Session Summaries
31st Annual Natural Hazards Research and Applications Workshop
July 9-12, 2006
Boulder, Colorado

Session summaries are listed in the order in which they appear on the workshop agenda within their respective categories.

Summaries have been lightly edited for formatting and glaring grammatical errors.

Plenary Sessions:

Recovery after Hurricane Katrina

Grand Challenges for Disaster Reduction (not yet available)

The State of Federal Emergency Management

Concurrent Sessions:

Leadership in Disasters (not yet available)

Effective Mitigation for Landslide Risk

Disaster Mental Health: Policies and Practice (not yet available)

The Urban Evacuation Problem (not yet available)

Politics of International Disasters: Aid, Conflict, and Dependency

Disaster Journalism: Roles, Rating and Responsibilities

Business Survival–Community Survival (not yet available)

Mapping in a Post-disaster Environment

Toward a Resiliency Index (not yet available)

Evolving Issues in Mitigation Policy

Pandemic and What It Means for the Hazards and Disasters Community

The Missing Links: What Municipal Managers Need (not yet available)

The Carrot or the Stick: Encouraging Climate Adaptive Strategies at the Local Level

Amenity Migration and Risk Management (not yet available)

Understanding Poverty for Effective Emergency Management

Asian Tsunami Update Session

Practicing Emergency Management in Institutions of Higher Education

Disaster Response and the Military

Legal Issues in Disaster Management: Eminent Domain (not yet available)

Preparing the Public: Earthquake Education and Building Local Capacity

New Research and Projects Sessions:

Disaster Risk Reduction Planning: The Story of Marikina City, Philippines

Advances in Hazards and Disasters Research from Taiwan

Quick Response Research in the Wake of Hurricane Katrina

National Consortium for the Study of Terrorism and Responses to Terrorism (START)

Post-Disaster Environmental Impact Assessment

Research in Hazards by Young Professionals I

Cannon Beach Post-Disaster Recovery Planning Initiative

A Critical Look at the Incident Command System (ICS) and Contemplating Alternatives

Weather and Society * Integrated Studies (WAS*IS)

New Enhanced Fujita Tornado Scale (not yet available)

National Institute for Building Sciences: Savings from Mitigation Study

Research in Hazards by Young Professionals II

Plenary #1: Recovery after Hurricane Katrina

Moderator: Clancy Philipsborn, AMEC Earth and Environmental, Inc.
Panelists: Paul Farmer, American Planning Association
Shirley Laska, University of New Orleans
Victoria Salinas, FEMA/Gulf Coast Recovery
Gavin Smith, Mississippi Governor's Office of Recovery and Renewal
Recorder: Inés Pearce, Pearce Global Partners

The discussants were asked to focus on the following questions:

- Given, first, the loss of life and catastrophic community impact, followed by the flawed government response, and then unending questions about the levees, FEMA's future, and where all the money is coming from and going to, what *big* lessons-learned are we walking away with? (i.e. should the U.S. Military serve a more primary role within the National Response Plan than the current and sole DOD lead role where the USACE is responsible for ESF #3, Engineering and Public Works?)
- Should the national standard for determining *public or societal* benefits and costs be revised to reflect the true cost of "damages avoided" such as the myriad costs associated with the nationwide relocation of hundreds of thousands people?
- Katrina created circumstances well beyond local, regional, state and federal governments "standard" recovery capabilities. Some believe that catastrophic problems are nothing more than the simultaneous occurrence of multiple smaller problems, and that while extraordinary circumstances often create their own set of issues in terms of magnitude, the common recovery strategy should be to break down the extraordinary problems to those that we know how to manage and accomplish. Others believe that catastrophic problems require an extraordinary solution, and thus develop and apply new approaches to resolving the issues at hand. We have witnessed how the 1985 Mexico City earthquake gave birth to what has become the National Response Plan, and how Hurricane Hugo in 1989 brought to everyone's attention that the profession had somehow ignored the "recovery" component of the four basic elements of Emergency Management (Preparedness, Response, Recovery & Mitigation).
- Following Katrina, we have seen a combination of both approaches: One state playing its losses against another to support its efforts in obtaining congressional funding; attempts to apply a uniform statewide recovery strategy to develop "one voice" with which to solicit funding; unprecedented Supplemental Appropriations in response to the solicitations; ESF-14, Long-Term Recovery Planning; Statewide Recovery Organizations reporting directly to the Governors; and Statewide consultant "Recovery Managers."
- What were the highlights and lowlights of the "Recovery Management" from your viewpoint? What are the pros/cons between how LA/MS are approaching the problems (e.g., the schedules for Charrettes, the timing and use of HMGP, the timing and use of Supplemental CDBG, and the troubled ESF-14? How much of a difference did having governors of different political parties, answering to different FEMA Regional Offices make?
- Right or wrong, New Orleans is the poster-child for Katrina; a Behavioral Science incubator, the Natural Hazards Research community's "I told you so" …. from financial, racial, and gender inequity; to the limits of a catastrophic imagination, to the behavioral complexities of warning and evacuation, to sensible/natural land-use, to the financial decimation of a major city, to retrofitting behavior, to repetitive losses, to the city beneath the sea, to a reputation for endless corruption, to a paralyzed city government. Given the complexity of the problem, the diversity of the citizenry, the displaced population, the diminished infrastructure, and from the revered minds of myriad expert organizations, how should the city proceed? What are your top 3 actions that need to happen next? What reassurance do we (or should we) have as citizens, taxpayers, researchers and practitioner, policy-makers … that it won't happen again?

Government response to Katrina was poor although differences existed depending on the state in charge and on pre-existing political and community structures. Unsurprisingly, recovery efforts and results vary from one community to another, however, Katrina recovery has been an immense undertaking by government to address the vast needs and management of responding resources. Much still needs to be done at the state/federal and especially local level in developing effective stakeholder planning. Planning is beginning now in affected communities, but it's still unclear whether these communities will ever fully recover based on what has occurred. The lesson for the rest of the country: undertake recovery planning now, pre-disaster.

A disconnect exists between federal and local response/recovery priorities. Values don't change after a disaster, but what does change is the flow of money and political will. This can bring additional strain to the local community by shifting the focus onto what is deemed politically important rather than what is.

Added conflicts arose from multiple mandates being placed on an already strained FEMA. Emergency Support Function (ESF) 14 (Long Term Community Recovery) needs to build capacity to do work with a clearly-stated purpose. FEMA must bridge the gap between community recovery planning and assistance for individuals/structures. This can be accomplished through community partnerships, coordination and leveraging funds. Challenges include lack of clear responsibilities and overlap between response and recovery coordination. Also, tension between decision-makers caused confusion, delays, and issues. Coordination is critical at all levels – since it's time intensive, it'll be the first to drop off the priority list.

Recovery planning does matter and needs to be comprehensive to address all-hazards. There's a long way to go regarding catastrophic planning, both in areas of long-term issues and equity. But issues prior to Katrina also contributed to effects during/after the storm and we cannot look at recovery without considering pre-storm shortfalls.

Pre-planned versus spontaneous response showed that pre-planning is the only effective way to add capacity. However, Katrina's evacuation pre-planning failed as many in the plan were not contacted beforehand. So effective pre-planning needs to build support from local stakeholders, and shouldn't be military-driven or pushed from the outside. These stakeholders are a key to determining specific options for evacuating the local communities and their needs.

Citizens are a resource developing neighborhoods plans as they're organized and motivated. Benefits are they're investing in the reconstruction and vitality of their own neighborhoods. In doing so, local government can build/rebuild trust, momentum and buy-in by using residents' local knowledge, energy, ability to engage quickly, and therefore gain support during recovery. Local government must maintain the engagement when federal dollars begin flowing which can shift focus to other areas, with pressed timelines, and can result in excluded and demoralized residents migrating out of the area. This is exacerbated by inequities, such as racism, which will further cause a rift between government and community.

New Orleans' recovery "enterprise" had corporations first to arrive. While swift response was commendable, issues included many layers before actual assistance reaches locals, and pricing set without bids to the disadvantage of local workers and government. Some companies were too big and external to the community, with no local connection, therefore had difficulty engaging local resources. To determine whether it's better to use national versus local firms, develop and use a "local benefit" test for capacity to complete work, cost effectiveness, and legacy to area for economic recovery and future capability.

Investor confidence needs to be repaired; otherwise investments won't be made in New Orleans. Leaders need to be honest in the recovery effort, otherwise precious time and planning is spent on non-critical priorities. Building the capacity for planning, recovery needs to include environmental issues and must increase local ability to address. Due to political "good will" or under guise of quick recovery, must not be allowed to build or rebuild in areas where vulnerable. Stick to sound land-use planning to curtail the human toll and economic losses. Otherwise, a few years and those policies are reversed; then the community is back at square one.

The recovery model in Mississippi is about restoring, rebuilding and reshaping the physical, social, economic and natural environment through pre-event planning and post event actions. Their Governor undertook sustainable development to rebuild the community back better than before involving planning, coordination, and policy-making with corporate participation. Community needs political leadership, capacity building, leveraging resources, identification of local needs, and program flexibility. However, difficulties come from lack of planning, low capability and commitment in addition to existing recovery programs seen as entitlement. To implement the model, there needs to be training, policy change, and creation of the sustainable recovery ethic to move toward disaster resilience and self-reliance.

A low-light, the FEMA we all know and respected didn't show up. Decisions made locally were continually countermanded and couldn't be relied on, causing further break-downs. Louisiana was hurt by existing dysfunction before Katrina, and it's ridiculous to expect improved effectiveness just because a disaster occurred. For instance, the New Orleans Planning Director still hasn't met with the Mayor.

Positively, the federal government began repairing levies quickly; otherwise their response and recovery marks are low. Federal dollars have been flowing into affected areas, in spite of a highly polarized congress. The States' use of funds has been good as Louisiana used their budget well, and Mississippi's leadership hired a Recovery and Renewal Director.

Focus needs to be on pre-disaster planning, partnerships, and decision-making which will all need to be a part of recovery. Buildings shouldn't just be rebuilt, they should be rebuilt safer and stronger utilizing best practices such as engineering with architecture in building codes, and possibly not be rebuilt at previous locations. Entities must commit to maintain effective coordination and communication at all levels. Also, government decisions need to be made with affected populations participating, and/or keeping in mind the local culture and community aspects, otherwise, local failure is eminent.

Plenary #3: The State of Federal Emergency Management

Moderator: Claire Rubin, Claire Rubin and Associates
Panelists: Michael Brown, Michael D. Brown and Associates
Craig Fugate, Florida Division of Emergency Management
Eric Holdeman, King County, Washington, Office of Emergency Management
Recorder: Ernest B. Abbott, FEMA Law Associates, PLLC.

The discussants were asked to focus on the following questions:

- There were no moderator questions.

Given the strong feelings of participants – and perhaps aided by the absence of any representative from DHS – this closing program of the 2006 Hazards Conference provided a wide-ranging and surprisingly thoughtful discussion of the reforms needed in Federal Emergency Management. Most critically – there appeared to be some agreement that the Big Debate in Congress -- about whether FEMA should remain in DHS or be restored as an independent agency status – largely evades the difficult but critical issues of assuring true leadership – and enhancing preparedness and response through focusing on all-hazards.

Claire Rubin opened the program with a plea that the DHS officials now wielding responsibility over emergency management – but absent from the conference – emerge from their lair inside the beltway, meet the experts, and sample the wide knowledge and experience accumulated over a number of years of research and experience. She then challenged the panelists to prioritize the following recommendations for federal emergency management which emerged in the many post-Katrina investigation reports:

- FEMA should be abolished/changed and replaced with a stronger, more capable organizational structure;
- Senior leaders should be drawn from a pool of individuals with risk management experience and have substantial management and leadership experience;
- FEMA should have responsibility over all four phases of comprehensive emergency management; and
- The organization should have regional offices located and staffed to achieve better coordination across agencies and levels of government.

These questions stimulated a wide variety of thoughtful observations about the challenges faced in emergency management:

1. Leadership: The solution is not to require that a FEMA director have a PhD in Emergency Management. You need someone with experience and success over broad range of issues – and who knows how to lead persons and organizations *in the absence of authority*.

    a. Director of FEMA must also have relationships at all levels of government-not just with President and federal department heads, but also governors. DHS structure has hindered these relationships.
    b. We must build leadership in emergency management long term by engaging local elected officials – you need strong EM at all levels of government.
    c. Success at local level – requires assigning full time duties to single person to do. If emergency management is no one's full time job -- it can always wait for another day
    d. Success requires bridging differences between the different types of people – different cultures of people – who are part of every response. The National

Incident Management System is an effort to do so – by trying to require common understanding of the Incident Command System (ICS) and a common language/ resource typing.

e. You can motivate political officials by starting with private sector- prove to them how resilience will affect bottom line. Then they will drive change on public side.

2. Reuniting FEMA: it must include all phases of Emergency management and be directed to all hazards. Separating preparedness from FEMA was a huge mistake – as is the extraordinary focus of resources on terrorism.

3. Where FEMA is placed is less important than clarity about its mission and on what outcomes constitute "success". For example, in temporary housing program is the goal to provide housing fast – or to make sure no housing is provided to ineligible recipients? Doing it fast or minimizing mistakes and fraud? You cannot have both.

4. Partisanship. Emergency management should not be a partisan issue; it is bad for Emergency Management.

5. Mitigation – complaining about federal government cut-backs of mitigation programs misses the point. Mitigation must be supported at all levels of government. As long as state or local governments support mitigation only when someone else is paying you will not get real mitigation. You have to create a demand, an expectation for mitigation – and not just at federal level. In Florida, mitigation was stimulated far more by 70% increase in insurance premiums than the 7% of federal money made available after disasters.

6. Creating an environment for reform.

    a. The media. You must use power of media to get your message to American people. You must use the power of the camera to show politicians what need to be done. The hazards community must get out of the academic mode, and get into the media mode.
    b. Keep plowing the ground, plant the seeds- be ready to get action when events trigger legislative change.

7. Restricting access to information is counterproductive. The more you try to protect public by withholding information- the more the think you know more. There is a security mentality that we must not let the bad guys know information that they might use against us. But it is better to let citizens know the threats- so citizens can ensure they will be addressed. Knowing what government is doing allows citizen oversight of government as well.

8. Outsourcing of emergency management: You can contract out a number of the activities of emergency response and recovery (such as providing ice or debris removal) but you cannot contract out leadership. Leadership – and assigning priorities and resources in emergency response is an 'inherently governmental' function.

9. Social/racial problems vs. emergency management problems. Hurricane Katrina exposed vast social, economic, organizational, political problems. Emergency managers cannot fix these underlying problems – they can only try to bring to the poor and disabled the tools they need to be a survivor and not a victim. Virtually all of those with special needs must bear some responsibility for themselves; they (or their care givers) must develop their own plans rather than merely wait for government programs to respond. For example – you can modify CRT training for people with disabilities; you all should be prepared yourselves, get active in your citizen ERT communities.

Effective Mitigation for Landslide Risk

Moderator: Lynn Highland, U.S. Geological Survey
Discussants: Rob Olshansky, University of Illinois at Urbana-Champaign
Charles Real, California Geological Survey
Recorder: Joanna Martin, New Zealand Earthquake Commission

The discussants were asked to focus on the following questions:

- What are the effects of landslide on the built environment?
- What are the effects of landslides on the natural environment?
- Provide examples of successful mitigation projects.

The consequences of landslides can be catastrophic - lives have been lost and the economic costs dire. One example highlighted by the discussants was the 2005 landslide in La Conchita, California which cost 10 lives, destroyed 10 homes, damaged 13 others and launched a lawsuit which is still pending. That the slide occurred on exactly the same site as one 10 years earlier reflects the complex and problematic nature of effective landslide mitigation.

Clearly the best time to mitigate landslide risk is before and during development of the built environment. However, if development has already taken place the choices available to prevent and mitigate landslide damage are constrained. And there are other barriers to landslide mitigation. They include indifference to the issue, the availability of disaster relief, and the hoary chestnut of liability.

It was observed that currently when a landslide hits the built environment, property owners call in lawyers and the result is that huge amounts of money are spent on litigation while the problem remains unsolved. Furthermore it is always public entities that end up paying. The comment was made that landslides are invariably bad for municipalities and that they should be prepared to purchase the affected land if necessary.

It was put forward that the best approach to take is co-operative and area-wide. There are a number of ways in which communities can do this, for example:

- Geological Hazard Abatement Districts (GHAD) which are set up for the purpose of prevention, mitigation, abatement, or control of geologic hazards. The first GHAD was in Abalone Cove, California where the residents were able to jointly finance abatement measures irrespective of property boundaries;
- Homeowners Associations; and
- Hillside Management Districts.

It was also noted that some legislation requires that hazards be considered, including the National Environmental Policy Act, the California Environmental Quality Act, Forest Practice Act, building loads and the Seismic Hazard Mapping Act.

Geologic mapping and earthquake monitoring assist natural resource management and natural hazards management. The California Geological Survey has a number of programs to do this, including seismic zonation, Caltrans Highway Corridor Mapping, the Forest and the Watershed Geology program and special study zone reports.

Of course it is crucial that the information available on identifying and mitigating landslide hazards reaches planners and others at the local and regional levels. Guidelines, a review and approval procedure and nation-wide mapping would all be elements of an effective landslide mitigation planning process.

The discussants touched on the effectiveness of the now defunct (?) Project Impact, a FEMA program designed to encourage local communities to step up their efforts to contain future disaster losses.

In Seattle, Project Impact funds were used for home and schools retrofit programs and for hazards mapping. The USGS and the City of Seattle agreed to collaborate on producing state of the art landslide and seismic hazard maps for the city. The USGS recently completed its suite of landslide maps for Seattle and developed methods that can be used to forecast the occurrence of landslides, including predictive rainfall duration-intensity thresholds.

Other resources to assist landslide mitigation include the book *Landslide Hazards and Planning* by Paula L. Gori, Sanjay Jeer and Jim Schwab. The book provides basic knowledge of the natural and man-made factors that trigger landslides, as well as information needed to identify at-risk areas and determine whether development should be permitted there.

In addition to the human cost, the discussants described some of the environmental costs when landslides occur. For example, wild fires destroy vegetation which in turn makes the land more susceptible to debris flows, affecting the quality of stream water. Another example is the coastal environment in California which has been harmed by the bulldozing of debris over the side of the highway and onto the rocky shore.

During the discussion period, the question of indifference and why people don't take action to prevent or mitigated against landslide hazards was raised. This widened into a general discussion about the difficulties associated with landslide mitigation including the application of the available information, the small size of the federal landslide program and the expense of insurance should it be available at all.

Politics of International Disasters: Aid, Conflict, and Dependency

Moderator: Carla Prater, Texas A&M University
Discussants: Allen Clark, Pacific Disaster Center
Emdad Haque, Canadian Risk and Hazards Network
Michael Renner, Worldwatch Institute
Margareta Wahlstrom, UN/Office of the Coordination of Humanitarian Affairs
Recorder: Patrick Roberts, Stanford University

The discussants were asked to focus on the following questions:

- How can we improve research in areas that are difficult to access because of political issues or wars?
- What are the organizations that can provide guidance to researchers and practitioners?
- How can aid be delivered more quickly to areas suffering from complex crises?
- How can we encourage intellectual exchange among disaster researchers around the world?

With increasing globalization, a national disaster can quickly become an international disaster when, for example, a natural event breeds a refugee crisis. The panelists examined how the international community might better assist humanitarian crises. Natural disasters can encourage cooperation among groups that have traditionally been enemies because disasters create an opportunity for antagonistic groups to recognize common interests. Unfortunately, this opportunity is not often sustained after the crisis has passed. The discussants examined contrasting cases in Sri Lanka and Ache, Indonesia.

Some panelists recommended further separating humanitarian assistance from political action in order to encourage governments to recognize that relieving suffering should not be subject to short term political ends. Other panelists believed that such a separation either was not possible or desirable. In some cases, the separation of the humanitarian and the political causes crisis. In other cases, it is difficult to achieve such a separation in the minds of people receiving assistance from a bewildering variety of organizations. Humanitarian organizations have struggled with this issue before. Humanitarian efforts in Rwanda during the 1990s showed that aid providers should not allow themselves to become substitutes for political action because political actors may neglect serious problems and humanitarians will be blamed. Protection and security issues may need to be addressed before humanitarian work can be fully effective.

Governments at many levels, not only official humanitarian organizations, can provide humanitarian assistance. If central governments are uncooperative or ineffective, humanitarian organizations should attempt to work with local government officials who are in many cases important to their local populations. Humanitarian organizations have valuable financial resources and expertise that can assist local populations, especially if the disaster community succeeds creating career paths in emergency management for future generations.

The discussion emphasized that the cooperation among antagonistic groups immediately following a disaster is fragile. It also emphasized the need for developing emergency management institutions and careers abroad. International institutions for disaster assistance have grown faster than the national institutions in some countries, and these low capacity countries need to develop their preparedness and response capabilities. The panelists and audience ended the session in agreement about the need for greater resources for mitigation as disaster losses increase over time.

Disaster Journalism: Roles, Rating and Responsibilities

Moderator: Marguerite Moritz, University of Colorado at Boulder
Discussants: Amanda Ripley, Time Magazine
Rebecca Solnit, Independent Consultant
Lee Wilkins, University of Missouri
Recorder: Steve Olsen, Dewberry and Davis

The discussants were asked to focus on the following questions:

- Did the news media effectively serve as a watchdog of government in Hurricane Katrina?
- Do media ratings drive coverage and does this lead to more sensationalism in reporting?
- What areas do the media need to improve on in covering disasters and are there any key lessons learned from reporting on Hurricane Katrina?
- How is technology impacting disaster coverage and reporting?

There are several normative assumptions in disaster journalism. The media has an important role in overall democratic governance. Journalism is a means providing public trust and service. In disasters, the news media has key roles in issuing warning, providing the command room point of view and serving as a community bulletin board for exchanging information.

Media coverage in disasters differs from their day to day business. Reporters do not normally have disaster knowledge and experience. Staff turnover, stressful work conditions and work away from their newsrooms mean they do not have the normal level of checks and balances. Often the emphasis on reporting is framed in terms of victims and this causes loss of reporting on larger policy issues.

There is a strong belief that the media makes many constructive contributions to disaster related success. The media helps to ensure that government officials are open and honest about reporting on disaster activities. They have a goal of reducing loss of life and property damage and play an important role in victim advocacy. The media plays the watchdog role and some have even created "watchdog desks" to try and confirm rumors.

Enhanced technology has provided the media with new tools and methods to cover disasters. Use of blogs, podcasts, websites and email have all helped the media increase its ability to report on more activity on a more timely basis. It was noted that some of these enhancements can be somewhat intimidating to reporters. For example, email has opened them up to attacks on their reporting. This causes some reporters to think twice about how and what they report.

Discussion views were mixed on whether disaster journalists and reporters are driven by the goal of making a positive difference to those impacted by disasters or to create wider news coverage via emphasis on the sensationalism of disasters. It was suggested that there is evidence that the opportunistic business nature of the media often relies on the sensational aspects of disasters. This was a contrary view to others who believed reporters were interested in helping make the overall disaster response and recovery a success.

There was considerable discussion about how educated or prepared disaster journalists and reporters are. It was noted that they are not disaster experts and are in need of good general disaster information and accurate data. The consensus was that there is a significant opportunity to improve media members' knowledge and ability to report.

Some suggestions were:

- Better educate reporters before, during and after disasters;
- Encourage strong interactions of media in conferences such as the Natural Hazards Workshop;
- Encourage proactive sharing with the research community so key information and research data can be made available early on to reporters;
- Strive to increase the accuracy in disaster reporting since the chaotic nature of events and rush to report can often lead to misinformation;
- Embed reporters in key federal, state and local operations so they will better understand the nature of and complexities of disaster assistance.

There was discussion about releasing sensitive information to the media. Opinions were mixed on when and how much should be shared. There was concern about the fine line between the media being the true watchdog and sometimes getting the story only part right and reporting it anyway. Some media representatives believe holding any public information close leads to mistrust and negative overtones. Others believe there are situations where it is best not to make certain information public. Final decisions are best determined on a case by case basis.

Mapping in a Post-disaster Environment

Moderator: John Pine, Louisiana State University
Discussants: Beverley Adams, ImageCat, Inc.
Jim Buika, Pacific Disaster Center
Mike Hutt, U.S. Geological Survey
Recorder: John Carroll, California State University, Fullerton

The discussants were asked to focus on the following questions:

- What technologies contribute to your efforts to effectively support response?
- How have these technologies helped support relief and recovery?
- What limitations and problems do you see in utilizing these technologies in supporting emergency response efforts?
- How do you know if the data is what responders need?

The first discussant, Beverley Adams, described her experience assessing damage following Hurricane Katrina. Her team utilized a system called VIEWS that is a portable data collection and visualization system which integrates GPS-registered digital video footage, digital photographs and in-field observations with high-resolution satellite imagery. Dr. Adams noted that emergency responders need accurate damage assessment and other information quickly. The VIEWS system provides rapid response field reports as well as accurate maps, photographs and videos of damaged areas. In response to the question about the limitations of technology in the post-disaster environment, she directed workshop participants to the following editorial written by her employer:
http://www.imagingnotes.com/go/article_free.php?mp_id=62

Dr. Adams finished with a brief demonstration of the VIEWS system.

The second discussant, Jim Buika, reduced the discussion questions to two:

- How does one create useful map products for decision makers?
- How should these products be delivered?

He described the Pacific Disaster Center's efforts to bridge the gap between scientists and decision makers in the enormous region that the PDC serves, especially in the area of impact assessment modeling. He suggested that in order to make maps that best answer user's questions, there needs to be improved institutional and interagency communication. He stressed the importance of creating formal liaisons to emergency managers in the PDC jurisdiction at all levels. Honoring simple, as well as, high tech solutions was another key point. Providing data via the World Wide Web is especially useful for a large geographic area. Also, 11x17 maps are an extremely useful tool in the field. Finally, Mr. Buika re-emphasized the importance of liaisons and training before a disaster. Many Pacific Disaster Center resources are available at:
www.pdc.org

The third discussant, Mike Hutt, described issues relating to information sources and the challenges of information flow in disasters. Following a disaster, everybody wants to help so many institutional barriers to communication and data exchange go down. The resulting flood of data can be overwhelming. Therefore, it is important to understand the needs of users. Mr. Hutt described two broad categories of users to emphasize this point. Strategic decision makers may only need a few general maps while tactical decision makers require detailed maps. He stressed the importance of local knowledge and the need to integrate a range of users in the process. He finished his presentation with 3 recommendations: 1) there needs to be communication between users before events happen; 2) have all maps registered to the common reference system such as the U.S. National Grid; 3) ongoing training.

Several points were addressed in the question and answer discussion. First, the moderator, John Pine, emphasized the importance of preparation and described the experience handling the flood of data at LSU following Hurricane Katrina. Second, how fast satellite imagery is available to decision makers following a disaster was discussed. Third, it is important to have high-quality pre-disaster images and GIS data available. Finally, all agreed that communication and training before a disaster are essential for the effective use of data following a disaster.

Websites referred to by discussants include:

- The ImageCat, Inc. website has links to products and services (including VIEWS), as well as technical articles: http://www.imagecatinc.com/
- The Pacific Disaster Center hosts a data server and map viewer at: http://www.pdc.org
- The United States Geological Survey: http://www.usgs.gov/
- Louisiana State University hosts the Hurricane Katrina and Rita Clearinghouse Cooperative at: http://katrina.lsu.edu/

Evolving Issues in Mitigation Policy

Moderator: Pam Pogue, Association of State Floodplain Managers,
Rhode Island Emergency Management Agency
Discussants: Anita Dwyer, Geoscience Australia
Bill Hooke, American Meteorological Society
Rebecca Quinn, Association of State Floodplain Managers,
RCQuinn Consulting, Inc.
Recorder: Christina Finch, University of South Carolina, Hazards Research Lab

The discussants were asked to focus on the following questions:

- What is the basis for the development and implementation of sound mitigation policy?
- How effective is current mitigation policy?
- What would make mitigation more effective?
- What is the role of science, technology and data in the development of mitigation policy?
- Who are the key partners involved in the evolution of mitigation and what are their roles?

The mere existence of mitigation programs, such as the Disaster Mitigation Act of 2000 and the Hazard Mitigation Grant Program, does not reduce damages to natural hazards. Mitigation measures need to be implemented and evaluated in order to be effective. Despite the history of mitigation policy, the damage caused by hazards in this country has been increasing at unsustainable levels.

In addressing the first question, the panel suggested that there is no clear answer to gauge the effectiveness of mitigation policy. Mitigation measures have been deemed extremely successful on a project specific basis; many examples were cited as mitigation success stories. The report, titled "An Independent Study to Assess the Future Savings from Mitigation Activities," by the National Institute Building Sciences was highlighted as one example. The report discusses the effectiveness of mitigation dollars spent; further analysis should continue to assess the impact of losses avoided due to mitigation.

Despite these successes, the panel considered the concept of mitigation less effective. The panel addressed multiple hurdles to successful mitigation implementation: trouble with marketing mitigation, political influences, the struggle to implement cost-benefit analyses, difficulty with non-structural mitigation proposals, lack of state building codes, the need for more utilization of funding sources other than FEMA, and a needed emphasis on public assistance (infrastructure).

In order to have an effective mitigation program it must be accepted and understood by all parties involved. Historically, many mitigation programs are driven to restore people to their "normal" circumstances. Unfortunately, that type of response does not improve the situation for a future hazard event. A truly effective mitigation policy framework demands a change in the way many people think about mitigation measures. An example was given that compared the occurrence of disaster damages to the number of aircraft accidents. In the aftermath of an aircraft accident, professionals from many disciplines converge to investigate all the details because aircraft accidents are unacceptable. In a similar fashion the attitudes of people with respect to disaster losses must change from "Let's rebuild as before and return to normal" to "This should never happen again." Emergency response should be treated with the same detail and investigation as an airplane accident.

Data and technology are essential to the implementation of sound mitigation policy; they are used to identify, understand, communicate, and own the risk associated with hazards. It is imperative to understand the complex interactions between natural and social systems. During this session, mitigation was called "evidence based decision making." Science and technology can be used to communicate "evidence" and information to the public, officials, and emergency managers. The panel suggested that the responsibility of ensuring that scientific findings are distributed to and reach the appropriate audiences falls on scientists and engineers. This way, people could make fully informed decisions based on scientific investigation and calculated risks.

Emphasis was placed on communities, as all mitigation is local. Data and technology should be used to foster understanding in communities, so communities will own their responsibility in preventing hazard losses. Professionals want communities to use this knowledge in hopes of breaking the "It won't happen to me" attitude that sometimes prevails at the local level. The transfer of knowledge will also be used to clarify that there are similarities in the probability of occurrence of a hazard event even though there are differences in reality.

Partnerships are an integral part of mitigation implementation and are the catalyst for change. Some of the discussion focused on building partnerships with the media, specifically challenging them to show success stories and deliver accurate information to the public. FEMA does have a mitigation success story webpage, however it needs to be expanded and distributed to a wider audience. In addition, mitigation needs to harness the strengths of the private sector as strategic partners. The private sector may be used for emergency response (IBM Crisis Response Team), business continuity planning, and marketing mitigation.

In closing, the panel deemed the Natural Hazards Workshop the ideal partnership, bringing together the academic researchers from many disciplines, public agencies, non-governmental organizations, faith based organizations, and the private sector. This combination of knowledge creates budding partnerships that will be instrumental in directing the evolution of mitigation policy.

Pandemic and What It Means for the Hazards and Disasters Community

Moderator: Kimberly Shoaf, UCLA Center for Public Health and Disasters
Discussants: Jennifer Horney, University of North Carolina at Chapel Hill
Don Shropshire, Canadian Red Cross
Crystal Franco, Center for Biosecurity UPMC (Univ. of Pittsburgh Med. Center)
Recorder: Richard W. Klomp, Centers for Disease Control and Prevention

The discussants were asked to focus on the following questions:

- In the face of uncertainty, how can Public Health work with the preparedness community?
- How will messages related to a pandemic be different than other Public Health messages?
- How should the relevant tasks be divided between state and federal authorities?
- What are some of the ethical and legal issues involved in dealing with a pandemic?

Kim Shoaf began by clarifying that the US flu season typically lasts from November to March and results in about 36,000 deaths. She explained that there are numerous strains of flu virus circulating at any given time. Some strains are common to both animals and humans. The most worrisome current strain, H5N1, or avian flu, has been about 60% fatal in humans. So far, while it spreads easily in birds, and has been shown to spread from birds to humans who have extensive contact with birds, H5N1 has not been found to spread easily between people. The moderator explained that if/when a virulent flu virus to which people have no immunity because it is new, becomes easily transmissible between people, we essentially would be at the beginning of an influenza pandemic.

Jennifer Horney addressed the first question by pointing out that about 100 million dollars for pandemic planning has been split by the states and 250 million more dollars should be available. She said that in North Carolina, existing bioterrorism committees will also be used as the pandemic flu committees. Messages related to a pandemic would be different than other messages because the death rates will be greater, people in the 18-45 year-old-age range will be hardest hit, there will be simultaneous outbreaks in numerous locations (which will make mutual aid agreements essentially worthless) and our health care system currently has virtually no surge capacity. She added that state and local authorities are responsible for reducing the spread of disease beyond their borders and must integrate their efforts with local law enforcement, utilities, and the private sector, which also has a role to play relative to social distancing and the development of policies like telecommuting to help them run their business with higher rates of influenza-related absenteeism.

Don Shropshire thought a pandemic would be different because the vast majority of people will be cared for at home. He suggested that public health can assist people by collecting the data and by creating and implementing a focused communication plan that covers how to care for yourself, basic emergency planning, proper hand washing, cough and sneeze control etc. He emphasized the important of looking at the human dimensions of responding to a crisis like getting paid and obtaining groceries. He suggested working with stores and their supply chains to keep food flowing despite unpredictable levels of absenteeism. He added that it is important to determine what the essential services are that need to be maintained, and to enlist the aid of voluntary and faith-based organizations to address surge capacity issues. He concluded by saying we need to do more with interoperability and move out of our silos to accomplish these objectives and provide information and training to help the public be as prepared as possible for an influenza pandemic.

Crystal Franco pointed out that HHS Secretary Michael Leavitt has said, "It's not a question of if we will have another pandemic, it's a question of when." She said that all communities will be affected to about the same extent at the same basic time. It will be very difficult to get staffing and resources due to the widespread and persistent outbreaks. There are about 5,000 hospitals around the country and the federal government will not be able to help them all. Hospitals will be overwhelmed, so planning still needs to be conducted by state and local leaders to tie into regional hospital groups. She addressed ethical issues ranging from the legality/advisability of forcible quarantine and isolation, to caring for huge numbers of sick people to allocation decisions and distribution of scare resources (like vaccine). Decisions would need to be made about hospitals canceling elective procedures and potentially rationing care. The whole process would benefit from community involvement and citizen engagement

The following information was shared in response to a question that was raised by the audience: What will be the impact of an influenza pandemic on transportation? A pandemic will happen very fast. In the states, we really have no idea how other people live around the world. Cock fighting still is very popular in Thailand and some people still drink raw duck's blood. When a pandemic hits, it will be rapid because so many people still live in close proximity to birds.

Remember, it's not physically feasible to quarantine a whole city or an entire state. Social distancing probably will be of greater benefit to combat what could be a three-year cycle of wave after wave of influenza virus sweeping around the world.

The Carrot or the Stick: Encouraging Climate Adaptive Strategies at the Local Level

Moderator: Koko Warner, United Nations University
Discussants: Sam Brody, Texas A&M University
Ian Burton, Meteorological Service of Canada
Ilan Kelman, National Centre for Atmospheric Research
Recorder: Sonia McManus, University of Canterbury, New Zealand

The discussants were asked to discuss the following questions:

- What are the trends in community climate adaptive policy (CCAP) and what communities are the innovators?
- What tools are used and do they compliment other risk management strategies?
- What are the key factors for success in climate adaptive strategies at the local level?
- Recommendations

Climate change impacts can be subdivided into two groups. Firstly are those that have short, sharp and acute impacts which are often labeled as disasters and which tend to occur with greater frequency and increasing intensity. Secondly are the long term incremental impacts that may be more insidious.

Trends suggest that the communities that are innovators in CCAP are coastal, urban and educated and which have a greater economic capacity to respond. However those communities that are producing the problems are often not the ones committed to addressing the consequences and socioeconomic trends may be a constraining factor in CCAP response.

Response in the USA was indicated to be entirely at the local level with no national policy in place. As a contrast, the national response and the local response were shown to be the same scale in Island States. Island States were proposing a range of tools for CCAP include land-use planning, the purchase of evacuation insurance and communication. However there were significant operational ethics involved with the implementation of these tools. Is land use planning irrelevant when some Island States are so small there is nowhere else to move to? Who is profiting from the purchase of evacuation insurance and should Island States be evacuating earlier rather than later even at the expense of profitability? Should emotive language be used to describe scientific processes or issues and what is the impact of cultural diversity?

Lessons to be gained from looking at CCAP in Island States are that these people are both flexible and creative in their response and are preparing for anything, not just climate change. There is an investment in adaptation to change, irrespective of what that change may be. Lessons for the climate change community could also be gained from the disaster community. While there are some semantic issues to be resolved a significant learning may be from the power of the people at the local level as an agent of change, rather than the climate communities traditional global, top-down approach. A significant restriction on this approach is that current tools for CCAP are based on a notion that the local community will do something for themselves; often they do not have the necessary resources to be successful. Furthermore, in this instance what are the ethics surrounding outside interveners moving into communities rather than providing them with information and letting them do things themselves?

Recommendations that arose from the discussion period included:

- Establishment of working groups at local levels and between the climate change and disaster communities.
- Education from university through to schools. Teachers at elementary through to high school need more information. We need to educate the educators. Ultimately it will be children making the change and changing their communities through their parents and peer groups.
- Proposal to the Natural Hazards Centre Workshop: include a plenary session on Climate change and invite high level spokespeople, including Al Gore. This plenary could be a 2hour package with climate change people and disaster research people tasked with addressing two questions:
    - What are the issues and local focus for combined action?
    - What are the areas of common interest?
- Promote community empowerment that any change is good change, even at a small, personal level.
- Change public policy to address both the local community level and the national level.
- Introduce hazard information to communities that is specific and at the local level. Addressing this from a personal level will increase empowerment and reduce the 'too-big' attitude.
- Provide information to communities in useable and lay terms.
- Ensure that the costs for local people are well documented regarding adaptive behavior for climate change. Provide people with practical things that they can do, and how much this costs personally, and the impacts both locally and globally. Put changes into context.

Understanding Poverty for Effective Emergency Management

Moderator: Elaine Enarson Brandon University, Canada
Discussants: Kelly Fitzgerald, University of Massachusetts at Boston
Kristina Peterson, University of New Orleans
Randy Rowel, American Red Cross
Rosina Philippi, Grand Bayou
Ruby Ancar, Grand Bayou
Ani Philippe, Grand Bayou
Recorder: Betty Hearn Morrow, SocResearch Miami

The discussants were asked to focus on the following questions:

- Thinking of the "hidden injuries" of class, race, and gender in disaster contexts, what have you observed that should be addressed in practice and how? What bridges can be built between disaster mitigation projects and on-going efforts in low-income communities to reduce poverty and how?
- What are the key research questions to be asked and answered in low-income communities at risk and how?
- What have you learned about poverty and the lives of poor people in disasters and how?

Hurricane Katrina reminded the nation of the existence of poverty. The gap between the rich and poor continues to increase and this is particularly true in many communities prone to hazards and disasters where daily living conditions increase risk. Attributes such as race and gender do not create vulnerability per se, but rather it emerges from society's reactions to them. With some discussion of poverty factors often associated with disasters, such as the health needs and lack of social and economic resources of many older citizens, transportation problems, and the salience of family and social networks, the discussion turned to how external forces cause or exacerbate poverty. Disaster vulnerabilities can be created by the lack of political power, social networks, education, literacy, and emotional resources, as well as a lack of economic resources. There is a need to view poverty as a disaster itself.

There is a poverty created by economic and social policies, a poverty associated with practices that exploit vulnerability. Examples given included how actions by business and corporate interests degrade the environment that formerly sustained long-time coastal residents. Residents of Grand Bayou spoke about how their lives had been changed as a result of the flooding and resource depletion caused by the building of canals and levees, and the extraction of minerals along the Louisiana coast. People who have lived there for several hundred years are now being asked to justify their existence, including why they should be helped to remain there. They spoke of the need for research that doesn't disappear like "water pouring through a strainer," but instead is used to echo their voices to promote change.

It is important to develop a risk communication process with the community, not for the community. Culture does matter. The importance of true participatory research was emphasized and several books suggested such as *At Risk, Participatory Vulnerability Analysis*, and *Voices of Change*. The importance of putting resources into the hands of the people was emphasized with a specific suggestion to hire them to assist with data collection. Poor people deal with disasters on a daily basis and have a resiliency that can be built upon in times of natural disasters. A customer-centered, not organization-centered, approach is most effective, as well as humane. Recent public health work emphasizes using cultural competencies to create change. It is important to understand the culture of those being served, to value and seek to understand diversities, i.e. to develop cultural proficiency. The web site of the National Center for Cultural Competency was recommended as a resource.

The question and answer discussion lead to some important observations. People in poverty have rights – a right to protection, to preparedness, to recovery. Disaster resiliency is not a product to be sold or provided, but a human right. It was mentioned that researchers often write in code and their work does not get translated and used. An important goal of participatory research was stated: "True empowerment means working yourself out of a job."

Asian Tsunami Update Session

Moderator: Sharon Mielbrecht, Pacific Disaster Center
Discussants: Thomas Birkland, National Science Foundation
Philip Berke, University of North Carolina at Chapel Hill
Elina Palm, United Nations Office of the Special Envoy for Tsunami Recovery and Early Warning
Recorder: Lori Dengler, Humboldt State University

The discussants were asked to focus on the following questions:

- How has recovery progressed in countries affected by the December 26th 2004 tsunami?
  - Have some countries with comparative damages recovered more quickly than others, and in what ways? Are there evident reasons why some nations have recovered more or less quickly than others?
- What long-term consequences (social, economic, environment, etc.) of the tsunami event (positive and negative) are just now emerging eighteen months later?
  - Have coastal industries or livelihoods (e.g. fishing, tourism) changed or become more diversified?
  - Are internally displaced persons moving back to coastal areas?
- What "risk-wise" strategies and policies have been implemented as a result of the tsunami event at local to regional levels? Of these, which have been driven by civil society, NGOs or at government insistence? How do the strategies of indigenous and non-indigenous peoples differ?
  - Discuss disaster risk reduction efforts such as the development of regional warning systems, land use management, environmental conservation and restoration, building placement, design and construction, hazard awareness and education, etc.
  - Have efforts been made to address the tsunami hazard in a multi-hazard context?
  - What are some of the challenges that impede adoption of "risk-wise" strategies and policies? How can we ensure the longevity of these strategies, policies, and practices?

The countries impacted by the 2004 tsunami are all still in the recovery stage. At least 40,000 people are still living in tents and 400,000 homes need to be built. Housing is the most significant challenge and has been hampered by land acquisition and title issues and the cost of materials. Additional challenges in the recovery-reconstruction process are land use planning, livelihood restoration, reducing vulnerability and encouraging resumption of tourism. Recovery rates vary from country to country and within countries and is a function of many factors including degree of impact, remoteness, hostilities and funding from international donors. Full restoration of economies, housing and infrastructure may take 10 to 15 years.

Progress has been made in establishing an early warning system for the countries bordering the Indian Ocean. The warning system is coordinated by UNESCO – IOC (Intergovernmental Oceanographic Commission) who is working with an intergovernmental group of 29 countries. Most have now established centers to receive warnings from the Pacific Tsunami Warning Center (PTWC), but of the 29 countries, 20 still have no national plan for warning protocols and dissemination of warning information. Education is a critical element of an effective warning system and the experiences of Simeulue Island, Indonesia and the indigenous peoples in the Nicobar and Andaman Islands serve as an effective lesson on how oral traditions and recognition of natural warning signs lead to self evacuation and minimal casualties.

In Thailand, two issues were identified as particularly problematic: a government emphasis on restoring tourism and restoration of mangrove forests. Tourism is the primary coastal industry and provides the biggest economic gains for the country. It is a high government priority to restore tourism, which may lead to a less diverse economy. Traditional fishing villages are being displaced and people are having difficulty establishing their title to the land. The hotels and tourist infrastructure has almost all been repaired but the number of tourists is still far below pre-tsunami levels. Much effort has gone into a public relations campaign to encourage tourism but the government and tourism industry is apparently reluctant to provide information on reducing risk. There is no hazard or evacuation information posted in hotels and there is resistance to implementing planning solutions such as setbacks and increasing the elevation of structures.

Recognition of the role of mangrove forests in protecting the coastal ecosystem is fairly widespread among villagers in Thailand. Prior to the tsunami 35 to 40% of the native coastal Mangrove forests had been removed in Thailand and satellite imagery analysis shows a strong correlation between damage and areas of forest removal. A study of 6 villages in Thailand showed that all were aware of the importance of restoring mangroves but differences in progress toward protection and restoration exist. Four of the villages had implemented a variety of measures including protection and cutting restrictions. Two of the villages had done nothing. These two villages had been moved inland and rebuilt using non-traditional materials. It was suggested that the linking social capitol was more impaired in these villages.

Maldive Islands have a more significant tourist problem than Thailand. All of the islands were inundated and they lost 2/3's of their tourist capacity. It is the most economically-impacted country in the Indian Ocean. Some international hotels have reassigned their Maldive staff out of the country. The event destroyed beaches, contaminated water systems and severely impacted food systems but the government does not seem to be in touch with the plight of the outlying islands. There were some positive impacts for emergency management and preparedness in Thailand. The country is spending $10,000 to revamp disaster management, and emergency response is now accepted as a government priority. However, there appears to be little to no effort to integrate tsunami mitigation into multi-hazard reduction efforts or introduce the concept of resiliency. The gender inequity of tsunami impacts has led to a variety of consequences. In some areas of Aceh, women have been blamed for the tsunami in the conservative Muslim society. In Thailand, the role of women was strengthened in some villages as they have developed new home industries.

Practicing Emergency Management in Institutions of Higher Education

Moderator: Sylvia Dane, University of Colorado at Boulder
Discussants: Bill Galle, University of New Orleans
Jennifer Holt, James Lee Witt and Associates
Elenka Jarolimek, University of Washington Office of Emergency Management
Recorder: Craig Grant, University of Illinois at Urbana-Champaign

The discussants were asked to focus on the following questions:

- What resources are available to your campus to establish and expand emergency management practices?
- What are the biggest hurdles your emergency management program faces?
- What advice do you have for campuses that are just beginning an emergency management program?

The discussants described the differences in organizational structure for emergency management at their universities and commented upon the changes in their programs that have developed following significant natural disasters such as the Nisqually Earthquake and Hurricane Katrina. The need for a commitment from the administrative level was deemed critical to the success of an emergency management program. This need for executive level support may also lead to additional challenges when preparing for implementation of the plan. Training for university administrators in emergency response programs like the Incident Command System (ICS) has been difficult to establish and such structured response plans may be contradictory to the institutional structures at universities.

The differences between emergency management programs at universities and municipalities were contrasted. These differences included the challenges in developing "buy-in" by faculty and administration and the difficulty in fully utilizing the extensive resources that may exist at a university. The typical role of university emergency management programs is to guide the departments in developing their own emergency plans. This requires an administrative mandate to the departments for participation to be effective.

The challenges faced in establishing a business continuity strategy for the educational role of the university were also discussed. The University of New Orleans used specialized "e-Learning" software to allow courses to be conducted via the Internet. This was ultimately effective, but proved difficult for some faculty to master and the lack of an initial plan for the use of this type of software led to unforeseen problems in areas such as scheduling exams across multiple time zones to meet the needs of students that were widely dispersed following the disaster.

The use of committees to assist in the development of an emergency planning initiative was recommended. The discussants observed that there was value obtained from establishing agreements with the surrounding communities to share resources, since despite university organizational structures, they are after all, part of the community in which they are located. The possibility of partnering with communities to apply for grants to fund emergency planning programs was recommended as an effective strategy to reduce competition for scarce funding resources.

The use of model programs as resources for emergency management program development was also discussed. The two specific examples cited were the Disaster Resistant University Program available from the Federal Emergency Management Agency and the Ready Campus Program (information available at www.readycampus.org), which was developed as a partnership among Pennsylvania's colleges and universities and their neighboring communities. These programs offer users a framework to establish a comprehensive emergency management program.

In the discussion period, several other examples of university initiatives in emergency management were discussed. Many of the examples built upon recommendations made by the panel. These included the need to look at what other institutions are doing and the potential value of updating training aids for faculty/administrators such as the "Academic Aftershocks" film that was developed following the Northridge earthquake. Audience members also mentioned the use of back up systems for campus websites, the value of Community Emergency Response Teams, the need to include pandemic flu outbreak in the emergency management plans and strategies for developing new means of getting your message out to the campus community.

Disaster Response and the Military

Moderator: Christine Bevc, Natural Hazards Center
Discussants: Bruce Baughman, Alabama Emergency Management Agency
Gregory Huckabee, University of South Dakota
Tammy Little, National Emergency Management Association
Clark Lystra, DoD/Office of the Secretary of Defense
Recorder: Geraldine Coyle, U.S. Department of Veterans Affairs

The discussants were asked to focus on the following questions:

- What is the military's role in domestic disasters?
- What are some of the current concerns/debates about federalizing and potentially militarizing the management of extreme events?
- At what point is the military too involved in disaster response?
- Based on recent events, there is a need for better communication between military & non-military agencies & officials. How can these relations & communications be improved?

The role of the military in disasters generated a robust discussion. The military is currently a supporting agency in responding to disasters except where there is federal property involved or during a federal event/function. Those opposed to a primary role countered with the military's lack of knowledge about geography, infrastructure, and local knowledge of people. This position was countered by the military involvement, at the State governor's request for assistance, would be the National Guard. These acknowledged citizen-soldiers are conversant with the local and politics and the military train the way they fight; therefore, exercises to increase the ability to mesh with a community. Within Department of Defense there are offices to respond to disasters and Defense Coordination Offices and elements are non-permanently assigned to Federal Emergency Management Agency (FEMA) regions. The military provides key support and supplies to FEMA. Within the past year, there is a signed memo by Secretaries Chertoff and Rumsfield outlining those few conditions where the military would take the lead.

The military's strength in logistical support appears to be untapped in how it might assist the lead agency, General Services Administration (GSA) in support of Essential Support Function (ESF) 7. State Emergency Management Agencies in many instances are collocated with National Guard units. An example of collaboration between Department of Homeland Security and the military was the review of the 50 states' emergency plans. Each state's National Guard Adjutant General has assigned an Emergency Management Liaison Officer within each county to provide military assistance to civil authorities.

The role of the military in a disaster generated several points, indicating the need for clarity in deploying military. The Department of Defense is a tool to deploy not to govern; they are not a lead agency in disaster events. If active military personnel are called in to respond, they are restricted by US Code, legislative acts (such as Posse Comitatus Act), and mutual agreements. Most states have a strong home rule ethos, so the feeling was the governor would not ask for military assistance lightly. Ultimately, if state and local government is unable to function, it is the governor's decision with the president to decide if the military is to be put in charge of a city, enacting martial law. This decision has never been made.

The perception of the populace also plays a role when the military is involved with disaster relief. One panelist pointed out seeing a military uniformed response "lets people know the government is doing its job." While looting during Katrina deployed response, an anecdotal story related how relief victims were being given money and then were preyed on. The uniformed presence provided a certain measure of safety and sense of security. The general agreement of the panel was that the military should remain as a support to state and local government.

Preparing the Public: Earthquake Education and Building Local Capacity

Moderator: Sarah Nathe, University of California, Berkeley
Discussants: Arrieta Chakos, City of Berkeley, California
Richard Eisner, California Governor's Office of Emergency Management
N. Emel Ganapati, University of Miami
David Johnston, Institute of Geological and Nuclear Sciences
Recorder: Rebekah Green, Earth Institute of Columbia University

The discussants were asked to focus on the following questions:

- How did you determine your audience(s) and effective communication vehicles?
- How did you establish your credibility?
- How did you decide content? Did you get any outside help in crafting the info?
- How do you measure your effectiveness?
- Are there sources of info and helpful hints for starting an education program?

Discussants argued that in public disaster preparedness education and capacity building efforts, engaging audiences, sustaining public interest, and cultivating political leadership has proven to be challenging. This field was likened to a Sisyphusian effort of pushing a heavy rock uphill only to have it roll back down. Both locally and internationally efforts have been plagued by a series of difficulties and only limited successes.

A common difficulty discussed is that the disaster preparedness message is often perceived as frightening, something people do not want to hear. Research in Istanbul, Turkey found that the public had high levels of knowledge and anxiety regarding hazards; yet this did not translate into risk-wise behavior. Rather, risk-wise behavior was influenced by issues of trust, funding, and responsibility. Likewise, Berkeley students consider themselves invincible and are more interested in other issues. Additionally, each year a new class of incoming students had to be introduced to disaster preparedness. Discussants argued that an understanding of local issues, perception and population are key to any efforts to promote risk-wise behavior.

The issue of sustainability was also critical. In California where efforts have been the most long-term, successful programs have been cut or challenged. Moreover, within the state, it is areas with high socio-economic and education levels that have been able to achieve the most, meaning that the state's most vulnerable neighborhoods continue to be the neighborhoods that are least prepared. Current efforts suffer from a lack of a social science perspective, coordinated messages, baseline measurements, and ongoing evaluation of outcomes – aspects that have made past efforts successful.

Discussants shared strategies they are currently using to address these challenges. The city of Berkeley has employed a "get out the vote." This effort has focused on creating clear, targeted messages, using multiple venues for each message, leafleting, and employing "map the vote" techniques. The city also effectively uses taxation as a strategy for funding mitigation efforts citywide. Efforts locally and internationally have effectively used competition strategies - providing emergency supplies and equipment to neighborhoods that could gather together a critical mass of residents for preparedness trainings and post-disaster responsibilities. Efforts in Gölcük, Turkey have been most successful when they were locally initiated by disaster victims. When organized by outside donors, efforts were successful when they work within existing social networks, employ legitimate representatives, and occur within an environment of trust and transparency.

Yet, even with these innovative strategies, disaster preparedness remains elusive. Those with the means for preparing (e.g. long-term residents, home owners, well-educated and middle/upper income residents) often do not. Moreover, the message and messengers used for public education tends to be most applicable for these "easy to target" audiences. Left out are those who may not have the means and ability to prepared (transient populations, renters, the urban poor, new immigrants, illiterate, and people who do not speak the dominant language). State and local governments have the most responsibility for preparing and protecting these residents, yet it is often these residents who are missed in current public preparedness efforts. To reach these audiences, discussants argued that we need to think and act more broadly.

The audience discussion was a lively continuation of these themes. It was suggested that preparedness education in the US should focus primarily on primary school students similar to anti-smoking campaigns. Others countered that any campaign must be multi-faceted and multi-generational. Information alone is insufficient. Training material developed for students through FEMA and the Red Cross was discussed as an example. While containing excellent information, teachers have difficulty integrating these materials into their plans due to tight teaching schedules and a test-prep focus. Discussants also noted that disaster survivors are the best source of hints for how to start and sustain public education efforts. This insight was reinforced by Katrina survivors who noted that evacuation plans in Grand Bayou were considered illegitimate because they did not take into account local culture and did not have local "buy-in" prior to their implementation.

Disaster Risk Reduction Planning: The Story of Marikina City, Philippines

Moderator: Robert Goldhammer, StormCall, Inc
Presenters: Tomas C. Aguilar Jr., City of Marikina, Philippines
Jim Buika, Pacific Disaster Center
Haruo Hayaski, Koyoto University
Kenneth C. Topping, Topping Associates International
Recorder: Wei Choong, RMIT University, Melbourne Australia

The discussants were asked to discuss the following questions:

- There were no moderator questions.

This was a presentation of the process of stakeholder consultation, developed and implemented in order to produce a Comprehensive Earthquake Disaster Risk Reduction (CEDRR) Plan (later renamed as Marikina Safety Program) for Marikina City, Philippines.

Using a Researcher-Practitioner-Stakeholder Coalition consisting of researchers from the Earthquake Disaster Management (EDM)-NIED, Kobe, Japan; Marikina City's key stakeholders; and the technical assistance of the Pacific Disaster Center (PDC), a Comprehensive Earthquake Disaster Risk Reduction (CERD) Plan, later named the Marikina Safety Program was developed.

The Valley Fault line is situated within the jurisdiction of Marikina City, so the City faces the challenge of developing risk reduction framework and implementing a strategy that addresses the mitigation of potential losses both 'traditional' (structural) and 'non-traditional (non-structural) measures. With a focus on integrating or mainstreaming risk reduction measures into City planning and economic development objectives, actions were formulated to both enhance the city's livability and economic competitiveness as well as create a safety conscious society.

At the government level, a Committee for disaster mitigation and preparedness along with subcommittees was established to develop the passage of an ordinance to adopt the goals and priorities as well as action plans as presented in the Safety Program. A budget was allocated for disaster preparedness for 2006, focusing on an Earthquake Learning Center and the Mainstreaming of disaster risk mitigation in the city's zoning and land use planning.

Some key highlights:

- Political will leading to policy commitment and motivated leadership – advocacy of local political leaders
- Use of a simple risk reduction strategy understood by local stakeholders
- Extensive public awareness and education using newly developed Risk Communication tools suitable for the people of Marikina
- Financial resource allocation

- Direct outreach to the business community on economic development and disaster reduction measures
- Stakeholder based strategic planning – this engagement lead to high and broad levels of involvement and institutional change
- Emphasis on institutional, community and economic capacity building
- Sustainable and balanced use of outside expertise (international) – knowledge transfer, Philippines-Japan-US collaboration from 2002-2006
- Development of three pilot studies
- Sustainable feedback mechanism from bottom-level grassroots to top-level city decision makers.

The process is unique in its approach. At the national level, the Philippines government displayed incredible will and support for the development of a community based disaster management system. At the local level, the City employed the understanding that incorporating disaster risk and to business planning would improve economic resilience to disasters, thus, give foreign business investors an incentive to invest in this City. Using the incentive of livability and economic competitiveness gives political leaders and the business community at large greater incentives to take risk reduction seriously.

The researcher-practitioner-stakeholder model encourages the missing-link between researchers and their information, assessment and analysis, the needs of the stakeholder and how the practitioners can assist to facilitate the development and implementation of lasting risk reduction measures. The emphasis of stakeholder involvement does not play rhetoric to the jargon of 'stakeholders', rather it identifies key leaders who are motivated by their own will and are armed with the ability and capacity to make policy changes that will ensure sustainability.

The use of outside international assistance encourages information sharing not just between countries, but also sets examples for other neighboring cities to share their information in order to replicate the risk reduction framework to other cities throughout the Philippines.

All in all, the approach taken by Marikina City and its partner organizations provides a holistic example of urban disaster risk reduction by identifying the strengths and future planning and development goals of the city by incorporating it into a realistic and simple plan of action.

Advances in Hazards and Disasters Research from Taiwan

Moderator: Marit Heiderman, Simon Fraser University, Canada
Presenters: Liang-Chun Chen, National Taiwan University
Ben Jong-Dao Jou, National Taiwan University
Wei-Sen Li, National Science and Technology Center for Disaster Reduction, Taiwan
Feng-Tyan Lin, National Science and Technology Center for Disaster Reduction, Taiwan
Recorder: Kim Galindo, Texas A&M University

The discussants were asked to discuss the following questions:

- There were no moderator questions.

Dr. Chen opened the session by introducing a systems approach to hazard reduction in Taiwan which was introduced ten years ago and continues to be improved. The approach includes top-down and bottom-up elements in the development of effective warnings systems, evacuation, and sheltering during natural disasters. At a national level, policies have been implemented which focus on planning and capacity development at the local level, in conjunction with an improved disaster warning system, base on information from various sources which can be accessed though the internet. At the local level, this program utilizes applied research techniques, to educate participants on the use of web-based information, dangers faced by different hazard agents, and best practices for the empowerment of local official to develop appropriate plans for warning dissemination, evacuation and sheltering.

Taiwan is located in an area of high seismic activity and meteorological activity; they experience 4.3 typhoons per year on average. Both its natural topography and economic development has left Taiwan vulnerable to multiple types of hazards, among these is landslides, and increasingly toxic spills. The National Science and Technology Center has been seminal in developing a disaster management system which is capable of dealing with large-scale and complex vulnerabilities.

Dr. Jou focused on the development and utilization of an early warning and response system for Typhoons. The focus of this project has been three pronged, to improve information on early warnings, improve quantitative measures, and operational responses. Early warning information has been improved through the collaborative effort of various agencies and their shared data on an integrated, web-based GIS site that includes information from rain gauges, real-time radar estimations, reservoir water levels, and previous disasters to provide forecasting models for landslides, debris flow, flood potential, and rainfall estimates. The Central Emergency Operations Center works with The National Science and Technology Center for Disaster Reduction, the Water Resources Agency, National Fire agency, a Specialist Advisory Board, the Soil and Water Conservation Bureau and the Central Weather Bureau in the use and development of operational responses to disasters. The have been very successful in this endeavor and helped drop the Typhoon mortality rate by 93% in four years, from 214 in 2001 to 15 in 2005.

Dr. Li presented applied research in the building of local-capacity and empowerment. This was facilitated by the first Disaster Prevention and Response Act passed in 2000. The project is expected to last four years (2003-2007) and has four main elements: (1) to develop a disaster reduction curriculum, (2) assist local communities review current disaster plans and vulnerabilities (3) integrate current research into the development of community-based hazard

mitigation plans, (4) empower local-capacity in emergency response by building collaborations between the local and central governments. This participatory process takes from six months to two years, depending on risk level. There are seven phases for implementation of the project, which concludes with an evaluation phase. This program has been very successful and led to some central government policy changes, due to pressure from local governments.

Dr. Lin presented information on the Disaster Management Information System (DMIS). This system is used to analyze and manage disaster information for the National Emergency Operations Center. Information from the following divisions was used for the development of DMIS: Meteorology, Flood and Drought Disaster Reduction, Slopeland Disaster Reduction, Earthquake Disaster Reduction, Socio-Economic Systems, Technological and Manmade Disaster Reduction and Disaster Information. The information was then converted onto a common platform for distribution on the web using an HTML format. There are five basic steps to the development of DMIS, which include constructing a data warehouse, gathering and obtaining metadata, standardizing the data, facilitating the use of the data through data visualization, and managing both the software and hardware to keep the system operating. This system is then used to produce rainfall forecast, using real-time data, debris flow potentials, inundation potential, earthquake potential, toxic risk potential, damage assessments, and disaster investigations.

The future focus of DMIS and the National Emergency Operations Center is to develop common standards and platforms for information sharing among organizations using grid computing, expert systems, and case based reasoning. This will facilitate the continued cooperation of the central and local governments, local capacity building, and development of collaborative mechanisms to provide a social and integrated approach to hazard mitigation.

Quick Response Research in the Wake of Hurricane Katrina

Moderator: Emmanuel David, University of Colorado at Boulder
Presenters: David Eisenman, University of California, Los Angeles:
Obstacles and Facilitators to Evacuation from Hurricane Katrina
William Fruedenberg, University of California, Santa Barbara:
Through Hell and High Water: Learning the Broader Lessons from an Un-Natural Disaster
Megan Underhill, Colorado State University:
Resettlement after Disaster: How Katrina Evacuees in Colorado Negotiate a Changed Habitat
Recorder: Christina Finch, University of South Carolina, Hazards Research Lab

The discussants were asked to discuss the following questions:

- There were no moderator questions.

The Natural Hazards Center manages a Quick Response program funded by the National Science Foundation. The Quick Response program offers social scientists grants for research in the aftermath of a disaster to gather perishable information concerning immediate impact and response. The Center issued twenty-five Quick Response grants to study the impacts of Hurricane Katrina. The Hurricane Katrina disaster was the result of complex interactions between the physical storm, the landscape, the population, and politics. The presentations in this session address some of these interactions, primarily focusing on the people affected by Hurricane Katrina.

Significant segments of the population are disproportionately vulnerable to hazards due to their socioeconomic characteristics. The focus of David Eisenman's presentation was to characterize variables that either facilitated or impeded evacuations within urban minority communities. Some major themes he addressed included the lack of transportation (no vehicle or too many people for vehicles), shelter (no outside social network) and employment (fear of losing employment). Social networks and extended families were key in understanding the evacuation behavior of these communities. In addition, evacuation problems were compounded by meeting the needs of the ill or handicapped. There was a strong sense of moral obligation in these communities and people stayed together to take care of the group as a whole. Another theme that was apparent was distrust, and the mention of "blowing up" the levees.

Many of these themes were reiterated in Megan Underhill's project involving the relocation of Katrina evacuees to the state of Colorado. This study tracked the experience of Katrina evacuees as they attempted to reconstruct their lives, confront issues of resettlement, and anticipate new experiences and opportunities. Initially, evacuees were housed on an air force base and had a sense of camaraderie (community of sufferers). However, as the base closed, evacuees had to relocate to their own housing. Though at first the relocation seemed to be a positive transition, most evacuees now feel like outsiders and would like to return to a more familiar environment. The selection of poor housing sites has caused a spiral of negative impacts. Three main themes outlined were geographic location and isolation, lack of transportation, and difficulty finding employment. Evacuees are now uncertain about their future, with worries and doubts increasing due to conflicting reports regarding the length of FEMA assistance. Further research will be continued and expanded as time progresses.

Finally, William Frudenberg discussed societal choices and their impact during Hurricane Katrina. Society has made changes to the natural landscape through structural mitigation, the destruction of wetlands, and other projects like Mr. Go. These types of decisions compounded the impacts of Hurricane Katrina. Anthropogenic modification of the physical environment enhanced the impact of Hurricane Katrina. In addition, the Hurricane Katrina disaster was complicated by the emergency response failure. The Federal Emergency Management Agency (FEMA) response was characterized as unorganized, unprepared and inadequate. However, successful emergency management measures were also addressed, such as the response by the US Coast Guard, the evacuation of Tulane Hospital, and the response of locals with flat bottom boats.

These projects briefly demonstrate the vital assessment of the impact, immediate response, and long-term recovery from disasters that is possible due to the Quick Response program. As the nation continues to study the Hurricane Katrina disaster, funding from the Quick Response program will enable many valuable contributions and research projects.

National Consortium for the Study of Terrorism and Responses to Terrorism (START)

Moderator: Judith Colle, DHS/Homeland Security Institute
Presenters: Erica Kuligowski, Natural Hazards Center, University of Colorado
Kathy Smarick, University of Maryland/START
Sarah Stapleton, Natural Hazards Center, University of Colorado
Recorder: Jeannette Sutton, Natural Hazards Center, University of Colorado

The discussants were asked to discuss the following questions:

- There were no moderator questions.

The discussants presented an overview of the START center as part of a New Research Session. The session was broken into three parts: a summary of the various Centers of Excellence funded by the Department of Homeland Security and the vision for START; the research agenda of one working group within START, focusing on the societal dimensions of terrorism and terrorist events; and a project within this working group that examines public preparedness and evacuation in disaster.

The START Center is one of 5 Department of Homeland Security Centers of Excellence. The goal of the Center is to use concepts and theories of behavioral and social science to address responses to terrorism. All of the Centers of Excellence are located within the Directorate for Science and Technology, Office of University Programs at DHS. START was funded through a competitive process and is formed from a consortium of universities and research centers from across the U.S., with partners in Europe and Israel. START has three research areas: terrorist group formation and recruitment; terrorist group persistence and dynamics; societal dimensions of terrorism and terrorist events. START is preparing to release open source data on terrorism (the "Terrorism Database") consisting of data on terrorist events from 1972-2004.

The working group which examines the societal dimensions of terrorism and terrorist events has included the following types of questions as part of their research agenda:

- How much do diverse groups within the U. S. population know about the terrorism threat, and where do they get their information?
- How well-prepared is the general public?
- How will the public respond to future terrorist attacks in the United States?
- What strategies are effective in reducing negative mental health impacts of terrorism?
- How are preparedness policies being implemented in local communities? Schools and school systems?

Research on preparedness policies includes a study of emergency management networks in five communities across the United States. Study communities have been chosen based upon the extent to which there are signs of regional collaboration and various indicators of social vulnerability. Each study community also receives funding from DHS as part of the Urban Area Security Initiative.

Research on public preparedness and evacuation uses data on high rise occupancy and evacuation from fire as well as community public evacuation. Research findings from all START studies will be available on their website www.start.umd.edu.

Post-Disaster Environmental Impact Assessment

Moderator: Matthew Schmidtlein, University of South Carolina
Presenter: Charles Kelly, University College London/Benefield Hazard Research Centre
Recorder: Joselin Landry, DHS/FEMA

The discussants were asked to discuss the following questions:

- There were no moderator questions.

This session objectives are to consider the role and importance of EIA's following disasters, to review different approaches to considering environmental issues after a disaster, and to identify areas of further research. This session addresses immediate post disaster impact assessments (not recovery IA) and most cases are outside of the US.

Definitions:
Environment - "The physical, chemical and biological surroundings in which disaster-affected and local communities live and develop their livelihoods" (Sphere Standards for Humanitarian Assistance)

Environmental Impact Assessment (EIA) - "Analysis of biological, physical, social and economic factors to determine the environmental and social consequence of a proposed development action. The goal of the EIA is to provide policy makers with the best available information in order to minimize economic costs and maximize benefits associated with a proposed development.

Why conduct a post disaster EIA?
The state of the environment can affect the impact of and recovery from a disaster. In an already polluted environment, a disaster may exacerbate the situation.

Disasters can have negative impacts on the environment, and relief and recovery assistance can have positive or negative impacts. Examples are flying a 747 across world to bring water when the affected area has water, or intentionally breaching a levee, forcing contaminated water into wetlands.

EIA's can provide a broad, forward-looking view of the impact of a disaster and recovery operation. However, there are contextual differences for disaster and non-disaster EIA. An EIA is a legal requirement during normal times, but rare during a disaster. A normal EIA is deliberate and proactive, while a disaster EIA is reactive.

Post Disaster EIA Policy – Requirements and Approaches
Requirements for a post-disaster EAI can fall into 4 general categories: An EIA is not performed, it is unclear how to perform the EIA, declared disasters don't have to follow regulations (a loophole), and the EIA may be limited in scope, time or coverage.

There may be 3 approaches to performing and EIA post-disaster: no assessment, reports with a scope for corrective feedback and a proactive approach incorporating realtime feedback or using past experience as a guide.

Further Consideration
The presumption is that recovery will not have an impact greater than the original impact (argues against the need for new EIA's). There is pressure to recover quickly, leading to a willingness to bypass environmental reviews/regulations in favor of immediate benefits.

Different Tools, Different Uses (taken from international experience)
EIA's can begin from within hours to months after a disaster. Results can arrive within hours or a few days to nearly 90 days after the assessment begins. Different techniques and methods focus on issues such as identifying the obvious hazards and conditions of the site, to assessment of temporary camps, to quantification of social environment and economic impacts. EIA's can collect data on the physical impact to livelihoods (quantification of damage to environment), or can determine the impact on bio/green and human/made/brown environments through sampling and testing. Post disaster EIA's (or near normal EIA's) draw on earlier assessments and focus on medium term activities.

The NRP (National Response Plan) and its linked process in the US were described. First FEMA tasks Federal organizations with activities which might impact the environments. Federal organizations or contractors complete environmental reviews usually during operations. Reviews are evaluated by State and Federal (EPA) authorities against applicable laws and regulations. A notwithstanding clause (when time is lacking and the impact may be negative, but decision is made to go forward) is applied at State or Federal level. The public's comments may or may not be sought. Mitigation is incorporated into on-going work. Lastly, reports are issued.

Issues
Disasters generate significant volumes of debris which require disposal. The volume of debris from a disaster can equal decades of development. The debris usually has complex composition from relatively benign to highly hazardous. Recovery cannot begin until most or all of the debris has been removed. New disposal sites are required and are often commissioned with little review or public input. This is sort of the silent disaster. Millions of dollars are spent on debris removal.

The scale of new disasters may be unimaginable and in world disasters, who is in charge? There is a lack of public survivor input; normal public comment procedures are inappropriate after a disaster. Assessments during a disaster often fail to be forward looking, overlooking the need to ensure benefits are greater than the costs over the long term. Yet some post disaster EIA's can have positive impacts, such as the clean up of some bay areas in Shri Lanka.

Discussion
Session participants discussed topics of burning debris, how effective are assessment tools in marine assessments, the development of baseline data, and the lack of risk assessment in disasters.

For information on post disaster EIA's visit http://www.benfieldhrc.org/rea_index.htm; follow link to Virtual Conference on Disaster-Focused EIA tools.

Research in Hazards by Young Professionals 1

Moderator: Nicole Dash, University of North Texas
Presenters: Lindsey Barnes, University of Colorado, Colorado Springs:
"Public Perceptions of Flash Flood False Alarms"
Aurelie Brunie, University of North Carolina at Chapel Hill:
"Community-based Preparedness: The role of social capital and middle-level institutions"
James Goltz, California Governor's Office of Emergency Services:
"Emotion and Disaster Response: A Sociological Assessment of Fear and Human Behavior During Three Damaging Earthquakes"
Recorder: Mary White, Women's Environmental Art Directory, Berkeley, CA

The discussants were asked to discuss the following questions:

- There were no moderator questions.

Lindsey Barnes: "Public Perceptions of Flash Flood False Alarms"
In her Undergraduate Honors Thesis, "Public Perceptions of Flash Flood False Alarms", Lindsey Barnes, University of Colorado, Colorado Springs researches public perceptions of false alarms of flash floods and examines the extent to which the "crying wolf" concept is viewed as a problem and the degree demographic characteristics influence perceptions about false alarms?

The study was based on a mail survey sent to 3000 residents living in or near floodplains in the Denver Metropolitan area, 419 respondents. Findings indicate that people would rather have more warnings with the possibility of a false alarm or close call. False alarms may not reduce confidence in the warning process. There is a need to re evaluate the "cry wolf" conventional wisdom. Demographic characteristics do matter. Females and older people may be more tolerant of false alarms.

The discussion that followed included questions on how to explain the gender and age response, the theory that "women go into cellar, men go up to watch tornados", and how to influence the 20% of people who feel false responses makes them less willing to heed a flood warning. More questions: how to determine the distance to the water course and the addresses selected in flood plain area for study, is there a threshold of how many false alarms: two or ten, in what time, and what kind of actions might be taken in case of a flood? It was suggested that Austin might be a good area to study, where low water crossings may influence perception to false alarms. Austin has more flash floods than Denver study, but responses were similar.

Aurelie Brunie: "Community-based Preparedness"
Aurelie Brunie's, University of North Carolina at Chapel Hill, study "Community-based Preparedness: The role of social capital and middle-level institutions", investigates the role of social capital in the sustainability of disaster preparedness programs. The research was done in six communities on the island of Dominica. Household survey and key informant interviews were used to collect the data.

The research employed a measure of social capital based on Putman and an additional novel measure based on evidence of Koud-mai, a tradition of inter-household exchanges. Social capital was compared by membership, mutual support and koud-mai. Controlling for a range of demographic and other characteristics, her early results suggest that social capital does matter but that different forms of social capital matter in different ways.

The questions included discussion of the interpretation and analysis of the data, and how the graphs can best represent the material and time element. A different analytical model was suggested and more careful definition of Social Capital. There was a question about how available funding for preparedness was used primarily to train district development leaders.

James Goltz: "Emotion and Disaster Response"

In his paper "Emotion and Disaster Response: A Sociological Assessment of Fear and Human Behavior During Three Damaging Earthquakes" James Goltz, California Governor's Office of Emergency Services examines existing theories about 1) human emotional responses to earthquakes, 2) how emotional responses may influence behavior. In previous work, Richter and Mercalli both hypothesized that in a strong earthquake, fright and panic will be widespread and that people will respond by motion which is not necessarily purposeful (e.g. by running, even if outdoors), while Kemper argues that fear will be greatest among those with relatively low levels of social status and ability to exercise power.

Goltz seeks to examine hypotheses regarding fear using data drawn from one set of surveys conducted after three California earthquakes. He finds that lower status and relatively powerless groups in a community may exhibit greater levels of fear than more powerful higher status groups. He then considers relationships between fear and behavior. He concludes that while fear is a factor in behavior, other factors may be as important and that where fear is associated with movement, movement is likely to take the form of adaptive behavior versus maladaptive behavior.

The questions and discussion included questions about who did run outside in the California earthquakes studied. Running outside was not common, but young men, with no dependents who were renters, were more likely to run outside. In Turkey during the 1999 devastating earthquake, there was not less fear than the following earthquakes because residents were unfamiliar with the possible damage. During the next earthquake, people were much more fearful and more likely to jump out windows. Other questions included whether women are more socialized to express fear and are they less likely to acknowledge it, and whether someone with higher status may have more ability to recover, which may influence fear level.

Cannon Beach Post-Disaster Recovery Planning Initiative

Moderator: Bruce Glavovic, Massey University, New Zealand
Presenters: Krista Mitchell, University of Oregon
Nathan Wood, U.S. Geological Survey
Recorder: Judith Steele, J. Steele Planning Solutions

The discussants were asked to discuss the following questions:

- There were no moderator questions.

Recognizing the importance to coastal communities in the Pacific Northwest along the Cascadia Subduction Zone of preparedness to undertake long-term post-disaster recovery and reconstruction efforts, the Oregon Natural Hazards Workgroup (ONHW) at the University of Oregon's Community Service Center, Cascadia Regional Earthquake Workgroup (CREW), the US Geological Survey (USGS), Oregon Emergency Management, and the City of Cannon Beach, partnered in an effort to better prepare coastal communities in the Cascadia Region for the short-term recovery and long-term reconstruction efforts communities may face as a result of a catastrophic Cascadia Subduction Zone event. First, a process was developed to conduct a community post-disaster recovery planning forum and to implement a pilot project in the coastal community of Cannon Beach, Oregon, that resulted in the identification and prioritization of the community's long-term recovery issues while at the same time developing potential solutions. Second, the lessons learned from the Cannon Beach pilot community were documented. Third, a Community Post-Disaster Recovery Planning Forum Manual was created for Cascadia Regional communities to utilize to develop, implement, and document their own post-disaster long-term recovery issues and to start the local planning process. The pilot project resulted in the development of four distinct products: 1) a community post-disaster recovery planning forum report for Cannon Beach; 2) a case study report; 3) a lessons learned report that identifies where forum methodology worked and where it needs improvement; and 4) next steps for improving the community post-disaster recovery planning forum methodology so that it may be implemented in other communities in the future. Cannon Beach was selected for the project because of their concerns regarding response to the Sumatra Earthquake and because they knew their own risk. Of 50 invited stakeholders, 42 participated in the one-day planning process and follow-up interviews. The community identified four main themes and disaster recovery issues for each: local economy, local population, land use and development, and critical facilities and infrastructure. Over 600 individual issues were categorized and pared down to the top three for each of the four themes. Participants then broke into groups based on the four themes to work out an action-based plan for identifying response strategies, increasing community awareness, identifying implementation leadership and determining next steps. Facilitators faced several challenges: keeping participants focused on post-disaster recovery rather than evacuation and emergency response, bringing stakeholders up to speed on how existing policies and plans fit into long term recovery planning, and finding willing leadership to implement next steps.

A Critical Look at the Incident Command System (ICS) and Contemplating Alternatives

Moderator: Justin Dombrowski, Boulder County Colorado, Office of Emergency Management
Presenters: Dave Neal, Oklahoma State University
Gary Webb, Oklahoma State University
Recorder: Sophia Liu, Natural Hazards Center, University of Colorado at Boulder

The discussants were asked to focus on the following questions:

- How do organizations manage events that vary from their daily routine?
- How do organizations manage events in a turbulent unpredictable environment?
- How do we respond effectively to disasters (or even catastrophes)?

Since disaster research has started, we have been struggling with the traditional command and control model of disaster management and the need for a more flexible, emergent, and creative approach. In this talk, the discussants provided a brief historical background about Incident Command System (ICS) and National Incident Management System (NIMS), the theoretical problems with ICS, the empirical issues that arose during Hurricane Katrina, and then concluded with final comments both from the discussants and the participants.

NIMS came to the forefront after 9/11 as a solution for standardizing the use of ICS at the federal, state, local, volunteer and private sector; therefore, ICS is being used as a "unified command" to coordinate all response activities. ICS was initially developed by Firefighting Resources of Southern California Organized for Potential Emergencies (FIRESCOPE) who came together in the aftermath of the 1970 wildfire in California in order to come up with a management structure to particularly handle fires.

There are very few objective, systematic, scientific, and academic studies on ICS even though it has been around for 35 years. Firefighters will often just say that "It works" or that "It was better than what we had before, which was nothing." In 1990, Wenger, Quarantelli, and Dynes were critical of ICS by pointing out that it was not grounded in any management theory, that it does not allow for coordination with outside agencies, that it cannot manage the typical intra-organizational coordination and communication problems during a disaster, and that it does not provide the needed flexibility for disaster response. In some ways, the ICS structure reflects more of a "rational bureaucracy" requiring its users to follow its rigid format and flat structure. The general organizational disaster research over the last 50 years continues to discuss the formation of emergent groups and organizations as well as the prevalent use and need for improvisation in organizational response.

Based on the empirical data and observations from Hurricane Katrina in the field, there seemed to be variation of use in NIMS and ICS. Some strictly followed the NIMS/ICS structure, some did not follow it at all, some questioned ICS since it was developed by the fire department, some did not know about NIMS or ICS, and then there were other organizations that had their own successful means of managing the disaster. What resulted was on-the-spot training to try to fill the gaps, the use of informal networks, the use of informal structures of organizations, and using the experiences developed from previous disasters to effectively respond. There were also some key inter-organizational issues. Some organizations outside of the ICS structure, such as the volunteer organizations and the IT organizations, found it hard to plug into the response activities that followed ICS. Instead, the convergence of organizations occurred where emergent groups formed and self-dispatching departments developed. In terms of the intra-organizational issues within the fire departments, buy in on ICS was the strongest in the upper management whereas the practitioners in the field had high skepticism of ICS. For those in the field, ICS did not really work and instead they devised new structures and methods to get the job done.

NIMS or ICS is essentially a national policy based on little, if any, scientific evidence. There has been little or no real true assessment of NIMS or ICS. NIMS and the national response was doomed to fail during Katrina based on the reasons stated here. NIMS needs to be looked at on a full scale from day-to-day operations to small and large-scale disasters to understand where it works and where it does not.

In the discussion period, conflicting viewpoints were shared from practitioners and researchers about NIMS and ICS. Some commented that ICS actually does work in practice; however, the panelists responded by pointing out that the true believers of ICS were often higher ranked officials in the fire departments and the skeptics were the ones in the field. Others argued that we cannot have a government-centered response with the use of ICS or NIMS; instead, we need to consider the community that is affected as well as the private sector and how they plan to respond to the disaster with the tools they have. The panelists emphasized that we need a system that allows for emergence and improvisation and that can also have greater trust in the creativity of the responders. It was mentioned that ICS should be seen as providing a basic structure that then could be used more flexibly in the field.

Weather and Society * Integrated Studies (WAS*IS)

Moderator: Tanja Fransen, NOAA / National Weather Service
Presenters: Julie Demuth, National Center for Atmospheric Research
Eve Gruntfest, National Center for Atmospheric Research
Recorder: Michael Deegan, State University of new York at Albany

The discussants were asked to discuss the following questions:

- What is WAS*IS? Why WAS*IS?
- What is the WAS*IS workshop?
- What has WAS*IS accomplished?
- What is the future of WAS*IS?

This was a unique hazards workshop session. The discussants gave a presentation on an existing project rather than answering questions on a specific hazards topic. The discussants provided some background to define WAS*IS, why it was necessary, the accomplishments of the program and prospects for the future.

What is WAS*IS? The discussants explained the name in terms of its components; to change from what **was** to what **is** the future of integrated weather studies. The purpose is to "integrate weather and social science to empower practitioners, researchers, and stakeholders to forge new relationships and to use new tools and concepts for more effective socio-economic applications and evaluations of weather products." There are two components to what they called capacity building: tools and concepts, and skills. The team emphasized a focus on specific tools and concepts to assist in capacity building, such as: communication, forecasting, GIS, qualitative research, decision making, economics and vulnerability. The team also suggested a focus on specific skills to build capacity, including: initiating and building relationships, and overcoming barriers.

Why WAS*IS? Eve Gruntfest was frustrated that social science was being marginalized or considered as an afterthought. Julie Demuth was excited about the potential for physical scientists to learn about impacts and applied work of social scientists. The challenge, as the discussants viewed, was to figure out how to integrate (not add) social science into meteorology. They wanted to design a program that would grow a community of people passionate and dedicated to this integration of ideas. They concluded their answer to this second question by saying that it is crucial to recognize and address societal impacts in a "real, sustained way."

What is the WAS*IS workshop? The first 2-part workshop took place in Boulder in November 2005 and March 2006. The second workshop was a condensed 3-day workshop in Norman during April 2006. The third WAS*IS workshop began on Thursday evening of this years conference. There have been over 85 participants so far. The best way to get a flavor for the workshop is to simply visit the website: www.sip.ucar.edu/wasis.

What has WAS*IS accomplished? There have been several tangible and intangible accomplishments. A few tangible accomplishments include: the development of a weather and society road map conceptual model and funding for a "WAS*ISer" interdisciplinary Ph.D. If you are interested in joining a newsgroup related to these issues, please visit: www.sip.ucar.edu/wxsoc.jsp. Among some of the intangible accomplishments include: introducing WAS*IS participants to each other to initiate this community, and facilitate peer mentoring to sustain the community. Three WAS*IS participants, Gina Eosco, Tanja Fransen, and Sheldon Drobot reflected positively on their WAS*IS workshop experience.

What is the future of WAS*IS? The initial funding for this effort is over on August 31, 2006. Before then, the group plans to trademark WAS*IS, plan for an Australian WAS*IS workshop in 2007 and submit a BAMS article. There is also a planned WAS*IS session at the American Meteorology Society Annual Conference in January 2007 (www.ametsoc.org/meet/ann/callforpapers.html#annual). The discussants would like to see some application of WAS*IS beyond weather related issues. The discussants are also working on an edited collection of articles and a book proposals. The main concern at the end of the presentation was regarding funding sources to support and continue WAS*IS research and applications.

In the question and answer period, several ideas were suggested. The audience was interested in possible distance learning courses. One audience member asked how social science could be introduced in a more systematic way. Another audience member was concerned that if only one social science discipline was introduced, the WAS*IS participants could get a biased or incomplete picture of the social sciences. There were a couple of ideas regarding ways to continue funding for WAS*IS. One person suggested that the WAS*IS team should seek out clients, both private and public sector organizations, which could help alleviate some of the costs of the WAS*IS workshops.

The WAS*IS team was very well prepared and gave an excellent presentation. I strongly encourage you to visit the websites listed in this summary.

National Institute for Building Sciences: Savings from Mitigation Study

Moderator: Linda Borque, University of California, Los Angeles
Presenters: Ron Eguchi, ImageCat Inc.
Elliott Mittler, Disaster Research Consultant
Recorder: Michelle Moses, Disaster Research Center, University of Delaware

The discussants were asked to discuss the following questions:

- There were no moderator questions.

Although large sums of time, funding and effort have gone into the Federal Emergency Management Agency's (FEMA) mitigation planning, many have wondered if these strategies are beneficial. Ron Eguchi and Elliott Mittler performed a study, "National Institute for Building Sciences: Savings from Mitigation Study", which developed a cost-benefit analysis of FEMA's mitigation planning. In this particular session, the discussion was not centered on specific questions asked by the moderator, but instead followed a basic outline presented at the beginning of the session. The panelists chose to begin with a general overview of their study, then discussed the two tracks of their research, and ended with a discussion session for any questions or comments that the listeners had.

The researchers found that FEMA's mitigation plan was indeed cost-beneficial. Through a comprehensive study presented to congress, they discovered that for every dollar spent on mitigation, three dollars were saved through the efforts of the plan. It was explained that the study was unique and influential because it was an independent study without bias to the project. The researchers used the National Institute of Building Sciences (NIBs) and ATC to collect and analyze data in two different tracks, one focusing on the direct impacts of the study, and the other on the less direct effects.

Track A involved a national analysis of the Hazard Mitigation Grant Program, Flood Mitigation Assistance, as well as Project Impact. All three government mitigation programs were public activities that involved projects (i.e. repairing structures) and processes (i.e. risk communication planning). They found, through the data in the National Emergency Management Information System (NEMIS) and HAZUS-MH, that these programs reduced property damage, community interruption, environmental damage, societal loss, and the need for emergency response. With a cost-benefit ratio of four to one, researchers discovered that fifteen billion dollars in benefits were produced through FEMA's mitigation projects, including the prevention of 4,699 injuries and 223 deaths.

When discussing track B, the discussants were referring to community studies that were performed as part of a larger assessment that looked at different "spin-off" projects inspired by FEMA's mitigation plans. It studied what communities had done in response to government funded mitigation in the past and present, as well as what they had done to begin there own mitigation for local disasters. The researchers examined how communities used 6,000 grants that FEMA provided to be used towards mitigation, along with whether communities already had pre-existing mitigation plans to follow. Communities that were studied had received grants from FEMA for mitigation, had to be at medium or high risk for a disaster striking their area, and had to be involved in both project and process forms of mitigation. By studying benefit to cost ratios, they found that communities that had institutionalized mitigation obtained more synergistic activity.

Research in Hazards by Young Professionals II

Moderator: Rory Connell, Innovative Emergency Management, Inc.
Presenters: Christopher Burton, University of South Carolina
Elizabeth Dunn, University of South Carolina
Ginni Melton, University of South Carolina
Recorder: Kirsten Dellinger, University of Mississippi

The discussants were asked to discuss the following questions:

- There were no moderator questions.

One of the ongoing challenges of hazards research is accurately measuring the vulnerability of individuals, neighborhoods, communities, or regional areas to natural disasters. All three panelists dealt with the methodological side of this challenge in their presentations.

Christopher Burton and Elizabeth Dunn explored ways of modifying the well-known Socio-vulnerability index developed by Professor Susan Cutter of the University of South Carolina Hazards Research Center. Burton examined the vulnerability of Oregon coastal communities to tsunami hazards. He argued that thinking about vulnerability at the community level vs. the individual level is necessary and demonstrated the usefulness of using block level data as well as variables measuring the physical environment or "place" to get a better picture of specific communities' and areas' resilience to tsunami threats. Elizabeth Dunn also argued that as loss and vulnerability is now defined in economic and demographic terms, we need a finer scale for examining how specific areas, such as the Gulf Coast, fare during disasters. Using the Gulf Coast as an example, Dunn demonstrated how she manipulated several of the 42 variables in the Socio-vulnerability index to derive more specific data at the block level. She tried to overcome the challenge of a lack of socio-economic data at this level of analysis by using data sources such as business establishment address data, Bureau of Labor statistics earning data, federal election data, etc. The final panelist, Ginni Melton, presented a comparison of measurements used by SLOSH, FEMA, and the University of South Carolina Hazards Research Center to assess storm surge along the Mississippi Gulf Coast. SLOSH data is based on pre-hurricane predictions of the trajectory and category of the storm. FEMA measures storm surge using on-the-ground evidence of high water marks. The research team at USC used evidence of surge, including high water marks, at 300 specific locations determined by a grid they superimposed on the area. Melton was able to map the "overprediction" and "underprediction" of each model and concluded that FEMA was more accurate than SLOSH with their own the ground high water mark method, but that they ignored certain areas which could be ameliorated by covering more ground and using more observation points, as did the USC team. There needs to be a continued discussion of the timing of surge measurements, the methods used to measure surge, and the human interpretation of what counts as surge.

Many of the questions raised in the question and answer period had to do with the feasibility of finding data at the block level or the techniques needed to grid the coast line in order to more

accurately measure the spatial effect of surge. One audience member wanted to know whether local government officials would find it too time consuming and cumbersome to gather socio economic data using the techniques described by the first two panelists. Another member asked how much accuracy is lost when downscaling the measurements to the block level and whether data at this level changes more quickly than it can be gathered. Overall, there was a great deal of excitement about the methodological contributions that these new scholars are making to our ability to accurately measure vulnerability to natural hazards.