedicated to Center founder Gilbert F. White and his continuing contributions to the improvement of the human condition and the preservation of the Earth's environment.

In the early 1970s, White was one of the principal investigators of a major National Science Foundation-funded assessment of the status of natural hazards research in the United States. The principal product of that study was the Natural Hazards Research and Applications Information Center, which White founded and subsequently directed from 1976 to 1984 and again from 1992 to 1994. Many friends and colleagues rightly associate Gilbert with the Natural Hazards Center, but his remarkable career—spanning eight decades—encompassed a far broader range of work.

The site provides a brief biography, curriculum vitae, a complete index of publications (along with a list of publications about White), an inventory of the many honors he has received, and more. To document his extraordinary career, to provide a portal through which scholars and other interested persons can access White's work, and simply to honor the man, the Natural Hazards Center and the Institute of Behavioral Sciences at the University of Colorado have established the Gilbert F. White Web site at <http://www.colorado.edu/hazards/gfw/>.

## Meet the 2005 Mary Fran Myers Scholarship Winners

Launched in 2004, the intent of the Mary Fran Myers Scholarship is to recognize outstanding individuals who are committed to disaster research and practice and who have the potential to make a lasting contribution to reducing disaster vulnerability. The scholarship was established to ensure that individuals from all sectors of the hazards community be represented at the Annual Hazards Research and Applications Workshop. This year's winners, Wei Choong and Ana Pamela Membreño, truly exemplify the spirit of the scholarship. The Natural Hazards Center awarded two scholarships this year because of the sheer excellence of the applications (there was no deciding between the two).

Choong, from Melbourne, Australia, has a background in international development and has worked in Bangladesh, Fiji, Lao PDR, Thailand, and East Timor on development issues such as food security, poverty alleviation, and natural disaster risk management. Over the past two years she has worked at the Asian Disaster Preparedness Center (ADPC) in Bangkok, Thailand, as both a research intern and as part of an Australian Government program—Australian Youth Ambassadors for Development. She has also served as an external evaluator for a disaster prevention and livelihood security project for CARE International in Lao PDR. Through research focused on reducing natural disaster risks at the community level, Choong has developed interests in disasters and development, community based disaster risk management, public awareness and education, and the exploration of indigenous coping strategies. In her pursuit of these interests, she hopes to continue contributing to the existing body of knowledge while working practically at a grass roots level to further reduce risks in developing countries.

Membreño is a civil engineer who recently finished her master of science in rural planning and development at the University of Guelph in Canada. She chose to pursue

this degree after working in her native Honduras as a project manager for reconstruction projects in the wake of Hurricane Mitch. Throughout her studies she pursued an interest in floodplain management (looking specifically at vulnerability reduction measures, institutional capacity building, and promotion of community participation) and is a certified floodplain manager. During the summer of 2004, she did a 12-week internship with the Natural Hazards Project at the Unit of Sustainable Development and Environment of the Organization of the American States in Washington, DC. Through this work, Membreño was encouraged to further pursue vulnerability reduction issues with the possibility of implementing a floodplain manager certificate program for Honduras. Currently she is conducting environmental assessment consistency analyses for Yap Environmental Systems Analysis Limited-Guelph and hoping to return to Honduras to work on development projects in the area of disaster management.

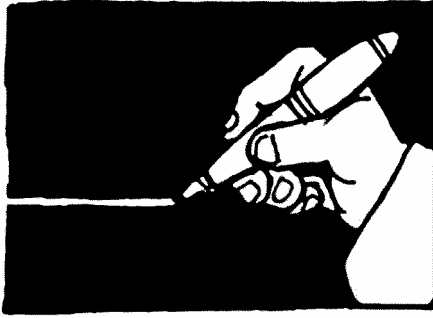
Congratulations again to the winners and many thanks to the scholarship's namesake. Mary Fran Myers, a former codirector of the Natural Hazards Center was a major guiding force for the Center as well as the broader hazards community. Reducing disaster losses, both nationally and internationally, was her life's work. By the time of her death in April 2004, her numerous contributions to the field were recognized by thousands of individuals and organizations throughout the world. Based on Myers' explicit request, scholarship funds are used to bring individuals to the annual workshop who otherwise might not be able to attend. A gift account has been established with the University of Colorado Foundation. Contributions can be sent to Mary Fran Myers Scholarship, Natural Hazards Center, University of Colorado, 482 UCB, Boulder, CO 80309-0482. Checks should be made payable to the "University of Colorado Foundation." Visit <http://www.colorado.edu/hazards/scholarship/> for more information.

## Congratulations to 2005's Student Paper Competition Winners

The Natural Hazards Center is pleased to announce the winners of the 2005 Hazards and Disasters Paper Competition for Undergraduate and Graduate Students. This year's call for papers resulted in one and a half times more submissions than last year's and reflected a broader diversity of academic interests, which included agricultural communications and journalism; anthropology; disaster and crisis management; community and regional planning; emergency administration and planning; environmental management and planning; geography; land use planning, management, and design; mechanical engineering; politics; rural sociology; sociology; urban and regional science; and veterinary sciences.

Students were encouraged to submit recent literature reviews, theoretical arguments, case studies, and descriptions of research results on topics relevant to the social/behavioral aspects of hazards and disasters. Papers were received from all over the world, including Australia, Canada, Chile, India, Pakistan, the United Kingdom, and the United States. Topics included tsunamis, typhoons, climate change, wildfires, floodplains, storm surges, and military response to crises.

The winning papers were written by undergraduate Sheridan Wimmer of Kansas State University and graduate student Hannah Brenkert of the University of Colorado at Boulder. Wimmer's paper, "Can Biotechnology Help Slow Global Warming?" addressed the use of biotechnology and global warming. Brenkert's "The Place of Fire" focused on the behaviors and perspectives of residents living in fire-prone areas. Copies of the winning papers are available online at <http://www.colorado.edu/hazards/SPC/>.



## ON THE LINE

# TsunamiReady Communities No Overnight Solution

The December 26, 2004, Sumatra earthquake and tsunami served as a grim reminder to those of us in the Pacific Northwest that we will have to deal with a similar event originating from the Cascadia Subduction Zone in the future. The Pacific Rim states of Alaska, California, Hawaii, Oregon, and Washington have been preparing for both local and distant tsunami events since before the inception of the National Tsunami Hazard Mitigation Program (NTHMP) in 1997. This program created a consortium of federal and state partners that lend both scientific and emergency management expertise to develop products such as hazard assessments, inundation and evacuation maps, and warning systems for communities at-risk from tsunamis.

In 2001, the National Weather Service (NWS) began its TsunamiReady program to provide coastal communities with guidelines for hazard awareness, improved planning, and public education to help them survive in the event of a tsunami strike. A community that meets program criteria may be recognized as TsunamiReady by the NWS. However, the TsunamiReady program only lays a foundation upon which a vulnerable coastal community can build its tsunami awareness and preparedness infrastructure. Washington and other NTHMP states have also applied emergency management principles and scientific product development initiatives that encourage communities to take steps toward becoming “tsunami resilient.” This continuous process of mitigation and preparedness includes the following:

**Hazard identification and risk assessment** is the first step in the development of an understanding of a community’s vulnerability and serves as the foundation for public education. Scientists can develop a tsunami model and inundation map that provides information such as wave heights, inundation zones, water depths, and land deformation. By identifying the hazard, assessing the risk, and understanding the associated issues, local decision makers can develop preparedness and response plans based on actual risk and vulnerability. They can define and establish evacuation routes and install signs, designate assembly areas, and develop strategies to care for evacuees. The model and map can also be used for land use planning and for developing ordinances to protect the community’s infrastructure and economic base. To be eligible for federal

hazard mitigation grant funding, all these activities should be incorporated into a local hazard mitigation plan that is compliant with the Disaster Mitigation Act of 2000.

**A good public education program** directly addresses tsunami hazard issues and presents information about mitigation and preparedness simply and clearly. Such a program should use risk communication principles and tools to change public perception of the threat and to generate community buy-in for tsunami preparedness actions that will reduce vulnerability and loss of life and protect a community’s infrastructure and economic base. It will also improve the community’s ability to react correctly to evacuation orders and procedures and decrease the likelihood that individuals will take legal action against their local government after a disaster.

Good risk communication tools for tsunamis include the following:

- **Tsunami warning and evacuation signs** identify tsunami risk areas and evacuation routes and generate significant media attention locally and nationally. They educate communities at a broader level than any other mitigation tool, bring long-term mitigation issues to the table for discussion, and provide a cost effective way of disseminating a consistent message. In addition, tourists get the same message regardless of which tsunami-vulnerable state they are visiting.
- **Tsunami brochures with evacuation maps** provide information about tsunamis, warnings, evacuation procedures, 72-hour emergency survival kits, local NOAA (National Oceanic and Atmospheric Administration) Weather Radio (NWR) frequencies, and more. These brochures are placed throughout coastal communities in locations that people are most likely to frequent: visitor centers, hotels and motels, ferry terminals, medical offices, libraries, local businesses, and community centers.

To validate an education program’s goals and objectives, a tsunami-resilient community must use social science tools, such as surveys and focus groups. These tools help quantify public understanding of the tsunami hazard and warning and evacuation procedures and the degree to which individuals are prepared to deal with hazard consequences. The community can use this information to develop strategies that will guide preparation of future public education initiatives and materials. For example, small

business focus groups could assess the hospitality industry's preparedness efforts, which should include continuity planning, staff and customer awareness, and the capability to receive alert and notification messages as well as to evacuate guests out of the tsunami hazard zone. Lessons learned from the Sumatra event clearly indicate that the tourism industry should be an integral part of a community's preparedness and education program as well as its alert, notification, and evacuation processes.

**Integrated on-shore communications** must be in place to get the warning message to the public. The NTHMP works to ensure tsunami warning information is as accurate as possible. It uses real-time data provided by two systems: deep ocean detection tsunameters and an NTHMP seismic network. Real-time data provides the West Coast/Alaska and Pacific Tsunami Warning Centers with quick and reliable information to determine whether a seismic event has generated a tsunami in the Pacific Ocean. Having these two 24-hour warning points and an integrated on-shore communications infrastructure that supports alert and notification ensures effective and rapid notification to citizens and tourists in at-risk communities.

In Washington State, NWR supplements coastal communities' communication infrastructures and improves local access to emergency information. NWR receivers are installed at designated Emergency Information Centers, including visitor centers, hotels and motels, marinas, ports, gas stations, and grocery stores. NWR placards are visibly posted at sites with weather radio receivers.

The NWR is an effective and rapid alert and notification system than can warn listeners about a hazard before the mass media and the state or county alerting systems can do so. This gives people additional time to react before danger hits their area. Washington has designated September as NOAA Weather Radio Awareness Month. The goal is to have NWR receivers as common as smoke detectors in homes and businesses statewide to help protect lives and property from natural and technological hazards.

While these receivers are gaining popularity in coastal areas, most communities lack a notification system for remote beachheads and heavily trafficked areas. In the areas hit by the recent tsunami, lack of warning to the people on the beaches and in other highly vulnerable areas resulted in loss of life that otherwise could have been avoided.

In July 2003, to remedy the lack of such a warning system, Washington State deployed an All Hazard Alert Broadcasting (AHAB) radio system to provide all-hazard warnings to heavily trafficked tourist areas in Ocean Shores, Washington, one of the state's most at-risk tsunami communities. This system ties into the Emergency Alert System and the National Weather Wire Service, giving it the same capabilities as the NWR. AHAB is economical, reliable, voice and siren capable, and can use wind power, solar panels, or commercial electricity to charge its batteries. National authorities as well as state and local officials can trigger the system, which can also be used as a public address system by local emergency response vehicles with the correct communication protocols.

Regardless of the communication alert and notification systems used by an at-risk tsunami community, it must ensure that all affected individuals receive warning messages in a rapid and efficient manner to avoid the potential loss of life from a tsunami.

A community does not become tsunami resilient overnight. The NWS TsunamiReady program provides the foundation as well as recognition to those that have embraced the TsunamiReady process. This recognition can be achieved only as a community's culture is changed, its citizens become sensitive to the tsunami hazard, and they prepare for it. The community must develop a strong public education program with an emphasis on risk communication tools supported by hazard identification and risk assessment, preparedness and mitigation planning, public education tools, on-shore communications, training, and exercises. The NTHMP facilitates the development of such a program and is the key to the development of tsunami-resilient communities.

George Crawford  
Washington Emergency Management Division

## Internet Resources

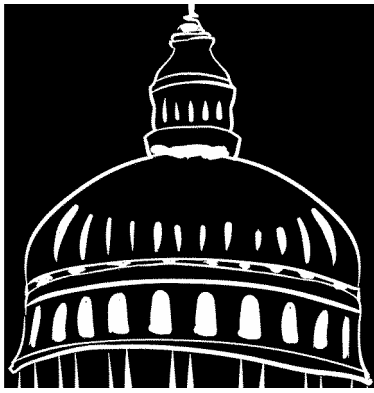
<http://www.stormready.noaa.gov/tsunamiready/>  
TsunamiReady Program

<http://www.pmel.noaa.gov/tsunami-hazard/>  
National Tsunami Hazard Mitigation Program

<http://emd.wa.gov/5-prep/PnP/prgms/eq-tsunami/tsunami-idx.htm>  
Washington Coast Tsunami Preparedness Information

<http://www.nws.noaa.gov/nwr/>  
NOAA Weather Radio





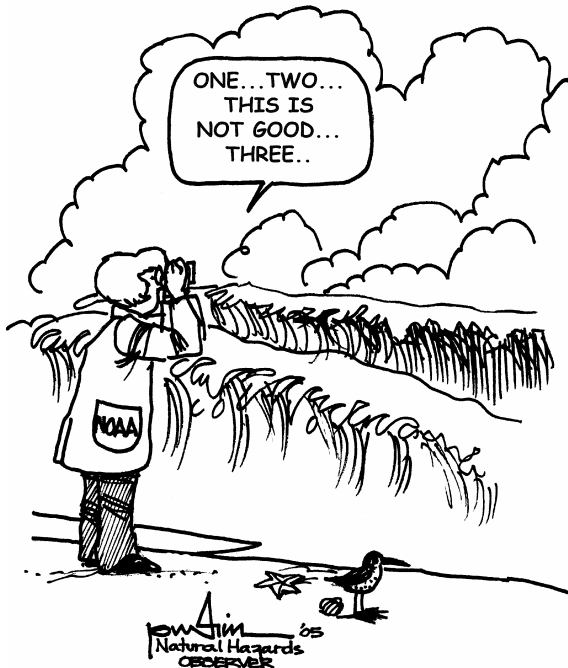
# WASHINGTON UPDATE

## NOAA Expects Another Above-Normal Atlantic Hurricane Season

National Oceanic and Atmospheric Administration (NOAA) hurricane forecasters have predicted another above-normal hurricane season for the Atlantic in 2005, a continuation of above-average activity that began in 1995. The prediction is for 12 to 15 tropical storms, with 7 to 9 becoming hurricanes, of which 3 to 5 could become major hurricanes. An update to the Atlantic hurricane outlook will be issued in early August, just prior to the season's historical peak from late August through October.

In contrast, NOAA's outlooks for the Eastern and Central Pacific predict below-normal hurricane seasons. The Eastern Pacific can expect 11-15 tropical storms, with 6 to 8 becoming hurricanes, of which 2 to 4 may become major hurricanes. Two or three tropical cyclones are projected for the Central Pacific.

For more information, visit the Climate Prediction Center at <http://www.cpc.ncep.noaa.gov/>, NOAA's Hurricane Research Division at <http://www.aoml.noaa.gov/hrd/>, the National Hurricane Center at <http://www.nhc.noaa.gov/>, and the Central Pacific Hurricane Center at <http://www.prh.noaa.gov/cphc/>.



## Law Makes FEMA Mitigation Grants Tax-Free

On April 15, the president signed Public Law 109-7, making mitigation grants from the Federal Emergency Management Agency (FEMA) tax-free. Prior to passage of this law, these grants were considered taxable income by the Internal Revenue Service. This tax code change applies to mitigation grants past, present, and future.

The complete text of Public Law 109-7 is available in any federal repository library and on the Library of Congress Web site at <http://thomas.loc.gov/>.

## NIMS Compliant ICS Training Guidelines

The National Incident Management System (NIMS) Integration Center (NIC) has developed guidelines for Incident Command System (ICS) training providers to help ensure that their training meets NIMS requirements and is consistent with the concepts, principles, and characteristics of the NIMS ICS training offered by the U.S. Department of Homeland Security (DHS) training entities and the National Wildfire Coordinating Group (NWCG).

The *NIMS National Standard Curriculum: Training Development Guidance* (2005, 26 pp.) outlines NIMS ICS concepts and principles, management characteristics, organizations and operations, organizational element titles, and recommendations for a model curriculum. It also provides an evaluation checklist that may be used to make sure ICS training meets the "as taught by DHS" standard. The guidance is available at [http://www.fema.gov/pdf/nims/nims\\_training\\_development.pdf](http://www.fema.gov/pdf/nims/nims_training_development.pdf).

The model NIMS ICS curriculum organizes four levels of training: ICS-100, Introduction to ICS; ICS-200, Basic ICS; ICS-300, Intermediate ICS; and ICS-400, Advanced ICS. ICS training provided by the Emergency Management Institute (EMI), the National Fire Academy (NFA), the NWCG, the U.S. Department of Agriculture (USDA), the Environmental Protection Agency (EPA), and the U.S. Coast Guard follow this model.

According to the NIC, emergency management and response personnel already ICS trained do not need re-training if their previous training is consistent with the DHS standard. This would include courses managed, administered, or delivered by the EMI, NFA, NWCG, USDA, EPA, or the U.S. Coast Guard.

For more information about NIMS ICS, e-mail [NIMS-Integration-Center@dhs.gov](mailto:NIMS-Integration-Center@dhs.gov) or call (202) 646-3850.

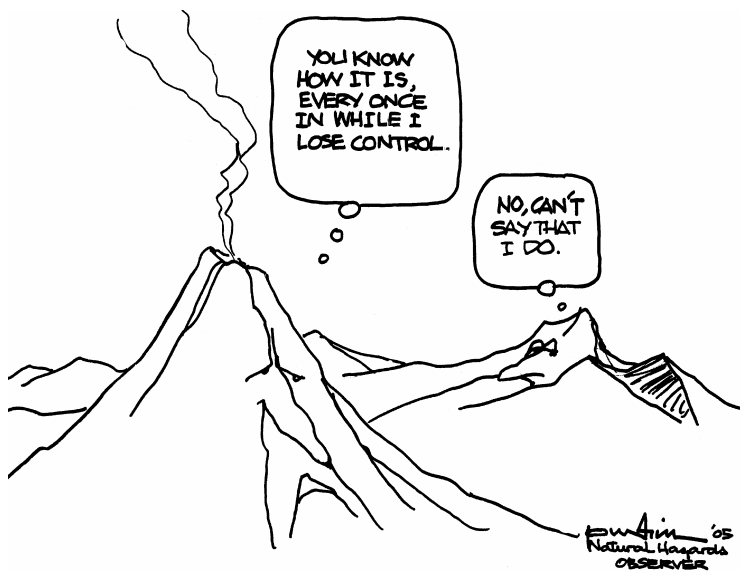
## USGS Announces Framework for National Volcano Early Warning System

The U.S. Geological Survey (USGS) has released an assessment of the nation's volcano monitoring needs based on a comprehensive and systematic review of the 169 geologically active U.S. volcanoes. The report, *An Assessment of Volcanic Threat and Monitoring Capabilities in the United States: Framework for a National Volcano Early Warning System* (2005, 62 pp.), ranks U.S. volcanoes that pose a threat to human lives, property, and aviation safety and discusses monitoring gaps at each volcano. According to the report, since 1980, 45 eruptions and 15 cases of notable volcanic unrest have occurred at 33 U.S. volcanoes. About half of the most threatening U.S. volcanoes are monitored at a basic level and a few are well monitored with a suite of modern instruments. Monitoring capabilities at many hazardous volcanoes are sparse or antiquated, and some hazardous volcanoes have no ground-based monitoring whatsoever.

Based on the threats and monitoring capabilities of each individual volcano, which determined their ranking, the USGS Volcano Hazards Program and the Consortium of U.S. Volcano Observatories (CUSVO) are collaborating on a National Volcano Early Warning System (NVEWS). In addition to closing the identified monitoring gaps, the NVEWS calls for a Volcano Watch Office that will operate around the clock seven days a week to improve forecasting and alerting capabilities and serve as the authoritative source on volcanic activity.

This report provides a framework for the implementation of the NVEWS. The USGS Volcano Hazards Program plans to convene workshops with key stakeholders, including federal agencies, state and county emergency management agencies, the CUSVO, businesses, and private organizations to review and refine the framework.

Read the report at <http://pubs.usgs.gov/of/2005/1164/> or, for a hardcopy, contact the USGS Publications Warehouse at (888) 275-8747; <http://infotrek.er.usgs.gov/pubs/>.



## Law Includes Strengthening of U.S. Tsunami Warning Capabilities

On May 11, the president signed into law the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Tsunami Relief, 2005 (Public Law 109-13), which includes \$17.24 million for the National Oceanic and Atmospheric Administration (NOAA) to support the expansion and enhancement of NOAA tsunami warning capabilities and \$8.1 million for the U.S. Geological Survey to accelerate improvements of its seismic monitoring capabilities and information delivery systems. Additionally, the new law provides \$656 million for tsunami recovery and rehabilitation efforts in the Indian Ocean. The complete text of Public Law 109-13 is available in any federal repository library and on the Library of Congress Web site at <http://thomas.loc.gov/>.

## NOAA Storm Tracker Follows Tropical Storms and Hurricanes

In response to a deluge of visitors to its Web sites during the 2004 hurricane season, the National Oceanic and Atmospheric Administration (NOAA) has introduced a new way to follow specific tropical storms or hurricanes. Once a storm is deemed a threat, NOAA Storm Tracker will offer links to associated advisories, tracking maps, satellite images, and more.

This Web tool opens in a new and smaller browser window, which can be resized and placed anywhere on a computer desktop, allowing the user to continue working while keeping track of a storm. Find out more and access the tracking tool at <http://www.stormtracker.noaa.gov/>.

## FEMA Web Site Now Features Public Affairs News Desk and Updated Photo Library

The Federal Emergency Management Agency (FEMA) has launched a new Web page for its Public Affairs News Desk. "In the News" features facts on emerging issues, official statements, background material, and downloadable high-resolution photos. The Web page provides the latest information on what FEMA is doing in the areas of mitigation, preparedness, response, and recovery. Visit "In the News" at <http://www.fema.gov/media/>. For more information, contact [FEMA-News-Desk@dhs.gov](mailto:FEMA-News-Desk@dhs.gov).

In addition to this new feature, FEMA has updated its online photo library, a collection of more than 9,200 images of natural disasters and terrorist events, including response and recovery activities, taken by FEMA's disaster photographers. The majority of photographs in the collection are in the public domain and may be downloaded, reproduced, and distributed for educational and informational purposes without further permission from FEMA. Copyrighted photographs are indicated as such and require permission for use. Visit the revamped library at <http://www.photolibrary.fema.gov/>.

## New FEMA Plan Builds on Success

The Federal Emergency Management Agency (FEMA) has announced a plan that details program evolutions during the 2004 hurricanes that are now in place to help the



agency respond to the 2005 hurricane season and all future disasters. Key elements of the "Building on Success" plan include the repositioning of disaster supplies, deployment of the National Disaster Medical System, the introduction of a Web-based individual assistance application, and expansion of mutual aid assistance. These are examples of program evolutions that will better serve disaster victims no matter where or when the next disaster strikes. To find out more, read the press release at <http://www.fema.gov/news/newsrelease.fema?id=17324>.

### New FEMA Web-Based ICS Courses

Two new Incident Command System (ICS) courses are now available online for emergency responders through the Federal Emergency Management Agency (FEMA) Virtual Campus.

Jointly developed by the U.S. Fire Administration (USFA) and the National Wildfire Coordinating Group (NWCG), these new courses integrate the National Incident Management System (NIMS) guidelines and meet the systems baseline training requirements. The USFA and USDA are working together and coordinating with the U.S. Department of Homeland Security's NIMS Integration Center to ensure that ICS courses at the 100, 200, 300, and 400 levels are available in various formats and for all emergency response disciplines.

Introduction to All-Hazards NIMS ICS for Operational First Responders, Q-462 (equivalent to NWCG I-100), and Basic All-Hazards NIMS ICS for Operational First Responders, Q-463 (equivalent to NWCG I-200), are both Web-based, self study, and interactive. They can be found at the FEMA Virtual Campus accessible through <http://training.fema.gov/>.

### FEMA Program Assists Socially and Economically Disadvantaged

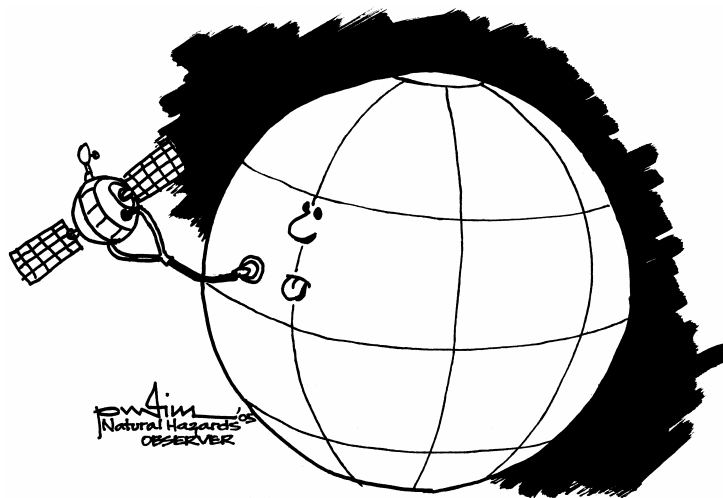
The Federal Emergency Management Agency (FEMA) has awarded a \$1.5 million Emergency Preparedness Demonstration Program grant to a North Carolina cooperative partnership between MDC, Inc. and the University of North Carolina's Center for Urban and Regional Studies.

The two-year long awareness and preparedness program for socially and economically disadvantaged households and communities will alert residents to the hazards they face and educate them about what they can do to protect themselves and achieve more effective levels of preparedness. The program will conduct extensive research on disaster awareness, develop culturally sensitive information/education materials, provide technical assistance, and document the results. Initially, the program will be carried out in Delaware, Maryland, North Carolina, Pennsylvania, Virginia, West Virginia, and the District of Columbia—all of which received major presidential disaster declarations following Hurricane Isabel in 2003.

For more information about the project, visit [http://www.fema.gov/preparedness/preparedness\\_demonstration\\_program.shtm](http://www.fema.gov/preparedness/preparedness_demonstration_program.shtm).

### U.S. Releases Earth Observation Strategic Plan

In April, the White House released the *Strategic Plan for the U.S. Integrated Earth Observation System (IEOS)* (2005, 149 pp.). The plan will serve as the framework for the U.S. contribution to the Global Earth Observation System of Systems (GEOSS), an integrated observation system involving nearly 60 countries, which will be developed and implemented over 10 years. GEOSS and IEOS will facilitate the sharing and applied usage of global, regional, and local data from satellites, ocean buoys, weather stations, and other surface and airborne Earth observing instruments. The end result will be access to an unprecedented amount of environmental information integrated into new data products benefiting societies and economies worldwide.



The U.S. plan is focused on nine societal benefit areas: improve weather forecasting; reduce loss of life and property from disaster; protect and monitor the oceans; understand, assess, predict, mitigate, and adapt to climate variability and change; support sustainable agriculture and forestry and combat land degradation; understand the effect of environmental factors on human health and well-being; develop the capacity to make ecological forecasts; protect and monitor water resources; and monitor and manage energy resources.

The plan was developed by an interagency working group now formally recognized as the United States Group on Earth Observation (US GEO), a standing subcommittee reporting to the National Science and Technology Council Committee on Environment and Natural Resources. US GEO will continue to develop implementation and integration plans for the U.S. system and provide input into GEOSS' implementation. For more information and a copy of the plan, visit <http://iwgeo.ssc.nasa.gov/>.

### USFA Launches Hazardous Materials Course

A new independent study course from the U.S. Fire Administration (USFA) provides a general introduction to hazardous materials that can serve as a foundation for more specific studies. The course, Introduction to Haz-

ardous Materials, IS-5, consists of five units: Health and Environmental Regulations, Hazardous Materials Identification Systems, Identifying Hazardous Materials, Hazardous Materials and Human Health, and Preparing for Hazardous Materials Incidents. No prior knowledge of the subject matter is required or assumed. To access the course, visit <http://training.fema.gov/EMIWeb/IS/IS5.asp>.

### Minor League Baseball at Bat for Emergency Preparedness

For the third season in a row, Minor League Baseball is joining the U.S. Department of Homeland Security to promote emergency preparedness. During the 2005 season, 48 teams will educate and encourage fans to prepare for emergencies in their homes, businesses, and schools by featuring “Ready” campaign information in television and radio public service announcements, ballparks, and/or game programs. Boy scouts troops will also take part in the effort by distributing “Ready” brochures at select games. To find out more, see the press release at <http://www.dhs.gov/dhspublic/display?content=4463>.



### FCC Rule Eases Wireless Cable TV EAS Requirements

In a final rule issued in April, the Federal Communications Commission (FCC) adopted revisions to the Emergency Alert System (EAS) that allows wireless cable television systems to provide EAS alerts to their subscribers in a more efficient and less burdensome manner. Specifically, wireless cable system operators are now able to install equipment that provides a means to switch all programmed channels to a predesignated channel that carries an EAS alert in lieu of installing an EAS decoder for each and every system channel. Accordingly, upon receipt of an EAS alert, subscribers' equipment will automatically be tuned to the channel carrying the EAS message. Details about the rule and its history are available in the April 13,

2005, *Federal Register*, Vol. 70, No. 70, pp. 19312-19315, which can be found in any federal repository library and online at <http://www.access.gpo.gov/>.

### New Continuity of Operations Course Offering from FEMA

Introduction to Continuity of Operations, IS-547, is a five-hour, Web-based course designed for a broad audience—from senior managers to those directly involved in the continuity of operations (COOP) planning effort. The independent study course from the Federal Emergency Management Agency (FEMA) provides a working knowledge of the COOP guidance in Federal Preparedness Circular 65, *Federal Executive Branch Continuity of Operations* (2004, 50 pp.). Topics include an overview of what COOP is and is not and the elements of a viable COOP program. Access the course at <http://training.fema.gov/EMIWeb/IS/IS547.asp>.

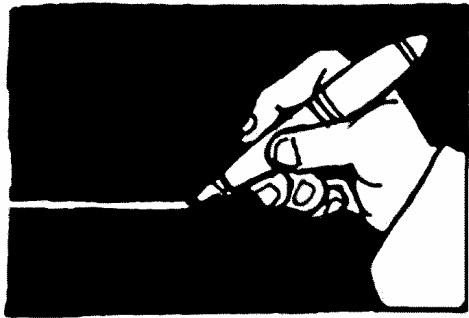
### USGS Offers One-Stop Shopping for Global Natural Hazards Events

The U.S. Geological Survey's (USGS) new Natural Hazards Support System (NHSS) is a Web-based tool that helps monitor, respond to, and analyze natural hazards events around the world. It provides a one-stop, Web-based portal to current natural hazards information, geo-spatial data, and other data directly from expert sources. This Web-based synthesis of information provides decision makers and the public with a tool to track numerous natural hazard events as they are happening.

USGS NHSS contains dynamic, near real-time natural hazards information from a wide range of sources, such as the USGS National Earthquake Information Center, the National Oceanic and Atmospheric Administration (NOAA); the National Hurricane Center; the National Interagency Fire Center; and NOAA's National Data Buoy Center. See what the new tool can do for you at <http://nhss.cr.usgs.gov/>.

### NOAA Releases Economic Statistics

*Economic Statistics for NOAA* (2005, 56 pp.) is a compendium of economic statistics relevant to the National Oceanic and Atmospheric Administration's (NOAA) mission and programs. It is intended to serve as a common reference regarding the economic impacts and benefits of NOAA's programs and provide a consistent set of economic statistics for NOAA management and staff when preparing for congressional visits and testimony, budget preparation, speeches, and other external events. Statistics are grouped into three general categories: economic and social impacts; contributions to U.S. income, employment, and output; and coastal ocean economics, population, employment, and benefits. Download a copy at <http://www.publicaffairs.noaa.gov/pdf/economic-statistics-2005.pdf> or request a hardcopy from NOAA's Office of Program Planning and Integration, Office of the Chief Economist, Silver Spring Metro Center, Building 3, 15th Floor, 1315 East West Highway, Silver Spring, MD 20910; (301) 713-3322 x182; e-mail: [rodney.f.weiher@noaa.gov](mailto:rodney.f.weiher@noaa.gov).



## ON THE LINE II

### Warning and Informing the Public

Since September 11, 2001, an unprecedented amount of attention and resources have been invested in homeland security and emergency management. Every level of government—federal, state, local, and tribal—is focused on protecting, detecting, and responding to emergencies, natural and otherwise. While these efforts are vital, most emergency managers recognize that government is only part of the solution. Individuals must make informed decisions and take appropriate actions to protect themselves and their families. To know what to do and when during an emergency, the public depends on receiving timely, accurate, and useful information from the government. Unfortunately, recent events (e.g., the May 11, 2005, evacuation of the White House and Capital) have demonstrated that this is an area where much can be improved.

State and local emergency managers have long known that effective warnings save lives, reduce property losses, and speed economic recovery. They have also known that the nation's existing public warning systems are fragmented, rely primarily upon radio and television, are not interoperable, and often provide contradictory or inconsistent information. Existing systems often fail to provide information that can be understood by those citizens with special needs (such as the 40 million Americans who are hearing impaired) and those who do not speak English. The bottom line is that these systems fail to reach many individuals who are at risk while unnecessarily warning many who are not. This article tells the story of a grassroots initiative that sought to focus attention on the issue of public warning.

In early 2001, emergency managers from state and local government, after discussions with representatives from industry, academia, and the nonprofit community, decided to hold a public warning summit in Washington, DC, in December 2001. On September 11 of that year, the world changed. And, when over 130 individuals from government and the private sector came to Washington for the December summit, the fact that not a single public warning system had been activated on September 11 was undeniably top of mind.

Summit participants agreed that improving America's public warning capability should be made a national priority. They also agreed that achieving this objective would require cooperation and collaboration among a wide variety of stakeholders, both public and private. To foster this collaboration, attendees decided to launch an objective, consensus-based forum where government, industry, and

other interested stakeholders could work together. A few weeks later the Partnership for Public Warning (PPW) was created as a public-private partnership.

The PPW's first initiative was to assist the federal government in the development of a terrorist threat system. This was followed by a comprehensive assessment of the Emergency Alert System, which set the stage for the PPW's development of a national strategy and implementation plan for improving the nation's public warning capabilities; further work on the Homeland Security Advisory System; and the development of a standard for communicating public warning messages across different technology platforms.

By 2004, the partnership was having funding difficulties. The majority of the PPW's funding had been privately raised and consisted of dues, grants, and contributions, but the organization was in dire need of federal funding. Congress had appropriated \$10 million to the U.S. Department of Homeland Security for public warning and there was hope that a portion of this funding would be used to support the PPW. Despite its recognition as the only national organization addressing the issue of public warning and numerous conversations with senior government officials, no funding made its way into PPW coffers. Ultimately, in April 2005, the Partnership for Public Warning was officially dissolved (see the *Observer*, May 2005, p. 7).

During its short life, the PPW had a number of significant accomplishments. Significantly, the PPW:

- Conducted the first comprehensive review of the Emergency Alert System and provided recommendations on how to make it more effective.
- Provided recommendations on how to improve the Homeland Security Advisory System (the color-coded terrorist alert system).
- Provided the leadership that led to the first interoperability standard for alert and warning, the Common Alerting Protocol (CAP), which was adopted as a national standard by the OASIS XML standards group.
- Led the public warning community to the recognition that better public warning is not a technology problem and that the major problems with the nation's existing public alert and warning capability include inconsistent warning systems, lack of clear and consistent messages, lack of clear policies and procedures, failure to imple-

ment and maintain warning systems, and lack of public education.

- Developed a national strategy for addressing the above problems and improving America's public warning capabilities that recommends the following:
  - Develop one integrated all-hazards warning capability;
  - Develop standard terminologies and threat scales;
  - Develop clear guidance on what constitutes an effective warning message;
  - Develop clear policies and procedures regarding the dissemination of warning messages;
  - Promote interoperability standards to permit the dissemination of warnings across multiple platforms;
  - Develop policies and procedures for regularly testing community warning systems;
  - Educate the public as to how they will be warned, what the warnings mean, and how to react; and
  - Provide a collaborative, consensus-based forum where government, industry and other interested stakeholders can work together.

While many communities would benefit from an investment in new systems, these activities do not require major new financial investments or a significant amount of time. The PPW developed an implementation plan for the national strategy that could be completed in a mere 24 months and for less than \$10 million.

- Developed criteria that emergency managers, public officials, and citizens can use as benchmarks in assessing public warning systems. While not every system will fulfill all the criteria, the same criteria are applicable to systems at the local, state, and federal levels. Features of an effective warning system include:
  - Supports multiple types of hazards;
  - Does not put message provider or recipient at risk;
  - Is always on and always ready to warn;
  - Is reliable, redundant, and secure;
  - Can reach and address everyone (including individuals with special needs, non-English speakers, and transient populations) in affected locations or areas;
  - Supports multiple distribution channels employing multiple technologies (e.g., telephones, cell phones, personal digital assistants, personal computers, televisions, radios, and other consumer electronics); and
  - Employs clear, uniform alert and warning terminology.
- Developed a public warning primer for public officials, which includes the above criteria and issues such as the “cry wolf” and “too much information” myths and provides guidance on developing effective public warnings. The most effective public warning messages employ:
  - Easily understandable “trigger words”;
  - Words that the majority of the population find simple and memorable;
  - Words that are transferable across hazards;
  - Words that easily translate into other languages; and
  - Words that can be used across media, such as a 10-character pager, a 12-character cell phone, or a 60-character short messaging appliance.

While there is still much to do, the partnership's efforts have had an impact. CAP is gaining widespread ac-

ceptance among state and local emergency managers. And, as communities and states begin discussions about implementing new public warning capabilities, many of the PPW's recommendations regarding effective systems and messages are front and center.

The Federal Communications Commission (FCC) recently undertook a major initiative seeking public comments on steps that should be taken to improve the nation's public warning system. The FCC stated that this inquiry was based partly upon the work done by the PPW. While it is unclear as to what will happen as a result of this inquiry, it is encouraging that at least one federal agency is seeking input from the public and other concerned stakeholders.

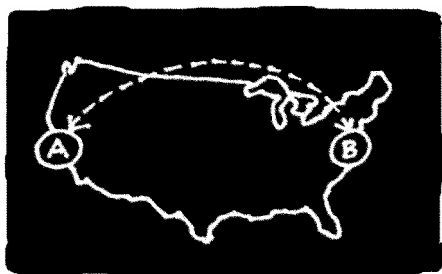
The PPW's work has also had an impact around the world. The United Kingdom has a partnership on public warning similar to the PPW called the National Steering Committee on Warning and Informing the Public, which has followed the PPW's activities closely. Additionally, recent proposals coming out of Southeast Asia to develop a public warning system to protect citizens from future tsunamis have drawn heavily upon the PPW's work.

So why did the partnership not succeed? The most important reason is the lack of public outcry regarding the need to develop a more effective public warning capability. Most citizens and government leaders, having grown up listening to the “this is a test of the emergency alert system” messages on radio and television, believe that an effective public warning system already exists. A second reason is that public warning encompasses all levels of government and requires close cooperation between government and industry. There must be leadership to bring these stakeholders together. The most likely candidate is the federal government. Unfortunately, no single federal agency has the statutory authority or resources to provide this leadership role. A number of federal agencies, including the U.S. Department of Commerce and the FCC, participated in the PPW. However, they lacked the authority to assume a leadership role in this area. The creation of the U.S. Department of Homeland Security offers some hope that a federal leader in public warning may emerge. But, the process of establishing the department has diverted management attention from issues such as public warning.

The Partnership for Public Warning is no more. However, there is still much that can be done to improve America's public warning capability. The next steps are up to you.

Kenneth Allen  
Partnership for Public Warning (formerly)

The Partnership for Public Warning's Web site, which contains many of the projects mentioned herein and links to other valuable resources, is being maintained as a public service by The MITRE Corporation at <http://www.partnershipforpublicwarning.org/>. PPW documents include *The Emergency Alert System (EAS): An Assessment* (February 2004), *A National Strategy for Integrated Public Warning Policy and Capability* (May 2003), *Public Alert and Warning—A National Duty, A National Challenge: Implementing the Vision* (September 2003), and *Developing A Unified All Hazards Public Warning System* (November 2002).



# CONFERENCES AND TRAINING

Below are the most recent conference announcements received by the Natural Hazards Center. A comprehensive list of hazards/disaster meetings is available at <http://www.colorado.edu/hazards/conf.html>.

**Coastal Zone 05: Balancing on the Edge.** Organizer: National Oceanic and Atmospheric Administration Coastal Services Center. **New Orleans, Louisiana: July 17-21, 2005.** The 14th installment of the biennial coastal resource management conference series will focus on balancing the issues and interests of land and sea. With over 1,000 participants expected from all over the world, this conference promises to provide valuable tools, lessons learned, and new ideas to help address the coastal management issues faced around the world. For more information, contact *Gale Peek*; (843) 740-1231; e-mail: [Gale.PEEK@noaa.gov](mailto:Gale.PEEK@noaa.gov) or *Lynn Sellers*; (843) 740-1284; e-mail: [Lynn.Sellers@noaa.gov](mailto:Lynn.Sellers@noaa.gov); <http://www.csc.noaa.gov/cz/>.

**America's Fire Expo.** Organizers: National Fire Protection Association (NFPA), ROC Exhibitions, *NFPA Journal Latinamericano*. **Miami, Florida: July 19-21, 2005.** This expo, which offers educational and networking opportunities as well as a showcase of products and services, is designed for leaders and decision makers from the fire safety and security industries in Latin America, the Caribbean Basin, and the southeastern United States. For more information, contact *ROC Exhibitions*, 1963 University Lane, Lisle, IL 60532; (630) 271-8210; e-mail: [info@rocexhibitions.com](mailto:info@rocexhibitions.com); <http://www.americasfireandsecurity.com/>.

**Emergency Readiness Conference and Expo 2005.** Organizers: University of Texas at Dallas School of Management, CyberSecurity and Emergency Preparedness Institute. **Richardson, Texas: August 10-12, 2005.** This year's plenary sessions' themes will be interoperability of information systems and preparedness. Sessions, tracks, and workshops will focus on interoperability in emergency management information management systems, school officials preparedness, and an all-hazards approach to disaster medicine. For more information, visit <http://som.utdallas.edu/erc2005/>.

**Summer Institute for Public Health Practice.** Sponsor: American Public Health Association (APHA). **Seattle, Washington: August 22-26, 2005.** The institute provides public health professionals with training that is immediately relevant and applicable with track objectives mapped to emergency preparedness competencies. This year's institute is organized around the theme "Public Health Preparedness: Tools for the Frontline." Case-based stud-

ies in public health law, financial accountability, leadership in emergencies, epidemic investigation, study design, and geospatial analysis will be generally applicable to public health practice. Participants will take part in one of five concurrent tracks: Introduction to Epidemiologic Methods, Intermediate Epidemiologic Methods, Public Health Management: A Case-Based Approach, Leadership Challenges During Public Health Emergencies, or Geographic Information Systems. For more information, contact *Nedra Pautler*, APHA, 800 I Street NW, Washington, DC 20001; (206) 616-9245; e-mail: [pautler@u.washington.edu](mailto:pautler@u.washington.edu); <http://healthlinks.washington.edu/nwcpnp/niphp/>.

**2005 NEMA Annual Conference.** Organizer: National Emergency Management Association (NEMA). **Anchorage, Alaska: August 28-31, 2005.** This conference provides an opportunity for emergency managers to come together to discuss the many challenges that face the community today, share solutions, grow professionally, and network with peers. Attendees will hear from those involved in shaping the future of homeland security and emergency management, strengthen relationships with partner organizations, and discuss NEMA's views on all-hazards emergency preparedness. For more information, contact *NEMA*, PO Box 11910, Lexington, KY 40578; (859) 244-8000; e-mail: [nemaadmin@csg.org](mailto:nemaadmin@csg.org); <http://www.nemaweb.org/?1331>.

**2005 Conference of the Floodplain Management Association.** **Sacramento, California: September 6-9, 2005.** The technical component of this year's conference, "Flood Risk Management: Structural and Non-Structural Solutions. How Much Is Enough?" will include floodplain management issues, floodplain mapping, coastal issues, postdisaster recovery, mitigation planning, public education and outreach, and more. For more information, visit <http://www.floodplain.org/>.

**RSPSoc 2005: Measuring, Mapping, and Managing a Hazardous World.** Organizer: The Remote Sensing and Photogrammetry Society (RSPSoc). **Portsmouth, United Kingdom: September 6-9, 2005.** This conference will cover the use of photogrammetry and remote sensing in measuring, mapping, and managing today's wide range of hazards. Day one of the conference will be held as a joint event with the National Environment Research Council

(NERC) and includes the NERC Earth Observation Conference 2005. Sessions are planned on global-scale hazards and climate change, ocean-atmosphere changes, meteorological hazards, flood hazards, the coastal zone, disaster relief, slope instability, soil erosion, wildfires, and more. For more information, contact *Richard Teeuw*; e-mail: [richard.teeuw@port.ac.uk](mailto:richard.teeuw@port.ac.uk); <http://www.rspoc.org/>.

**2005 WSSPC Annual Conference.** Sponsors: Western States Seismic Policy Council (WSSPC), U.S. Geological Survey, Federal Emergency Management Agency. **Boise, Idaho: September 11-14, 2005.** The objective of this conference is to revisit the National Earthquake Hazard Reduction Program goals and what the goals support—reduced exposure to loss of life, infrastructure, economies, and resources—in light of national realities: western earthquakes, rural earthquakes, and earthquakes in cash-strapped states and communities. For more information, visit <http://www.wsspc.org/Events/ac2005/>.

**APWA International Congress and Expo/The Best Show in Public Works.** Sponsor: American Public Works Association (APWA). **Minneapolis, Minnesota: September 11-14, 2005.** This annual public works event will feature education sessions on emergency management, stormwater/flood control, engineering/construction management, snow and ice, and more. For more information, contact *Dana Priddy* or *Diana Forbes* at the APWA, 2345 Grand Boulevard, Suite 500, Kansas City, MO 64108; (800) 848-2792; e-mail: [congress@apwa.net](mailto:congress@apwa.net); <http://www.apwa.net/meetings/congress/2005/>.

**ESRI Homeland Security GIS Summit.** **Denver, Colorado: September 12-14, 2005.** This summit will focus on geographic information systems (GIS) tools, datasets, and partnerships that can support organizations in the areas of emergency preparedness and public safety. It will feature current efforts and initiatives and future requirements for operational best practices. Anyone with responsibilities in safety, budget planning/funding, policy development, partnerships, GIS data, imagery, as well as other government, nongovernmental, or private sector knowledge experts, are encouraged to attend. For more information, e-mail [hssummit@esri.com](mailto:hssummit@esri.com); <http://www.esri.com/events/homeland/>.

**National Floodproofing Conference III.** Sponsors: Association of State Floodplain Managers (ASFPM), U.S. Army Corps of Engineers National Nonstructural Flood Proofing Committee, Federal Emergency Management Agency, FloodMaster Barriers, Inc. **Charleston, West Virginia: September 12-16, 2005.** This triennial conference will build upon its predecessors with a focus on floodproofing techniques, materials, floodproofing and elevation contractors, current issues and programs, new federal tax implications, and the various means of funding floodproofing projects. For more information, contact the ASFPM, 2809 Fish Hatchery Road, Madison, WI 53713; (608) 274-0123; e-mail: [asfpm@floods.org](mailto:asfpm@floods.org); <http://www.floods.org/Conferences,%20Calendar/nfpc3.asp>.

**Technical Conference on the Federal Building and Fire Safety Investigation of the World Trade Center (WTC) Disaster.** Sponsor: National Institute of Standards and Technology (NIST). **Gaithersburg, Maryland: September 13-15, 2005.** The objective of this conference, which is open to the general public and technical experts from industry and academia, is to present the technical foundation for the NIST recommendations for improving building and fire codes, standards, and practices and to solicit feedback on the Draft NIST Investigation Report from the technical community outside of the investigation team, with an emphasis on spurring action on recommendations. For more information, contact *Teresa Vicente*; (301) 975-3883; e-mail: [teresa.vicente@nist.gov](mailto:teresa.vicente@nist.gov); <http://wtc.nist.gov/media/Sept13ConferenceAnnouncement.htm>.

**Integrated Planning Against Risk: Exploring Interfaces Between Disasters and Development.** Organizer: Centre for Development Studies, University of Wales–Swansea. **Bangkok, Thailand: September 17-18, 2005.** This seminar about “The Management of Risk and Vulnerability After the Trauma of Relocation” will focus on South and Southeast Asia. It will examine comparative experience in the design of management and relief measures for the rehabilitation of communities and population after their displacement by natural disasters such as tsunamis, supercyclones, and earthquakes and the rehabilitation of households and communities after their displacement by major infrastructure projects such as reservoir development and urban transport improvements. For more information, visit <http://www.swansea.ac.uk/cds/research/ESRCseminarprog6.htm>.

**8th Symposium of the International Association for Fire Safety Science.** Organizer: China Fire Protection Association (CFPA). **Beijing, China: September 18-23, 2005.** This scientific conference for the global fire safety science community will feature everything from fundamental breakthroughs to new best practices. Papers and posters will be presented in all areas of fire safety science. For more information, contact CFPA, 5th Floor, No. 19A, Huawei Xili, Chaoyang District, Beijing 100021, P.R. China; +86 10 8778 9259; e-mail: [iafss2005@126.com](mailto:iafss2005@126.com); [http://2005.china-fire.com/en\\_index.htm](http://2005.china-fire.com/en_index.htm).

**Oceans 2005 MTS/IEEE.** Sponsors: Marine Technology Society (MTS), IEEE Oceanic Engineering Society. **Washington, DC: September 19-23, 2005.** This annual technical and professional conference is a forum for ocean scientists, engineers, industry end users and suppliers, technologists, educators and researchers, policy makers, and other interested parties to present their latest research results, technologies, future concepts, and innovative ideas as they pertain to the future of the oceans. Plenary themes are homeland maritime security; global observation and exploration; emerging ocean science, technology, and engineering; ocean education and outreach; and proactive global cooperation and engagement. For more information, visit <http://www.oceans2005.org/>.

**Association of Engineering Geologists Annual Conference. Las Vegas, Nevada: September 19-24, 2005.** The technical program for this event features landslides and slope stability, engineering geology of problem soils, earthquake/seismic hazards, environmental site assessments (regulatory aspects), hydrogeology, and environmental risk management and remediation. Field trips, short courses, symposia, and a teachers' workshop round out the event. For more information, contact *Jim Werle*; e-mail: [jwerle@converseconsultants.com](mailto:jwerle@converseconsultants.com); <http://www.aegweb.org/>.

**2005 General Conference of the International Risk Governance Council (IRGC): Implementing a Global Approach to Risk Governance. Beijing, China: September 20-21, 2005.** The intent of this conference is to provide specific ideas for implementing improved governance strategies for major transboundary risks. Risk areas of discussion will include critical infrastructures, emerging technologies, natural disasters, and changes in the environment. For more information, contact the *IRGC*, 7-9 *Chemin de Balaxert, Châtelaine, CH-1219 Geneva, Switzerland*; +41 (0)22 795 1730; <http://www.irgc.org/>.

**Eighth Annual Conference on Innovations in Disaster Mental Health. Rapid City, South Dakota: September 22-24, 2005.** This conference will examine research strategies and methodology in disaster psychology in an effort to promote innovative approaches and collaborative agreements that will yield more definitive results. Its goal is to assemble experts in the field of disaster and trauma research to discuss ways in which they have successfully implemented their research protocols. Poster abstracts are due August 19, 2005. For more information, contact the *Disaster Mental Health Institute, University of South Dakota, SDU 114, 414 East Clark Street, Vermillion, SD 57069*; (605) 677-6575, (800) 522-9684; e-mail: [dmhi@usd.edu](mailto:dmhi@usd.edu); <http://www.usd.edu/dmhi/conference.cfm>.

**Dam Safety 2005.** Organizer: Association of State Dam Safety Officials (ASDSO). **New Orleans, Louisiana: September 25-29, 2005.** This annual conference offers attendees professional development, a trade show, issue forums, networking, and technology transfer opportunities. Session topics at this year's event will include seismic issues, dam failures and incidents, emergency preparedness, and more. For more information, contact the *ASDSO, 450 Old Vine Street, Floor 2, Lexington, KY 40507*; (859) 257-5140; e-mail: [info@damsafety.org](mailto:info@damsafety.org); <http://www.damsafety.org/>.

**18th Emergency Preparedness Conference: Community Resilience; A Future for All.** Sponsors: City of Burnaby, City of Vancouver, Insurance Bureau of Canada, Justice Institute of British Columbia, Public Safety and Emergency Preparedness Canada, Ministry of Health Services, Emergency Social Services, Provincial Emergency Program, University of British Columbia, Royal Canadian Mounted Police "E" Division. **Vancouver, British Columbia: October 4-7, 2005.** This conference will emphasize community resiliency in the face of disasters through community involvement and planning by building on the

action plan from last year's conference. The goal of the action plan was to provide tools to help communities become disaster resilient. The program will include six workshops: Public Awareness and Education, Psychosocial Impact on Responders, Volunteer Management, Community Health Care Resources, Critical Infrastructure, and Community Emergency Programs. For more information, contact the *Emergency Preparedness Conference, 900 Heatley Avenue, Vancouver, British Columbia V6A 3S7, Canada*; (604) 665-6097; e-mail: [info@epconference.ca](mailto:info@epconference.ca); <http://www.epconference.ca/>.

**The Sixth Open Meeting of the Human Dimensions of Global Environmental Change Research Community.** Organizer: International Human Dimensions Programme on Global Environmental Change. **Bonn, Germany: October 9-13, 2005.** The theme of this meeting is "Global Environmental Change, Globalization, and International Security: New Challenges for the 21st Century." It aims to promote a better understanding of global transformations, to identify the resulting opportunities and challenges, and to develop appropriate responses. This entails a critical assessment of what the community has achieved to date as well as the development of a forward-looking action plan that links human dimensions research into contemporary policy debates on future actions of the global community. For more information, visit <http://openmeeting.homelinux.org/>.

**Geological Society of America Annual Meeting. Salt Lake City, Utah: October 16-19, 2005.** At this annual meeting, geoscientists, educators, and policy makers from around the world will come together to share the latest advances and discoveries and work to improve the understanding and application of science in society. This year's program features 20+ sessions focused on education-related topics and a plethora of sessions addressing geologic hazards, resource utilization, and environmental policy. Abstracts are due July 12, 2005. For more information, contact *Adolph Yonkee*; e-mail: [ayonkee@weber.edu](mailto:ayonkee@weber.edu); <http://www.geosociety.org/meetings/2005/>.

**Tall Timbers 23rd Fire Ecology Conference: Fire in Grassland and Shrubland Ecosystems.** Host: Tall Timbers Research Station. **Bartelsville, Oklahoma: October 17-20, 2005.** The purpose of this conference is to provide an international forum for discussion of research and research needs in the area of fire ecology. It will present the current state-of-the-art research and management efforts and bring to light areas where new research and management information is needed in grassland, shrubland, and grassland-woodland ecosystems. For more information, contact *Kaye Gainey, Tall Timbers Research Station, 13093 Henry Beadel Drive, Tallahassee, FL 32312*; (850) 893-4153; e-mail: [kaye@ttrs.org](mailto:kaye@ttrs.org); <http://www.ttrs.org/23FEconference/>.

**2005 IBHS Annual Conference on Property Loss Reduction.** Organizer: Institute of Business & Home Safety (IBHS). **Lake Buena Vista, Florida: October 20-21, 2005.** This annual congress on property loss reduction

brings together professionals in the insurance industry, emergency management, government agencies, and academic institutions to discuss the latest developments in natural hazards mitigation. For more information, contact *IBHS*, 4775 East Fowler Avenue, Tampa, FL 33617; (813) 286-3400; e-mail: [info@ibhs.org](mailto:info@ibhs.org); <http://www.ibhs.org/congress/>.

**Extreme Natural Hazards.** Organizer: Royal Society. **London, United Kingdom: October 26-27, 2005.** This meeting will focus on extreme geophysical and astrophysical hazards, including earthquakes, supervolcanic eruptions, tsunamis, near Earth objects, and giant landslides. Speakers will discuss the frontiers and challenges in the science of extreme natural hazards as well as related topics, such as prediction, forecasting, monitoring, and technological innovations. The meeting will assess the role of the international scientific community and how these efforts can be better coordinated, integrated, and funded to improve the ability to anticipate and mitigate the effects of extreme events. Issues of the accessibility of relevant science to poor nations with limited scientific infrastructure and expertise will also be discussed. For more information, contact *Hannah Jemmett*; +44 (0) 207 451 2575; e-mail: [discussion.meetings@royalsoc.ac.uk](mailto:discussion.meetings@royalsoc.ac.uk); <http://www.royalsoc.ac.uk/event.asp?id=3177&month=10,2005>.

**International Technical Rescue Symposium 2005.** Sponsor: Mountain Rescue Association. **Fort Collins, Colorado: November 3-6, 2005.** This event will bring together representatives from across the spectrum of rescue disciplines, including mountain rescue, park services, water rescue, outdoor recreation, fire service, and rescue teams to share news and views on advances in equipment and techniques, technical problems, and other issues of mutual concern. For more information, download a brochure at [http://www.mra.org/ITRS\\_Brochure2005.pdf](http://www.mra.org/ITRS_Brochure2005.pdf).

**IAEM 2005 Annual Conference and EMEX.** Sponsor: International Association of Emergency Managers (IAEM). **Phoenix, Arizona: November 12-16, 2005.** The purpose of this conference is to provide a forum to discuss current trends, topics, and the latest tools and technology in emergency management and homeland security, and to advance IAEM committee work. Sessions encourage stakeholders at all levels of government, the private sector, public health, and related professions to exchange ideas on collaborating to protect lives and property from disaster. Members of IAEM, disaster professionals, and other officials with a role in homeland security and emergency management are invited to attend. For more information, contact the *IAEM*, 201 Park Washington Court, Falls Church, VA 22046; (703) 538-1795; e-mail: [info@iaem.com](mailto:info@iaem.com); <http://www.iaem.com/events/annual/intro.htm>.

**Greenhouse 2005: Action on Climate Change.** Organizer: Commonwealth Scientific and Industrial Research Organisation (CSIRO). **Melbourne, Australia: November 13-17, 2005.** There is a clear need for industry, scientists, and government at all levels to work closely together to tackle climate change. Demand is strong for the latest

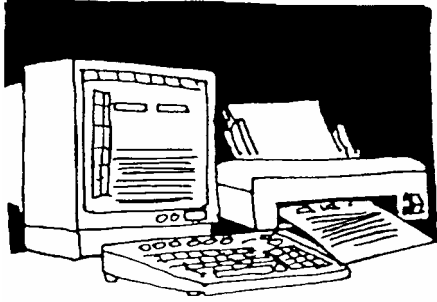
information on the science, the likely impacts of climate change, adaptation strategies, and approaches to reducing atmospheric greenhouse gas concentrations. This conference will cover these themes as well as international issues, policy development, communication, and education. Abstracts are due August 15, 2005. For more information, e-mail [info@greenhouse2005.com](mailto:info@greenhouse2005.com); <http://www.greenhouse2005.com/>.

**World Conference on Disaster Reduction (WCDR): Focus on Corporate Sector Role and Responsibility.** Organizer: Global Forum for Disaster Reduction (GFDR). **Mumbai, India: November 16-18, 2005.** The objective of this conference is to connect government agencies, relief organizations, and the corporate world to better mitigate the human suffering caused by disasters. It is a follow up to the WCDR conference held in Kobe, Japan, in January, where the need to involve all stakeholders in the disaster mitigation process was identified and enforced. This conference aims to identify sectors' strengths and highlight the areas where they can make a difference. For more information, contact the *GFDR Secretariat*, B-302, Twin Arcade, Military Road, Marol, Andheri (East), Mumbai-400 059, India; +91 22 28516690; <http://www.wcdr.gfdr.org/>.

**2005 Society for Risk Analysis (SRA) Annual Meeting.** **Orlando, Florida: December 4-7, 2005.** There are three supporting goals for this year's annual meeting: (1) take advantage of the meeting location in Florida to touch upon "local" topics that have broad implications or analogies, (2) continue the internationalization of the SRA, and (3) encourage a more interdisciplinary orientation in the technical program. The 25th anniversary of the SRA also presents an opportunity to examine the changing role of risk analysis in societal and private decision making. For more information, contact the *SRA*, 1313 Dolley Madison Boulevard, Suite 402, McLean, VA 22101; (703) 790-1745; e-mail: [sra@burkinc.com](mailto:sra@burkinc.com); [http://www.sra.org/events\\_2005\\_meeting.php](http://www.sra.org/events_2005_meeting.php).

**Cities on Volcanoes 4.** Hosts: The Geophysical Institute of the Escuela Politécnica Nacional, Cities on Volcanoes Commission of the International Association of Volcanology and Chemistry of the Earth's Interior, Distrito Metropolitano de Quito, Institut de Recherche pour le Développement of France. **Quito, Ecuador: January 23-27, 2006.** This meeting provides a forum where volcanologists, urban planners, civil defenders, community authorities, and business and health specialists can meet to discuss ways to mitigate the effects of volcanic eruptions and minimize their impact upon humanity through better science, technology, communication, and education. Symposia include new computational techniques for mitigating volcanic hazards, volcano studies and monitoring, risk management, emergency management, and human health impacts of volcanism. Workshops, field trips, and other scientific activities will also be offered. Abstracts are due August 1, 2005. For more information, e-mail [citiesonvolcanoes4@igepn.edu.ec](mailto:citiesonvolcanoes4@igepn.edu.ec); <http://www.citiesonvolcanoes4.com/>.





# INTERNET PAGES

Below are new or updated Internet resources that Natural Hazards Center staff members have found to be informative and useful. Other valuable resources can be found throughout this newsletter. For a more complete list, visit <http://www.colorado.edu/hazards/resources/sites.html>.

## All Hazards

<http://www.fema.gov/pdf/library/pfd.pdf>

<http://www.fema.gov/pdf/library/children.pdf>

<http://www.fema.gov/pdf/library/f&web.pdf>

[http://www.fema.gov/pdf/library/pfd\\_all.pdf](http://www.fema.gov/pdf/library/pfd_all.pdf)

Four preparedness booklets supplement the Federal Emergency Management Agency's recently rereleased *Are You Ready*. They are *Preparing for Disaster*, *Helping Children Cope with Disaster*, *Food and Water in an Emergency*, and *Preparing for Disaster for People with Disabilities and Other Special Needs*. These guides and more can be found at [http://www.fema.gov/preparedness/prepare\\_guides\\_links.shtm](http://www.fema.gov/preparedness/prepare_guides_links.shtm).

<http://www.fas.org/sgp/crs/homsec/RL32863.pdf>

**Homeland Security Department: FY2006 Appropriations** from the Congressional Research Service is a guide to the U.S. Department of Homeland Security appropriations bill for fiscal year 2006. It summarizes the status of the bill, its scope, major issues, funding levels, and related congressional activity.

<http://www.fas.org/sgp/crs/misc/RL32837.pdf>

This Congressional Research Service report, **Science and Technology Policy: Issues for the 109th Congress**, discusses the influence that science and technology have over a wide range of policy issues and the related funding challenges.

[http://www.mipt.org/pdf/CRS\\_RL32803.pdf](http://www.mipt.org/pdf/CRS_RL32803.pdf)

**The National Preparedness System: Issues in the 109th Congress** from the Congressional Research Service provides background information on the six National Preparedness System documents and identifies related issues, such as compliance and federalism, that may be subject to congressional debate.

[http://www.nyc.gov/html/oem/pdf/seniors\\_disabilities\\_english.pdf](http://www.nyc.gov/html/oem/pdf/seniors_disabilities_english.pdf)

[http://www.nyc.gov/html/oem/pdf/rny\\_smallbiz.pdf](http://www.nyc.gov/html/oem/pdf/rny_smallbiz.pdf)

As part of its ongoing effort to help all New Yorkers better prepare for emergencies, the New York City Office of Emergency Management has released **Ready New York for Seniors and People with Disabilities** and **Ready New York: Emergency Planning for Small and Mid-Sized Companies**.

<http://www.nap.edu/catalog/11274.html>

The 12th Disasters Roundtable workshop focused on grand challenges in science and technology related to society's vulnerability to disaster. Agencies and stakeholders from the disaster research and policy community gathered to discuss research and program priorities for the future. They identified problems in science and technology that might be resolved by coordinated and sustained investments in research, education, communication, and the application of knowledge and technology. The summary is available here.

[http://www.riskinstitute.org/newsite/uploads/PDR\\_FinalReport\\_04\\_22\\_05.pdf](http://www.riskinstitute.org/newsite/uploads/PDR_FinalReport_04_22_05.pdf)

This is the final report on the Oregon Natural Hazards Workshop's (ONHW) Public Entity Risk Institute-supported three year project to coordinate the implementation of the Institute of Business & Home Safety Showcase State program in Oregon. Learn about the challenges and opportunities of coordinating a statewide disaster mitigation effort and how ONHW plans to continue promoting disaster mitigation in Oregon.

<http://www.pdc.org/atlas/html/atlas-init.jsp>

The Pacific Disaster Center has redesigned and enhanced its Web-based hazards atlas to support disaster management and humanitarian assistance communities in the Asia-Pacific region and Hawaii. The updated atlas provides a geospatial framework through which a wealth of hazards-related information can be viewed, including real-time and historical tropical cyclone tracks, earthquake locations, wildfires, and tsunami runup zones.

<http://www.redcross.org/financialplanning/>

The American Institute of Certified Public Accountants (AICPA), the AICPA Foundation, the National Endowment for Financial Education, and the American Red Cross have launched this new, broad-based disaster preparedness and planning guide to help consumers take steps to minimize financial loss before a disaster strikes.

<http://www.cwserp.org/training/forum.php>

Select video presentations from the 2004 Church World Service Emergency Response Program Forum on Domestic Disaster Ministry are available here. Presentations include "Overview of Disaster Research," "Participatory Action Research," "Preparing Neighborhoods for Disasters," and "Breaking Out of Cycles of Trauma."

<http://www.iscram.org/>

Papers presented at the recent ISCRAM2005 meeting (the second International Conference on Information Systems for Crisis Response and Management) are available online. Site registration is required to access the papers.

<http://training.fema.gov/EMIWeb/edu/jobmarket.asp>

This report, *Emergency Management and Related Labor Market Data and Statistics, 2005*, was conducted for the Federal Emergency Management Agency's Emergency Management Higher Education Project in response to requests from collegiate academics and administrators interested in developing emergency management type programs on their campuses.

[http://www.air-worldwide.com/\\_public/html/whitepaper.asp](http://www.air-worldwide.com/_public/html/whitepaper.asp)

To help insurers and reinsurers analyze and prepare for future multiple-catastrophe years, AIR Worldwide Corporation has released *Analyzing and Preparing for Multiple Event Seasons*.

## Earthquakes and Volcanoes

<http://pasadena.wr.usgs.gov/step/>

The U.S. Geological Survey has launched this Web page that shows the probability of earthquake shaking in the next 24 hours in California. Maps graphically illustrate the change in earthquake probability during aftershock and possible foreshock sequences. The maps are updated at least once an hour.

<http://www.bbc.co.uk/sn/tvradio/programmes/supervolcano/game.shtml>

In conjunction with *Supervolcano*, the BBC's docudrama that imagines how a super-eruption would devastate the planet, the network created this interactive online game that casts players as emergency managers tasked with saving communities from a volcanic eruption.

## Tsunamis

<http://www.asce.org/files/pdf/Tsunami.pdf>

This article from the American Society of Civil Engineers' journal *Civil Engineering* examines the possibility of a tsunami, such as the one that struck in the Indian Ocean in December, happening in the United States, off the coast of Southern California in particular.

[http://www.eeri.org/lfe/clearinghouse/sumatra\\_tsunami/presentation.html](http://www.eeri.org/lfe/clearinghouse/sumatra_tsunami/presentation.html)

The Earthquake Engineering Research Institute (EERI) has released "The Great Sumatra Earthquake and Indian Ocean Tsunami," a comprehensive PowerPoint presentation intended for use by individuals who are giving presentations to colleagues, community groups, and others. It explains the origins of the earthquake and tsunami and documents the damage they caused. It also includes slides on tsunamis in the United States and a discussion of tsunami risk reduction methods.

<http://www.unisdr.org/ppew/tsunami/ppew-tsunami.htm>

This new section of the United Nations International Strategy for Disaster Reduction Platform for the Promotion of Early Warning Web site provides information on developments pertaining to the organization of a tsunami early warning system for the Indian Ocean. It also contains a concise summary of information on tsunamis and links to other tsunami Web sites.

[http://ioc.unesco.org/indotsunami/mauritius05/mauritius05\\_outcome.htm](http://ioc.unesco.org/indotsunami/mauritius05/mauritius05_outcome.htm)

The result of the Second International Coordination Meeting for the Development of a Tsunami Warning and Mitigation System for the Indian Ocean, the Mauritius Declaration posted here, complements the Paris Communiqué issued in March and further outlines the way forward toward the development of a tsunami warning system for the region.

[http://www.oxfam.org.uk/what\\_we\\_do/issues/conflict\\_disasters/bn\\_tsunami\\_women.htm](http://www.oxfam.org.uk/what_we_do/issues/conflict_disasters/bn_tsunami_women.htm)

This report from aid agency Oxfam International about the impact of the Indian Ocean tsunami on women shows that up to four times as many females as males may have been killed by the tsunami. It examines some of the reasons why and what can be done to address the disproportionate impact on women in general.

<http://www.e-aceh.org/>

eAceh.org is an effort by the government of Indonesia and the donor community to bring together the stakeholders rebuilding lives, livelihoods, and communities in Aceh and northern Sumatra devastated by December's earthquake and tsunami. Information from all government agencies, international institutions, bilateral donors, international NGOs, and local Lembaga Swadaya Masyarakat participating in the rehabilitation and reconstruction of Aceh will be made available on this site.

[http://www.adrc.or.jp/publications/Srilanka\\_survey/en/Index.html](http://www.adrc.or.jp/publications/Srilanka_survey/en/Index.html)

The Asian Disaster Research Center conducted a field survey on the awareness of disaster risk in the Galle district of Sri Lanka to identify the current situation and characteristics of the community's capacity to respond to natural disasters. The survey was conducted for the purpose of proposing a strategy for dissemination of disaster knowledge and raising public awareness for reducing the negative impact of natural hazards. The results are available here.

## Severe Weather

[http://www.nasa.gov/vision/earth/lookingatearth/hurricane\\_2005.html](http://www.nasa.gov/vision/earth/lookingatearth/hurricane_2005.html)

The National Aeronautics and Space Administration (NASA) has launched this Web page highlighting their hurricane research. The page is a compilation of data from various satellites and computer models, and it explains why and how NASA investigates hurricanes.

[http://www.pdc.org/perspectives/2004\\_hurricanes.pdf](http://www.pdc.org/perspectives/2004_hurricanes.pdf)

The Pacific Disaster Center has released **2004—Year of the Storms or Typical Storm Year? A Warning Worth Heeding** as part of its Perspectives publications series.

<http://www.worldweather.org/>

<http://severe.worldweather.org/>

The Hong Kong Observatory developed and operates these sites on worldwide official weather forecasts and warnings, the World Weather Information Service and the Severe Weather Information Centre, on behalf of the World Meteorological Organization.

## Floods and Coastal Issues

<http://www.nws.noaa.gov/oh/hic/archive/>

This Web site from the National Weather Service's Hydrologic Information Center features a U.S. flood summary archive from 1997 to the present.

<http://woodshole.er.usgs.gov/project-pages/nps-cvi/>

In 2001, the U.S. Geological Survey, in partnership with the National Park Service's (NPS) Geologic Resources Division, began conducting hazard assessments and creating map products to assist the NPS in managing its vulnerable coastal resources. The most recent report, **Coastal Vulnerability Assessment of Cape Hatteras National Seashore (CAHA) to Sea-Level Rise**, is available here along with details about the project and assessments of other national park units.

<http://www.kqed.org/w/coastalclash/home.html>

This site supplements KQED Public Broadcasting's documentary **Coastal Clash** that takes an in-depth look at the struggle for California's shores, a struggle that is echoed on coastlines around America. Online features include a "How Beaches Work" animation, classroom content, and a bulletin board.

## Fire

[http://www.iso.com/studies\\_analyses/fireProtection/](http://www.iso.com/studies_analyses/fireProtection/)

ISO (Insurance Services Office) conducted this study on fire protection in the United States, **Effective Fire Protection: A National Concern**, which focuses on the impact of growth to fire service delivery systems.

## Climate Change

<http://ealert.pewclimate.org/ctt.asp?u=2965528&l=86536>

A recent Pew Center on Global Climate Change workshop, Innovative Approaches to Climate Change: A State-Federal Workshop, explored states' actions while highlighting lessons learned from these efforts for state and federal policy makers. Presentations from the workshop, which included panel discussions and keynote presentations from top state environmental, energy, and transportation officials, as well as representatives of industry and Congress, are available here.

<http://www.climatechange.gc.ca/english/>

This Web site from the government of Canada addresses climate change issues and features the recently released *Moving Forward on Climate Change: A Plan for Honouring Our Kyoto Commitment*.

<http://sciencepolicy.colorado.edu/sparc/>

The Science Policy Assessment and Research on Climate (SPARC) conducts research and assessments, outreach, and education aimed at helping climate science policies better support climate-related decision making in the face of fundamental and often irreducible uncertainties. SPARC is a joint project of the University of Colorado's Center for Science and Policy Technology Research and Arizona State University's Consortium for Science, Policy, and Outcomes and is sponsored by the National Science Foundation.

<http://ealert.pewclimate.org/ctt.asp?u=2965528&l=86550>

The Pew Center on Global Climate Change has compiled answers to key questions raised by Michael Crichton in his latest novel *State of Fear*.

## Hazardous Materials

<http://www.ncseonline.org/nle/crsreports/05Feb/RS22041.pdf>

*Legal Issues Concerning State and Local Authority to Restrict the Transportation of Hazardous Materials by Rail* from the Congressional Research Service provides an overview of federal statutes pertaining to the transportation of hazardous materials by rail and discusses some of the legal issues with respect to federal preemption and the dormant commerce clause.

## Health

<http://www.phppo.cdc.gov/phtn/stress-05/default.asp>

This webcast from the National Center for Environmental Health/Agency for Toxic Substances and Disease Registry and Public Health Training Network deals with the physical, emotional, and mental stressors first responders face when called to a technological disaster. It gives practical coping strategies and resources for dealing with stress.

<http://www.fema.gov/pdf/nims/NIMSWebArticle1.pdf>

This document from the Federal Emergency Management Agency clarifies the relationship between the Hospital Emergency Incident Command System and the National Incident Management System.

<http://www.ahrq.gov/research/epri/>

The Agency for Healthcare Research and Quality has released this new tool, the Emergency Preparedness Resource Inventory, which allows local and regional planners to assemble an inventory of critical resources that would be useful in responding to a bioterrorist attack.

## Terrorism

<http://www.fas.org/sgp/crs/terror/RL32920.pdf>

*Federal Counter-Terrorism Training: Issues for Congressional Oversight* from the Congressional Research Service is an overview of the major training activities and facilities of the federal departments and agencies that provide counter-terrorism training and issues associated with them.

<http://www.disaster-timeline.com/ttl.html>

The latest version of the *Terrorism Time Line* chart, which includes events and outcomes from 1993 through 2004, is now available online and for purchase. It shows major focusing events and the influences each event had on major outcomes—reports and analyses; federal statutes, regulations and executive orders; federal response plans; and major federal organizational changes.





# CONTRACTS AND GRANTS

Below are descriptions of recently awarded contracts and grants related to hazards and disasters. An inventory of awards from 1995 to the present is available at <http://www.colorado.edu/hazards/resources/grants/>.

**Using Global Communication Systems as Early Warning Systems for Natural Disasters.** Funding: National Science Foundation, one year. Principal Investigators: *Malik Magdon-Ismail (Mark K. Goldberg, William A. Wallace), Rensselaer Polytechnic Institute, Computer Science Department, Room 207 Lally, 110 8th Street, Troy, NY 12180; e-mail: magdon@rpi.edu.*

In response to the Sumatra-Andaman Island earthquake and Indian Ocean tsunami disaster, these researchers have embarked on a project studying the functioning of communication networks and their use by various social groups to better understand how sensor technologies could be best deployed and integrated into global communication networks. Their research will address what went wrong in the Indian Ocean region, recommend ways to avoid a similar situation in the future, and offer concrete suggestions for improving social communication networks to allow warning messages to flow under situations of disruption and destruction.

**An Integrative Study of Vulnerability and Cultural Response to Hurricane Hazards Among Indigenous Populations on the Miskito Coast of Honduras and Nicaragua.** Funding: National Science Foundation, two years. Principal Investigators: *Kam-biu Liu, Louisiana State University, Department of Geography and Anthropology, E104 Howe-Russell Geoscience Complex, Baton Rouge, LA 70803; e-mail: kliu1@lsu.edu and Carl A. Reese (David M. Cochran Jr.), University of Southern Mississippi, Department of Geography, 118 College Drive, Box 5051, Hattiesburg, MS 39406; e-mail: carl.reese@usm.edu.*

Despite the impact history of hurricanes on coastal areas of Central America, no research has been done to date to assess the societal vulnerability of this region to hurricane strikes. This project will examine the vulnerability of the Caribbean coasts of Honduras and Nicaragua to intense hurricane strikes and the cultural responses of different ethnic communities to hurricanes. Researchers will employ geoscience, paleotempestology (an emerging field of science that studies past hurricane activity by means of geological proxy techniques), ethnography, and participatory research to produce historical records, construct oral histories, and investigate the human dimension

of hurricane vulnerability. The resulting information on hurricane risk estimates and cultural responses by different ethnic groups will be useful for decision makers and stakeholders in disaster planning and management.

**Social Vulnerability Mapping and GIS in Tsunami Impact Analysis.** Funding: National Science Foundation, one year. Principal Investigators: *Carla S. Prater (Walter G. Peacock, Michael K. Lindell, Robert T. Snelgrove, Raghavan Srinivasan), Texas A&M University, 3137 TAMU College Station, TX 77843-3137.*

Recent research suggests a need to integrate a broader notion of vulnerability that extends beyond vulnerabilities arising from the built environment to also include social vulnerabilities. These investigators plan to extend their recent work in hazard mapping that links hazard exposure (and disaster impact) with a more comprehensive notion of vulnerability. A community vulnerability assessment that involves hazard exposure, physical/structural vulnerability, and social vulnerability will be applied to India to promote a better understanding of disaster impacts and enhance understanding of the recovery process. This project will also examine issues of variability in disaster impacts by gender as well as coping strategies used most successfully by women in a traditionally patriarchal society. This research aims to broaden understanding of what social science findings are applicable across nations and cultures. With such information, funds for disaster aid and foreign aid could be better targeted to the sectors of society most likely to benefit.

**Assessment of Tsunami Impacts on Coastal Aquifers in Sri Lanka.** Funding: National Science Foundation, one year. Principal Investigator: *Tissa H. Illangasekare, Colorado School of Mines, Environmental Science and Engineering Division, 1500 Illinois Street, Golden, CO 80401; e-mail: tillanga@mines.edu.*

The tsunami of December 26, 2004, was one of the worst natural disasters in Sri Lanka's known history. The resulting rapid movement of saline water inland due to the massive waves has impacted water supply sources and other natural resources in the coastal regions. Funding for this project will be used to assemble an expert panel of groundwater scientists to visit Sri Lanka and provide an

assessment of tsunami impacts on water supplies in coastal aquifers and lend their restoration expertise. It is expected that the experience in Sri Lanka will also be applicable to coastal aquifers in Indonesia and India.

**Reconnaissance Survey of the December 26, 2004, Great Sumatran Earthquake and Tsunami.** Funding: National Science Foundation, one year. Principal Investigators: *Jose C. Borrero (Costas E. Synolakis), University of Southern California, Department of Civil Engineering, Los Angeles, CA 90089-2531; e-mail: jborrero@usc.edu.*

This grant supports reconnaissance surveys of the December 26, 2004, earthquake and tsunami. Tsunami field surveys allow for quantitative measurements of tsunami inundation based on observations of watermarks and eyewitness accounts to help understand arrival times and infer tsunami currents. The geographical distribution of inundation in South East Asia, the Indian Subcontinent, and Africa will help the scientific community better understand tsunami generation and the associated seismological parameters. Data collected will be used to develop and validate new tsunami inundation models and assess risk from future tsunamis in the Indian Ocean and elsewhere (e.g., the Cascadia Subduction Zone).

**Development and Evaluation of a Natural Hazard Interactive Laboratory for Improving Decision Making.** Funding: National Science Foundation, two years. Principal Investigators: *Holly Taylor, Tufts University, Psychology Building, 490 Boston Avenue, Medford, MA 02155; e-mail: htaylor@emerald.tufts.edu and Carl Renshaw, Dartmouth College, Department of Earth Sciences, 6105 Fairchild, Room 208, Hanover, NH 03755; e-mail: carl.e.renshaw@dartmouth.edu.*

This work will examine the impact of a fully developed interactive computer-based role-playing laboratory on decision making based on scientific data. Previous studies showed the "proof of concept" of Eruption, a role-playing simulation of a volcanic hazard, and its impact on decision making using an innovative evaluation strategy that incorporates cognitive science methodologies. This work identified specific design principles that impact higher-order thinking and increase the effectiveness of computer assisted instruction laboratories. Incorporation of these principles into the fully implemented Eruption will increase its impact on higher-order cognitive skills such as decision making, problem solving, and critical analysis. The completed implementation and coincident assessment will further inform the relationship between educational exercises and higher-order critical thinking skills.

## New Quick Response Reports

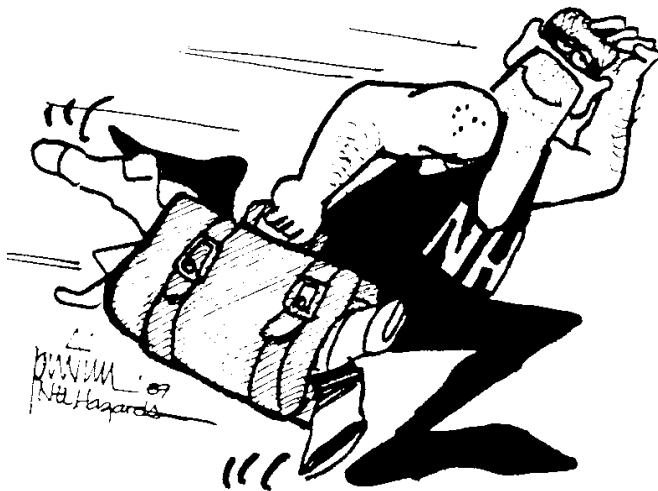
The following Quick Response reports have been posted on the Natural Hazards Center's Web site at <http://www.colorado.edu/hazards/qr/qrrepts.html>.

**QR175 *Europe's Flood Disaster of August 2002: Vienna's Evolving Flood Mitigation Projects***, by Jane Preuss. 2005. In the wake of the devastating floods in northern Europe in August 2002, Vienna, Austria, was largely spared. This research examined the mitigation strategies in place in Vienna and how they contributed

to reduced levels of damage. The researcher concluded that the success of these strategies can be attributed to the multidisciplinary and cooperative approach utilized in the city's floodplain restoration project.

**QR176 *An Urban Nightclub Multicasualty Shooting: Lessons Learned in Critical Incident Stress Management***, by Mary Myers and Stacy Muffet-Willett. 2005. This research features a case study of the critical incident stress management (CISM) services provided to responders and the population affected in the Columbus, Ohio, area following the nightclub shooting in December 2004. What they found was that primary victims and witnesses were overlooked in the provision of CISM care. They concluded that, although CISM has come a long way over the years, severe gaps still exist in the system in meeting the needs of the diverse populations involved in critical incidents.

**QR177 *Snowbirds and Senior Living Developments: An Analysis of Vulnerability Associated with Hurricane Charley***, by Burrell E. Montz and Graham A. Tobin. 2005. These researchers studied senior living developments in Florida affected by Hurricane Charley to see how "snowbird" (seasonal resident) populations and manufactured housing affected vulnerability and recovery. Preliminary results indicate that permanency of residence, age of the population, and structural characteristics do have an effect on resilience and recovery and that these socioeconomic factors are as important as geophysical factors when assessing vulnerability.





# RECENT PUBLICATIONS

Below are brief descriptions of a sampling of recent publications on hazards and disasters received by the Natural Hazards Center. Information on how to obtain copies is included.

## All Hazards

**Disaster Risk Reduction 1994-2004.** 2005. CD-ROM. Available from the United Nations International Strategy for Risk Reduction (ISDR). For more information or to get a copy, contact Marie-Lou Darricau at [darricau@un.org](mailto:darricau@un.org); <http://www.unisdr.org/>.

Following the first World Conference on Natural Disaster Reduction held in Yokohama, Japan, in May 1994, a wealth of literature and information on disaster reduction has been developed by a range of individuals, institutions, and nations. This set of three CD-ROMs represents the first compilation of disaster risk reduction documentation and information (in full text) derived from ISDR partners around the world. Comprising reviews and reports prepared and collected in the context of the review of the Yokohama Strategy, it presents guidelines, tools, articles, and case studies to promote and support the application of disaster risk reduction.

**Report of the World Conference on Disaster Reduction: Kobe, Hyogo, Japan, 18-22 January 2005.** 2005. 42 pp. Available free online from the United Nations International Strategy for Disaster Reduction, Palais des Nations, CH 1211 Geneva 10, Switzerland; e-mail: [isdr@un.org](mailto:isdr@un.org); <http://www.unisdr.org/wcdr/intergover/official-doc/L-docs/Final-report-conference.pdf>.

The purpose of the World Conference on Disaster Reduction (WCDR) was to take stock of progress in disaster risk reduction accomplished since the Yokohama Conference of 1994 and to make plans for the next ten years. This report features the main outcomes from the WCDR, which represent the commitment of the international community to address disaster reduction and to engage in a determined, results-oriented plan of action. Contents include the "Hyogo Declaration," the "Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters," and the "Common Statement of the Special Session on the Indian Ocean Disaster: Risk Reduction for a Safer Future."

**Risk Modeling, Assessment, and Management. Second Edition.** Yacov Y. Haimes. ISBN 0-471-48048-7. 2004. 837 pp. \$126.50. Available from John Wiley & Son, Inc., Customer Care Center, Consumer Accounts, 10475 Crosspoint Boulevard, Indianapolis, IN 46256; (877) 762-2974; <http://www.wiley.com/>.

The second edition of this reference describes the state of the art of risk management and its important applications in such areas as engineering, science, manufacturing, business, management, and public policy. The author strikes a balance between the quantitative and the qualitative aspects of risk management, showing how to quantify risk and construct probability in conjunction with real-world decision-making problems. At the same time, he addresses a host of institutional, organizational, political, and cultural considerations. Incorporating real-world examples and case studies to illustrate the analytical methods under discussion, the book presents basic concepts as well as advanced material, avoiding higher mathematics whenever possible.

**Natural Disaster Hotspots: A Global Risk Analysis.** Maxx Dilley, Robert S. Chen, Uwe Deichmann, Arthur L. Lerner-Lam, and Margaret Arnold. *Disaster Risk Management Series No. 5.* ISBN 0-8213-5930-4. 2005. 150 pp. \$20.00. Available from The World Bank, PO Box 960, Herndon, VA 20172-0960; (703) 661-1580, (800) 645-7247; e-mail: [books@worldbank.org](mailto:books@worldbank.org); <http://publications.worldbank.org/>.

This report is the result of a project with the overall goal of identifying geographic areas of highest disaster risk potential to better inform development efforts. It presents a global view of major natural disaster risk hotspots—areas at relatively high risk of loss from one or more natural hazards—and summarizes the results of an interdisciplinary analysis of the location and characteristics of hotspots for six natural hazards: earthquakes, volcanoes, landslides, floods, drought, and cyclones. Data on these hazards are combined with data on the subnational distribution of population and economic output and past disaster losses to identify areas at relatively high risk from one or more hazards. A 29-page synthesis report is available free online at <ftp://ftp.ciesin.columbia.edu/pub/hotspots/synthesisisreport.pdf>.

**Identification and Analysis of Factors Affecting Emergency Evacuations.** L.J. Dotson, J. Jones (Sandia National Laboratories). 2005. Vol. I 61 pp, Vol. II (appendices) 411 pp. Available free online from the U.S. Nuclear Regulatory Commission, Office of Nuclear Security and Incident Response, Washington, DC 20555. <http://www.nrc.gov/reading-rm/doc-collections/nuregs/contract/cr6864/>.

The objective of this study was to assess the emergency evacuation process in the United States, including evaluating evacuation experience (e.g., time to complete evacuation, traffic issues, deaths or injuries, etc.) and identifying critical factors affecting emergency evacuations (e.g., training, drills, preparedness, ad hoc versus preplanned, etc.). The study examined public evacuations of 1,000 or more persons in response to natural disasters, technological hazards, and malevolent acts in the United States between January 1, 1990, and June 30, 2003. Fifty evacuation incidents were selected for case study analysis. Findings revealed that large-scale evacuations in the United States have been very effective and successfully saved lives and reduced the potential number of injuries associated with the corresponding hazard. This analysis is featured in Volume I. Volume II contains the supporting data and information.

**Topics: Annual Review of North American Natural Catastrophes 2004.** 2005. 50 pp. Free. Available from American Re-Insurance Company (Am Re), 555 College Road East, Princeton, NJ 08543; (609) 243-5607; e-mail: [jbradley@amre.com](mailto:jbradley@amre.com); [http://www.amre.com/content/rl/topics04\\_amre.pdf](http://www.amre.com/content/rl/topics04_amre.pdf).

Written by American Re in cooperation with Munich Re, this publication provides information about significant U.S. natural catastrophes and related insurance issues in 2004. It is intended to provide insight and perspective about recent natural catastrophes as well as natural hazard risk and the underlying perils that influence the property and casualty insurance industry. This edition features articles on the impacts and lessons learned from Hurricanes Charley,

Frances, Ivan, and Jeanne; the January 2004 freeze in the Northeast, the thunderstorm events of 2004, and the U.S. tsunami hazard.

***When Their World Falls Apart: Helping Families and Children Manage the Effects of Disaster.*** Lawrence B. Rosenfeld, Joanne S. Caye, Ofra Ayalon, and Mooli Lahad. ISBN 0-87101-358-4. 2004. 488 pp. \$54.99. Available from the National Association of Social Workers Press, 750 First Street NE, Suite 700, Washington, DC 20002; (800) 227-3590; <http://www.naswpress.org/>.

This book is a comprehensive examination of the effects of disasters on children and families from cognitive and behavioral, family systems, and ecological perspectives. It celebrates the resilience of people in their responsiveness to adversity and serves as a guide for action when crises disrupt lives and routine services. The book's three parts cover understanding disasters, the effects of disasters, and disaster intervention. An accompanying CD-ROM features video clips of families affected by disaster.

***Supporting Earth Observing Science 2004.*** 2005. 70 pp. Available free from the National Aeronautics and Space Administration (NASA) National Snow and Ice Data Center; e-mail: [nasadaacs@nsidc.org](mailto:nasadaacs@nsidc.org); [http://nasadaacs.eos.nasa.gov/pdf/annual\\_2004.pdf](http://nasadaacs.eos.nasa.gov/pdf/annual_2004.pdf).

The 2004 edition of this annual multidisciplinary publication highlights new uses of data from NASA's Earth Observing System and features a 10th anniversary section celebrating a decade of publishing the benefits and research uses of Earth science data and information products. Articles include "Sensing Remote Volcanoes," "The Flood Hunters," and more.

As part of a ProVention Consortium initiative to identify lessons learned from recovery efforts following major natural disasters, the World Bank has released the following reports. They are available free online from the Hazard Management Unit, The World Bank, 1818 H Street NW, Washington, DC 20433; (202) 458-4500; e-mail: [hazardmanagement@worldbank.org](mailto:hazardmanagement@worldbank.org); <http://www-wds.worldbank.org/>.

***Learning Lessons from Disaster Recovery: The Case of Bangladesh.*** Tony Beck. Disaster Risk Management Working Paper Series No. 11. 2005. 46 pp.

***Learning Lessons from Disaster Recovery: The Case of Mozambique.*** Peter Wiles, Kerry Selvester, and Lourdes Fidalgo. Disaster Risk Management Working Paper Series No. 12. 2005. 99 pp.

***The National Plan for Research and Development in Support of Critical Infrastructure Protection 2004.*** 2005. 96 pp. Available free online from the U.S. Department of Homeland Security (DHS); [http://www.dhs.gov/internet/assettlibrary/ST\\_2004\\_NCIP\\_RD\\_Plan\\_FINALApr05.pdf](http://www.dhs.gov/internet/assettlibrary/ST_2004_NCIP_RD_Plan_FINALApr05.pdf).

Homeland Security Presidential Directive 7 (HSPD-7) Critical Infrastructure Identification, Prioritization, and Protection directed the secretary of the DHS, in coordination with the director of the Office of Science and Technology Policy, to prepare an annual research and development plan in support of the directive. This plan, the first of the required annual plans, focuses on the identification of capabilities, needs, and gaps based on known threats and serves as a baseline for future efforts.

***Top Priority: A Fire Service Guide to Interoperable Communications.*** William L. Pessemer. 2005. 36 pp. Free. Available from the International Association of Fire Chiefs, 4025 Fair Ridge Drive, Fairfax, VA 22033; (703) 273-0911; e-mail: [skalish@iafc.org](mailto:skalish@iafc.org); [http://www.iafc.org/home/nextel\\_handbook.asp](http://www.iafc.org/home/nextel_handbook.asp).

The purpose of this guide is to provide fire and emergency service agencies with a comprehensive understanding of interoperability. This understanding, in turn, can form the foundation for increasing the effectiveness of emergency response services and improving the safety of emergency response personnel. The guide proposes a common operational definition of interoperability, discusses the foundation for interoperable communications, and provides direction to establish interoperability between and among public safety services. Although written from a fire-service perspective, it is recom-

mended for use by fire departments, emergency medical services, law enforcement agencies, and emergency managers.

***Statewide Communication Interoperability Planning (SCIP) Methodology: An Approach Based on the Commonwealth of Virginia's Planning Process.*** 2004. 154 pp. Available free online from SAFECOM, PO Box 57243, Washington, DC 20037; (866) 969-7233; <http://www.safecomprogram.gov/NR/rdonlyres/9628BE4B-E7A5-4F1B-9179-2CFCF2653CA9/0/SCIPMethodology.pdf>.

With the support of the U.S. Department of Homeland Security's SAFECOM program, the Commonwealth of Virginia recently completed the first phase of an effort to enhance interoperability through the development of a strategic plan for improving statewide interoperable communications. SAFECOM believes the Virginia planning process can be useful in the development of other statewide plans because it describes a process that builds support at all levels of government. Therefore, SAFECOM developed this methodology as a model that other states may adapt to their particular needs.

***Telecommunications Infrastructure in Disasters: Preparing Cities for Crisis Communications.*** Anthony M. Townsend and Mitchell L. Moss. 2005. 45 pp. Available free online from the Robert F. Wagner Graduate School of Public Service, New York University, 295 Lafayette Street, Room 3090, New York, NY 10012; (212) 998-7526; <http://hurricane.wagner.nyu.edu/pickup/report1.pdf>.

This report examines how telecommunications networks contribute to prevention, response, and recovery related to major urban disasters. It describes how telecommunication infrastructure fails during urban disasters; examines the role of telecommunications infrastructure and the consequences of failure during emergency response, restoration and repair, reconstruction, and redevelopment; and suggests areas in which urban telecommunications infrastructure and disaster communications practices can be strengthened to increase their effectiveness in future disasters.

***Surviving Disasters and Supporting Recovery: A Guidebook for Microfinance Institutions.*** Eileen Miamidian, Margaret Arnold, Kiendel Burritt, and Marc Jacquand. Disaster Risk Management Working Paper Series No. 10. 2005. 51 pp. Available free from the Hazard Management Unit, The World Bank, 1818 H Street NW, Washington, DC 20433; e-mail: [hazardmanagement@worldbank.org](mailto:hazardmanagement@worldbank.org); <http://www.worldbank.org/hazards/files/disasterguidefinal.pdf>.

Published by The World Bank's Hazard Management Unit, the United Nations Development Programme, and the United Nations Capital Development Fund, this guidebook is part of an initiative to develop mechanisms for poor households and communities to better manage disaster risk. Since microfinance institutions (MFI) work with the poor, it is critical that they are prepared for upheavals, such as natural disasters, to protect their clients as well as themselves. Guidance for MFIs is offered through chapters dedicated to assessment of risk, institutional preparedness, client preparedness, emergency response, and recovery.

***Disaster Reduction: Living in Harmony with Nature.*** Julio Kuroiwa. ISBN 9972-9999-0-4. 2004. 513 pp. \$79.00. Available from the International Code Council, 4051 West Flossmoor Road, Country Club Hills, IL 60478; (800) 786-4452; <http://www.iccsafe.org/>.

A product of the International Decade of Natural Disaster Reduction, this book takes a multidisciplinary and practical approach to disaster reduction, blending science with humanitarianism. Contents include discussions on sustainable cities; geological, climatic, and technological hazards; economic and social impact of disasters; and reduction of social vulnerability.

***Connecticut Emergency Broadcast System Survey: Public Reaction to the Erroneous Statewide Broadcast of February 1, 2005.*** 2005. 35 pp. Available free online from the Public Entity Risk Institute, 1350 Random Hills Road, Suite 210, Fairfax, VA 22030; (703) 352-1846; [http://www.riskinstitute.org/newsite/uploads/Conn\\_Emergency\\_Broadcast\\_Survey.pdf](http://www.riskinstitute.org/newsite/uploads/Conn_Emergency_Broadcast_Survey.pdf).

A recent survey gauged Connecticut residents' reactions to an erroneous Emergency Alert System alert that aired statewide in February 2005. The message, which ran on television and radio



stations for about three minutes on a Tuesday afternoon, advised residents to evacuate the state. The message was general and did not specify an affected area or give any details about the emergency. Researchers concluded that specific information about a threat or emergency situation, as well as the source of the information, are key factors in the public's reaction to emergency alert messages. Absent specific information, people are likely to either dismiss the message or to seek further information from additional sources before taking any action.

## Earthquakes, Volcanoes, and Tsunamis

***The San Simeon, California, Earthquake: December 22, 2003.*** ISBN 1-932884-06-8. 2005. 78 pp. \$10.00. Available from the Earthquake Engineering Research Institute, 499 14th Street, Suite 320, Oakland, CA 94612; (510) 451-0905; e-mail: eeri@eeri.org; [http://www.eeri.org/cds\\_publications/catalog/](http://www.eeri.org/cds_publications/catalog/).

This Learning from Earthquakes report documents the Mw=6.5 earthquake that struck the central coast of California in a region of sparse development and low population density in December 2003. While the damage was less than expected given the magnitude of the earthquake, the event has relevance as a characteristic scenario anticipated for moderate risk regions in other parts of the country that have similar seismic risk, infrequent earthquakes, and a largely unretrofitted building stock. Through examination of structural and nonstructural performance; seismological, geological, and geotechnical effects; performance of lifelines; emergency response and recovery; and public policy implications, the report offers lessons learned that could help improve the mitigation of future loss of life and property.

***Echoes of Fury: The 1980 Eruption of Mount St. Helens and the Lives it Changed Forever.*** Frank Parchman. ISBN 0-974504-3-3. 2005. 432 pp. \$24.95. Available from Epicenter Press, PO Box 82368, Kenmore, WA 98028; (425) 485-6822, (800) 950-6663; e-mail: [info@epicenterpress.com](mailto:info@epicenterpress.com); <http://www.epicenterpress.com/>.

Twenty-five years after the eruption of Mount St. Helens, this new account of the event examines the effects it had on the land, the people, and America's national psyche. The author tells this tale of terror, survival, and recovery through the experiences of eight individuals whose lives were irrevocably changed by the events of March 20, 1980.

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) released the following reports. They are available free online from UNESCO; <http://ioc.unesco.org/INDOTSUNAMI/>.

***International Coordination Meeting for the Development of a Tsunami Warning and Mitigation System for the Indian Ocean Within a Global Framework.*** IOC Workshop Report No. 196. 2005. 103 pp.

***Second International Coordination Meeting for the Development of a Tsunami Warning and Mitigation System for the Indian Ocean.*** IOC Workshop Report No. 198. 2005. 74 pp.

***Developing Tsunami-Resilient Communities: The National Tsunami Hazard Mitigation Program.*** E.N. Bernard, editor. ISBN 1-4020-3353-2. 2005. 186 pp. \$99.00. Available from Springer New York, 233 Spring Street, New York, NY 10013; (212) 460-1500; e-mail: [service-ny@springer-sbm.com](mailto:service-ny@springer-sbm.com); <http://www.springeronline.com/>.

This volume chronicles the development and accomplishments of a joint state/federal partnership that was forged to reduce tsunami hazards along U.S. coastlines—the National Tsunami Hazard Mitigation Program. By integrating hazard assessment, warning guidance, and mitigation activities, the program has created a roadmap and a set of tools to make communities more resilient to local and distant tsunamis. Among the set of tools are tsunami forecasting, educational experiments, early alerting systems, and design guidance for tsunami-resilient communities. The book was written for coastal community planners, emergency managers, responders, policy mak-

ers, educators, and researchers and practitioners in the field of natural hazards impacts and risk assessment.

## Landslides and Debris Flows

***Partnerships for Reducing Landslide Risk: Assessment of the National Landslide Hazards Mitigation Strategy.*** ISBN 0-309-09140-3. 2005. 144 pp. \$31.75. Available free online from the National Academies Press, 500 Fifth Street NW, Box 285, Washington, DC 20055; (202) 334-3313, (800) 624-6242; <http://books.nap.edu/catalog/10946.html>.

This report reviews the U.S. Geological Survey's National Landslide Hazards Mitigation Strategy, which was created in response to a congressional directive for a national approach to reducing losses from landslides. Components of the strategy include basic research activities, improved public policy measures, and enhanced mitigation of landslides. The report suggests that substantially increased funding will be required to implement a national landslide mitigation program and that as part of a 10-year program the funding mix should transition from research and guideline development to partnership-based implementation of loss reduction measures.

***Debris-Flow Hazards and Related Phenomena.*** Matthias Jakob and Oldrich Hungr. ISBN 3-540-20726-0. 2005. 760 pp. \$229.00. Available from Springer New York, 233 Spring Street, New York, NY 10013; (212) 460-1500; e-mail: [service-ny@springer-sbm.com](mailto:service-ny@springer-sbm.com); <http://www.springeronline.com/>.

With climate change and deforestation, debris flows and debris avalanches have become the most significant landslide hazards in many countries. In recent years, there have been numerous debris flow avalanches in Southern Europe, South America, and the Indian Subcontinent that have resulted in major catastrophes and large loss of life. Such hazards are thus major problems for governments worldwide and for the engineers and scientists concerned. This text was written for advanced undergraduates, postgraduates, and researchers studying engineering, geosciences, and water resources as well as water resource managers and engineers.

## Drought, Climate Change, and Severe Weather

***From Disaster Response to Risk Management: Australia's National Drought Policy.*** Linda Courtenay Botterill and Donald A. Wilhite, editors. *Advances in Natural and Technological Hazards Research* 22. ISBN 1-4020-3123-8. 2005. 212 pp. \$129.00. Available from Springer New York, 233 Spring Street, New York, NY 10013; (212) 460-1500; e-mail: [service-ny@springer-sbm.com](mailto:service-ny@springer-sbm.com); <http://www.springeronline.com/>.

In 1992, Australia's commonwealth and state governments announced the introduction of a national drought policy, adopting an innovative risk management approach that received broad support from Australia's major political parties and the policy community. The implementation of this policy over the past decade, which has not been without problems, has intrigued the international scientific and policy communities. This book brings together a range of perspectives to illustrate the challenges that Australian policy makers have faced in implementing a national drought policy, something few other nations have made much progress on.

***Drought and Water Crises: Science, Technology, and Management Issues.*** Donald A. Wilhite, editor. ISBN 0-8247-2771-1. 2005. 432 pp. \$139.95. Available from CRC Press, 6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487; (561) 994-0555, (800) 272-7737; e-mail: [orders@crcpress.com](mailto:orders@crcpress.com); <http://www.crcpress.com/>.

This compilation of research efforts from more than three dozen scientists and engineers across numerous disciplines explains the complexities of drought and the role of science, technology, and management in resolving many of the issues associated with the world's expanding water crises. It brings together considerable information with the goal of reducing societal vulnerability to drought. Featuring case studies and stressing new technologies, the book seeks to encourage nations to adopt a more risk-based, proactive policy for water and drought management.

***Beyond Kyoto—A New Global Climate Certificate System.*** Lutz Wicke. ISBN 3-540-22482-3. \$2005. 320 pp. \$119.00. Available from Springer New York, 233 Spring Street, New York, NY 10013; (212) 460-1500; e-mail: service-ny@springer-sbm.com; <http://www.springeronline.com/>.

The author of this book argues that a global climate certificate system (GCCS) can achieve what neither the Kyoto-Protocol Climate Protection System nor the various proposals for improving the commitment system can: the prevention of dangerous anthropogenic interference with the climate system. In doing so, he shows that this interference can also be avoided without harm to the global economic system. He recognizes that extremely high hurdles will have to be overcome to implement the GCCS, but believes a small chance exists that mankind will manage to prevent dangerous climate change.

***Changing Sea Levels: Effects of Tides, Weather, and Climate.*** David Pugh. ISBN 0-521-53218-3. 2004. 280 pp. \$60.00. Available from Cambridge University Press, 100 Brook Hill Drive, West Nyack, NY 10994; (845) 353-7500; e-mail: orders@cup.org; <http://us.cambridge.org/>.

Flooding of coastal communities is one of the major causes of environmental disasters worldwide. This undergraduate textbook explains how sea levels are affected by astronomical tides, weather effects, ocean circulation, and climate trends. It introduces measurement techniques, tidal analysis and prediction, storm surges, and flood risks and how they are estimated. Hydrographers, coastal engineers, geologists, biologists, coastal planners, and economists may also find this book of interest.

***Hurricane Isabel Assessment: Review of Hurricane Evacuation Study Products and Other Aspects of the National Hurricane Mitigation and Preparedness Program (NHMPP) in the Context of the Hurricane Isabel Response.*** 2005. 301 pp. Available free online from the Virginia Department of Emergency Management; <http://www.vdes.state.va.us/library/postisabelreport.cfm>.

This post-Isabel assessment, which is a cooperative study of hurricane response done by the Federal Emergency Management Agency, the National Oceanic and Atmospheric Administration, the U.S. Army Corps of Engineers, and state and local emergency managers, offers more than 30 recommendations for improving disaster response in Virginia, Maryland, and North Carolina coastal areas. It explores many areas of hurricane response during Hurricane Isabel, such as communication with non-English speaking people, sheltering problems, evacuation rates, and storm surge issues.

## Wildfire

***Mimicking Nature's Fire: Restoring Fire Prone Forests in the West.*** Stephen F. Arno and Carl E. Fiedler. ISBN 1-55963-143-0. 2005. 256 pp. \$24.95. Published by Island Press. Available from the University of Chicago, Distribution Center, 11030 South Langley Avenue, Chicago, IL 60628; (800) 621-2736; e-mail: [custserv@press.uchicago.edu](mailto:custserv@press.uchicago.edu); <http://www.islandpress.org/>.

The stands of old-growth trees that characterize the forests of western North America depend on periodic fires for their creation and survival. Deprived of that essential disturbance process they will eventually die, leaving an overcrowded growth of smaller trees vulnerable to intense blazes and epidemics of insects and disease. To address this problem, the authors of this book advocate "restoration forestry," an ecologically based approach that seeks to establish forest structures in which fire can once again serve as a beneficial process. To do so, they introduce the fundamentals of restoration forestry and use profiles of restoration forestry projects to demonstrate how this type of forestry management is being implemented.

***Planning for Wildfires.*** James Schwab and Stuart Meck. *Planning Advisory Service Report Number 529/530.* ISBN 1-932364-07-2. 2005. 120 pp. \$60.00. Available from the Planners Book Service, American Planning Association, 122 South Michigan Avenue, Suite 1600, Chicago, IL 60603; (312) 786-6344; [bookservice@planning.org](mailto:bookservice@planning.org); <http://www.planning.org/bookservice/>.

Wildfires are both dangerous and costly, yet people continue to build in wildfire-prone areas. This poses challenges for governments

and planners, who must decide whether to permit development in such areas and how best to design developments that are allowed. Underwritten by the National Wildland/Urban Interface Fire Program, a cooperative interagency program operated by the National Fire Protection Association, this report explores both issues, outlining how knowledge of wildfire risks can be incorporated into comprehensive planning and identifying best practices for development in at-risk areas. It also looks at how residents in the wildland/urban interface can play an integral role in mitigating damage by maintaining their property.

## Public Health

***Public Health Risks of Disasters: Communication, Infrastructure, and Preparedness.*** ISBN 0-309-09542-5. 2005. 88 pp. \$18.00. Available free online from the National Academies Press, 500 Fifth Street NW, Box 285, Washington, DC 20055; (202) 334-3313, (800) 624-6242; <http://books.nap.edu/catalog/11201.html>.

The National Research Council's Disasters Roundtable and the Institute of Medicine's Roundtable on Environmental Health Sciences, Research, and Medicine, convened a workshop for the stakeholders from both roundtables to come together to consider issues related to health risks of disasters and to explore capacity needs. This workshop summary captures the discussions and presentations by the speakers and participants who identified the areas in which additional research is needed, the processes by which changes can occur, and the gaps in the knowledge.

***Altered Standards of Care in Mass Casualty Events.*** 2005. 53 pp. Free. Available from the Agency for Healthcare Research and Quality (AHRQ), 540 Gaither Road, Rockville, MD 20850; (800) 358-9295; e-mail: [ahrqpubs@ahrq.gov](mailto:ahrqpubs@ahrq.gov); <http://www.ahrq.gov/research/altstand/>.

The result of an expert panel convened by the AHRQ and the U.S. Department of Health and Human Services Office of the Assistant Secretary for Public Health Emergency Preparedness, this report offers a framework for how to provide optimal care during a potential bioterrorism or other public health emergency involving thousands, or even tens of thousands, of victims.

***Public Health Response to Biological and Chemical Weapons: WHO Guidance.*** Second edition. ISBN 92-4-154-615-8. 2004. 359 pp. \$34.20. Available from the World Health Organization Publications Center USA, 49 Sheridan Avenue, Albany, NY 12210; (518) 436-9686; e-mail: [QCORP@compuserve.com](mailto:QCORP@compuserve.com); <http://www.who.int/bookorders/>.

Originally published in 1970, this book contains information designed to guide preparedness for and response to the deliberate release of biological or chemical agents. It underscores the magnitude of potential impacts on civilian populations and the corresponding need for public health authorities, in close cooperation with other parts of government, to develop contingency plans. It describes how biological and chemical agents may endanger public health, provides the standard principles of risk analyses that may be undertaken to prepare for a deliberate release, and covers the preventive legal framework provided by treaties as well as international sources of assistance.

## Hazardous Materials and Terrorism

***Hazardous Materials Response Special Teams Capabilities and Contact Handbook 2005.*** 2005. 196 pp. Available free online from the U.S. Coast Guard; <http://www.uscg.mil/HQ/G-M/2005SpecialTeamsHandbook.pdf>.

Intended for use as a reference job aid for U.S. Coast Guard federal on-scene coordinators and other federal, state, and local responders and planners, this handbook provides quick access to the capabilities of various special teams related to oil, hazardous material, and weapons of mass destruction response. It is designed so that responders can easily locate response components or categories of technical expertise and ascertain which teams have the capability and resources to execute the relevant response actions. For planning purposes, additional narrative information describes the level of each team's capability in performing the necessary functions of response.

**Project Responder: National Technology Plan for Emergency Response to Catastrophic Terrorism.** Thomas M. Garwin, Neal A. Pollard, and Robert V. Tuohy, editors. 2004. 304 pp. Available free online from the National Memorial Institute for the Prevention of Terrorism, PO Box 889, 621 North Robinson, 4th Floor, Oklahoma City, OK 73101; (405) 232-5121; <http://www.mipt.org/pdf/Project-Responder-National-Technology-Plan.pdf>.

The guiding vision for this technology roadmap was “emergency responders should have the capability to prevent or mitigate terrorist use of chemical, biological, radiological, nuclear, or high explosive/incendiary (CBRNE) devices and emerging threats.” The plan focuses on technology investment to improve capabilities within 12 national terrorism response objectives that cover the anticipated scope of emergency responders’ requirements for dealing with CBRNE attacks on the United States. As new capabilities and threats emerge, this plan will change. Thus, it is the first contribution in an ongoing process to continually improve responders’ capabilities.

## GAO Reports

The Government Accountability Office (GAO) reports provide background information and insight into key issues and concerns of the U.S. Congress. The office frequently publishes studies regarding hazards and disaster policy. Some recent GAO reports and testimonies that might interest *Observer* readers are listed below. Summaries and full text are available on the Web at <http://www.gao.gov/>. Printed copies are also available. The first copy is free. Additional copies are \$2.00 each. To order, contact the GAO, 441 G Street NW, Room LM, Washington, DC 20548; (202) 512-6000; TDD: (202) 512-2537; <http://www.gao.gov/cgi-bin/ordtab.pl>.

**National Flood Insurance Program: Oversight of Policy Issuance and Claims.** GAO-05-532T. 2005. 15 pp.

**Wildland Fire Management: Progress and Future Challenges, Protecting Structures, and Improving Communications.** GAO-05-627T. 2005. 23 pp.

**Technology Assessment: Protecting Structures and Improving Communications During Wildland Fires.** GAO-05-380. 2005. 114 pp.

**Bioterrorism: Information on Jurisdictions’ Expenditure and Reported Obligation of Program Funds.** GAO-05-239. 2005. 34 pp.

**Homeland Security: Overview of Department of Homeland Security Management Challenges.** GAO-05-573T. 2005. 17 pp.

**Homeland Security: Much is Being Done to Protect from a Terrorist Attack, but Important Challenges Remain.** GAO-05-214. 2005. 95 pp.

**Homeland Security: Federal and Industry Efforts Are Addressing Security Issues at Chemical Facilities, but Additional Action is Needed.** GAO-05-631T. 2005. 15 pp.

**Department of Homeland Security: A Comprehensive and Sustained Approach Needed to Achieve Management Integration.** GAO-05-139. 2005. 33 pp.

**Results-Oriented Government: Improvements to DHS’ Planning Process Would Enhance Usefulness and Accountability.** GAO-05-300. 2005. 20 pp.

**Critical Infrastructure Protection: Department of Homeland Security Faces Challenges in Fulfilling Cybersecurity Responsibilities.** GAO-05-434. 2005. 73 pp.

**Hazardous Waste Sites: Improved Effectiveness of Controls at Sites Could Better Protect the Public.** GAO-05-163. 2005. 60 pp.

**Continuity of Operations: Agency Plans Have Improved, but Better Oversight Could Assist Agencies in Preparing for Emergencies.** GAO-05-577. 2005. 80 pp.

## Call for Papers: *Natural Hazards Review*

The *Natural Hazards Review* is the first cross-disciplinary journal to bring together engineering, the regulatory and policy disciplines, and the social, behavioral, and physical sciences to natural hazards loss and cost reduction. Extending well beyond the boundaries of a single traditional field, it serves as a forum for holistic approaches to natural hazards mitigation. The journal publishes original, peer-reviewed papers on every aspect of loss reduction. Articles containing detailed case studies are complemented by ones reporting original research findings to describe both practical projects and the latest cutting-edge knowledge on significant hazards issues.

The *Natural Hazards Review* is a publication of the American Society of Civil Engineers and the Natural Hazards Center at the University of Colorado at Boulder. The editors are currently seeking submissions. Send manuscript submissions, editorial inquiries, comments, or suggestions to the *American Society of Civil Engineers, Journals Production Department, 1801 Alexander Bell Drive, Reston, VA 20191*. For more information, visit <http://scitation.aip.org/nho/>.

## IBHS Wants Small Businesses Open for Business

According to the U.S. Small Business Administration, small businesses account for 99.7 percent of all employers in the United States. Small businesses are especially at risk from disaster since, unlike their larger counterparts, few have the resources or knowledge to develop full-scale property protection and continuity plans.

To help these small businesses become better prepared, the Institute for Business & Home Safety (IBHS) created *Open for Business*, a comprehensive disaster-planning toolkit in booklet and CD-ROM formats. The guide helps business owners reduce the potential for loss should disaster strike and reopen quickly should they be forced to close. This creates a savings for the business and also benefits the employees and customers who rely on it.

Download the toolkit at <http://www.ibhs.org/publications/view.asp?id=556>. To request a free single copy, write [info@ibhs.org](mailto:info@ibhs.org) or call (866) 657-4247.



## The Natural Hazards Center

The Natural Hazards Center was founded to strengthen communication among researchers and the individuals and organizations concerned with mitigating natural disasters. The Natural Hazards Center is funded by the National Science Foundation, the Federal Emergency Management Agency, the National Oceanic and Atmospheric Administration, the U.S. Geological Survey, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Department of Transportation, the U.S. Bureau of Reclamation, the U.S. Forest Service, the National Aeronautics and Space Administration, the Centers for Disease Control and Prevention, the Institute for Business & Home Safety, and the Public Entity Risk Institute. Please send information of potential interest to the Natural Hazards Center or the readers of this newsletter to the address below. The deadline for the next *Observer* is July 20, 2005.

Center phone number..... (303) 492-6818  
Fax ..... (303) 492-2151  
E-mail..... hazctr@colorado.edu  
Publications Administrator ..... (303) 492-6819  
E-mail.....janet.kroeckel@colorado.edu

### Natural Hazards Center

ISSN 0737-5425

Printed in the USA.

Published bimonthly. Reproduction with acknowledgment is permitted and encouraged.

The *Observer* is free to subscribers within the U.S. Subscriptions outside the U.S. cost \$24.00 per year. Back issues of the *Observer* are available for \$4.00 each, plus shipping and handling. Orders must be prepaid. Checks should be payable to the University of Colorado. Visa, Mastercard, and American Express cards are also accepted.

Copies of the *Observer* and the Natural Hazard Center's electronic newsletter, *Disaster Research*, are also available on the Center's Web site:

<http://www.colorado.edu/hazards/>

Natural Hazards Center  
University of Colorado at Boulder  
482 UCB  
Boulder, Colorado 80309-0482



Change Service Requested

## Staff

Christa Rabenold..... Editor  
Kathleen Tierney..... Director  
Dennis S. Mileti..... Senior Research Scientist  
Greg Guibert..... Project Manager  
Wanda Headley ..... Library Manager  
Diane Smith..... Office Manager  
Janet Kroeckel..... Publications Administrator  
Jeannette Sutton ..... Research Associate  
Christine Bevc..... Research Assistant  
Lori Peek..... Research Affiliate

Cartoons for the *Observer* are drawn by Rob Pudim.

Please:

- Add my name to the *Observer* mailing list
- Delete my name
- Change my address

(Return this page with your current address label)

Name: \_\_\_\_\_

Mailing Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Affiliation: \_\_\_\_\_

E-mail Address: \_\_\_\_\_

Natural Hazards Center  
University of Colorado at Boulder  
482 UCB  
Boulder, Colorado 80309-0482



Change Service Requested

Non-Profit Org.  
U.S. Postage  
PAID  
Boulder, CO 80309  
Permit No. 257

Printed on Recycled Paper

