

# Scientific Earthquake Studies Advisory Committee (SESAC)

## Members

Ralph Archuleta, Chair, Professor, University of California, Santa Barbara

Jeffery Freymueller, Professor, University of Alaska, Fairbanks

John Parrish, State Geologist, California Geological Survey

Christine Powell, Professor, University of Memphis

Ellen Rathje, Professor, University of Texas, Austin

Garry Rogers, Senior Researcher, Geological Survey of Canada

David Simpson, President, IRIS Consortium

Terry Tullis, Professor Emeritus, Brown University and Chair of the National Earthquake Prediction Evaluation Committee (NEPEC)

# Izmit Earthquake Damage in Duzce

## What Star rating?



# Scientific Earthquake Studies Advisory Committee (SESAC)

- Induced Seismicity
- Earthquake Early Warning and Earthquake Operational Forecasting
- Seismic Hazard Maps

# Tectonic or Induced?

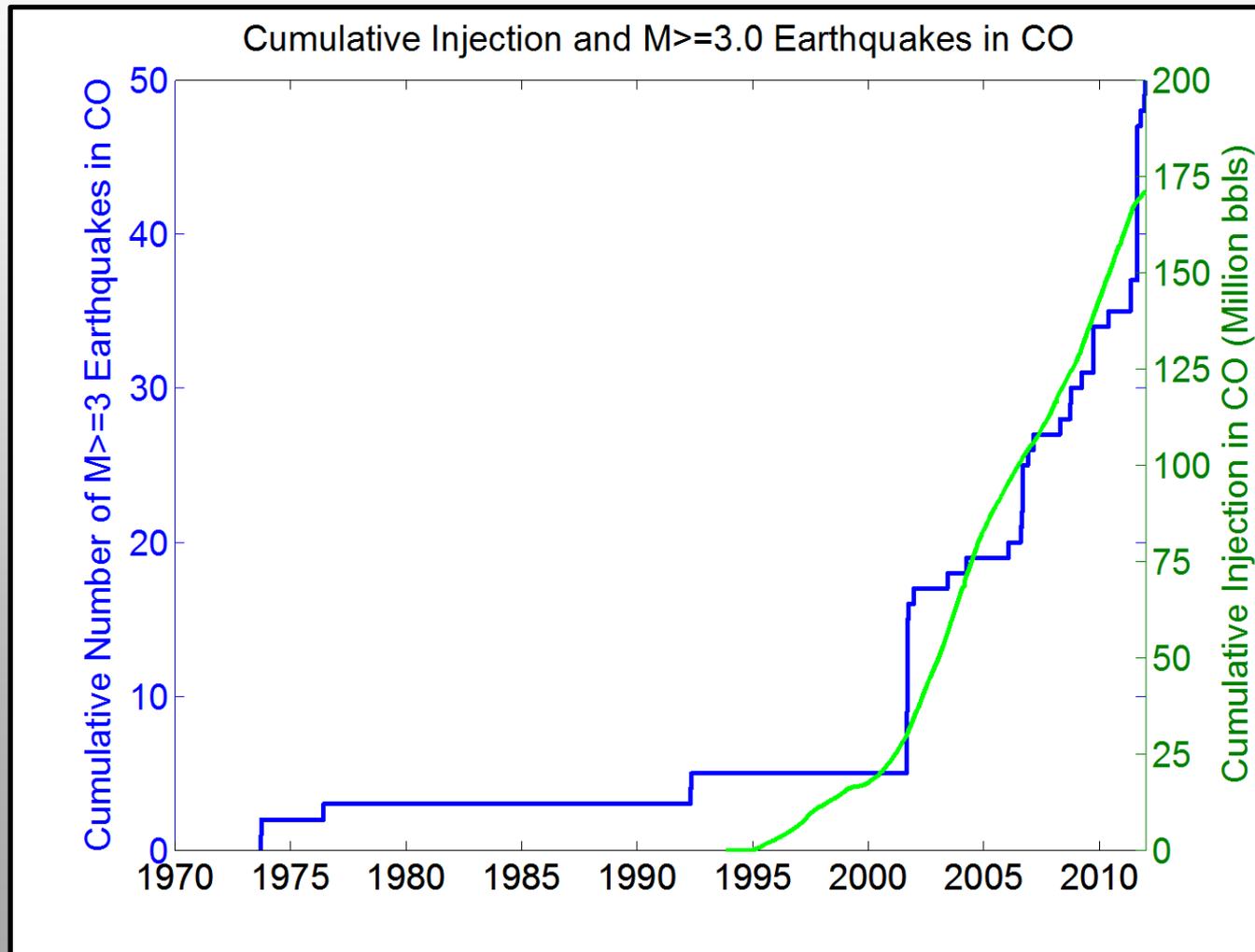
## Some Recent Earthquakes of Concern

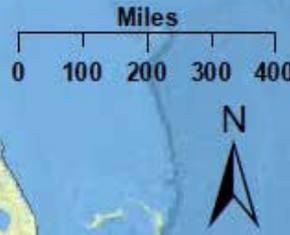
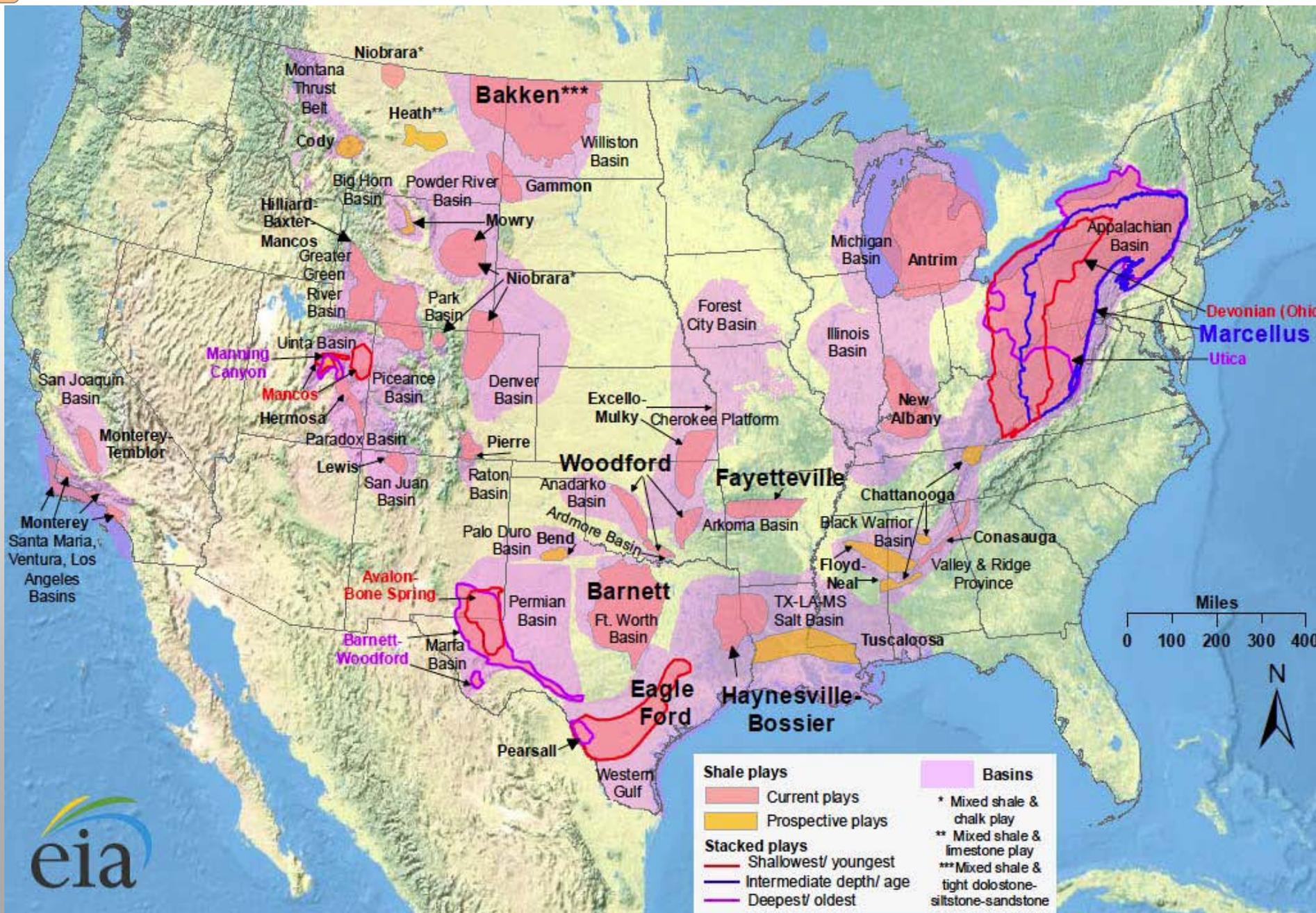
<u>Date</u>	<u>Location</u>	<u>M<sub>w</sub></u>
8/23/2011	Mineral, VA	5.8
11/6/2011	Prague, OK	5.6
<del>8/26/2012</del>	<del>Brawley, CA</del>	<del>5.5</del>
8/23/2011	Trinidad, CO	5.3
10/20/2011	Fashion, TX	4.8
5/17/2012	Timpson, TX	4.8
2/27/2011	Guy, AR	4.7
9/11/2011	Cogdell, TX	4.3
12/31/2011	Youngstown, OH	4.0
5/19/2011	Horn River Basin, BC	3.6
6/24/2012	Cleburne, TX	3.5
...		

### Fracking boom gains momentum, USAToday, Nov. 20, 2012

” ‘Fracking is happening and it's not going to stop, so we have to take the high road of good regulation and taxes so communities are better off, not worse off, after it's done,’ says Ted Boettner, executive director of the liberal West Virginia Center on Budget and Policy.”

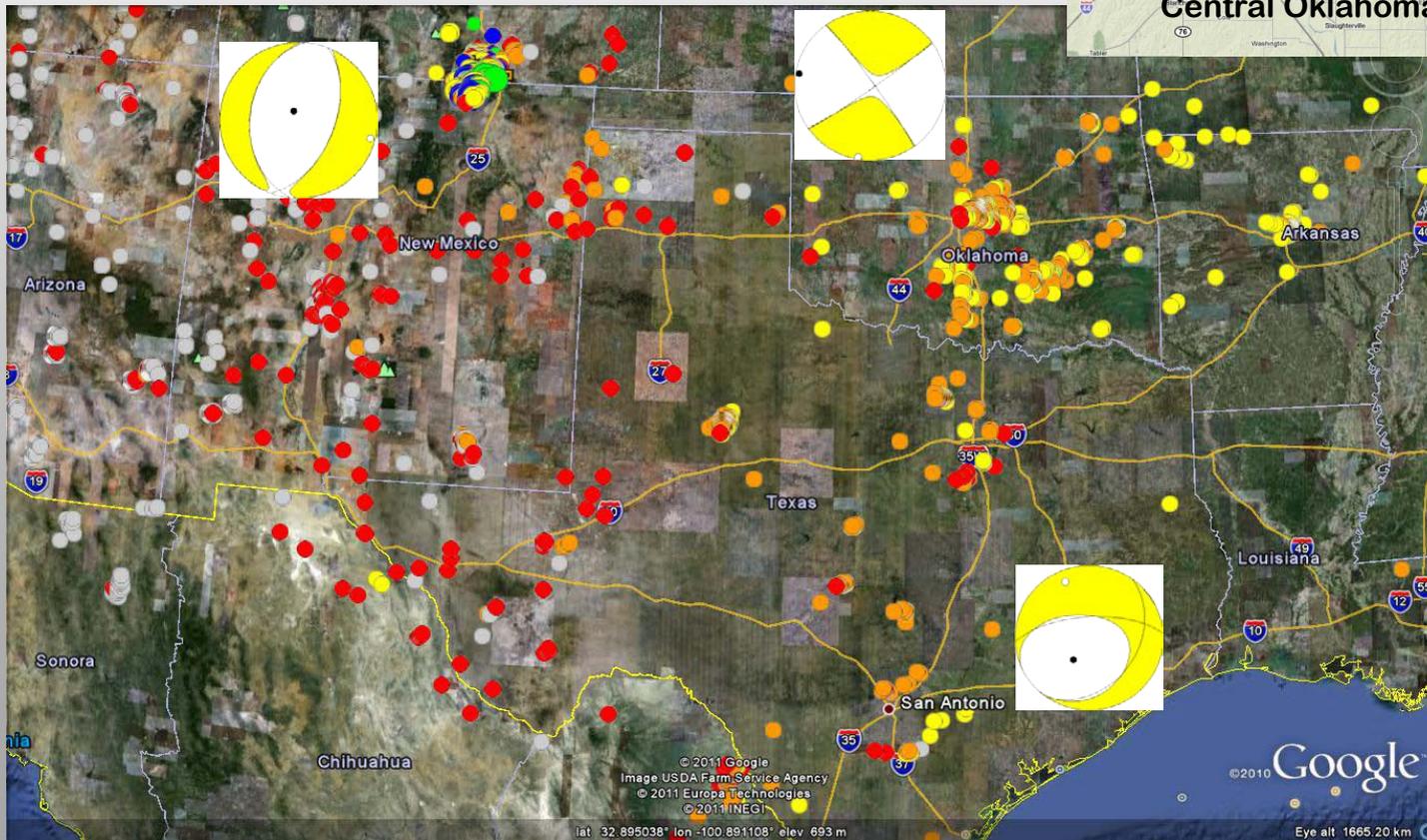
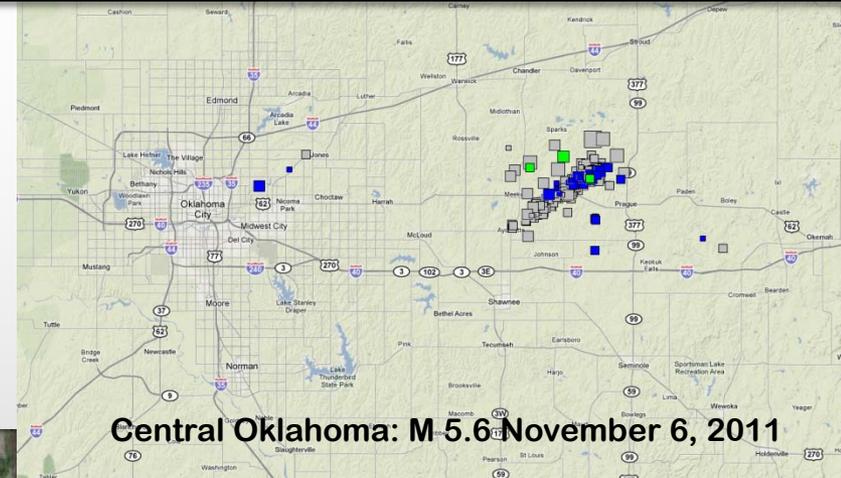
# Number of Earthquakes vs Injection Volume



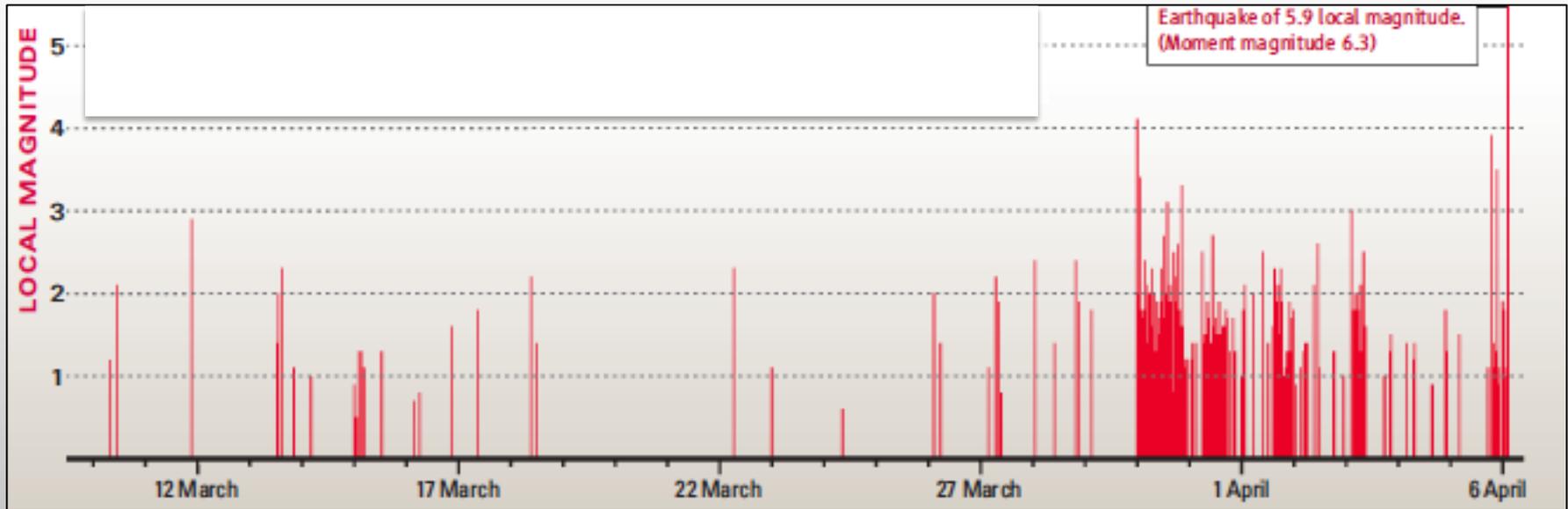


# Recent Earthquakes in the Midcontinent

- Trinidad, CO 8/22/2011 Mw 5.3
- Fashing, TX 10/20/2011 Mw 4.8
- Prague, OK 11/06/2011 Mw 5.6

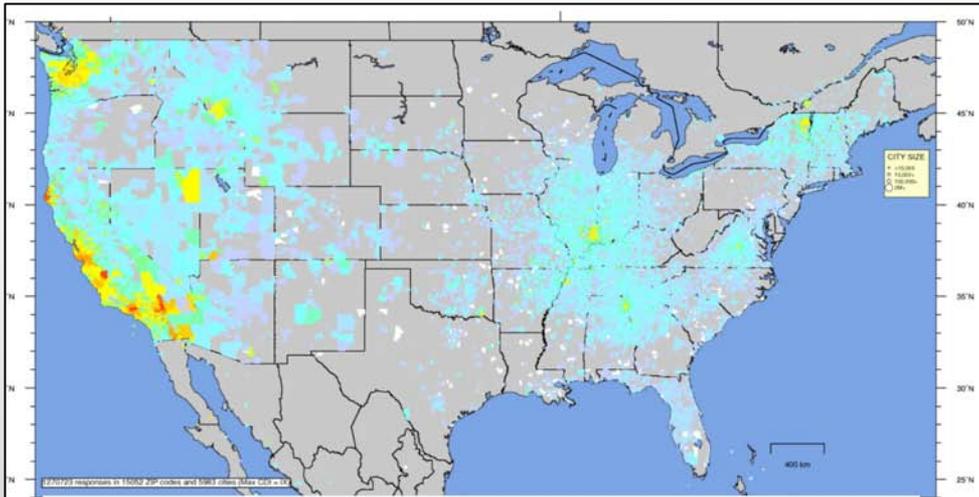


# Earthquake Early Warning (EEW) and Earthquake Operational Forecasting

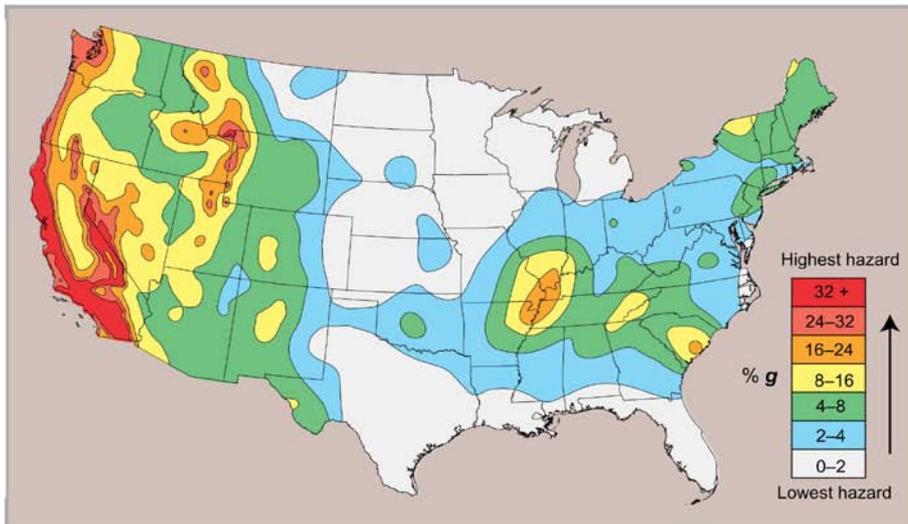


# Seismic Hazard Maps

“Did You Feel It” distribution of intensities 1999-2009



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC. (%g)	<.17	.17-1.4	1.4-3.9	3.9-9.2	9.2-18	18-34	34-65	65-124	>124
PEAK VEL. (cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-18	18-31	31-60	60-116	>116
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+



1996 USGS Hazard map for PGA, 10% in 50 years