Get Ready to ShakeOut!

Dale A. Cox
USGS Multi-Hazards

Multi-Disipline Science

- Early Surveys: Multi-Discipline
- USGS Structure: Geology, Biology, Water Resources, and Geography
- Abolishment and Multi-Discipline
- Timely, Relevant, Accurate, and Accessible
- Lake Tahoe Environmental Forum
- Urban Earth Campaign
- Confluence Park

Multi-Hazards Demonstration Project

Science for decision-making

- Integrate across the hazards
- Bring scientists and decision-makers together
- Guide the research fill the needs of the community.

Multi-Hazards Working Groups

- Earthquake / Tsunami
  Earthquake Scenario
- Fire / Debris Flow
  2007 Post Fire Coordination
- Winter Storm
  Winter Storm Scenario
- Information Interface
  Community Interface, Implementation, and Training

ShakeOut Earthquake Scenario

- USGS Multi-Hazards Demonstration Project (MHDP)
  - Lucy Jones, Chief Scientist
  - Dale Cox, Project Manager
  - Sue Perry, Staff Scientist

- 10 Section Leaders
  - Earth and Computer Science
    - Ken Hudnut, USGS
    - Dan Ponti, USGS
    - Mike Reichle, CGS
  - Engineering
    - Keith Porter, EERI
    - Hope Seligson, MMI Engineering
  - Public Health
    - Kim Shoaf, UCLA
  - Disaster Sociology
    - Dennis Mileti, Seismic Safety Commission
    - Jim Goltz, Governor’s Office of Emergency Services
  - Disaster Economics
    - Anne Wein, USGS
  - Richard Bernknopf, USGS
- More than 300 Panelists, Experts, Special Studies

Download reports at urbanearth.usgs.gov

Widespread Strong Ground Shaking

Compare with 1994 Northridge earthquake:

- 50x smaller
- Magnitude 6.7
- $40 billion

Compare with 2008 Chino Hills earthquake:

- 5000x smaller!
- Magnitude 5.4
- 0 deaths
- Minimal damage
Northridge 1994
over in 30 sec's
ShakeOut rupture unzips SE to NW, taking 90 seconds; Shaking lasts >3 mins in LA & Ventura

Aftershock Simulations
- Simulate aftershocks allowing random fluctuations to control productivity
- Communicates variability and possibility of long-distance triggering

Widespread Strong Ground Shaking + Shaking of Long Duration =
300,000 buildings significantly damaged
Widespread infrastructure damage
$213 billion damages
270,000 displaced persons
50,000 injuries
1,800 deaths

ShakeOut Scenario “Disaster Equation”

Building Damage
- 300,000 significantly damaged (1 in 16)
  - repairs cost at least 10% of replacement cost
- 45,000 complete losses (1%)
  - Unreinforced masonry (most dangerous)
    - most near the fault destroyed
  - Other concrete buildings (almost as dangerous)
    - 30 collapses
      - 5,000 – 10,000 people in collapsed buildings
    - 300 red tagged buildings
- Woodframe buildings (most numerous)
  - 1,185,000 wood buildings significantly damaged (1 in 25)
- Steel frame buildings (least dangerous)
  - 1,100 stories, 200,000-300,000 square feet
  - Up to 1,200 occupants each
  - 10 red tags
  - 20 yellow tags

Commuting Across the Fault

Fire Following Earthquake
- Earthquakes cause fire disasters
  - Numerous simultaneous ignitions
  - Degraded fire-resistive building features
  - Reduced pressure in water mains
  - Saturation communications
  - Traffic impacts
  - More fires than firefighting capabilities...
- Study findings
  - 1,600 ignitions requiring a fire engine
  - 1,200 exceed capability of 1st engine
  - Northern Orange County & LA Basin configurations destroy 100% of blocks
  - 200 million square feet burnt
  - 1.5% of total building stock
  - No Santa Ana winds... not worst case

In the ShakeOut Scenario, Fires double casualties and losses.
**Economic Impacts**

- **Damage to Structures and Contents:** $112.7b
  - Fire is biggest shock
- **Business Interruption:** $96.2b
  - Water is biggest shock
- **Additional Costs**
  - Relocation: $0.1b
  - Traffic Delay: $4.3b

**A National Economic Disaster**

Los Angeles Total Truck Flows (1998)

- **ShakeOut Goals**
  - Participation of at least 5 million people in the ShakeOut Drill
    - School, Business, and Community Organization recruitment efforts will have several million people participate
    - Everyone is encouraged to “spread the word” to promote people participating in the ShakeOut!
  - Shift the culture in southern California about preparedness
    - We must take greater responsibility for readiness
    - We all need to talk about earthquakes and preparedness more often
  - Significant increase in earthquake readiness at all levels

- **Everyone Can Participate!**
  - **Register** today to be counted in the ShakeOut Drill, get email updates, and more.
  - Get ready for big earthquakes, and practice Drop, Cover, and Hold On at 10:00 AM on Nov. 13.
  - Attend the **Get Ready Rally** on Nov. 14.
  - Take one more step Nov. 15 and 16: complete your disaster plan & kits, or attend a local preparedness event.

- **The Great Southern California ShakeOut**
  - November 12-16, 2008
  - A week of special events to inspire southern Californians to get ready for big earthquakes
  - Concurrent with statewide “Golden Guardian” emergency exercise: largest ever this year.
  - Region-wide earthquake drill Nov. 13
    - millions of participants: schools, families, community groups, business, etc.
  - Los Angeles International Earthquake Policy Conference
  - “Get Ready Rally” in downtown L.A.
  - Hundreds of community events

- **What we do now, before the earthquake, will determine what our lives are like after**
Products from the California Integrated Seismic Network (CISN)

- ShakeMovie
- ShakeMap
- CISN Display
- ShakeCast
- And more…

Community Interface

- Golden Guardian: Emergency Responders
  - ShakeOut Relevant at Local Level
  - Feedback Loop to the Scenario
- Los Angeles County Fire Department
  - “Earthquake Task Force” evaluating every aspect of earthquake response
- Water conveyance companies forming mutual aid agreements
- USNorthComm: Tri-National Catastrophic Earthquake Roundtable
  - US, Mexico, and Canada
  - Expansion of the Network in Mexico

Community Interface

- LA Unified Schools District
  - District-wide drill
  - ShakeCast / ROVER
- Burbank
  - Coordinated city-wide drill
  - Studios deploy, schools provide “victims”, hospital response
- NASA / USGS
  - Thermal, SAR
  - Emergency Responders
- Geospatial Preparedness Center
  - Interface Development / Training

ShakeOut: County Associates

- Every county has a committee
- Associates empowered to take ShakeOut preparedness message
- Chaired by political, business and emergency management leaders
- After the ShakeOut, we have contact with people who care about our work

What’s next?

- 2009 exercises to be on ShakeOut scenario in all Los Angeles County jurisdictions
- MHDP will create a Winter Storm scenario
- Research agenda of the ShakeOut?

We can make history.

www.ShakeOut.org