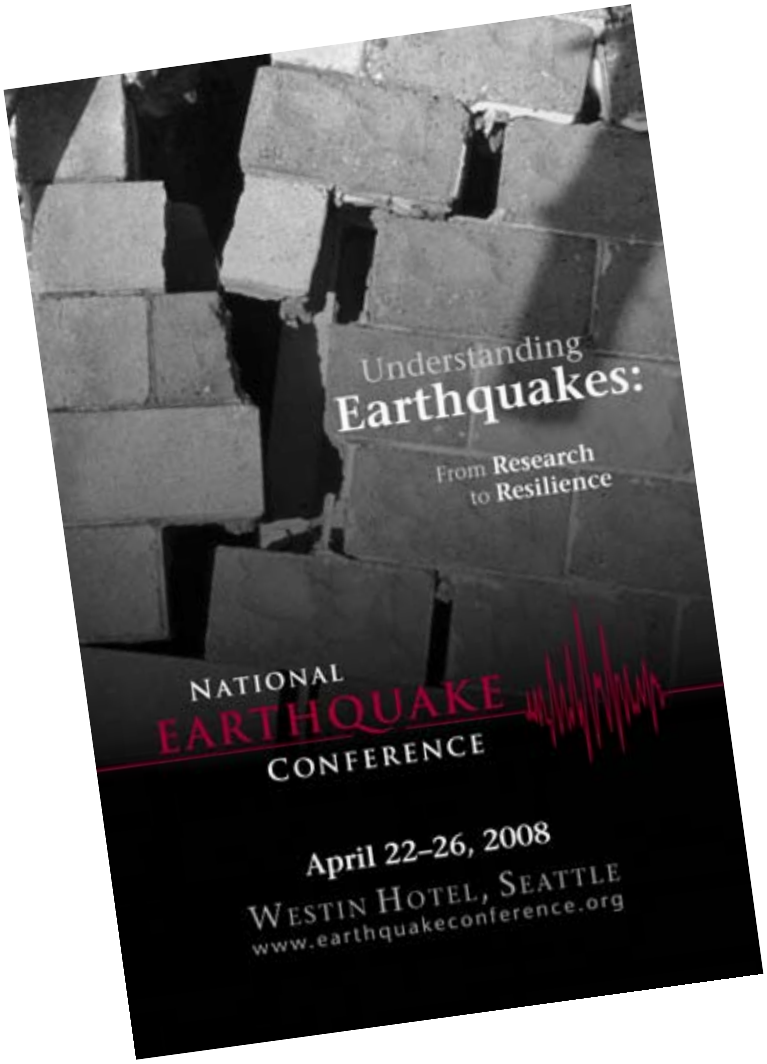
*After the 2008 National Earthquake Conference:*

**From Research to Resilience**

# What next?




**2008**

CREW
AHEAD OF THE WAVE
Cascadia Region Earthquake Workgroup
Sharing Information to Promote Mitigation

# Executive Summary

From April 22-26, 2008, more than 400 people came to Seattle for the National Earthquake Conference with its theme, *Understanding Earthquakes: From Research to Resilience.*

The five conference objectives were to: understand the research; exchange ideas about tools for earthquake hazard and risk reduction; showcase successful programs; learn from past disasters, and build resiliency.

Evaluations from participants showed a high level of satisfaction (approximately 4.3 on a scale of 1-low to 5-high). Attendees said this conference is an important event because a variety of disciplines come together to exchange information and insights.

Though several people offered descriptions of resiliency, most had components in common:

- A public educated about their risk;
- A multidisciplinary approach;
- An approach that applies to all hazards;
- A focus on all four aspects of emergency management: mitigation, preparedness, response, and recovery;
- A structure and resources to recover from a damaging event.

Some impediments to resiliency were also mentioned including:

- People think it won't happen to them, to their location, or in their lifetime.
- Lack of will. Information exists, but is not incorporated into current activities.
- Earthquake safety must be prioritized along with all other demands on the resources of governments, businesses, organizations, neighborhoods, and families.

Day 1 of the conference presented lessons from the past.

- Appropriate messages about the earthquake hazard are critical. People perceive whether they're safe, not whether they're at risk in the future.
- Community resilience has occurred after many disasters through the years. Lessons from those cities give important steps for us to take.

Day 2 focused on the present.

- Many parts of the US, not just the West, are at risk from earthquakes.
- A national HAZUS study shows annualized earthquake losses of $5.3 billion per year. Relatively high earthquake loss ratios exist in the western US (including Alaska and Hawaii); the New Madrid Seismic Zone; the Charleston, South Carolina area; and some parts of New England.
- Vulnerability science helps explain why some places are more vulnerable than others. Coupling the Social Vulnerability Index with seismic hazards can highlight the highest areas of vulnerability.
- A FEMA study showed that between 1993 and 2003, earthquake grants of $947 million led to a benefit of $1.4 billion. The study showed that mitigation is most effective when carried out on a comprehensive, community-wide, long-term basis.

The future was the target of Day 3.

- Even where mitigation activities are undertaken, they are often fragmented among various agencies, organizations, missions, and resource providers.
- Developing partnerships for funding, planning, and implementation is critical.
- After a major earthquake, many areas will need to respond to their own damage. Breaking communities into small neighborhoods and training them before an event can save lives and allow professional emergency responders to attend to major events.
- Some in the earthquake field would like to spend more time on mitigation than they are currently able to do, believing it to be the most cost-effective use of resources. However, funding sources are often not geared to mitigation, but to response or planning. In addition, funding to prepare for hazards is often targeted mostly to terrorism/national security. Although many tasks are useful for a variety of hazards, there are some earthquake-specific activities that are not being done.
- Local efforts are underfunded and understaffed. There are probably many reasons, but the most commonly identified culprits were the lack of local resources and political will. Neither governments, businesses, nor the general public are asking for greater earthquake protection.
- Earthquake measures generally happen after an event causes great damage and/or injury.

For more information, abstracts were published in the pre-conference agenda and many presentations are available online at http://www.earthquakeconference.org/Presentations/presentations.htm.

# 2008 National Earthquake Conference

*Understanding Earthquakes: From Research to Resilience* was the theme of the event. More than 400 participants came to Seattle from April 22-26 for the conference. Five field trips, 27 exhibits, and 23 posters supplemented the plenary, breakout, and webcast sessions.

The conference was organized by:

- Cascadia Region Earthquake Workgroup (CREW)
- Western States Seismic Policy Council (WSSPC)
- Northeast States Emergency Consortium (NESEC)
- Central US Earthquake Consortium (CUSEC)
- Earthquake Engineering Research Institute (EERI)
- Emergency Preparedness for Industry and Commerce Council (EPICC).

In addition, funding and support came from:

- Department of Homeland Security's Federal Emergency Management Agency (FEMA)
- US Geological Survey (USGS).

Conference objectives were to:

- Understand the research.
- Exchange ideas about tools for earthquake hazard and risk reduction.
- Showcase successful programs.
- Learn from past disasters.
- Build resiliency.

Awards were presented for excellence in the field. The 2008 WSSPC Lifetime Achievement Award went to Dr. Walter J. Arabasz, Director of the University of Utah Seismograph Stations. Other awards:

- Overall Award in Excellence to the Washington Military Department, Emergency Management Division, for *Map Your Neighborhood: Building and Strengthening Disaster Readiness Among Neighbors.*
- For Mitigation, the Oregon Department of Geology and Mineral Industries, for *Statewide Seismic Needs Assessment of Oregon Schools and Emergency Facilities;* and the Capitol Preservation Board, for the *Utah State Capitol Seismic Retrofit and Restoration.*
- For Response and Recovery, the Washington Military Department, Emergency Management Division, *Broadcasters Tsunami Emergency Guidebook.*
- For Innovations, Ridg-U-Rak, Inc., for the *Ridg-U-Rak Seismic Base Isolation System.*
- For Outreach, the Washington Military Department, Emergency Management Division and the Earthquake Engineering Research Institute, for *Seattle Fault Earthquake Scenario Project;* and Cascadia Region Earthquake Workgroup, for *Cascadia Subduction Zone Earthquake: A Magnitude 9.0 Earthquake Scenario.*
- For Plans/Materials, the *Emergency Preparedness for Industry and Commerce Council.*

Fields trips were taken to: tsunami sites; the University of Washington Seismic Lab; the Seattle Fault; seismic retrofit projects; and the Washington State Emergency Operations Center.

## The program

The three days of plenaries and breakout sessions were organized into Past, Present, and Future. Abstracts were published in the pre-conference agenda. Presentations that were submitted are available at the conference website, http://www.earthquakeconference.org/Presentations/presentations.htm.

Because of the amount of information presented, only a few key points from plenaries are included here.

### Learning from the Past

Washington Governor Chris Gregoire, FEMA Region X Director Susan Reinertson, Washington State Emergency Management Division Director Jim Mullen, and conference chair and CREW President Bob Zimmerman welcomed participants.

The first plenary, *Toward Resiliency: What We've Learned from Past Events*, set the tone for Day 1. Dennis Mileti began by describing resiliency.

- It requires interdisciplinary contributions.
- It's about mitigation, preparedness, response, and recovery.
- It's not earthquake specific: it applies to all hazards.
- It's the ability to thwart and recover from consequences.
- It's analogous to "sustainable development."

He set out four goals to achieve societal resilience.

1. Understand risk and embrace safety.
   - Put safety at the forefront of public priorities.
   - Communicate risks to the public and decide how much risk is acceptable.
2. Re-evaluate and harden high loss-potential structures.
   - Rethink the approach from a systems viewpoint, combining engineering strategies with other loss-reduction strategies.

3. Revamp the management of risk management.
   - A single person should be in charge and be responsible for managing the entire approach.
   - Improve interagency coordination.
4. Demand engineering quality.
   - Upgrade engineering design procedures.
   - Put safety first.

At the same time, the human element must be taken into consideration. People are often the greatest constraint to resiliency.

- People perceive safety, not risk. We must craft messages to reflect that.
- We manage risk with hindsight not foresight. Most (99%) of seismic safety laws from 1906-2006 were adopted after earthquakes.
- Normalize new risk information so it is available *before* the next earthquake.
- Engineering solutions lead to the perception that "we" are safe, and disasters happen to others.
- Many people focus on disciplinary solutions that are expensive and difficult to enforce.
- People think in the short term: "It won't happen today or to me."

Lawrence Vale reviewed past earthquakes to explore the resiliency of modern cities to be rebuilt. He presented 12 axioms of resilience that include political, financial, and social factors in post-disaster recovery.

Plenary 2 featured staff from the NEHRP agencies (USGS, FEMA, NSF, and NIST) to outline *NEHRP Strategies and Challenges.*

USGS Director Mark Myers spoke at lunch. He reinforced the USGS commitment to advancing the science of earthquakes and helping communities prepare for them.

*Scientific and Engineering Lessons from Past Earthquakes* was the focus of Plenary 3. Hiroo Kanamori discussed slow earthquakes, like the 2006 Java event that produced weak shaking but a large tsunami, and how they differ from "regular" earthquakes. He emphasized that our seismological data base is too short to fully understand earthquake diversity. Singular events can have large, unexpected consequences.

Chris Poland discussed performance-based engineering and how to use it to improve the performance and buildings and utilities in earthquakes.

Afternoon breakout sessions were:

- Critical Infrastructure
- Impact of Earthquakes on Rural Communities
- Spreading the Risk: The Role of Earthquake Insurance in Economic Recovery
- Business Continuity Lessons Learned from Past Events: Hurricane Katrina, Kobe, Japan Earthquake and Research Findings
- Land Use Planning, Policy and Earthquakes 101
- Scientific and Engineering Lessons from Past Earthquakes

## Dealing with the Present

Seattle Mayor Greg Nickels, WSSPC Executive Director Patti Sutch, and Washington State Military Department Adjutant General Timothy Lowenberg opened Day 2.

Plenary 4, *Earthquake Hazards in the US,* followed. Mary Lou Zoback highlighted the geologic underpinnings of earthquake-prone regions across the US, and their resulting hazards. She pointed out that in most earthquakes, single-family residences (including both structure and contents) account for a majority of losses.

Jack Moehle presented a variety of scenario earthquake results, showing what would happen if selected earthquakes happened today.

- A repeat of the 1906 San Francisco earthquake could leave 1,800 to 3,400 dead, with 250,000 displaced households. Direct economic losses could total $150 billion.
- A projected magnitude 6.7 earthquake on the Seattle Fault could cause 1,600 deaths and 24,000 injuries. Nearly 10,000 buildings could be destroyed, with 27,000 unsafe to occupy. Direct economic losses could total $33 billion.
- A repeat of the 1811-1812 New Madrid earthquakes would affect 126,600 square miles with a population of 11 million. Damaged structures could leave 120,000 displaced households, 35,000 casualties, and $50 billion in direct economic losses.

*National Earthquake Risk—Impacts and Vulnerabilities* was the topic of Plenary 5. Philip Schneider presented HAZUS as an important planning tool. A national HAZUS study showed annualized earthquake losses

of $5.3 billion per year. Relatively high earthquake loss ratios exist in the western US (including Alaska and Hawaii); central states (New Madrid Seismic Zone); the Charleston, South Carolina area; and some parts of New England.

Susan Cutter explained vulnerability science: why some places are more vulnerable to natural hazards than others. Coupling the Social Vulnerability Index with seismic hazards can highlight the highest areas of vulnerability. Memphis was used as an example of how this tool can help policymakers.

Keith Porter reported on a major study that showed FEMA spent $3.5 billion on flood, earthquake, and wind hazards from 1993 to 2003, that led to a savings of $14 billion. In particular, earthquake grants of $947 million led to a benefit of $1.4 billion, a 1.5 benefit to cost ratio. The study also showed that mitigation is most effective when carried out on a comprehensive, community-wide, long-term basis.

Jim Stanton, Director of Communications for the British Columbia Olympia and Paralympics Winter Games Secretariat, was the luncheon speaker. He related the importance of preparation and mitigation before an international event such as the Olympics, and how natural hazards like earthquakes must be considered along with more traditional security issues.

Jack Hayes presented the Awards in Excellence.

Financial risks were highlighted in Plenary 6, *Earthquake Risk Management from a Financial Accountability Viewpoint.* Jill Combs, Joel Gaither, and Rebecca McQuade examined how to manage financial risks caused by earthquakes. Businesses are used to dealing with risks, and in one sense, natural hazards like earthquakes are of no more concern than others. Even regional disasters where facilities are located can happen with other hazards.

However, earthquakes provide specific problems, many of which can be foreseen, even though there is no warning time. USGS and local maps are an invaluable resource which some companies supplement with their own modeling. Another benefit from government programs is the upgrade of codes by cities and states to provide for safer buildings, which are the primary cause of earthquake damage.

For companies themselves, the cost of mitigation must compete with other priorities, always with an eye on shareholder returns. The enormous exposure of some companies causes them to employ several insurance and reinsurance companies.

Afternoon breakout sessions were:

- Tools of the Trade: ShakeMap, ShakeCast, PAGER, ENS, HAZUS, GIS, Scenarios, AGORA
- Building Earthquake Science and Engineering into Codes and Policies
- Temporary Populations: Evacuation, Planning, Problems and Procedures
- Addressing Tsunami Risk
- Communicating Risk and Risk Reduction
- Turning Mitigation into an Economic Advantage

The evening session was the webcast *Learning from the December 2004 Tsunami.*

## Future Directions

King County Executive Ron Sims and NESEC Executive Director Ed Fratto opened Day 3.

Next was Plenary 7, *Overview of Resiliency—A Working Goal*. David Maurstad talked about the importance of a nation of communities that are resilient for all natural hazards. Mitigation can be supported by federal agencies, but must begin at home, with stakeholders such as elected officials, land use planners, builders, business leaders, and homeowners.

Kathleen Tierney outlined what contributes to resiliency. The number, size, and type of entities involved (businesses, governments, individuals, etc.), their relationships, interdependence, capacity for cascading failures, technological design, and organizational processes are just a few of the most important factors.

From the perspective of a community, resilience encompasses four domains: connection and caring; resources; transformative potential; and the extent of disaster management activities.

Rich Eisner explained the Bay Area Preparedness Initiative (BayPrep). An analysis of the San Francisco Bay Area preparedness showed that though the concept was seen as critical, no single sector (government, corporate, philanthropic, or non-profit organizations) was truly prepared. Problems included: unclear defi-

nition of preparedness; lack of objective measures; knowledge fragmented across sectors; duplication of efforts; lack of collaboration across sectors; and lack of intermediaries to facilitate regional approaches. The next step in the program is for philanthropic organizations to continue their efforts to improve area-wide capabilities.

Plenary 8 focused on *Building Community Resilience—Applications of Resiliency.* Krista Dillon explained that building local capacities takes community-based planning efforts; local commitment; leveraging funding and public-private partnership resources; quarterly training; service learning components; and identifying applied research needs. In addition, sustainable programs need: institutionalization; leadership; professional coordination; funding; and public-private partnerships.

*Map Your Neighborhood* is an application for community resiliency presented by LuAn Johnson. It breaks communities into neighborhoods of 15-20 households and shows what should be done in the first hour after an earthquake to ensure that people in the neighborhood are safe. *The 9 Step Response Plan* includes how to make a neighborhood map, showing items such as gas meters and homes of neighbors with special needs, and use it as a guide for response. For example, the simple act of keeping sturdy shoes under the bed would eliminate many instances of the most common injury—cut feet.

Post-earthquake disaster response must include more than providing food, water, and shelter, said William Matthews. The people who need such services after a disaster are only a fraction of the families and communities that must rebound from the event. Resiliency has been a hallmark of communities; it is only the tools they need in today's society that change.

The luncheon speaker was Jim Wilkinson, who discussed the next National Earthquake Conference.

A new electronic voting system was pioneered. During lunch, it was tested by polling the audience. A few of the questions and answers:

*A. Which area of the country best represents where you live and/or work? (182 responses)*

| | |
|---|---|
| West | 117 |
| Midwest | 11 |
| East | 17 |
| South | 16 |
| Outside US | 21 |

*B. Who should be the target audience for the New Madrid Bicentennial Conference? (rating 1-low to 5-high)*

| | |
|---|---|
| Emergency managers | 4.4 |
| Elected officials | 3.3 |
| Business (CEO, CFO) | 3.2 |
| Government planners | 2.7 |
| Citizen groups | 2.2 |
| Engineers | 1.3 |
| Developers | 1.0 |
| Educators | 0.9 |

*C. What area should be the most important focus of the conference? (178 responses)*

| | |
|---|---|
| Preparedness | 45 |
| Mitigation | 60 |
| Research | 18 |
| Multi-state planning | 38 |
| Historical aspects | 4 |
| Other | 13 |

Afternoon breakout sessions were:

- Establishing State Post-Earthquake Technical Clearinghouses
- Public/Private Partnerships for Economic Resiliency
- Creating and Using Earthquake Scenarios
- Cultural Implications of Earthquakes and Tsunamis
- Motivating and Preparing the Next Generation
- Volcano Science, Hazard, and Risk

Kathleen Tierney moderated the closing event, Plenary 9. The electronic voting system was used again. This time, discussion of questions was encouraged.

A few of the questions and answers presented, with major discussion points:

*A. What discipline do you represent? (74 responses)*

| | |
|---|---|
| Earth sciences | 20 |
| Engineering | 9 |
| Emergency management | 34 |
| Social sciences | 5 |
| Business sector | 6 |

Composition of the audience might have been more heavily geared toward emergency management and West Coast attendees than the rest of the conference.

*B. What are the largest impediments to successful state earthquake programs? (80 responses)*

| | |
|---|---|
| Lack of resources (money and staff) | 39 |
| Lack of state and local level political support | 36 |
| Lack of coordination with federal partners | 0 |
| Lack of federal support | 2 |
| Other | 3 |

State programs suffer from a lack of resources. There is still a disconnect between what science and history show is needed and what state and local policymakers support. There may be several reasons for this disconnect. Static or declining budgets give elected officials less money to work with. The relative infrequency of earthquakes makes them a low priority. The general public is not putting political pressure on elected officials for more earthquake protection.

*C. What are the major barriers to local adoption and utilization of research findings (82 responses)*

| | |
|---|---|
| Lack of local commitment and funding | 19 |
| Research results that don't reach potential users | 18 |
| Lack of federal stimulus and resources | 4 |
| Lack of interaction between researchers and users | 32 |
| Other | 9 |

As in question B, lack of local resources is a significant issue. However, more people found a problem with the relationship between researchers (and their research) and users. The more that local staff can interact with researchers, the more likely current research will be transferred to and implemented by local jurisdictions.

*D. Where are you expending most of your efforts **now** in doing your day-to-day job? (81 responses)*

| | |
|---|---|
| Prevention | 2 |
| Preparedness | 33 |
| Mitigation | 37 |
| Response | 6 |
| Recovery | 3 |

*E. Where would you like to be expending most of your efforts **three years from now?** (81 responses)*

| | |
|---|---|
| Prevention | 1 |
| Preparedness | 25 |
| Mitigation | 44 |
| Response | 5 |
| Recovery | 6 |

The greatest movement was people who wanted to move to mitigation (these are emergency management terms and might not mean the same thing to those outside that profession). The discussion that followed centered on funding. Responses were that most funding is not targeted to mitigation. It tends to be more available for preparedness, and sometimes must be intertwined with antiterrorist activities.

In many cases, using resources for multiple hazards is economic and useful. There are, however, some earthquakes programs have very specific needs, and those activities are often difficult to fund.

Mitigation covers a wide array of activities but as one person said, "Mitigation is fun." It's a positive action that feels good to do and results in more safety.

"Recovery is dreary," said one participant. Another disagreed, saying, "Recovery can be exciting, that's when you get the most done."

Everyone agreed that there are windows of opportunity for educating the public and policymakers, funding programs, and other projects. These moments are commonly found right after an event. The interlude between damaging earthquakes and tsunamis can be used to develop and write down projects and programs that need resources. When the opportunity presents itself, it can be taken advantage of with materials that are already prepared and ready to go.

## Rating the conference

### Attendees

After the conference, 196 participants turned in evaluations. Most people found the conference well-organized with new, relevant information.

The evaluation included a question about each attendee's background. Because they were able to choose more than one descriptor, the totals added up to over 500 responses.

The most common categories were:

| | |
|---|---|
| Government/public administration | 96 |
| Emergency management/response | 90 |
| Geoscience | 35 |
| Risk management | 35 |
| Education/research | 34 |
| Strategic planning | 30 |
| Engineering | 28 |
| Policymaker | 24 |
| Private, for-profit | 23 |
| Insurance | 22 |
| Private, not-for-profit | 16 |

**Post-conference evaluations showed high marks.**

| | 1 (no!) | 2 | 3 (so-so) | 4 | 5 (yes!) | Average rating | Number of responses |
|---|---|---|---|---|---|---|---|
| Did you gain insight into the earthquake risk issue at this conference? | 3 | 5 | 19 | 72 | 89 | 4.3 | 188 |
| Overall, was the conference worthwhile? | 2 | 5 | 18 | 65 | 94 | 4.3 | 184 |
| Will you attend a similar conference in four years? | 6 | 18 | 25 | 52 | 85 | 4.0 | 186 |
| Will you recommend the conference to others? | 2 | 5 | 26 | 62 | 92 | 4.3 | 187 |
| Will you take action(s) on what you learned about the earthquake issue? | 3 | 9 | 18 | 69 | 86 | 4.2 | 185 |
| Did you network with others whom you expect to hear from in the future? | 4 | 8 | 22 | 48 | 105 | 4.3 | 187 |

*Suggestions for the next event*

Most people were happy with organization and content of the conference, but a few had suggestions for the future.

- Several people cited a desire for additional private sector representation and perspective. One commenter said, "I suggest marketing to business continuity, risk management, and security groups for the next conference and let them know that if they have employees in earthquake risk areas, this information, and the contacts available, are invaluable."
- Another commenter noted that most emergency management attendees were from state levels and added, "Having more participation from locals would make this better to help 'close the circle' between researchers, policymakers, facilitators, and implementors."
- Another suggested, "Collaborate with FEMA's Emergency Management Institute (EMI) and see if there are classes that could be taught at the conference. Perhaps state governments, such as California, have state-specific earthquake related courses that can be modified to be taught to anyone. Ask DHS for a catastrophic planning course, or some ICS courses. Work with private sector business continuity trainers, such as DRII. Make it so credits count for CEU's."
- In the discussion the last afternoon, several people expressed a desire for more policymakers to attend. Increasing this sector will require more thought about marketing to them and about how their experience at the conference would be most useful.

## Program

The diversity of opinions about the content of the conference, probably reflected the diverse group of people attending. Most were happy with the spread of topics available and as one commenter said, "A real plus for the program was the multi-hazard application for most presentations." Another said, "People loved the 'Past, present, future' format."

Individual comments included:

- Some wanted more science and engineering, some wanted less. One evaluation said, "The three of us [engineers] were expecting a little bit more technical information especially on the breakout sessions." On the other hand, a commenter said there were, "Too many technical breakouts, geared more to the technical side than a general audience even though one of the objectives was to 'develop a shared understanding of scientific, engineering, and social research.' " Another said that, "It was difficult for those of us who do not hold that [scientific and technical] knowledge to follow along on some of the plenaries."
- Several comments focused on emergency management. Again there was a split between whether there should have more or less time devoted to it. One request was, "Add focus on response and recovery...mitigation and planning are before the event...what can be done immediately and longer term after the shake?"
- There was general approval of the growing amount of social sciences in the presentations, though like other sciences, the level of language was too technical for some.

- Ironically, the word "communication" showed a split in how participants of various disciplines use specific terms. To some, communication meant working with various constituencies to deliver appropriate messages. To others, it meant part of the critical infrastructure that must be maintained or restored quickly after an earthquake.
- The use of the same word to mean different things seems to be typical of the problems of having a wide variety of disciplines participating. One person cited the need for a lexicon of conference acronyms. Another suggested that researchers learn the Incident Command System and use that as a common language and structure for applying new information.

*Suggestions for the next event*

While people were generally satisfied with the content of the program, many suggestions were given for future plenary and breakout sessions, both organization and content.

Whatever the topic, several commenters liked the format of telling stories, rather than just data to convey information. Summed up one commenter, "…One of the recurring statements made at this conference was that people do not understand the concept of risk, but they do understand the idea of their own personal safety. That Webcast session demonstrated the power of a message about personal earthquake safety in a tsunami story presented by one that did not experience damages, and another that did and was well into recovery. I think future conferences should have at least one of these personal story telling sessions … all decision makers at any level act on their personal feelings, and nothing is more personal than safety. I believe that is why the antiterrorist movement in this country was able to divert funds and the attention of decision makers away from natural disasters, and if we are going to regain some of what we lost, we are going to have to use their tactics. A small dose of on point, personal story telling in the middle of all that logic based on hard science can go a long way."

*1. Fewer plenaries, more breakouts*

In general, the plenaries were popular sessions. The two commonly cited concerns about them were that some were too technical for a broad audience, and that people couldn't get to all the breakout sessions they wanted because of the amount of time spent in plenaries.

- However, several commenters wanted more breakouts and fewer plenary sessions. The plenaries need to be sessions that are targeted to the entire group of attendees, not an easy task with so diverse a base. As one emergency manager said of researchers, "I think what you do is very important but I really don't need all the details." The continuing challenge for this conference, however, is to fine tune the amount of detail given in plenaries, so they continue to satisfy participants like the one who said, "I appreciate the very broad yet focused discussions."
- Some suggested repeating breakouts, or having theme-tracked sessions, so more people could get to the sessions that most interested them. As one person said, "Breakout choices were tough—excellent competing subjects."

  A. "One [track] for emergency managers, another for researchers, tools/applications, emergency responders, private sector/business continuity, local/state government (decision-makers, land-use planners, etc). Solicit the help from each of these communities for development committees to bring in, or create, earthquake-related speakers and breakouts. Beefing up the breakout sessions and reducing the plenaries will increase personal choices and satisfaction."

  B. "Breakout tracks [for] building codes, mitigation, insurance, emergency planning, and research."

**The program was rated well-organized and relevant.**

| | 1 (no!) | 2 | 3 (so-so) | 4 | 5 (yes!) | Average rating | Number of responses |
|---|---|---|---|---|---|---|---|
| Was the program well organized? | 0 | 3 | 8 | 81 | 99 | 4.5 | 191 |
| Were the topics relevant to you? | 0 | 10 | 40 | 77 | 63 | 4.0 | 190 |
| Was most of the information presented new to you? | 2 | 20 | 76 | 61 | 28 | 3.5 | 187 |
| If you attended, how was your Blake Island evening experience? | 2 | 3 | 8 | 18 | 17 | 3.9 | 48 |

C. "Concurrent workshops should be divided on three main topics: buildings and infrastructure, risk and vulnerability, outreach & best practices."

*2. Potential topics*

Many suggestions for future topics were made, some contradictory. Perhaps more breakouts would resolve some of these issues.

A. Geoscience/emergency management balance

- At one end were comments like, "I would like to see more on mitigation and preparedness... It seemed a lot of it was engineering, both structural and infrastructure."
- At the other end were comments like, "More focus on science/predicting/understanding physical risk/building codes—engineering." More information about lifelines and critical infrastructure was also requested by a few.
- One suggestion to tie the two groups together was an exercise: "A plenary session could bring together scientists (to develop the scenario) and exercise EM staff in an effort to tie it together. This would be productive in stressing the importance of testing and validating plans to better prepare for the real world response to the event/incident."
- Some commenters wanted information about a wider geographic area. "It would be very helpful to have more information that can be used by areas that are not West Coast or New Madrid," said one. Others would have liked more rural topics, more coverage of Alaska and Territories (and please include Alaska and Hawaii on maps, asked several, especially in light of their earthquake risk). Because of the international scope of earthquakes, there was one plea to, "continue [the conference] in future while giving special chances for the peoples of countries like Pakistan, India etc."

B. Other science

- Commenters wanted to keep increasing the quantity and quality of social science representation. Information specific to the health care sector was also requested.

C. Insurance

- Another thread of comments requested more information about earthquake insurance. "There was one session on earthquake insurance, and it dealt strictly with the New Madrid fault and the Northwest area. No mention of other parts of the country, California for example, and their earthquake insurance policies," summed up one participant.

D. Communication and program development

- "How can I move the needle in my area?" asked one person, reflecting a general concern. " There was no information on how to convey the risk to people in your area in a REAL way… ."
- "I would like to see a conference with some sessions on steps to take in educating the public on preparedness and steps we can take in our mitigation efforts," said another. "Also, how can we communicate risk and safety to a population who is either resistant or face barriers such as language, disabilities, or who are poor and lack resources for information?"
- Many people asked for more information to bridge the gap between information and application. Typical requests were, "Specifics on program development and planning efforts," "Examples of how to bring the community into preparing," and "More on-the-ground experience with a real live event." A specific idea was, "A field trip to a Tsunami Ready Community and talk with the people in their neighborhood to get 'messages' from them."

## Electronic voting

On the last day, a new electronic voting system was pioneered. The two caveats that emerged were the small number of people left at the Friday afternoon session (about 80 people participated) and the sometimes uneasy flow of questions and discussion. According to comments on the evaluations, some questions provoked discussions that could have lasted much longer, while other questions really didn't need discussion.

Some thought the session could have moved faster. Another summed up a popular response by saying, "The audience voting system was good at fostering conversation. However, the comments from the audience are always more important than the questions and should be fostered more."

*Suggestions for the next event*

- Most commenters were very supportive of this technology and would like to see it used again. One suggestion to improve it was, "Polling after each plenary/breakout; but reduce [the number of] questions." Another comment was, "I liked the last afternoon discussion. I wish people were more open…There were only a few, and the same people, talking."

**The speakers were found to be knowledgeable, prepared, and informative.**

| | 1 (no!) | 2 | 3 (so-so) | 4 | 5 (yes!) | Average rating | Number of responses |
|---|---|---|---|---|---|---|---|
| Overall, were the speakers informative, prepared, and understandable? | 0 | 0 | 14 | 89 | 89 | 4.4 | 192 |
| Were the speakers prepared? | 0 | 0 | 7 | 78 | 106 | 4.5 | 191 |
| Was the material presented understandably? | 1 | 6 | 15 | 98 | 71 | 4.2 | 191 |
| Were questions and discussion handled to your satisfaction? | 0 | 4 | 25 | 84 | 74 | 4.2 | 187 |

- One person suggested using the tool at the next conference, with a different focus: "That [last] session might have better served to ask realistically about what the field needs to move forward.… That session could have been used to create a charge for research, projects, and policy development, so that when you all meet again in 2012, you can see how far you've made it."

## Speakers

A big part of the success of the conference was the choice of speakers. More than 190 people answered the question, "Overall, were the speakers informative, prepared, and understandable?" An overwhelming 93% rated the speakers 4 or 5 (with 5 being high).

Speakers were deemed to be informative, prepared, and able to handle questions and discussions they provoked. A number of speakers were cited by multiple participants. Several people commented on the ability of the speakers to present information to participants from multiple disciplines.

A very common response was some version of, "Very good group of speakers!" "Excellent," "professional," "knowledgeable," even "amazing" were used frequently.

*Suggestions for the next event*

- Several commenters made suggestions for improvement. Some of these reflected the breadth of backgrounds in the audience. "Heavy on science," and "hard to understand the systems and engineering language" fell into this category. One commenter said the speakers were the best in their fields, which was great, but they heavily favored academia.
- Another group of comments focused on the downside of having speakers from government and political arenas. These ranged from a general statement that there was too much on government and policy to strongly felt comments that a particular speaker was so political that the participant wanted to walk out on him.
- Some participants were looking for more variety in presenters. "It often seems like the same speakers present at almost every earthquake conference…. Some people presented and/or moderated more than once," said one.
- Suggestions were also made on the slides used by presenters. One commenter said, "Death by PowerPoint!" Simpler (and readable by the audience) slides and diagrams were requested by others.
- Because of the amount of information given and the difficulty in taking notes, many participants were looking forward to getting copies of the presentations Many of them are available online, though not everyone was clear where they would be posted.

## Exhibits

There were 27 exhibits and 23 posters at the conference. "I thought the vendors added to the conference and the attendees had ample time to spend with them," summed up one commenter. But more exhibits would have been welcome by a few.

Exhibitors were generally satisfied, though less so than other conference participants. Nine of them submitted evaluations. The average rating to the question, "Overall, was the conference worthwhile?" was 3.3 (with 5 being high).

In general, the accommodations and visitors to the booths were as expected, but exhibitors would have liked more motivation to get people to the area. As one commented, "You have to make people *have* to go into the exhibit area with food, drinks, etc. They should have to go through the exhibit hall to get to meetings, if possible."

## Logistics

As with other aspects of the conference, those who filled out the evaluation forms were generally happy with the logistics of the event. The hotel, registration, and time of year were more than satisfactory.

Many specifically commented on the evaluation form that the conference staff and hotel were terrific. There were, however, some problems and suggestions for improvement:

*Cost*

- Most found the cost acceptable, but there were a few comments about the high price of the hotel, food, and Seattle in general. As one commenter said, "Our per diem is only $160 a day. Is NEC pricing itself out of the business of communication? While the hotel was overpriced, it was a first class operation. Meals, bar, and rooms were killers. If I was not supported, I could not attend at the price." However, another said, "Thank you for keeping the cost of the conference in check, this allows those of us from small/rural areas an opportunity to attend these valuable learning and networking functions."

*Hotel and food*

- Most people were happy with their rooms, but there were some registration problems, including the hotel running out of rooms at the conference rate.
- The most common complaint was that more coffee service and mid-morning/mid-afternoon snacks were needed. Using plastic bottles for water sparked several negative comments. One commenter said there was no thought given to food for special medical needs.

*Timing*

- Though most of the participants who filled out an evaluation sheet thought April was an appropriate time, not everyone agreed. "April is a busy month for natural hazards conferences meetings," explained one person. Another reason given to change the date was that Spring is hurricane/flood/tornado preparation season for some emergency managers.
- Some would like the frequency of the event increased. One commenter said, "Hold annually to provide momentum on seriousness and reality of earthquake…once every four year is like its outta sight and outta mind." Others suggested holding it every two or three years.

*Networking*

- Several people asked for greater networking opportunities. One suggestion was to cut down the amount of time speakers took at lunch. Another was to use, "breakfast as round-table for topics. I have seen the use of signs at tables to foster discussions (i.e., one morning regional signs, another could be an interesting question to discuss)." Yet another was to have an afternoon social hour each day.

**Logistics were well handled.**

| | 1 (no!) | 2 | 3 (so-so) | 4 | 5 (yes!) | Average rating | Number of responses |
|---|---|---|---|---|---|---|---|
| Were the hotel layout and accommodations adequate? | 3 | 1 | 13 | 63 | 104 | 4.4 | 184 |
| Was the conference food good? | 0 | 6 | 41 | 66 | 74 | 4.1 | 187 |
| Were session starting and ending times convenient? | 1 | 2 | 10 | 77 | 99 | 4.4 | 189 |
| Was your registration handled smoothly? | 3 | 2 | 8 | 42 | 136 | 4.6 | 191 |
| Was the time of year (end of April) convenient? | 1 | 4 | 14 | 69 | 103 | 4.4 | 191 |
| Did you find out about the conference in a timely manner? | 0 | 1 | 2 | 57 | 130 | 4.7 | 190 |
| Did the exhibits add to the value of the conference for you? | 5 | 12 | 49 | 48 | 75 | 3.9 | 189 |