

An invited comment by  
Louise K. Comfort

**N**EARLY A YEAR AFTER its catastrophic January 12, 2010, earthquake, Haiti is still in turmoil. Debris clogs the streets. Shattered buildings block reconstruction. Twenty-four tent cities still house an estimated 1.6 million people, all waiting to rebuild their lives.

An outbreak of cholera has strained the already burdened health infrastructure, further imperiling a vulnerable population. A contested presidential election challenges the governing capacity of the fragile nation. Much of the \$5.3 billion in international assistance has not been spent because of a lack of coherent plans and leadership to translate aid into action.

Why—even with significant government and nongovernmental planning, substantial funds, and the obvious needs of a severely damaged environment—has the rebuilding process stalled in Haiti?

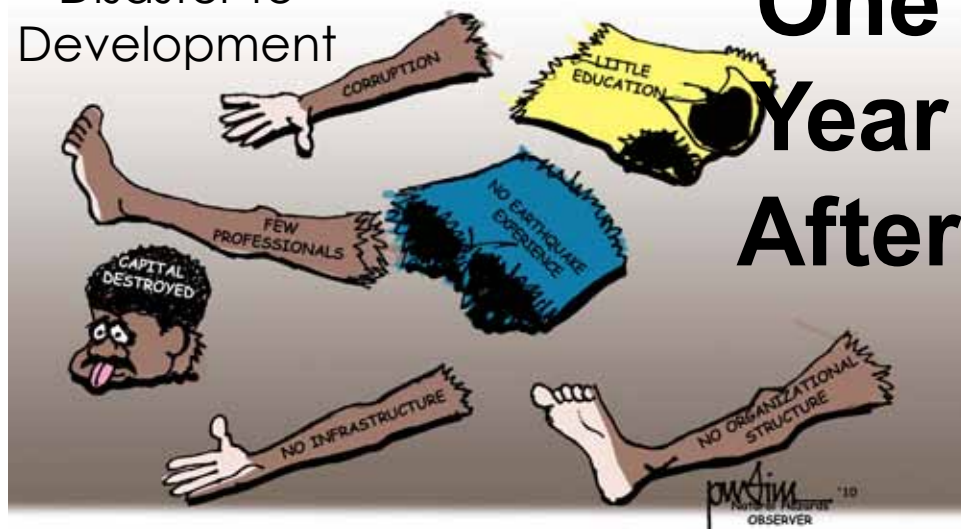
### The Haitian disaster context

THE INABILITY TO MOVE FORWARD IN HAITI is an organizational and policy conundrum. It defies the international disaster assistance structure developed over more than 50 years in the international aid community. Several factors contribute to this situation.

First, the catastrophic damage to the capital, Port-au-Prince—the political, economic, and cultural center of the country—was a direct result of conditions that existed before the earthquake. Before the quake, Haiti seemed ignorant of its seismic risk. The nation undertook no preparations for the hazard, even though the island is located on the edge of the active Caribbean plate. Unstable and corrupt governments over the last two generations have contributed

## Haiti:

From  
Disaster to  
Development



## One Year After

to widespread poverty, illiteracy, and failing infrastructure. Economic and social conditions have declined steadily in the past 50 years.

The resulting dysfunction has produced a set of conditions that placed Haiti 145th out of 169 nations ranked on the United Nations' index of human development (UNDP 2010). As a result, there was little capacity in Haiti that international organizations could connect to when mobilizing response.

Second, the international machinery that has evolved to assist nations after disasters operates on a set of assumptions that don't fit the Haitian context. The UN Organization for the Coordination of Humanitarian Affairs is designed to deal with nations with at least some functioning governing capacity to provide local knowledge, contacts, and commu-

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Remember when flying was glamorous?

## ‘My junk,’ racial profiling, and random searches

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Wait until they hear about the brain scan!

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**T**HE RECENT KERFUFFLE over pat-downs at airport security highlighted national dissatisfaction with long lines and intrusive searches. It may also demonstrate some vague

discomfort with the growth of Big Brother government. But the fact that this controversy developed shortly after two suspicious package bombs were found aboard flights bound for Chicago emphasizes the real and complex problem faced by security planners.

Software engineer John Tyner became a mini-hero in some circles—and a pariah in others—when prior to boarding a flight, he told Transportation Security Administration screeners, “If you touch my junk, I’ll have you arrested!”

New pat-down procedures were introduced by TSA right before the busy Thanksgiving holidays, triggering some activists to call for a “National Opt-Out Day” ([www.optoutday.com/](http://www.optoutday.com/)) on November 24 for full-body scanners, which would mean a physical inspection—a “pat-down”—

would be required for those refusing the scanner. The protest brought predictable counter protests. William Saletan at *Slate* ([www.slate.com/id/2275681/](http://www.slate.com/id/2275681/)) called it “idiocy ... Ignore these imbeciles,” he wrote. “If you opt out of the scan, you’ll get a pat-down instead. You’ll trade a fast, invisible, intangible, privacy-protected machine inspection for an unpleasant, extended grope.”

The scanners are intended, in large part, to detect the explosive PETN, which has been a staple of terrorist bomb makers, according to the *Los Angeles Times* ([www.latimes.com/news/nationworld/nation/la-na-petn-20101124.0.3675872.story](http://www.latimes.com/news/nationworld/nation/la-na-petn-20101124.0.3675872.story)). PETN was the material found in the package bombs sent via cargo planes to Chicago on October 28, apparently intended to bring down those airplanes.

A Zogby International poll found 61 percent of “likely voters” oppose TSA body scanners and body pat-downs ([www.zogby.com/news/ReadNews.cfm?ID=1925](http://www.zogby.com/news/ReadNews.cfm?ID=1925)).

“It’s clear the majority of Americans are not happy with TSA and the enhanced security measures recently enacted,” Zogby said. “The airlines should not be happy with 42 percent of frequent fliers seeking a different mode

of transportation due to these enhancements. It seems the airlines and TSA need to come together to find a solution before the American flying public abandons both."

But in a dueling conclusion, a joint ABC News and *Washington Post* poll released the day before Thanksgiving found that 64 percent of the population—not just "likely voters"—supported the use of body-scanning machines, while 32 percent opposed them. Fifty percent said hand searches were over the top. A roughly equal number said hand searches were okay to "prevent terrorism."

The uproar renewed calls for alternatives to the current system, including some form of profiling to weed out potential terrorists.

On the racial profiling front, at least, the arithmetic doesn't work. William Press of the University of Texas at Austin says that as well as being politically and ethically questionable, racial profiling does no better in helping law enforcement officials in their task of catching terrorists than standard uniform random sampling techniques—that is, picking people out of line at random and subjecting them to extra screening. This is the topic of a paper in *Significance*, the magazine of the Royal Statistical Society and the American Statistical Association ([doi.wiley.com/10.1111/j.1740-9713.2010.00452.x](https://doi.wiley.com/10.1111/j.1740-9713.2010.00452.x)).

## ‘Twas the season

After ignoring the Transportation Security Administration for nearly a year, the mainstream media turned on the agency with a vengeance over the holidays, according to The Project for Excellence in Journalism.

During the week prior to Thanksgiving, TSA generated 6.3 percent of the coverage in the news media ([www.journalism.org/node/23082](http://www.journalism.org/node/23082)), vaulting them to a total of 2.6 percent for November of 2010. They got a minuscule .003 percent of the news hole in July. The surge in interest was inspired by the tempest-in-a-teapot over pat-down searches versus full body scanning, even while planned protests and airport slowdowns urged by some groups failed to materialize.

"For that week (November 15-21), when passenger John Tyner's response to more invasive airport searches seemed to strike a chord, attention to airport security filled 6.3 percent of the news hole, its highest level of coverage since PEJ began tracking that topic in November 2007," the journalism watchdog group wrote on its web site.

"In the past three years there has been only one other time that airport security made significant news. Following the failed Christmas Day airplane bomb plot, calls for increased airport security—including demands for more use of full body scanners—filled 5.2 percent of the news hole from December 28, 2009-January 3, 2010."

## Yes, but what do you really think, Dave?

"Let's state this directly: John Tyner, the software engineer who refused to be patted down before boarding a flight in San Diego, is no hero—he is a selfish idiot who clearly cared nothing for the lives or safety of the other passengers and crew on the plane he was about to board."

—David Silverberg, writing for *HS Today*.

Press applied statistical methodology comparing profiling to random statistical sampling of passengers. He found that profiling was no more effective in identifying terrorists than random searches. Indeed, he found that paradoxically, "strong profiling"—picking out, say, young Muslim males traveling alone—was less likely to catch terrorists.

"The aggregate effect of [focusing on] such innocent, but high profile, individuals is, on average, to draw enforcement resources away from the actual terrorist, so that fewer actual terrorists are caught," he writes.

He concludes, "If there is any general advice that we can give to policy makers, or to our colleagues in law enforcement, it would seem to be this: no strategy of using racial (or any actuarial) profiles is likely, in practice, to be substantially more effective at catching terrorists than uniform random sampling of the population that can be screened. Many such strategies, especially those with strong profiling, will be less effective than uniform random sampling."

But if physical pat-downs are inspiring waves of protest, we hesitate to imagine what might happen if a technique now being developed at Northwestern University is perfected. Researchers were able to "correlate P300 brain waves to guilty knowledge with 100 percent accuracy in the lab," when they knew specifics of the make-believe planned attacks in advance, according to a Northwestern news release.

So it seems old-fashioned intelligence work, combined with mind-reading, may be able to identify terrorists.

The most intriguing part of the study is its real-world implications, says psychology professor J. Peter Rosenfeld. Even when the researchers had no advance details about mock terrorism plans, the technology was still accurate in identifying critical concealed information.

"Without any prior knowledge of the planned crime in our mock terrorism scenarios, we were able to identify 10 out of 12 terrorists and, among them, 20 out of 30 crime-related details," Rosenfeld said. "The test was 83 percent accurate in predicting concealed knowledge, suggesting that our complex protocol could identify future terrorist activity."

We can hardly wait to hear what the "likely voters" have to say about that.

## They Said It ...

"Find them early, find them early, and find them early."—Former Apollo astronaut Rusty Schweickart on the search priorities for Near Earth Objects, quoted on *Space.com*.

"There are no countries who are as far ahead as we are in this area. We are going to be the ones who set the standard for final disposal."—Timo Seppala, of the construction company Posiva, on Finland's progress in providing high-level nuclear waste storage that will last 100,000 years, quoted on *CNN World*.

"I do believe in the Bible as the final word of God. And I do believe that God said the Earth would not be destroyed by a flood. Now, do I believe in climate change? In my trip to Greenland, the answer is yes. The climate is changing. The question is more about the costs and benefits and trying to spend taxpayer dollars on something that you cannot stop versus the changes that have been occurring forever. That's the real debate."—Rep. John Shimkus (R-Ill.), quoted by *Politico*.

"Indonesia is not at a stage where people are well prepared for disasters. Indonesians tend to be risk takers. Disaster preparedness is not considered important, especially for people who are still grappling with poverty and a lack of education."—Wisnu Wijaya, director for disaster preparedness at the National Disaster Management Agency, quoted by *IRIN*.

"In some provinces of Papua New Guinea, the rate of death due to snake bite is two times higher than malaria."—David Williams, coordinator of the Global Snakebite Initiative, quoted by *IRIN*.

"The dunes are invading our land and consuming the villages and we are very worried. They used to be far away, but now they are much closer and our plots of land are being completely consumed. In years to come, this village is likely to disappear."—Seidou Samba Guindo, the chief of Anakila village, Mali, asking for assistance in curbing desertification caused by climate change, quoted by *Reuters AlertNet*.

## Polio strikes in Congo, Uganda

A battle between traditional and modern medicine

months of 2010, according to health officials.

In the neighboring Republic of Congo, polio has killed 169 people and paralyzed 409, according to reports from the news service IRIN.

"The current epidemic is alarming, but it is important to stay calm," DRC Health Minister Victor Makwenge Ka-

THERE HAVE BEEN 63 CASES of polio reported in the Democratic Republic of Congo this year, with a sharp increase in the last

put told IRIN. "We now have enough vaccines to meet our needs."

Many researchers believe that the world is on the verge of eradicating polio as a health threat. The DRC had no reported cases between 2001 and 2005. The United Nations Children's Fund will provide 3.7 million polio vaccine doses to two provinces in DRC in December.

Since the introduction and wide use of polio vaccine beginning the 1950s, polio has been in retreat and is close to global eradication. It is endemic in only four countries—India, Pakistan, Afghanistan, and Nigeria.

Kaput lashed out at some religious leaders in DRC who are prohibiting vaccination "with no reason." Some preachers have apparently said that the vaccine causes sterility in women.

"The paralysis caused by polio is irreversible," WHO representative Matthieu Kamwa said "We are in the midst of battle between traditional and modern medicine. There is a magical-religious perception of this disease. Children are sometimes taken long distances to consult healers, when in fact there is nothing they can do."

The DRC anti-vaccination effort is mirrored in the United States, where celebrity Jenny McCarthy has campaigned against even polio vaccines in



the incorrect belief that vaccination contributes to autism.

Meanwhile, officials in Uganda and Kenya stepped up anti-polio efforts after one case of the disease was reported in Uganda near its border with Kenya. Officials were attempting to vaccinate more than 40,000 children under five.

Many public health researchers believe that polio can be eradicated soon. When the Global Polio Eradication Initiative was launched in 1988, there were 350,000 cases of polio. In 2009, 1,600 cases were reported. To date, though,

smallpox is the only disease ever eradicated.

"Polio is next in line," Claudia Emerson, program leader in ethics at the University of Toronto's McLaughlin-Rotman Centre for Global Health told the *Natural Hazards Observer* (July 2010). "It's really running a marathon. We're close to the finish line and it doesn't make much sense to stop short of the finish line. We have a moral duty to do that."

## Environmental refugees' numbers are growing

The policy lags behind the problem

**S**PECULATION that more people are displaced in Africa by the environment

than by warfare is growing and it's time for international policy makers to develop plans that deal with climate change induced population migration, according to a paper from the German Marshall Fund of the United States.

A paper by Susan Martin at the Fund says countries have been slow to respond to migration resulting from environmental factors, even though the need for such policies is becoming apparent.

President Mohamed Nasheed of the low-lying Maldives in the Indian Ocean said in 2008 that his country was establishing a trust fund that could be used to purchase another island for his nation's population, which is threatened by rising sea levels caused by the changing climate. The Maldives has a population of just under 400,000 people.

Anote Tong, president of Kiribati in the central Pacific Ocean, says his nation's nearly 98,000 people may also be forced to relocate, possibly to New Zealand and Australia. Kiribati has 98,000 citizens, according to the World Bank.

"In only a few cases has there been any serious discussion of new immigration policy frameworks for those displaced by climate change," Martin writes, "but even in this context, the focus has been on disaster-related, not slow-onset, movements."

Currently, environmental refugees are not recognized in international law or policies. Martin cites an initiative by Australia's Green Party to create a "climate refugee visa" in immigration law, which would allow up to 300 climate refugees annually from Tuvalu, 300 from Kiribati, and 300 from elsewhere in the Pacific.

"Few potential destination countries have explicit policies to manage climate change induced migration," Martin writes.

Rose Mwebaza, writing for the African Institute for Security Studies, cites a report by the United National High Commissioner for Refugees saying that the number of refugees worldwide grew from 9.9 million in 2007 to 11.4 million in 2008.

"The same report identifies climate change as one of the leading causes of the global rise in refugees, along with



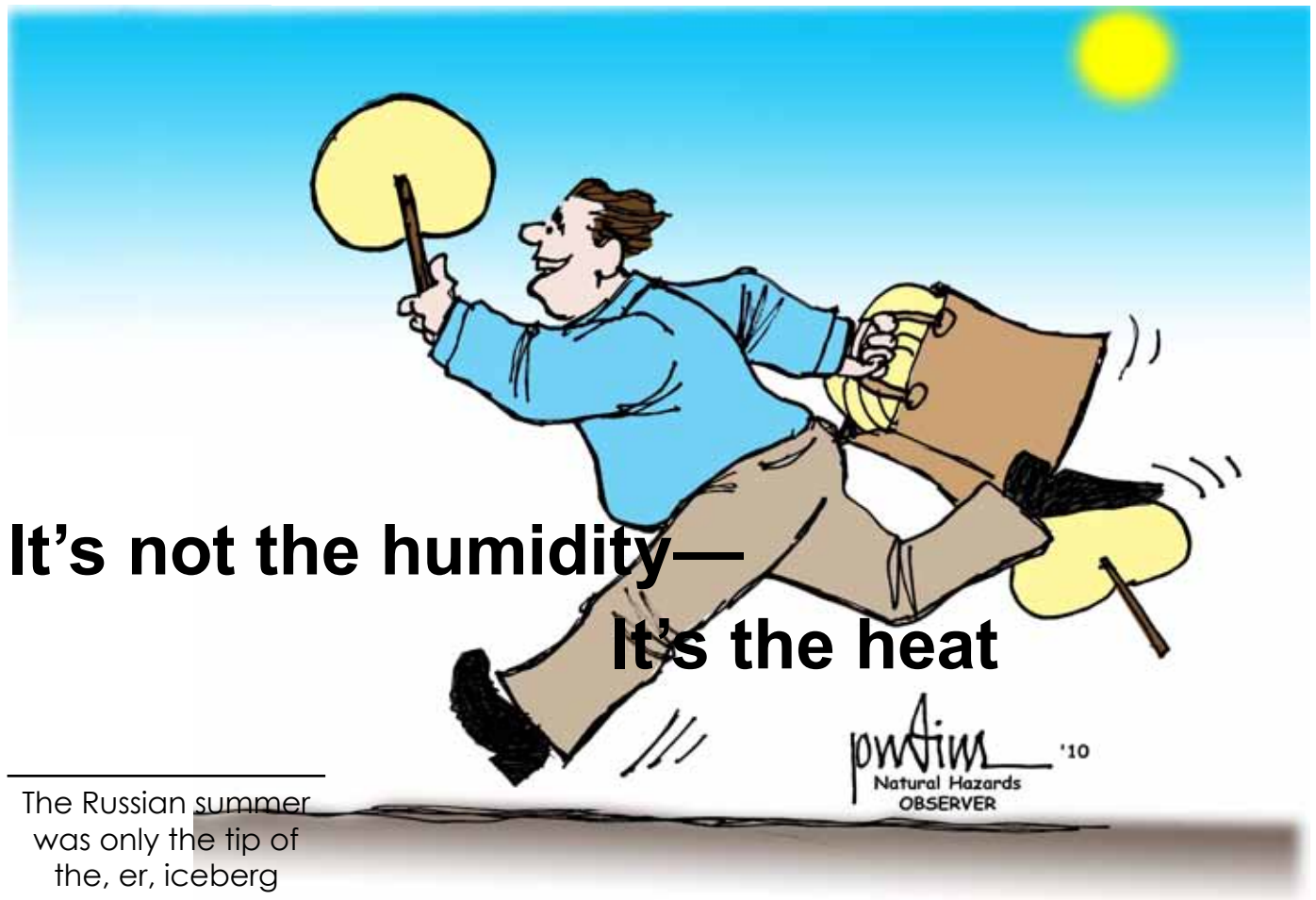
conflict," she writes. "The International Red Cross concurs that climate change disasters are now a bigger cause of population displacement than war."

By the end of 2010, about 50 million people were considered to be "persons of concern" likely to be displaced by environmental disaster, according to a report from the United Nations University.

Meanwhile, the old-fashioned reasons for refugee movements—war and civil strife—are causing more internal displacement than at any time since the 1990s. According to the Internal Displacement Monitoring Center and the Norwegian Refugee Council, "In 2009 the world witnessed more people displaced within their country by conflict and violence than at any point since the mid-1990s. An alarming total of 27.1 million were internally displaced at the end of the year."

One issue is whether environmental refugees require a different kind of humanitarian relief. Koko Warner, an economist at the United Nations University and expert on environmental refugees, told the *Observer* last year that they do (*Natural Hazards Observer*, September 2009).

"The cause [of migration] does matter," she said. "Right now we have certain protection regimes for internally displaced people and refugees. There are resources and protection mechanisms for political refugees, and a clear case for being persecuted for religion, race, political affiliation or group identity .... Environmentally induced migrants don't have status like that."



# It's not the humidity— It's the heat

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The Russian summer was only the tip of the, er, iceberg

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**H**HEAT WAVES HAVE BECOME A SERIOUS THREAT to lives and health around the world. The hazard may become more severe if, as anticipated, climate warming leads to more frequent and severe heat waves.

Moscow gathered up most of the heat-related headlines last summer. The death rate there was twice normal at the height of the disaster, according to the BBC ([www.bbc.co.uk/news/world-europe-10912658](http://www.bbc.co.uk/news/world-europe-10912658)). The heat and related wildfires may have been responsible for as many as 15,000 deaths ([www.bloomberg.com/news/2010-08-10/russia-may-lose-15-000-lives-15-billion-of-economic-output-in-heat-wave.html](http://www.bloomberg.com/news/2010-08-10/russia-may-lose-15-000-lives-15-billion-of-economic-output-in-heat-wave.html)).

But the Russian catastrophe was only the latest in a series of heat disasters over the past two decades. Two recent research papers have attempted to quantify the risks to the population, and to assess the more direct causes of death. The quantification is fairly clear—a lot of people die during heat waves—but the precise causes of those deaths has proven more elusive. The clinical reasons for fatalities vary considerably by location.

The studies focused on the most vulnerable populations, people older than 65, and especially older women. But as described in the November 2010 *Natural Hazards Observer*, this may also overlook other vulnerable populations.

Daniela D'Ippoliti of the Rome, Italy, Regional Health Authority, and colleagues, in the journal *Environmental Health*, found that extended heat waves dramatically increased mortality in European cities. "Heat waves of long duration had the greatest impact on mortality, and resulted in 1.5 to three times higher daily mortality than others," she said. "The elderly are most at risk during heat

waves, especially women. And the excess mortality is mostly in regard to respiratory, rather than cardiovascular, mortality."

Defining a heat wave has been one of the challenges for researchers in this field. D'Ippolita and her team used a definition of a period of at least two days when "Tappmax," a measure of interaction between air temperature and humidity, was among the highest monthly 10 percent or when the minimum temperature was in the highest 10 percent, with the Tappmax index above average.

The researchers examined the effects of the heat waves on nine European cities. There was a significant increase in death rates in all cities. The largest increase was in Milan, up 33.6 percent over background death rates, while the lowest was a 7.6 percent increase in Munich. The impacts were higher in Mediterranean cities than in northern cities.

The year 2003 was a special case, when more than 40,000 deaths in Europe were attributed to excessive heat. "In all cities, except in Athens and Budapest, heat waves in 2003 were more extreme and showed an higher impact on daily mortality than the effect observed in the other years," the paper says.

The researchers also looked at the clinical causes of the heat deaths, but here there was considerable variation from city to city. For instance, respiratory issues contributed to the increase in heat-related deaths of 3.9 percent of the excess deaths in Munich, but of 92.5 percent of the excess deaths in Milan.

A study on U.S. heat waves in the journal *Environmental Health Perspectives* has found that even less dramatic heat waves that occur nearly every year have important effects

on mortality. The researchers, led by Michelle Bell of the Yale School of Forestry and Environmental Studies, found the average daily risk of non-accidental death increased by an average of 3.74 percent during the heat waves studied. Risk increased 2.49 percent for each one degree Fahrenheit increase, and 0.38 percent for each day the heat dragged on. The study looked at 43 U.S cities, from 1987 to 2005. They found that heat hazards were more severe in northeastern and midwestern cities than in the South.

Emergency response to heat waves should be tailored to the community, the authors said. The best intervention effort in one city may not be appropriate for

another because of possible differences in buildings, air conditioning use, and other local adaptations.

The precise impact of heat waves will be increasingly important as the global climate warms. Chapter 11 of the most recent report from the Intergovernmental Panel on Climate Change says that longer duration, more intense, and more frequent heat waves are very likely over all continents, but especially central Europe, the western United States, East Asia, and Korea.

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## Disasters have little effect on economic growth—probably

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### The 'dismal science' gets dismal-er

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**E**CONOMICS IS SOMETIMES CALLED "the dismal science." Recent analysis about the economic impact of disasters goes a long way toward explaining the tag.

If you live through a disaster, the assessments say, it's usually good for the economy. This is small comfort for the deceased, but it makes the economists happy.

A June 2010 paper from the Inter-American Development Bank ([www.iadb.org/research/pub\\_desc.cfm?pub\\_id=IDB-WP-183](http://www.iadb.org/research/pub_desc.cfm?pub_id=IDB-WP-183)) by Eduardo Cavallo and colleagues found "even extremely large disasters do not display any significant effect on economic growth ... smaller, but still very large natural disasters, have no discernible effect on output."

The economists used a clever comparative method to reach this conclusion. They looked at four large disasters in the late 20th century, then compared their growth with "counterfactuals ... using as a control group other unaffected countries that, optimally weighted, estimate the missing counterfactual of interest."

The method showed that while large disasters in Iran, Nicaragua, Honduras, and the Dominican Republic had both short- and long-term impacts on economic growth, this was the result of political upheavals that followed the disasters in two of the countries—Iran and Nicaragua—and not the disasters themselves.

"This result confirms, once again, the salient importance of the political organization of societies in determining their economic performance," the authors write. "We conclude that unless a natural disaster triggers a radical political revolution, it is unlikely to affect economic growth."

The conclusion that natural disasters need not be long-term economic disasters seems to be a growing theme among the dismalists, er, economists. "Major natural disas-



ters can and do have severe, negative short-run economic impacts. Disasters also appear to have adverse longer-term consequences for economic growth, development, and poverty reduction. But negative impacts are not inevitable," write Charlotte Benson and Edward Clay in a report from The World Bank, *Understanding the Economic and Financial Impacts of Natural Disasters* ([www.worldbank.org/](http://www.worldbank.org/)).

A disaster can result in replacement of aging or inefficient infrastructure, new production technologies, better economic policy environments, and other factors that can increase economic resiliency and lead to improvements, the World Bank report says.

In an April 2008 paper in the journal *Economic Inquiry*, authors Jesús Crespo Cuaresma and colleagues found that it was mostly wealthier countries who saw strong economic recovery after disasters. Using research and development

measures as a proxy, they found “richer countries eventually experiencing creative destruction after a disaster.”

In contrast to the findings by Cavullo et al., the Crespo Cuaresma et al. paper found that the type of disaster had an impact on recovery. Climatic disasters are “a significant determinant of medium- and long-run patterns of technological transfer,” but that geologic disasters only hold a country back for a short period.

An earlier paper, also in *Economic Inquiry*, found almost precisely the opposite result, however. Writing in the Oc-

tober 2002 issue, Mark Skidmore and Hideki Toya found, “Although ... the effects of disasters on the economy are generally ambiguous, the empirical analysis shows that while controlling for many factors, climatic disasters are positively correlated with economic growth, human capital investment, and growth in total factor productivity, whereas geologic disasters are negatively correlated with growth.”

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## Drought insurance programs spread in developing world

Farmers in Ethiopia may soon be able to take advantage of weather-based insurance protection programs like those set up elsewhere in Africa and Asia.

That nation’s National Meteorological Survey has set up 20 weather stations around the country, and expects to set up 30 more very soon. Reliable weather data is the first step in providing index-based crop insurance (*Natural Hazards Observer*, November 2010).

About 85 percent of Ethiopians are farmers, according to the news service IRIN, but only a few thousand—fewer than one percent—have been able to sign up for fledgling crop insurance programs. Index-based insurance programs pay out when rainfall measured in an area is so sparse or so heavy that it would damage crop yields. It helps protect against drought losses, but requires reliable weather data for the insurance provider.

“The stations will allow us to identify climate risks at an early stage and better protect vulnerable, food-insecure people in rural areas through innovative projects such as the weather risk insurance,” said Felix Gomez, Ethiopia acting country director for the World Food Programme, which installed the stations.

Rose Goslinga, who works on a similar index-based program in Kenya, says access to weather data is an essential step in providing drought insurance.

“So you have weather data so you can assess the risk,” she said. “That is not the case in many African countries. As soon as you have a civil war somewhere, the first things to go are observations and weather data.”

Not everyone is enthusiastic about these insurance programs, however. Katherine Vincent of the Regional Hunger and Vulnerability Program said she has doubts about the plans’ long-term sustainability in an article on *Wahenga.net* ([www.wahenga.net/node/1919](http://www.wahenga.net/node/1919)).

“There are various causes for my concern in

the promotion of index-linked weather insurance as a risk management and climate change adaptation tool,” she wrote. “The provision of insurance by private sector companies is based on their calculated assessments of the risks involved, in turn dependent on complex layers of decision-making, including the ability to sell risks on the international market through reinsurance. Insurance companies are not answerable to any public sector organizations or governments, and thus are entitled to (and do) withdraw their products should they no longer become financially viable.”

“Whilst I can see a potential for index-linked weather insurance as a tool for managing risks, I feel that a longer term perspective on whether or not it is appropriate and how it will work needs to be taken now. Index-linked weather insurance is not a panacea, and will not necessarily be the most appropriate risk reduction mechanism in some marginal environments, where promoting agriculture will be unsustainable under climate change and its associated weather conditions,” Vincent said.





# 72 hours of one, three days of another

An invited comment by Valerie Lucus-McEwen

**I**F YOU TYPE THE PHRASE “SUPPLIES FOR 72 HOURS” into Google’s search engine, you’ll get 7,430 hits, most of which will tell you what you need for a 72-hour emergency survival kit—or offer to sell you a ready-to-go version of one. My question is: Why 72 hours?

I teach emergency management planning at California State University, Long Beach. One of my students posted a description of the program his jurisdiction has to help its citizens prepare for disaster. It was heavy on earthquake preparedness. It recommended enough resources to get through the first 72 hours without outside assistance.

Like most planners, I’ve lived with the 72-hour standard for most of my career. It’s a well accepted rule of thumb—although probably one that’s observed more in the breach. A Marist public opinion poll undertaken in 2007 found only 24 percent of Americans were prepared for a disaster. Even this level of preparedness is probably high, if the standard is “72 hours on your own.”

I was curious about where this rule came from. In late October, I put out a question to the International Association of Emergency Managers’ listserv: “Where did the time frame (72 hours) for being able to care for yourself and your family after a disaster come from? My recollection is that it ... seemed to make sense and [be] doable for the public.”

The lively response to this question made me think I wasn’t alone in unthinking acceptance of the 72-hour rule.

Seventy-two hours is exactly three days. Several listserv respondents thought perhaps a lot of people hadn’t done that arithmetic. A period of 72 hours preparation, they argued, seemed like a more achievable goal than a three-day supply of food, water, shelter, and so on. So it was a sort of public relations standard.

Most respondents, though, thought it was: (1) the average amount of time needed to marshal state and federal resources; and (2) a time frame that the public could be convinced to prepare for without being discouraged. In other words, if you tell them be ready for 96 hours without help, they won’t do it, and if you tell them 48 hours, they won’t have enough stuff.

Emergency information specialist Art Botterell said, “That the number 72 happens to be so ‘round’ (precisely three days) certainly suggests that its selection was somewhat arbitrary ... Also, as much as it’s an effort to encourage individual preparedness, I’ve always understood the 72-hour ‘speech’ as an attempt to manage public and political expectations, and to inoculate responders against criticism that they were slow to respond to calls for service during a large event.”

National Association of Counties Program Director Rocky Lopes said, “72 hours is a throwback to the days of nuclear attack preparedness, when the recommendation began showing up in some printed Civil Defense literature.”

And you can indeed trace the standard to some of the Civil Defense literature of the Cold War. An article from the *Bulletin of the Atomic Scientists* from April 1979 by Harvard Law School professor David Cavers said, “Our hard-liners accept the Soviet claim to be able, *in only 72 hours*, to evacuate all those city dwellers whom their blast-proof shelters can’ accommodate.” (Emphasis in original.)



U.S. Civil Defense planners were a little more skeptical about the ability to rapidly evacuate hundreds of heavily populated cities around a vast nation with short notice. Val Peterson, head of Civil Defense in the Eisenhower administration, doubted that anyone knew of “anything tougher than to evacuate millions of men, women, and children from 100 or more American cities in the face of a bombing raid—get the people out, get them out safely, get them out on time, and feed them, clothe them, shelter them, give them whatever they need in the way of medication, reunite families, and take care of them following an attack.” Peterson didn’t mention doing all this in 72 hours.

Civil Defense preparation in the late 1950s and 1960s began to emphasize fallout shelter protection rather than evacuation. The 72-hour standard may have become more visible then, since people sheltering in place after a nuclear attack would certainly have to survive for three days on their own—probably longer.

The earliest reference I can find to the 72-hour standard was in a 1954 news story in the *Los Angeles Times*, in which a Civil Defense official said that in the event of nuclear attack, a declared state of emergency would freeze food supplies for 72 hours. This would mean people should have that much food and other emergency survival gear on hand.

So, next time someone asks you about the need for 72 hours worth of supplies, what are you going to say? If we have to make recommendations, there might as well be a list of items, a list of actions and some kind of time frame. Why not 72 hours?

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*Valerie Lucus-McEwen is an instructor in emergency service administration at California State University, Long Beach. She is also emergency and continuity manager at the University of California, Davis.*

# Helping Readers Understand Natural Hazards



An invited comment by Laurie J. Schmidt

In the early hours of October 15, 2006, a magnitude 6.7 earthquake, followed by several aftershocks, struck off the coast of Hawaii (the Big Island). Thousands would have been killed if the earthquakes had triggered a tsunami because people in low-lying areas did not move to higher ground, Hawaii tsunami specialist Dan Walker told the Honolulu *Star-Bulletin*. Walker also said spending money to improve tsunami warning systems is wasted if people don't have a fundamental understanding of what to do in a tsunami (Altonn 2007).

Walker's point about public understanding seems to be right on the money. In fact, recent surveys of Hawaii residents showed that, although residents' awareness of warning sirens is high, their understanding of the meaning of the sirens is disturbingly low (Gregg et al. 2007). But the public's lack of understanding isn't unique to tsunami hazards in Hawaii. Similar results are likely when surveying South Florida residents about hurricane storm surges, or Pacific Northwest residents about potential eruptions of Mount Rainier or Mount Baker.

While it may be tempting to dismiss this lack of public understanding as a communication gap between scientists and laypeople, low knowledge levels might actually be traced to ineffective explanations of scientific phenomena—

in this case, natural hazards. The following strategies can help create accurate and interesting text that help readers visualize and understand unfamiliar processes, thereby aiding them in decision making about risk.

## Speak the reader's language

IT'S EASY TO SLIP INTO JARGON when writing about an extremely familiar subject. But public service announcements, educational brochures, and Web site content won't accomplish much if the public doesn't understand the language.

According to *Science and Engineering Indicators 2010*, many Americans do not give correct answers to questions about basic scientific terms and concepts (National Science Board 2010). Other studies show that readers have trouble understanding science articles containing unfamiliar scientific terminology that is not adequately explained (Steinke 1995). The moral of the story? Make sure terms and phrases are defined—in plain English. You may live and breathe seismology every day, but don't assume your readers know what a strike-slip fault is. Or any other type of fault, for that matter.

Analogies can help lay audiences envision unknown processes by relating the unfamiliar to something they

know. For example, in an article about the 2001 Bhuj earthquake in India, many readers would have struggled to visualize pore-water pressure. But U.S. Geological Survey geologist Martitia Tuttle came up with an effective way to explain the process of liquefaction by comparing it to shaking a soda can:

Imagine a cube full of sand and water. If you press it in from both sides (compressing and releasing it, then compressing it again), you build up what's called pore-water pressure. It's like shaking a soda can—when the pressure builds up and you release it, the fluid comes shooting to the surface. ([earthobservatory.nasa.gov/Features/Earthquake](http://earthobservatory.nasa.gov/Features/Earthquake))

### Address myths and misconceptions

MANY SCIENTIFIC PROCESSES and phenomena are counterintuitive to lay readers, which leads to misconceptions. For example, the concept of continental drift is counterintuitive because continents appear to be stationary. But simply defining a process or term is often not enough—communications research suggests that misconceptions need to be acknowledged or they will stand firm and be an obstacle to learning (Giordan 1991).

Misconceptions can become entrenched in public thinking and lead to poor decision making, which sometimes has catastrophic results. The idea that a 100-year flood will only occur once every 100 years, for example, is a widely held but erroneous belief. Addressing the misconception directly and then replacing it with an accurate explanation would help lay readers understand that a 100-year flood actually means a 1 percent chance of flood annually.

In a U.S. Geological Survey fact sheet titled *100-Year Flood—It's All About Chance* (Holmes and Dinicola 2010), the authors directly addressed the misconception by explaining probability to the reader:

If we had 1,000 years of streamflow data, we would expect to see about 10 floods of equal or greater magnitude than the 100-year flood. These floods would not occur at 100-year intervals. In one part of the 1,000-year record, it could be 15 or fewer years between "100-year floods," while in other parts, it could be 150 or more years between "100-year floods."

An Associated Press article about flood terminology (Taylor 2008) explained probability by comparing it to something the average lay reader would understand—tossing a coin:

While the rules of probability say that the odds are 50-50 that a coin will come up heads, it is entirely possible to flip a quarter and come up with heads

four or five times in a row.

### Make your topic relevant

IF I COME ACROSS AN ARTICLE ABOUT A SPACE MISSION to do a flyby of an asteroid, I may be mildly interested. But tell me that the asteroid's path will bring it to within 500 miles of Earth in 10 years, and you bet I'm going to pay attention. That's relevance.

Today's readers are bombarded by information. If they don't see a connection between what they're reading and their own lives, their attention will bounce on to something else.

In the text below, Alaska Volcano Observatory volcanologist Kenneson Dean clearly explains the hazards posed to aircraft by volcanic eruptions, which makes an article about a volcanic ash monitoring system relevant to the reader:

Large-body jets fly across this region carrying about 2,000 passengers and \$1 billion in cargo daily. If a plane is flying towards an ash cloud, and the cloud is moving towards the plane, they will cross

paths very quickly. Even if the cloud is not moving towards the plane, an aircraft still needs plenty of time to adjust its course and avoid the cloud.

([earthobservatory.nasa.gov/Features/monvoc](http://earthobservatory.nasa.gov/Features/monvoc))

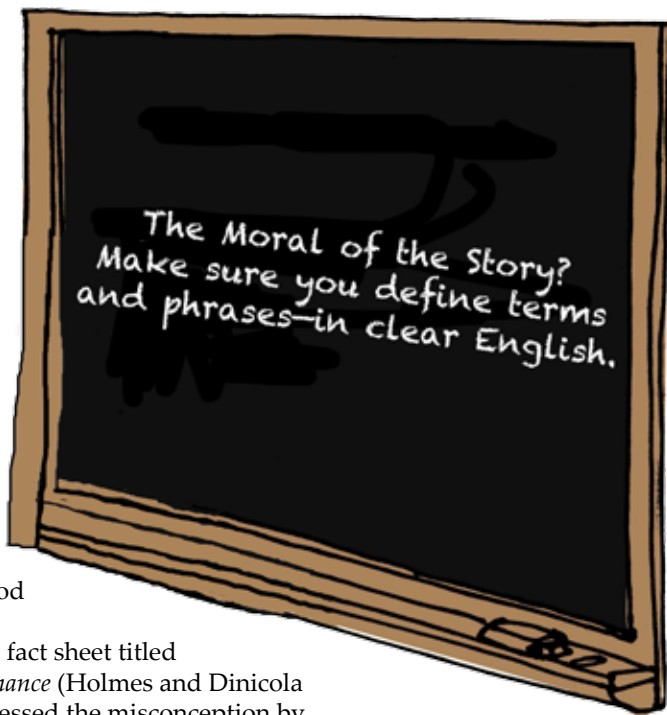
### Add sidebars and glossaries

A DETAILED DEFINITION of scientific process can sometimes interrupt the flow of an article or report. Sidebars provide in-depth information for readers who wish to learn more without distracting readers already familiar with the term or process. Likewise, glossary boxes can provide shorter definitions—again without interrupting the flow.

For example, let's say you're writing about climate change and diminishing Arctic sea ice. Stopping mid-paragraph to define several sea ice-related terms could pull the reader's attention away from the main idea you're trying to communicate. Including a glossary box allows the reader to access additional information on an as-needed basis:

Sea ice is any form of ice in the sea that originates from the freezing of sea water. Sea ice extent refers to the total area covered by some amount of ice, including open water between ice floes. Maximum extent refers to the day of the year when sea ice covers the largest area of the Arctic; minimum extent refers to the day of the year when sea ice covers the smallest area of the Arctic. (From [www.popsci.com/laurie-j-schmidt/article/2008-10/spying-sea-ice](http://www.popsci.com/laurie-j-schmidt/article/2008-10/spying-sea-ice))

A fact sheet about avalanche risks might not need a full



explanation of roof avalanches, but a sidebar on the topic is helpful to readers who want more in-depth information:

Roof avalanches occur when a mix of ice and snow slides off a roof. Mid-winter thaws often precipitate roof avalanches—water from melting snow and ice lubricates the roof, allowing the snow from an entire winter season to slide off in a matter of seconds. Metal roofs are especially prone to avalanches, as there is little friction available to hold snow and ice to the metal. Poor roof design can also cause roof avalanches to fall on entry pathways and garage entrances. Large masses of snow and ice have slid off roofs with slope angles as low as 20 degrees. (From Colorado Avalanche Information Center website, 2010)

### Make hazards real

PROVIDING READERS WITH REAL-LIFE SCENARIOS can help readers grasp the danger associated with hazards risks. For example, which of the following would be more likely to convey avalanche risks to readers—a technical description of a slab avalanche, or an account of two skiers who were caught in a slab avalanche last winter?

Capture attention by showing the severity of the risk, and follow up with the details needed to make safe decisions. Some of the best sources for field stories are researchers who routinely spend time in the field and know the risks first-hand.

For example, each year polar rookies deploy to Antarctica to work in various research support positions. Understanding the risks associated with being outside in sub-zero temperatures is essential to their survival. A quote like the one below communicates the risk far more effectively than simply telling the reader that field workers shouldn't be outside more than two hours.

"I went inside and was taking all my gear off, and it felt like I had a piece of duct tape stuck to my cheek," glaciologist Ted Scambos said. It wasn't duct tape—his cheek was frozen, and it took about three to four minutes for it to thaw out.

"Over the next couple of days it was like a bad sunburn, and several layers of my skin fell off," he said.

Natural hazards pose potentially devastating effects—impacts that can often be avoided if residents understand the science behind the hazards and the risk associated with their own decisions. Adding the above writing strategies to the communications toolbox can help create text that provides



Capture attention by showing the severity of the risk, and follow up with the details needed to make safe decisions.

lay readers with accurate, interesting, and clear explanations of natural hazards.

Laurie Schmidt is a former editor of the *Natural Hazards Observer* and a freelance science writer specializing in earth science and natural hazards. Her website is [www.lauriejschmidt.com](http://www.lauriejschmidt.com).

### References

- Altonn, H. 2007. An alert public is best defense. *Honolulu Star-Bulletin*, April 2, 2007.
- Giordan, A. 1991. The importance of modeling in the teaching and popularization of science. *Impact of Science on Society* 164: 321-338.
- Gregg, C.E., B.F. Houghton, D. Paton, D.M. Johnston, D.A. Swanson, and B.S. Yanagi. 2007. Tsunami warnings: Understanding in Hawai'i. *Natural Hazards* 40: 71-87.
- Holmes, R. R., Jr., and K. Dinicola. 2010. *100-Year Flood—It's All About Chance*. U.S. Geological Survey General Information Product 106.
- National Science Board. 2010. Science and technology: Public attitudes and public understanding. In *Science and Engineering Indicators—2010*. [www.nsf.gov/statistics/seind10/start.htm](http://www.nsf.gov/statistics/seind10/start.htm).
- Steinke, J. 1995. Reaching readers. *Science Communication* 16:432-453.
- Taylor, B. 2008. Experts say flood terminology misleads the public. Associated Press, 30 June.

## PERISHIP Dissertation Fellowships

Ph.D. students are invited to apply for the 2011 PERISHIP dissertation awards. The deadline to apply for the Dissertation Fellowship Program in Hazards, Risks, and Disasters is Monday, February 1, at 5 p.m. Eastern Standard Time.

Ph.D. students will receive up to \$10,000 to support interdisciplinary dissertation work. The program assists top scholars in completing hazards dissertation work in natural and physical sciences, social and behavioral sciences, and engineering, and in interdisciplinary programs such as environmental studies.

The PERISHIP Fellowship is administered by a partnership between the Natural Hazards Center and the Public Entity Risk Institute (PERI) with funding from Swiss Re and the National Science Foundation. For more information on the program and application guidelines, visit the PERISHIP Web site at [clas.ucdenver.edu/periship/](http://clas.ucdenver.edu/periship/).

## Haiti...

(Continued from page one)

nication with the affected population.

Mobilizing assistance effectively in a severely damaged disaster environment is not easy. OCHA uses the “cluster format” to align the assistance and services of international organizations with local groups that request assistance. The process is meant to create joint partnerships by matching international resources to local needs.

The UN cluster format is a relatively recent organizational concept. It emerged informally in the spring of 2005 after the Indian Ocean earthquake and tsunami. It was formally adopted by OCHA in July 2005. It was first used the following October, in response to the Kashmir, Pakistan, earthquake.

The cluster format organizes 13 different categories of service, such as food, shelter, health, education, logistics, agriculture, water, and sanitation. It presumes there are both international and national counterparts. The format is a comprehensive way to manage the intersection between international assistance offerings and needs of a disaster-stricken community. In Haiti, however, where the organizational structure collapsed along with the physical environment, the cluster format has been difficult to apply.

Third, the limited number of local professionals providing matching components in the cluster categories in Haiti for international-local partnerships greatly weakened clus-

ter effectiveness. Worse, it shifted planning and service delivery to international organizations, further weakening the participation of the local Haitian organizations in recovery.

For example, cluster meetings for different functional sectors were most often conducted in English at the logistics base near the airport. The result was little participation from French-speaking Haitian counterparts in the city. This stifled local leadership, alienated residents, and worsened the perception of international aid. It also undermined confidence that the process would have a constructive outcome.

### Turning disaster into development

ANALYSES OF RESPONSE SYSTEMS AFTER DISASTERS repeatedly document the lack of informed decision making, lack of coordination in response operations, and resulting losses in lives and human and social capacity. Haiti is no exception.

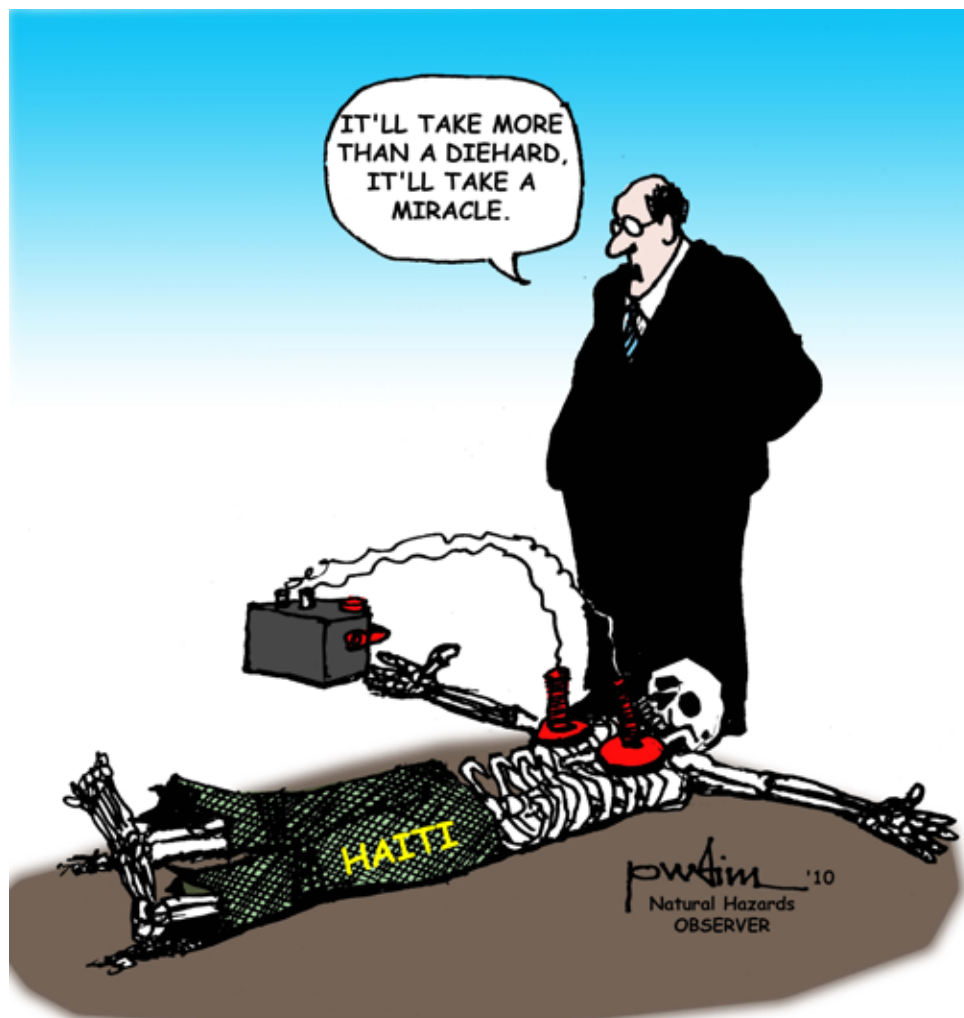
One approach to minimizing these losses would be restructuring the response in terms that lead to more constructive action for both the international community and Haitian society. Key to this restructuring is recognizing that “recovery” to Haiti’s previous dysfunctional state is not the goal. Instead, developing a genuinely sustainable society with viable political, economic, and social functions is the aim.

To shift from disaster recovery to a development perspective, international organizations offering assistance and local Haitian organizations seeking assistance must integrate planning and focus on long-term development.

The process then becomes an opportunity for Haitians to gain skills and knowledge needed to manage their own affairs, including risk reduction.

One approach for advancing development in Haiti is creating a “knowledge commons” based on a concept formulated by Elinor Ostrom in 1991. Knowledge commons address decision making in complex, interdependent, postdisaster environments. It requires a socio-technical approach that links the technical systems of managing information to the human organizations mobilizing action. The idea was developed in her book, *Understanding Institutional Diversity* (2005) and refined further in her edited book with Charlotte Hess, *Understanding Knowledge as a Commons: From Theory to Practice* (2007).

The broad outline for a successful knowledge commons is clear. The commons must be interdisciplinary, interjurisdictional, and interorganizational, with a carefully designed set of “feed forward” and feedback processes that capture the evolving situation, allowing for updates and course corrections by the participants. Haiti cannot develop without informed, respon-



sible international assistance in the short term. Achieving the long-term goal of sustainable development requires a continuous, disciplined process of organizational and inter-organizational learning that could effectively be supported by a knowledge commons.

### Designing a knowledge commons for Haiti

BUILDING A KNOWLEDGE COMMONS to achieve sustainable development in Haiti requires thoughtful design and investment. It can most effectively be achieved as a joint project between international and Haitian organizations. Key research questions would include:

- What is the proportional balance of local vs. global knowledge to be collected, stored, and shared through the commons?
- What types of tools and training are essential for users to engage in the commons and what methods of training are most effective in engaging different levels of audience interest, skill, and capacity?
- Who should invest in the commons and what are the responsibilities and rewards for those who do?
- What are the respective responsibilities of public, private, and nonprofit organizations in collecting, maintaining, and validating knowledge shared through the commons?
- To what extent would this contribute to developing

the capacity to learn skills and acquire the knowledge necessary to assess, manage, and reduce the risks?

The need for improved performance in humanitarian assistance and disaster operations is vividly underscored by Haiti's post-earthquake operations. A rigorous study of the most efficient methods of activating an experiential learning environment for international and local Haitian organizations would contribute to more effective humanitarian assistance management in Haiti, as well as other countries exposed to recurring risk.

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*Louise Comfort is a professor at the University of Pittsburgh Center for Disaster Management.*

### References

Hess, C. And E. Ostrom, eds. 2007. *Understanding Knowledge as a Commons: From Theory to Practice*. Cambridge: MIT Press.

Ostrom, E. 2005. *Understanding Institutional Diversity*. Princeton University Press.

United Nations Development Programme (UNDP). 2010. *Human Development Reports*. Human Development Index. [hdr.undp.org/en/statistics](http://hdr.undp.org/en/statistics).

## Washington Update

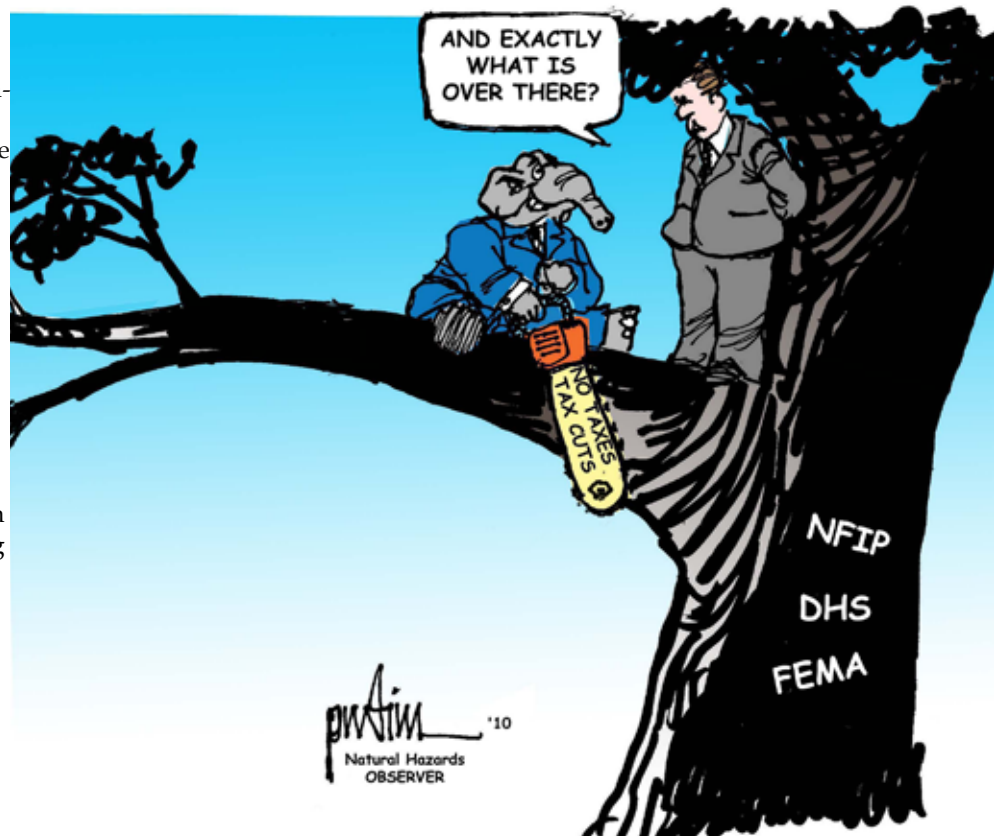
U.S. Congress 2011

# What to Expect in Hazards Legislation

By Dan Whipple

THE BIG NEWS from the November elections was the changing of the guard in the House of Representatives, putting different parties in control of the House and Senate. But most observers do not expect this new political alignment to have a large impact on the prospects for important hazards legislation likely to be considered in the coming year—primarily renewal of the National Flood Insurance Program and some revisions to the Stafford Act.

"The fact of the matter is when it comes to disasters, you're talking about victims and you're talking about people that need help due to no cause of their own. It really becomes a bipartisan issue," says Albert Ashwood, state director of emergency management in Oklahoma and a spokesman for the National Emergency Management Association. "It's something that



might be politicized when you're talking about it just in theory, but when it comes right down to it, when the disaster occurs, most people all jump on the same bandwagon and say, 'Let's help our fellow man.'"

This doesn't mean that there won't be partisan friction, especially in the areas of oversight and budget, only that it's likely to be less strident in emergency management and national security. A staffer at the Senate Homeland Security Committee said, "Our committee is one that is uniquely bipartisan in a number of ways. Republicans and Democrats work very well together, regardless of who is in charge. We're certainly going to attempt to continue in that tradition."

In the House, this political split is likely to be manifested in more intensive oversight. Kareem Murphy, a specialist in homeland security and emergency management at The Ferguson Group, a D.C. lobbying firm, says the chair of the House Homeland Security Committee is likely to be Rep. Peter King (R-N.Y.). "What the chairman has said he was interested in, even when he was the ranking member, he's looking at aggressive oversight," Murphy says.

### Flood insurance program

ONE PIECE OF LEGISLATION that virtually every emergency management professional wants to see is the formal reauthorization of the National Flood Insurance Program, which has limped along lately on temporary measures. But that may prove to be politically thorny — although not along partisan lines.

Meredith Inderfurth, Washington liaison for the Association of State Floodplain Managers, says, "One of the things that we can look for in the next session is probably some form of flood insurance reform legislation. The National Flood Insurance Program has been extended by legislation to September 30, 2011."

The Federal Emergency Management Agency has been issuing updated floodplain maps, which are the basis for requiring the purchase of flood insurance. In many cases, the mapped floodplains are changed, requiring people to get the insurance who had not previously been required to do so. Furthermore, the agency is deaccrediting some levees that no longer meet the 100-year flood standard. So homeowners and businesses who thought they were protected by a levee suddenly find that they aren't. They too must buy flood insurance. A lot of them aren't happy about it.

"Members of Congress are being battered about the whole issue of deaccreditation of levees that are found not to meet the 100-year flood standard," Inderfurth says. "And that converges with the issuance of new floodplain maps which, when a levee has been deaccredited, show an area that had been thought to be protected by a levee as if the levee doesn't exist at all. The area's now in a floodplain, requiring people to buy flood insurance. Members of Congress are going home and hearing from their constituents loudly about that concern, and it's really resonating significantly on Capitol Hill."

A subcommittee of the Senate Homeland Security

Committee held hearings on flood maps and levee decertifications in the fall of 2010. Sixteen senators sent a letter to FEMA and the U.S. Army Corps of Engineers expressing concerns about the process.

A senate staffer says, "One of the new developments that has recently occurred — and we're happy to see — is that FEMA launched what they're calling 'scientific review panels.' These are third party panels that consist of experts from the National Institute of Building Sciences. Basically, communities that disagree with the flood maps that have been issued for their communities can ask these independent panels to review the maps and take a look at the scientific data and make changes where they see necessary. Having a third party review process is something that we were solidly behind."



One piece of legislation that virtually every emergency management professional wants to see is the formal reauthorization of the National Flood Insurance Program, which has limped along lately on temporary measures.

This staffer agrees, though, that the issue is "resonating significantly" on Capitol Hill with members of both parties. "I know that the appropriate level of support from the Corps of Engineers and the federal government, the appropriate role for the insurance industry, and the impacts of levee decertifications and flood insurance on economic development, and on households' ability to make their

budget each month are all difficult issues that we're going to continue to grapple with," he says. "A lot of new maps are being modernized and updated around the country, so a growing number of communities are experiencing challenges like these."

ASFPM's Inderfurth says, "I imagine we'll continue in the next Congress to see pieces of legislation saying, 'Don't issue my flood maps. I don't want to know that I have a risk because I might have to buy flood insurance.' I expect that trend will continue. The Association of State Floodplain Managers has been working hard to try to point out to members of Congress and policy makers that this is actually an opportunity to do a better job of flood risk management.

"These smaller bills that are being introduced are really just short-term fixes. They're not addressing the real problem, which all get back to affordability of flood insurance, and mandatory purchase requirements. This is a real opportunity to develop some thoughtful, better flood risk management policies. We'd certainly like to see something like that come forward," she says.

FEMA is engaged in a comprehensive effort to rethink the NFIP ([www.fema.gov/business/nfip/nfip\\_reform.shtml](http://www.fema.gov/business/nfip/nfip_reform.shtml)), which should come out with legislative recommendations. The current temporary NFIP fix expires in September 2011, while FEMA has set its timetable for recommendations for December 2011. There appears to be movement within the agency to speed up its process to get the "rethinking" to Congress before the September expiration of the law.

### Stafford Act

ANOTHER ISSUE GAINING MOMENTUM is changes to the Stafford Act, driven largely by problems that were clarified

in the response to hurricanes Katrina and Rita on the Gulf Coast. These have been spearheaded by Sen. Mary Landrieu (D-La.). Early in 2011 Landrieu hopes to move on legislation with the working title of the Disaster Recovery Act, which would make a number of changes to the Stafford Act. The bill will address infrastructure, housing, case management, crisis counseling, mental health, and the needs of children. It would also provide incentives for streamlined preparedness and recovery measures after a particularly catastrophic event.

"I wouldn't call it a major overhaul of the Stafford Act, because people generally like the way the Stafford Act works and inherently most people believe it is a flexibly drafted statute," says a Landrieu staff member. "We have, however, over the course of the last several years encountered a number of instances in which there is either ambiguous authority within the act, or authority which people have been uncomfortable using because of that lack of clarity and sometimes there are various hard lines which are drawn in the sand by the statute which prevented us from being able to provide the level of support needed to support recovery."

There have, for instance, been interagency disputes and legal interpretations. Bush administration attorneys ruled that temporary shelter assistance absolutely had to stop at the end of 18 months. As result, "they pushed a lot of people out of hotels and motels even though there were no occupiable, habitable apartments in the area. As a result the homeless population of New Orleans doubled," this staffer says. "If there are extraordinary circumstances and no other viable housing alternatives, we believe that emergency sheltering authority ought to exceed the hard 18-month standard that attorneys in the previous administration believed to exist."

These Stafford Act changes appear to meet with less enthusiasm elsewhere in the emergency management community, though the objections are diplomatically muted. NEMA's Ashwood says the changes "have to do with specific challenges that they faced in recovery from Katrina. A lot of them have to do with specific issues that there's a back-story to that I really have to find out more about. It's kind of hard for me sitting in Oklahoma—where we haven't had a catastrophic event as was defined by Katrina—to sit here and say, 'you don't need this or you do need this,' based on the amendment that I just read in the paper.

"I'm sure there's a really good reason that everyone is pushing for this. However, I believe a lot of the times, the things we try to change in legislation could be changed just with the implementation of the current law. So that's more information that we need to look at," he says.

### Water Resources Development Act

ANOTHER PIECE OF LEGISLATION OF INTEREST to the hazards community is the Water Resources Development Act. Last reauthorized in 2007, WRDA had been on a two-year renewal schedule, but like the flood insurance program, that schedule has been slipping. WRDA is essentially the authorizing legislation for the Corps of Engineers and for flood control projects. The 2007 version established a committee on levee safety, which came out with some recommendations in early 2009, but which have yet to be acted on.

At a November 17, 2010, hearing on WRDA with the Senate Committee on Environment and Public Works, ranking member Sen. James Inhofe (R-Okla.) said, "I strongly

support federal investment in public infrastructure. In fact, I believe it is one of two areas where the federal government should spend money, the other being national defense, of course. We have significant water resources needs across the country, but we aren't dedicating the funds necessary to address them.

"Let me be clear, though, that I am not advocating for simply increasing overall spending. Instead, I support making infrastructure spending a greater percentage of overall spending," Inhofe said.

ASFP's Inderfurth says that the levee committee recommendations are not currently part of the Senate version of the bill, but "it is expected when the bill comes to the floor there will be a levee component to it."

On the House side, she says, "The WRDA bill has been subject to the politics of earmarks. The Republicans in the House took a strong position that they didn't want any earmarks, which means no named projects that individual members have requested be included in the bill. There are a lot of politics surrounding it. Now President Obama is on record as saying that he, to, would like to avoid earmarks in the next congressional session."

Rep. John Mica (R-Fla.) will probably be chairman of the Transportation Infrastructure Committee, which has jurisdiction. "We don't know what path he will want to take in the next Congress," Inderfurth says.

### Money, money, money

MANY OF LEGISLATORS ARRIVING IN WASHINGTON in January were elected on a wave of voter sentiment for cutting government spending. What this will mean for emergency management and disaster spending is unclear.

"It's certainly a tough budget environment. I think everybody recognizes that," a Senate staffer says. "Emergency management performance grants and grants under some of these other programs are receiving more funding now than they have in any other time in their history, in some instances. We've seen level funding or increases for the last several years. But I think everyone recognizes that there aren't any sacred cows and that everything needs to be studied very carefully to make sure that we're spending each and every dollar as effectively as possible."

The Ferguson Group's Kareem Murphy says, "There are those who would argue that everybody should suffer across the board. The conversation about reducing spending now is very different because in the past the discussion has been that non-Defense, non-Homeland Security spending should all be subject to a cut. We've got some newly elected members of Congress, House and Senate, who say, 'everything needs to be cut.'

"That is very different than in previous years. I would think that most of DHS's core programs will probably be safe. If the agency is cut, there are a lot of programs that don't necessarily appear as line items in the president's budget request that are ongoing programs. If DHS has to feel the pinch of the budget, it will probably be in ways that we typically will not see. They'll be in programs where there's not a lot of promotion. Research and development programs, science and technology directives would be some of the places that might suffer most."

More will be known after the president submits his fiscal year 2012 budget in February. In Congress, a lot will depend on the budget cutting strategy that's adopted. One



approach would be to argue that all agencies should suffer equally. An alternative would be to impose greater cuts on some—say, for instance, Labor or Interior—while sparing others like DHS.

“I would expect Republican leaders to be calling for a 5 to 10 percent reduction in federal funding,” Murphy says. “Commonly what they say is they want a reduction of spending back to fiscal 2008 levels. I’ve heard that batted about a lot. Now they’re talking about the overall federal government-wide number, and not an agency-by-agency number. How you get that level—that’s the sausage making of Congress. Certain agencies suffer more than others. Some may even gain.”

Nevertheless, Murphy says that he doesn’t see any major DHS programs on the chopping block. People are more

interested in using the flexibility of current laws to deal with the issues facing them, rather than going for any major new initiatives.

NEMA’s Ashwood says, “Budget’s always going to be an issue, but I’m a little more concerned about where we’re going with the Disaster Relief Fund and some of the concerns we have about that than we even are about the grant programs. I do expect grants for the most part to stay relatively static—and that’s what we’re asking for basically, is to try to keep them at current levels. We’ll see how that comes out.”

## Resources

Below are brief descriptions of some of the resources on hazards and disasters that have recently come to the attention of the Natural Hazards Center. Web links are provided for items that are available free online. Other materials can be purchased through the publisher or local and online booksellers.

All of the material listed here is available at the Natural Hazards Center Library. For more information contact librarian Wanda Headley at [wanda.headley@colorado.edu](mailto:wanda.headley@colorado.edu)

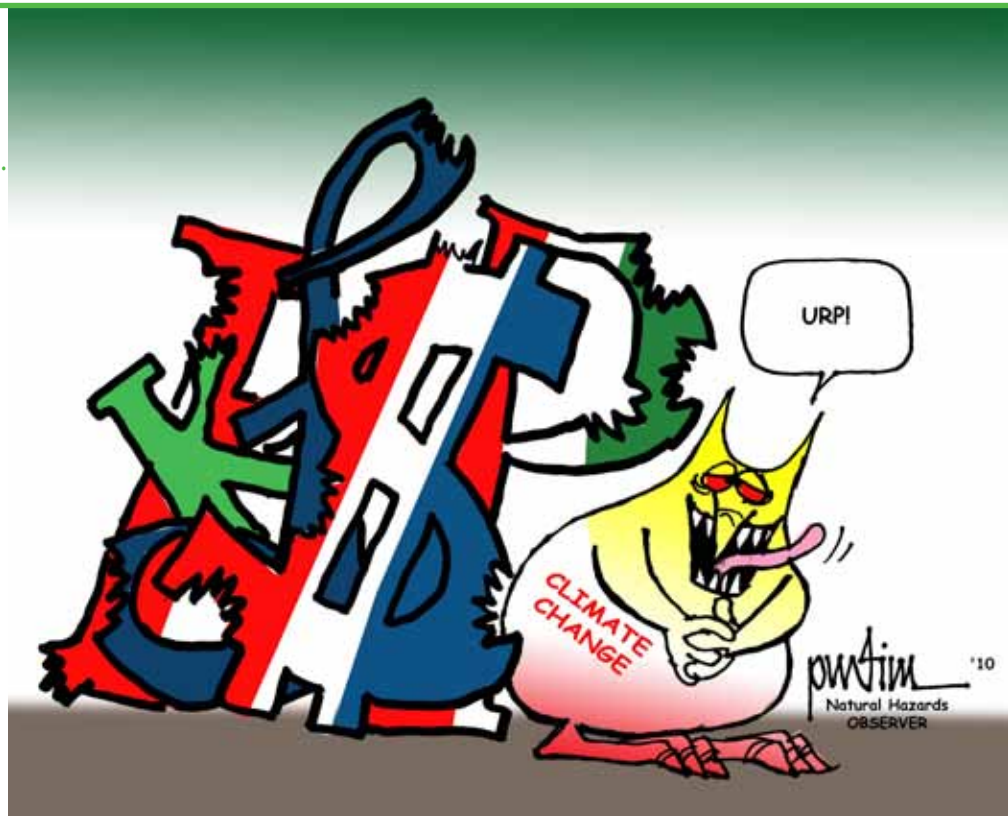
### ALL HAZARDS

**ARC Resource Pack.** By Action for the Rights of Children. 2010. 14 modules in two groups. Free download at [www.arc-online.org/using/index.html](http://www.arc-online.org/using/index.html).

This is a comprehensive guide for emergency workers who will have to deal with children and their welfare. The goal of this international inter-agency cooperation is “to tackle the root causes of children’s vulnerabilities; to build effective child protection systems for use in emergencies and long-term development; [and] to ensure that no activities inadvertently compromise children’s rights or safety.”

ARC takes a rights-based approach to dealing with children in disasters. The first seven modules outline the legal background, the methodology, and the practical application of what those rights and methods mean. The experience of childhood is not the same for all children, and not all societies have the same values about children. The publications attempt to navigate these difficult waters.

The second set of modules deals with the specific issues that workers can expect to deal with in the field, from abuse to sexual issues to land mines. This material is carefully organized and clearly written. “All modules include: study material giving detailed information on the module’s sub-



ject and a list of further reading; slides giving a summary of the study material; [and] training material for participatory workshops that comprises exercises giving practical guidance for facilitators and handouts for participants.”

**Early Warning Practices Can Save Lives: Selected Examples.** By the United Nations Secretariat of the International Strategy for Disaster Reduction. 2010. 77 pp. Free download at [www.preventionweb.net/english/professional/publications/v.php?id=15254](http://www.preventionweb.net/english/professional/publications/v.php?id=15254).

Ever since the 2004 Indian Ocean tsunami roared ashore and killed 230,000 people, the issue of early warning systems has taken a higher priority in international emergency management. This ISDR report looks at case studies of systems that have been put in place around the world.

The first part examines a few systems, especially in various nations in Asia and Africa, examining how a participatory approach to building the system within the community has led to acceptance and understanding. The findings also show that clear responsibilities and structures are essential for an effective system. "Early warning systems should build upon existing structures," the report finds.

The second section "highlights the importance of risk assessments ... that evaluate the conditions in the hazard prone area before developing or implementing early warning systems." This stresses the technical and data gathering needs required to assemble a warning that both addresses the threats faced, and is meaningful to the population that the system is designed to warn.

**Building Community Disaster Resilience Through Private-Public Collaboration.** By the National Research Council. 2010. ISBN: 978-0-309-16263-0. 131 pp. Free download at [www.nap.edu/catalog.php?record\\_id=13028](http://www.nap.edu/catalog.php?record_id=13028) or \$29.70 for print version from the same website.

Community resilience in the face of disasters is the new frontier for research and action. It is a truism of disaster response that the people on the scene are the real "first responders." And the people in the community are the ones who determine how well it bounces back from a catastrophe. But it remains unclear why some communities do better, others worse.

This report focuses on the value of public-private cooperation in developing a resilient community. "The private and public sectors each have resources, capabilities, and access to different parts of the community. Through their collective efforts to identify interdependencies, needs, and resources in advance, a community can significantly improve its disaster resilience," the report says.

These collaborations must be carefully nurtured, the National Academies committee says. They work better when formed from the grass roots, from the communities themselves, and are then widened to be inclusive of all the community stakeholders. This also requires paying attention to the process itself: "Effective decision making is grounded in trusted relationships and common purpose. Because different community sectors and populations are motivated by different factors, the collaborative structure itself will be strongest if it is trusted and perceived as neutral, nonpartisan, and focused on the greater good of the community."

The committee came up with a crisp list of "overarching guidelines" to pursue successful public-private resiliency strategies, as well as suggestions for a research strategy to learn from these efforts and apply them to other communities. "Because most resilience-focused collaborative efforts are largely in nascent stages throughout the nation and because social environments and vulnerability to hazards evolve rapidly, a program of research run parallel to the development of collaborative efforts is imperative, and embedding research within collaborative efforts is ideal," the report says.

**FEMA Higher Education Bundle.** By the Public Entity Risk Institute. Three volumes for \$65. Available at [www.riskinstitute.org](http://www.riskinstitute.org).

PERI is offering its three volume set of 2007, 2008, and the new 2009 Higher Education Conference book at a special price, \$65 for a selection costing about \$120 purchased individually. The volumes on offer are: Emergency Management in Higher Education; Ideas From an Emerging Field; and Integrating Emergency Management Studies into Higher Education. The books offer a comprehensive look at higher education programs in hazards and disasters.

**The Day After Tomorrow: A Handbook on the Future of Economic Policy in the Developing World.** Otaviano Canuto and Marcelo Giugale, editors. 2010. ISBN: 978-0-8213-8498-5. 466 pp. The World Bank. Free download at [siteresources.worldbank.org/EXTPREMNET/Resources/TDAT\\_Book.pdf](http://siteresources.worldbank.org/EXTPREMNET/Resources/TDAT_Book.pdf).

The 2004 Hollywood film *The Day After Tomorrow* was an over-the-top disaster flick. While the title of this collection of essays echoes the movie's name, it provides perhaps the most optimistic view of the economic future of the developing world since the heyday of the late 1960s, when all things seemed possible with just the right investment.

The editors asked specialists on developing economies to present their individual—not institutional—views about how the developing world might cope in the face of the developed world's credit collapse. While the opinions differ, as opinions will, a remarkable rough consensus emerged about the future of developing nations. They have not leveraged themselves as severely as the developed world, and are in relatively good financial condition, the writers found.

The editors found four "take-home messages." They are:

1. While the rich world puts its house in order, and macroeconomics and finance get to a new consensus, developing countries will become a (perhaps, "the") growth engine for the world. Faster technological learning and more South-South integration will fuel that engine.
2. Governments in developing countries will be better—they may even begin to earn the trust of their people.
3. A new, smarter generation of social policy will bring the end of poverty within reach, but inequality is another matter.
4. Staying with sensible policies, many regions of the developing world will break out of their 'developing' status and will graduate into something akin to 'newly developed.' Africa will eventually join that group. Others, like Eastern Europe, will have a legacy of problems to fix beforehand.

While this is not really a book about hazards and disasters, its message is relevant to those who work on these topics within the developing world, because the wealth and well-being of those citizens affect the material, human, and psychological resources they can bring to bear at the various stages of the disaster cycle. Some disasters are a direct result of poverty, and others are exacerbated by it. This book offers a pretty optimistic glimpse of the developing world's future.

**A Practical Guide for Disaster Risk Reduction: Building Safer Communities in South Asia.** By Elizabeth G. McNaughton. 2009. 130 pp. International Federation of Red Cross and Red Crescent Societies. Free download at [www.ifrc.org](http://www.ifrc.org).

Focusing on the increasing occurrence of hazards in South Asia, this Red Cross guide provides a step-by-step program for advocacy, preparation, and response in the region. The book begins with an explanation of the key concepts of risk and relief, in response to an on-the-ground concern that communication in emergencies sometimes gets lost in technical language. While not intending to be comprehensive, the guide discusses resilience, holistic disaster management, and other terms of art in clear language.

Section two of the book offers advice on actively advocating for disaster mitigation and prevention in the region. "We are starting to see the benefits of interventions and policies that aim to reduce disaster risk," the guide says. "However, despite good results, disaster risk reduction is a long-term, low visibility process that can be neglected compared to the high profile, high drama, emergency phase ... Therefore we need to work together to increase our advocacy efforts to raise the visibility of disaster risk reduction and make it a priority for action and funding. Three reasons that are useful to keep in mind when advocating for disaster risk reduction are: our moral obligation; financial benefits; environmental protection or sustainability."

The guide is aimed at Red Cross-Red Crescent members, but provides a solid background for anyone working in the region.

**Natural Disasters, Vulnerability and Sustainable Development: Examining the Interplay, Global Trends, and Local Practices in Istanbul.** By Ebru Gencer. 2008. ISBN: 978-3-8364-7510-5. 444 pp. (softcover). \$86.65. Verlag Dr. Müller. [www.vdm-publishing.com/index.php?&act=nav&nav=10039](http://www.vdm-publishing.com/index.php?&act=nav&nav=10039).

There's little doubt that the quality and design of urban infrastructure determines the way a disaster affects a community. The stark contrast between the damage from two large earthquakes in Haiti and Chile recently demonstrated this dramatically. This book examines the way urban planning in cities of various economic levels can affect how hard a disaster hits.

The quantitative study compared 20 countries: nine low income, four middle income, and six high income. It examines how natural disasters affect sustainable development, how sustainable development disparities shape the way nations are affected by hazards, and the interactions between those two questions.

The latter part of this study focuses on Istanbul and its approach to hazard planning. Istanbul is a famously earthquake-prone city, but one of the major problems for any sustainability in the face of natural hazards is what Gencer gently calls "problem recognition." That is, despite frequent earthquakes, local officials don't seem to know they have a problem. She writes, "None of the planning studies ... considered Istanbul's past disasters. Even though geological studies that were undertaken during the preparation of the 1976 plan indicated unsuitable settlements around Büyükçekmece and Küçükçekmece lakes, this problem was in a way ignored, making its way into future planning studies. Consequently, a commercial centre and a large-scale

residential development were proposed between the lakes, an area, which had the highest level of destruction in the 1999 earthquake and is again expected to have the highest exposure in a possible future earthquake."

A major commercial and residential center had been located there, with a high level of destruction in the 1999 earthquake.

**Flirting with Disaster: Why Accidents Are Rarely Accidental.** By Marc Gerstein with Michael Ellsberg. 2008. ISBN: 978-1-4027-5303-9. 340 pp. \$24.95 (hardcover). Sterling Publishing. [www.sterlingpublishing.com](http://www.sterlingpublishing.com).

This book is engagingly written with a refreshing passion bubbling from the pages, but it isn't likely to hold many surprises for disaster professionals. "After years of research and the review of dozens of disaster case histories," writes Gerstein, "I have learned that virtually all these 'accidents' were not what we normally mean when we use that term—that is, unpreventable random occurrences. Chernobyl, Hurricane Katrina, both space shuttle accidents, the Asian tsunami, and the monetary crises of East Asia, these disasters had long buildups and numerous warning signs. What's more, they display a startling number of common causes."

Gerstein memorably calls these failures the "triumph of misguided intuition over analysis," a problem with risk perception that we also recognize as "it can't happen here."

The book does have considerable sympathy for the "middle managers," people who often can see the issues that are going to lead to disaster, but who may be constrained from speaking up for fear of losing a job, being ridiculed, or suffering some other negative outcome. "First and foremost," writes Gerstein, "we shouldn't be bystanders and shouldn't encourage bystander behavior in those around us."

The book is well and passionately written by a man who has suffered some of his own disasters, at least one of which he correctly predicted in advance—the demise of the investment firm at which worked. He was the Cassandra in that case, and he takes up Cassandra's defense throughout the book. As we said, there won't be much new for disaster pros, but if you're introducing an acquaintance to the difficulty of dealing with low-probability, high-impact events, you could do a lot worse than recommending *Flirting with Disaster*.

## CLIMATE CHANGE

**The Economics of Adaptation to Climate Change.** By the World Bank Group. 2010. 84 pp. Free download at [www.worldbank.org](http://www.worldbank.org).

The prospects of the world doing anything to mitigate climate change—that is, to reduce the amount of carbon dioxide entering the atmosphere each year—seem to be fading. This is in part because people see the solutions as expensive. Christiana Figueres, executive secretary of the UN Framework Convention on Climate Change (UNFCCC), said, "This is the greatest societal and economic transformation that the world has ever seen." While acknowledging that the adjustments are great, Figueres was actually hopeful that long-term agreements could be reached among the world's major emitters.

But in the absence of CO<sub>2</sub> emissions reductions, adapting to climate change is inevitable. Indeed, it's inevitable

even if there is mitigation, because so much warming is “in the pipeline” (as they say) from the amount of long-lived CO<sub>2</sub> already in the atmosphere.

This World Bank report addresses clearly and conservatively the economic issues of adapting to climate change, focusing on developing nations. The good news from the report is that the cost, even among the poorer nations, may be affordable. On the flip side, caution is counseled.

According to the report, “The cost of developing countries to adapt to climate change between 2010 and 2050 is estimated at \$70 billion to \$100 billion a year at 2005 prices. This amounts to about ‘only’ 0.2 percent of the projected GDP of all developing countries in the current decade and at the same time to as much as 80 percent of total disbursement of [the Office of Development Assistance].”

The report says a go-slow approach is necessary. “Do not rush into making long-lived investments in adaptation unless these are robust to a wide range of climate outcomes or until the range of uncertainty about future weather variability and climate has narrowed. Start with low-regret options.”

The report also calls for a hazard-oriented approach to adapting to the upcoming changes, though it doesn’t call it that: “Adaptation to climate change should start with the adoption of measures that tackle the weather risks that countries already face, e.g. more investment in water storage in drought-prone basins or protection against storms and flooding in coastal zones and/or urban areas. Climate change will exacerbate these risks.”

The World Bank also suggests, “Invest in human capital, develop competent and flexible institutions, focus on weather resilience and adaptive capacity, and tackle the root causes of poverty. Eliminating poverty is central to both development and adaptation, since poverty exacerbates vulnerability to weather variability as well as climate change.”

**Land, Environment and Climate Change: Challenges, Responses and Tools.** By UN Habitat. 2010. ISBN: 978-92-1-132251-4. 83 pp. \$10, or free download at [www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3022](http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3022).

This report uses 20 case studies to examine the role of land tenure and management on the changing environment resulting from climate change. “Property rights are core determinants for how land resources are utilized and their welfare effects are distributed through market and nonmarket mechanisms,” the report says. “Similarly, the degree of market development for natural resources as inputs in production and as essential elements of livelihoods and safety nets for current and future generations determine the need for complementary non-market institutions and regulations where markets do not work properly.”

While acknowledging that land tenure is important for dealing with environmental change, the report seems reluctant to draw broad general conclusions about how best to achieve reforms. In many countries, it says, land reforms intended to assist the poor are compromised by elites. This political and power problem can only partially be addressed by better internal systems—low-cost land registration, low-cost land use planning, and better land rental markets.

The authors favorably examine “payment for environmental service” schemes, which are intended to internalize costs of environmental degradation in the economic system. But even here they say, “This requires innovative designs

and careful pilot testing before they are scaled up. The poverty of land users and the poverty reduction effects of PES schemes will be important design considerations.”

**Coming Climate Crisis? Consider the Past, Beware the Big Fix.** By Claire Parkinson. 2010. ISBN: 978-0-7425-6830-3. 432 pp. \$24.95 (softcover). Rowman and Littlefield. [www.rowmanlittlefield.com](http://www.rowmanlittlefield.com).

Parkinson, a climate scientist with more than 30 years of experience in the field, describes herself as “generally aligned with the consensus view on climate change but with many serious doubts.” The doubts spring primarily from uncertainty about the ability of climate models to successfully predict extent of climate change with as much certainty as is sometimes claimed for them. She says, “I am not entirely certain whether the fearful predictions of a coming climate crisis are correct; they could be seriously overestimating the coming difficulties, or they could alternatively be seriously underestimating them.”

Her assessment leads her to advise reducing carbon emissions, while acknowledging the difficulties. But Parkinson’s chief cautionary message is about the potentially disastrous consequences that could result from geoengineering. We simply don’t know enough, she says, to proceed with large-scale schemes to artificially manipulate the climate.

“People advocating geoengineering do so with good intentions,” she writes, “but even the best of intentions can lead to very undesired consequences, especially given the highly interconnected and incompletely understood Earth system. Using geoengineering to remove some of what humans have inserted into the atmosphere (such as carbon dioxide, other greenhouse gases, and particulate matter) could be very favorable. However, some of the potential consequences of others of the proposed geoengineering schemes are terrifying, scaling far above and beyond the damage that we have already done to our planet.”

## NEAR EARTH OBJECTS

**Defending Planet Earth: Near-Earth Object Surveys and Hazard Mitigation Strategies: Final Report.** By the Committee to Review Near-Earth Object Surveys and Hazard Mitigation Strategies of the National Research Council. 2010. ISBN: 978-0-309-14968-6. 152 pp. \$32.85 (softcover). National Academies Press. Free download at [www.nap.edu/catalog.php?record\\_id=12842](http://www.nap.edu/catalog.php?record_id=12842).

The area of space that the earth inhabits is densely populated with hazards—“near earth objects” like asteroids, meteors and so on, large and small, that might slam into our planet. NEOs larger than 30 meters in diameter strike Earth once every few centuries, and objects with a diameter larger than 300 meters every hundred thousand years or so. “Even objects only 30 meters in diameter can cause immense damage,” says *Defending Planet Earth*. “The cosmic intruder that exploded over Siberia in 1908 may have been only a few tens of meters in size, yet this explosion severely damaged a forest of more than 2,000 square kilometers. Had an airburst of such magnitude occurred over New York City, hundreds of thousands of deaths might have resulted.”

As shown by the asteroid that eliminated the dinosaurs 65 million years ago, very large impacts can have vast worldwide effects. “For impactor diameters exceeding about two to three kilometers,” the report says, “worldwide

damage is possible, this affecting all of humanity and its entire living space ... While such a collision is exceedingly rare, the consequences are enormous, almost incalculable. This presents the classic 'zero times infinity' problem: nearly zero probability of occurrence but nearly infinite devastation per occurrence."

What to do, what to do?

There are a variety of proposals for dealing with NEOs before they hit earth. These are things like gravity tractors, nuclear weapons, long tethers and so on. None are even close to being implemented. But first, we have to know what we're facing. The National Aeronautics and Space Administration has been charged by Congress to find at least 90 percent of the near earth objects larger than 140 meters in diameter by the end of 2020. Little funding has been provided. The NRC committee tried to put an "optimal" budget

number on this search.

The committee gives three budget estimates for dealing with NEOs: \$10 million annually, \$50 million a year, and \$250 million a year. Being a scientific review committee, it doesn't present a preferred alternative, but only the \$250 million level offers any real chance of protecting the earth from NEOs. The report says, "A \$250-million annual level of funding, if continued for somewhat under a decade, would be sufficient to accomplish the survey and research objectives, plus provide survey redundancy and support for a space mission to test in situ characterization and mitigation."

The current budget for the U.S. Secret Service to protect the president and other top officials is \$1.4 billion per year.

## Contracts and Grants

Below are descriptions of some recently awarded contracts and grants related to hazards and disasters.

### **Collaborative research: Examining the hurricane warning system: content, channels, and comprehension.**

National Science Foundation grant #1036922. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1036922](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1036922). One year. \$132,701. Principal investigator Henry O'Hair, University of Kentucky Research Foundation, hdohair@ou.edu.

This project investigates the processes involved in communicating hurricane forecast advisories and warnings. Through a multi-method approach, a multidisciplinary team will examine: (1) the process through which advisories and warnings are developed, and the resulting content; (2) the communication channels used by participants in this process; and (3) how at-risk coastal residents, including more vulnerable populations, comprehend and react to specific components of advisories and warnings. The ultimate goal is to improve communication of hurricane information in order to promote more effective public-protective decision making, thereby saving lives and property.

A collaboration of researchers from the social and physical sciences (communication, sociology, economics, management information systems, and meteorology) will, in conjunction with key stakeholders, implement six research components in the greater Miami and Houston/Galveston areas. The first three components consist of semi-structured interviews and observations investigating message content development and communication channels with (1) National Weather Service forecasters, (2) broadcast meteorologists, and (3) emergency managers. The National Hurricane Center will produce forecasts for hypothetical storms that broadcast meteorologists and emergency managers will use to produce communication products.

In the fourth component, the research team will synthesize findings from the first three components and create sample messages (text, graphics and video) for testing with the public. The fifth component examines how members of the public comprehend and react to these messages and their channel preferences, using (1) a household survey, (2) focus groups with vulnerable populations, and (3) a laboratory test including direct physiological observation.

The project addresses the needs of vulnerable popula-

tions through focused research with non-English-speaking populations, the elderly, and new area residents. The sixth project component connects the findings back to meteorologists, emergency managers, and other communities with the goal of helping improve hurricane warning messages and communication processes.

### **Natural-based absorbent for crude oil spill cleanup.**

National Science Foundation grant #1057438. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1057438](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1057438). One year. \$39,601. Principal investigator Karlene Hoo, Texas Tech University, karlene.hoo@ttu.edu.

Powder made from certain sorghum varieties can be used effectively as an absorbent to remove organic based materials (e.g., car oils). The core of the proposed research is to combine the absorption properties of this natural material with existing technology to create a porous sponge-like material to remove crude oil spilled in seawater.

The goal of the proposed work is to develop an economically viable, natural absorbent to clean up oil spills. The study will identify and quantify the key parameters of the absorbent so it can be quickly applied to the current Gulf oil spill. We will apply a basic bench-scale design of experiments that compare different parameters in a simulated system of crude oil and seawater. The experimental data will be used to assess the method's economic viability.

Preliminary tests of the sorghum-based material in the shape of a foamy absorbent have shown that it can absorb simulated crude oil as much as 12 to 20 times its own weight. The material can be made at the site of the spill, eliminating storage and transportation costs. There is the potential to recover a relative large portion (up to 80%) of the absorbed oil from the absorbent. Preliminary calculations show that the value of the recovered oil may be higher than the cost of the absorbent and the recovery operation.

**Assessing the impact of the Deepwater Horizon oil spill on the west Florida shelf and slope.** National Science Foundation grant #1049586. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1049586](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1049586). One year. \$99,678.

Principal investigator Benjamin Flower, University of South Florida, [bflower@seas.marine.usf.edu](mailto:bflower@seas.marine.usf.edu).

The investigators will assess the impact of Deepwater Horizon oil and dispersants on sediments and benthic communities of the west Florida shelf and slope. In particular, assessing subsurface oil and dispersants will gauge the effects on benthic habitat critical to nearby fisheries and marine protected areas. We will acquire a MC-800 multicorer system to sample the sediments along three depth transects, one where subsurface oil is suspected, and two transects where the areas are not yet affected. Samples will be collected on an eight-day cruise aboard *R/V Wetherbird II*. Core samples will be dated by radioisotopes and chemically analyzed for oil and dispersants.

**Disaster resilient rural communities: The effect of information access on rural collective efficacy.** National Science Foundation grant #1049340. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1049340](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1049340). One year. \$399,999. Principal investigator Jeannette Sutton, University of Colorado at Colorado Springs, [suttonj@colorado.edu](mailto:suttonj@colorado.edu).

Under the current administration, the American Recovery and Reinvestment Act has dedicated more than \$7.2 billion to broadband projects designed to increase connectivity and Internet access in rural areas. Little is known, however, about the potential effects of these infrastructure developments for community resiliency among rural communities, especially as it relates to public safety functions, access to information online, and the development of individual and community resiliency among populations at risk of seasonal hazards.

This research examines the question: How does access to online information affect the perception of individual and collective resilience in rural communities across all phases of disaster? We will investigate the interplay among disaster exposure, individual and family level coping ability, perceptions, access to information, and actual behavioral responses to communications from official and other sources to better understand individual and community resilience. The findings from this research will increase knowledge about critical dimensions of rural community resiliency, including community resources, information and communication infrastructures, social capital, and community competence across all phases of disaster, taking into account the individual and community level responses. Outcomes of this research will include increased knowledge about the role of information access for community resilience leading to the development of recommendations on strategies to link information usage and access across the phases of mitigation, preparedness, response, and recovery, as they affect rural community resilience.

**Assessing the effects of the Gulf oil spill on mobility of toxic metals and microbial activities in Alabama coastal wetlands.** National Science Foundation grant #1048925. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1048925](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1048925). One year. Three awards. \$34,083 to principal investigator Ming-Kuo Lee, Auburn University, [leeming@auburn.edu](mailto:leeming@auburn.edu); \$40,000 to Benedict Okeke, Auburn University at Montgomery, [bokeke@aum.edu](mailto:bokeke@aum.edu); and \$56,607 to Alison Keimowitz, Vassar College, [alkeimowitz@vassar.edu](mailto:alkeimowitz@vassar.edu).

The explosion of the oil rig Deepwater Horizon in

the Gulf of Mexico on April 20, 2010, has released an estimated three million barrels of crude oil into the Gulf as of mid-June. This oil has a range of deleterious effects on the aquatic and coastal ecosystems of the Gulf. One such effect may include alteration of biogeochemical cycling of heavy metals in the coastal wetlands. Cycling of mercury and arsenic both depend on microbial activity, particularly iron and sulfate reduction, which may be promoted by the influx of the oil. Coastal wetlands are particularly susceptible to heavy metal contamination and may therefore be especially vulnerable to altered heavy metal cycling as a result of the spill. This project will examine solids and pore waters from sediment cores in Weeks Bay, Alabama for changes in microbial activity, arsenic concentration and speciation, and mercury concentration and speciation over the next eight to 12 months.

**Oil spill transport modeling in shelf, estuary, and intracoastal regions.** National Science Foundation grant #1045151. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1045151](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1045151). One year. \$137,663. Principal investigator Ethan Kubatko, Ohio State University, [kubatko.3@osu.edu](mailto:kubatko.3@osu.edu).

The main goal of this research is to develop, apply, and analyze a computational tool that can be used to examine the transport tendencies along the U.S. East Coast including Florida, Georgia, and both Carolinas as they relate to the Deepwater Horizon oil spill. The central piece of this computational tool will be the Advanced Circulation (ADCIRC) hydrodynamic model. ADCIRC is a finite element model for solving time-dependent, free surface circulation and transport problems in two and three dimensions.

Existing finite element meshes of the region will be further developed to provide an unprecedented level of resolution and physical detail, including detailed coverage of coastal rivers and lagoons, tidal creeks, the Atlantic Intracoastal Waterway, and tidally flooded marshes. The ability to accurately simulate the tidal dynamics of this region, as well as hurricane storm surge, will be coupled with the recent development of the transport capabilities of the ADCIRC model using discontinuous Galerkin methods.

The integration of these three key components—i.e., the high-resolution finite element meshes, the ability to accurately simulate tidal and storm surge dynamics, and robust, mass-conserving transport algorithms—will provide a powerful computational tool that will be used to simulate the transport tendencies of the Deepwater Horizon oil spill along the East Coast.

An immediate concern related to the Deepwater Horizon oil spill is the possibility of the oil slick reaching the Loop Current—a warm ocean current that enters the Gulf of Mexico flowing northward through the Yucatan Strait and that exits flowing east through the Florida Straits continuing northward along the east coast of Florida as the Gulf Stream. Oil entering the Loop Current would eventually be transported far afield to the Atlantic Ocean where the presence of large-scale eddies that separate from the western edge of the Gulf Stream have the potential to carry it toward the U.S. East Coast.

There is additional concern regarding the transport of oil that may occur during the Atlantic hurricane season. Using available data sources, simulations will be performed to ultimately identify areas especially susceptible to receiving

transported oil and likely areas of deposition. The model and results will also be transferable to other regions of the Gulf of Mexico.

**Developing an intergovernmental management framework for sustainable recovery following catastrophic disasters.** National Science Foundation grant #1030332. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1030332](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1030332). Two years. Four awards \$166,243 to principal investigator Robert Olshansky, University of Illinois at Urbana-Champaign, [robo@uiuc.edu](mailto:robo@uiuc.edu); \$58,000 to principal investigator Yan Song, University of North Carolina at Chapel Hill, [ys@email.unc.edu](mailto:ys@email.unc.edu); \$102,715 to principal investigator Yu Xiao, Texas A&M Research Foundation, [yuxiao@tamu.edu](mailto:yuxiao@tamu.edu); and \$123,051 to principal investigator Yang Zhang, Virginia Polytechnic Institute and State University, [yz@vt.edu](mailto:yz@vt.edu).

This research project will use the 2008 Wenchuan earthquake—which affected 46 million people in western China, caused over 88,000 deaths, and paralyzed the economy of a large part of Sichuan province—to answer the question: What can government do to ensure that post-disaster recovery is fast, fair, efficient, and sustainable?

Managing reconstruction following catastrophic disasters is especially challenging, because of the pressure to rebuild everything in a short time. An effective recovery process can help minimize the long-term effects of a disaster on a community. To accomplish its goal, this project will study the recovery planning and management strategies used at national, provincial, and local levels following the Wenchuan earthquake. It will also survey households to find out about the actual results of the Chinese recovery policies. A bilingual team of researchers will meet with officials and collect recovery documents from all three levels of government, and the household survey will be conducted by Chinese university students.

This research will improve our understanding of recovery management after catastrophic disasters. In order to gain a deep understanding of postdisaster recovery, it is necessary to study events in a variety of settings. A detailed study of the Chinese style of recovery management, in the current era of rapid change in China, will help to broaden our understanding of postcatastrophe recovery management processes. In addition, the Chinese strategy includes some unique aspects that may be worth emulating or adapting to U.S. situations.

**Land-use change as an adaptation strategy to coupled climate and economic change in rural western Kenya: implications for vulnerability reduction.** National Science Foundation grant #1029111. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1029111](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1029111). Two years. \$11,520. Principal investigator Brent McCusker, West Virginia University Research Corporation, [Brent.McCusker@mail.wvu.edu](mailto:Brent.McCusker@mail.wvu.edu).

Increasing concern over the effects of climate change on the rural poor in Sub-Saharan Africa concerns researchers and development experts. But climate change is occurring simultaneously with other processes, creating new risks and requiring a whole new range of adaptive strategies. Economic change has been identified as one of the processes having a major impact on rural livelihoods.

The dual occurrence of climatic and economic change is expected to have significant effects on the vulnerability

of these communities. Because most rural communities depend directly on land, changes in land use are important in understanding the broader change process. Rural change studies indicate a link between land use and the vulnerability of rural communities.

This research project will examine land use change as a pathway for adaptation to coupled economic and climate change and identify vulnerability at the local level. The study will be conducted in rural western Kenya where poverty levels are high and climate related stresses are on the increase. It will examine the nature and extent of land use/cover change in the past 10 to 15 years as households intensify agricultural production and engage more in market oriented production. Economic and climatic changes that have occurred in this area during this period will also be examined as well as their influence on land use.

A multi-method approach incorporating spatial, qualitative, and quantitative methods will be adopted to bring out the full range of the interactions between these processes and their effect on vulnerability. Spatial and social data will be linked in a GIS to examine the relationship between land use change and vulnerability.

This study will provide a deeper understanding of the complex nature of vulnerability and how this plays out at the local level in rural settings in developing countries.

**The citizen science of risk in the Gulf Coast oil spill.** National Science Foundation grant #1051074. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1051074](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1051074). One year. \$97,016. Principal investigator Sabrina McCormick, University of Pennsylvania, [sabmc@wharton.upenn.edu](mailto:sabmc@wharton.upenn.edu).

This project assesses multi-stakeholder risk perception, monitoring, and evaluation of the BP Deepwater Horizon oil spill in the Gulf of Mexico. It will focus on a new citizen science interface called Ushahidi that has been developed for crowdsourcing the monitoring of disasters such as the spill. It allows the public to upload key information, like exposure data through cell phone-based text messages and web-based submissions. Researchers will use interviews and video recordings with three core aims: to analyze crowdsourcing as a new form of citizen science; to investigate differences between lay experiences and governmental risk evaluation as driven by social and political and scientific factors; and to translate this research to broad audiences to facilitate improved disaster response and recovery.

**Monitoring of the Gulf oil spill with gliding robotic fish.** National Science Foundation grant #1050236. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1050236](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1050236). One year. \$100,000. Principal investigator Xiaobo Tan, Michigan State University, [xbtan@msu.edu](mailto:xbtan@msu.edu).

The oil spill in the Gulf of Mexico is expected to have devastating impact on the environment, ecosystem, and local economy for many years to come. Monitoring and tracking the oil plume is critical for cleanup efforts, beach closure warnings, protection of sensitive areas, and understanding of the spill's environmental and ecological impacts. There is an urgent need for new, efficient, and economical technology for ubiquitous monitoring of the oil spill. The proposed project will develop and deploy a school of small, cost-effective, energy efficient gliding robotic fish for dynamic and continuous monitoring of coastal areas of the Gulf for detection and tracking of oil plumes, both on and under the sea

surface. This goal will be achieved through three research and development efforts:

1. Design and development of gliding robotic fish. Through gliding mechanism design, tail-glider integration, and packaging scheme development, we will achieve the desired specifications on the maximum dive depth, travel speed, duration of continuous operation, and reliability.

2. Realization of autonomy, through onboard instrumentation, modeling and control of robot dynamics, and design of communication and coordination protocols. The autonomy will enable robots to work reliably in bumpy waters, avoid obstacles, and maintain network connectivity.

3. Demonstration and deployment in the Gulf. Gliding robotic fish equipped with compact crude oil sensors will be deployed to detect and track oil plumes in the Gulf, with technology transfer pursued at the same time for wide availability of the developed sensing platform.

**The impact of the BP oil spill on views towards nuclear energy.** National Science Foundation grant #1049476. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1049476](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1049476). One year. \$30,405. Principal investigator John Besley, University of South Carolina Research Foundation, [jbesley@sc.edu](mailto:jbesley@sc.edu).

This research assesses the degree to which the BP oil spill has had an impact on how Americans view nuclear energy. The study will follow up with 500 survey respondents who took part in a late March 2010 survey about nuclear energy. While the original survey was not intended to include a second wave, the oil spill has created the opportunity for a natural experiment. One possibility is that the oil spill has increased support for non-petroleum based sources of energy by making nuclear energy seem relatively less risky and by making decision makers involved in nuclear energy seem relatively more responsible. A second possibility is that the oil spill has decreased support for nuclear energy by increasing the risk that Americans associate with complex technical systems such as those involved in nuclear energy and by making decision makers involved

in the overall energy industry seem less responsible. The research explores both possibilities as well as questions about the role of media use and survey question order. The work builds on this unique opportunity by grounding itself in contemporary research and theory related to the impact of framing and fairness perceptions.

**A clearinghouse on natural hazards research applications.** National Science Foundation grant #1030670. [www.nsf.gov/awardsearch/showAward.do?AwardNumber=1030670](http://www.nsf.gov/awardsearch/showAward.do?AwardNumber=1030670). Three years. \$809,003. Principal investigator Kathleen Tierney, University of Colorado at Boulder, [tierneyk@colorado.edu](mailto:tierneyk@colorado.edu).

The mission of the Natural Hazards Center at the University of Colorado at Boulder is to advance and communicate knowledge on hazards mitigation and disaster preparedness, response, and recovery. Using an all-hazards and interdisciplinary framework, the Center fosters information sharing and integration of activities among researchers, practitioners, and policy makers from around the world; supports and conducts research; and provides educational opportunities for the next generation of hazards scholars and professionals. This grant enables the Natural Hazards Center to conduct its information clearinghouse activities, which include: a website at [www.colorado.edu/hazards](http://www.colorado.edu/hazards); other web-based products, including the biweekly publication *Disaster Research* and a quarterly *Research Digest*; library and information services; publication of a newsletter, the *Natural Hazards Observer*; support for postdisaster quick response research and publication of quick response reports; and an annual workshop for researchers, students, the private sector, and government representatives. This grant also supports various outreach activities—such as public presentations and media-related activities—all aimed at transferring knowledge on research findings and best practices for disaster loss reduction.

## Conferences and Training

### February 6-8, 2011 Southern Rural Sociological Association Annual Meeting

Southern Rural Sociological Association  
Corpus Christi, Texas

*Cost and Registration: \$150 before January 10, open until filled*

This meeting will focus on using social science to build sustainable and resilient communities with a special focus on the sociological aspects of rural life.

[www.ag.auburn.edu/auxiliary/srsa/pages/meeting.html](http://www.ag.auburn.edu/auxiliary/srsa/pages/meeting.html)

### February 9-11, 2011 Extreme Weather Conference Australian Meteorological and Oceanographic Society and the Meteorological Society of New Zealand Wellington, New Zealand

*Cost and Registration: \$386, open until filled*

Climate change is expected to drive more extreme weather throughout the world. This conference

will examine the phenomena with an emphasis on Australasian region. Session topics include the use of high-resolution models in local meteorology, regional oceanography, and the impacts of natural disasters.

[www.extremeweather.co.nz](http://www.extremeweather.co.nz)

### February 9-12, 2011 EERI Annual Meeting: Earthquakes Without Borders Earthquake Engineering Research Institute La Jolla, California

*Cost and Registration: Not listed, open until filled*

Earthquakes, tsunamis, and many other disasters often span national borders. EERI will consider the issues involved in these kinds of hazards. A panel discussion of the recent El Mayor-Cucapah earthquake, the San Diego wildfires, and border challenges since the events of September 11, 2001, will kick off the meeting. Session topics include regional earthquake response planning.

[www.eeri.org/site/2011-annual-meeting](http://www.eeri.org/site/2011-annual-meeting)



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Copies of the *Observer* and the Natural Hazard Center's electronic newsletter, *DR-Disaster News You Can Use*, can be downloaded free from the Center's Web site:

[www.colorado.edu/hazards/](http://www.colorado.edu/hazards/)

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**March 2-3, 2011**

**Mitigating Disaster through Design and Construction**

*Engineering News-Record*, American Society of Civil Engineers, and others

Washington, D.C.

Cost and Registration: \$350 before February 11, open until filled

This conference will discuss ways to limit risks posed by the built environment during disasters, to raise awareness of the need for disaster mitigation, and to create more resilient infrastructure. Session topics include creating standard risk assessment methods, incentives for incorporating mitigation measures, and insurers' role in mitigation planning.

[construction.com/events/2011/mitigatingdisaster](http://construction.com/events/2011/mitigatingdisaster)

**March 7-8, 2011**

**Fifth International Symposium on Wind Effects on Buildings and Urban Environments**

Tokyo Polytechnic University

Tokyo, Japan

Cost and Registration: \$120, open until filled

This symposium will address risks from wind hazards such as typhoons and tornadoes, how wind damage can be limited, and how cities can be made more resilient to impacts such as pollution. Sessions topics include urban wind hazards, wind and climate change, damage recognition, and gust fronts.

**March 12-14, 2011**

**Disaster, Risk, and Vulnerability Conference 2011**  
Mahatma Gandhi University School of Environmental Sciences  
Kottayam, India

Cost and Registration: \$150

Disaster management, risk and vulnerability reduction, strategies for resiliency, and new disaster management techniques will be the chief issues at this meeting. Topics include the science of disaster, disaster management and public administration, disaster education and community participation, and gender and social issues stemming from disaster.

[sites.google.com/site/geometoce/home/news/workshop-n/](http://sites.google.com/site/geometoce/home/news/workshop-n/)

**disasterriskandvulnerabilityconference2011drvc2011**

**March 21-24, 2011**

**Bridging the Gaps: Public Health and Radiation Emergency Preparedness**

U.S. Centers for Disease Control and Prevention

Atlanta, Georgia

Cost and Registration: \$250 before February 25, open until filled

Preparing the public health workforce for radiological and nuclear terrorism incidents is a critical need. This conference will examine the gaps in and barriers to radiation emergency preparedness, ways to improve planning for and recovery from radiation emergencies, and how to build stakeholder networks.

[www.cdcradiationconference.org](http://www.cdcradiationconference.org)

**March 29-30, 2011**

**Disaster Information Outreach Symposium**  
National Library of Medicine

Bethesda, Maryland

Cost and Registration: Free, open until filled

Librarians, public information officers, and other communicators are on the front lines of educating the public about disasters and health emergencies. Topics at the Disaster Information Outreach Symposium include how to meet the information needs of emergency managers and responders, using libraries to support response and recovery, and the Medical Library Association's new disaster information specialization.

[sis.nlm.nih.gov/dimrc/symposium2011.html](http://sis.nlm.nih.gov/dimrc/symposium2011.html)

**April 4-8, 2011**

**Greenhouse 2011: The Science of Climate Change**  
CSIRO and others

Queensland, Australia

Cost and Registration: \$990 before January 21, open until filled

This conference will discuss current climate change science, practical applications to address issues, and adaptation strategies. Session topics include extreme events and community resilience, transferring science into policy, climate variability, and impacts of adaptations.

[www.greenhouse2011.com/registration](http://www.greenhouse2011.com/registration)



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## Support the Natural Hazards Center

**T**HE SUCCESS OF THE NATURAL HAZARDS CENTER relies on the ongoing support and engagement of the entire hazards and disasters community. The Center welcomes and greatly appreciates all financial contributions. There are several ways you can help:

**Support Center Operations**—Provide support for core Center activities such as the *DR* e-newsletter, Annual Workshop, library, and the *Natural Hazards Observer*.

**Build the Center Endowment**—Leave a charitable legacy for future generations.

**Help the Gilbert F. White Endowed Graduate Research Fellowship in Hazards Mitigation**—Ensure that mitigation remains a central concern of academic scholarship.

**Boost the Mary Fran Myers Scholarship Fund**—Enable representatives from all sectors of the hazards community to attend the Center’s Annual Workshop.

To find out more about these and other opportunities for giving, visit:

[www.colorado.edu/hazards/about/contribute.html](http://www.colorado.edu/hazards/about/contribute.html)

Or contact Ezekiel Peters at [ezekiel.peters@colorado.edu](mailto:ezekiel.peters@colorado.edu) or (303) 492-2149 to discuss making a gift.

A U.S.-based organization, the Natural Hazards Center is a nonprofit, tax-exempt corporation under Section 501(c)(3) of the Internal Revenue Code.

THE MISSION OF THE NATURAL HAZARDS CENTER is to advance and communicate knowledge on hazards mitigation and disaster preparedness, response, and recovery. Using an all-hazards and interdisciplinary framework, the Center fosters information sharing and integration of activities among researchers, practitioners, and policy makers from around the world; supports and conducts research; and provides educational opportunities for the next generation of hazards scholars and professionals. The Natural Hazards Center is funded through a National Science Foundation grant and supplemented by contributions from a consortium of federal agencies and nonprofit organizations dedicated to reducing vulnerability to disasters.

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