



# On Shaky Grounds

## Earthquake Consequences and Preparedness

-Randy Styner,

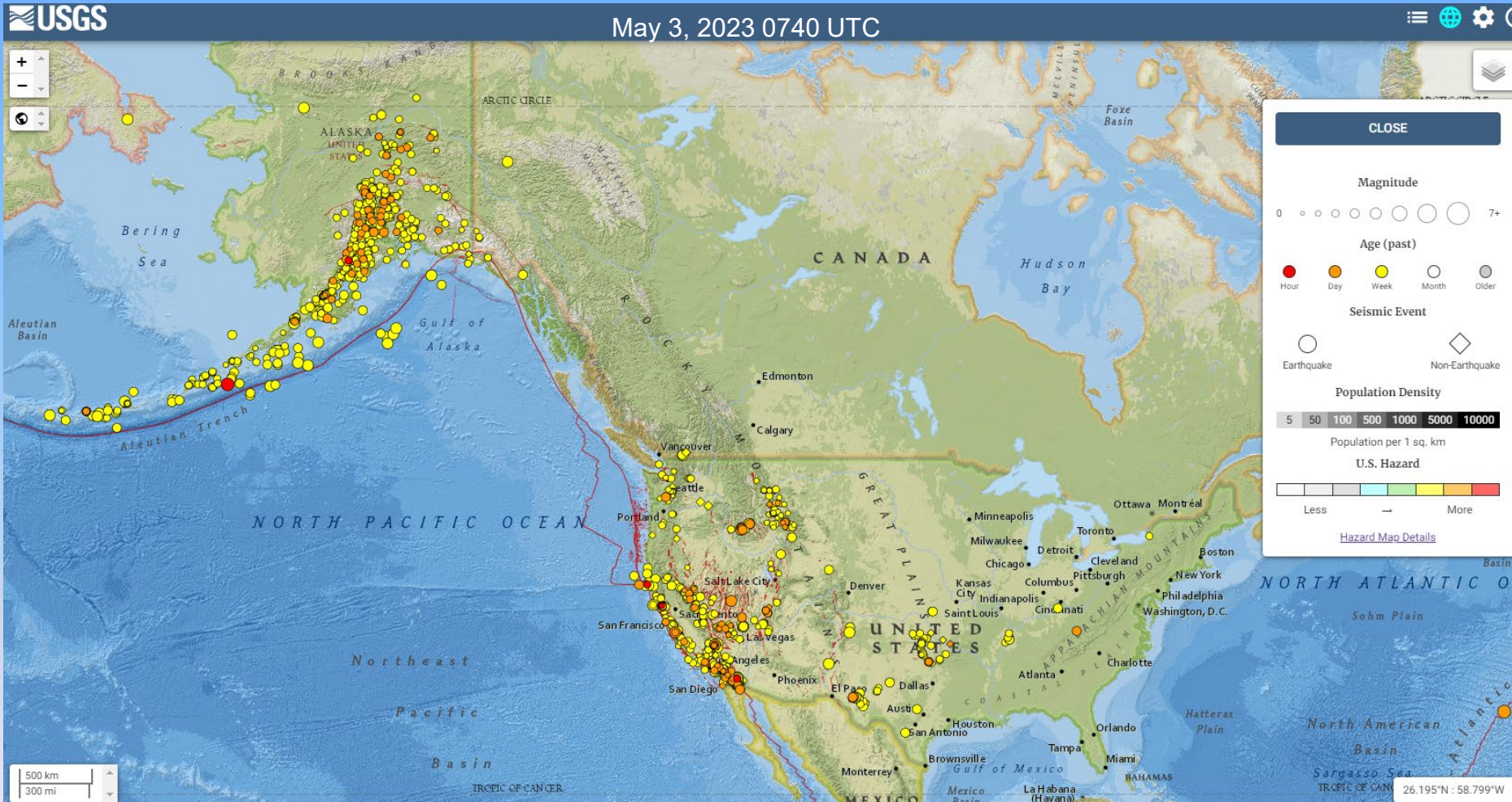
Director of Emergency Management

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# Training Objectives

- Prepare!
- Prepare!!
- Prepare!!!
- And finally,  
    »PREPARE!!!!!!

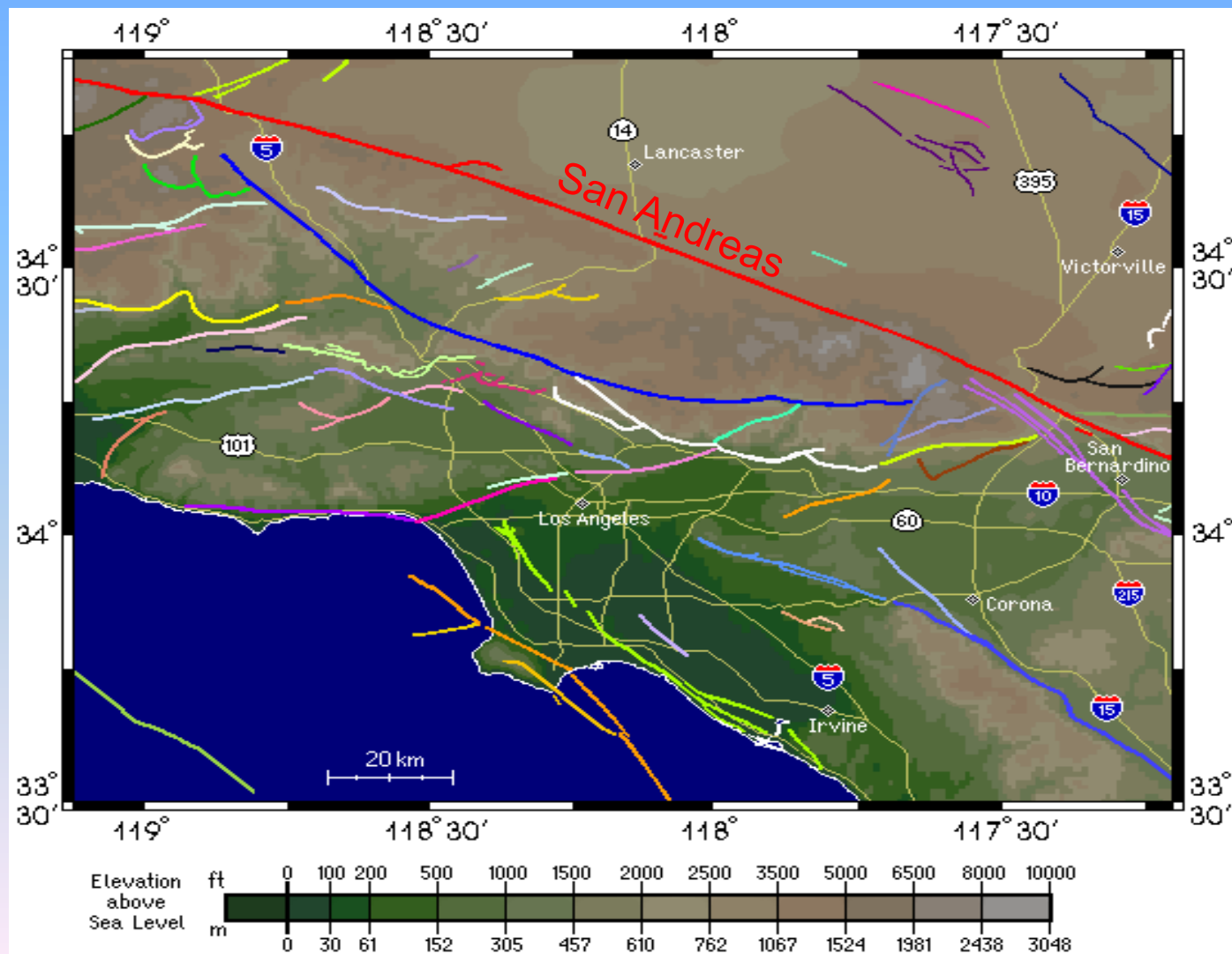
# Earthquakes: An Everyday Occurrence



# Seismic Intensity Scale

Intensity (MMI)	Verbal Description	Magnitude	Witness Observations
I	Instrumental	1 to 2	Detected only by seismographs
II	Feeble	2 to 3	Noticed only by sensitive people
III	Slight	3 to 4	Resembling vibrations caused by heavy traffic
IV	Moderate	4	Felt by people walking; rocking of free standing objects
V	Rather Strong	4 to 5	Sleepers awakened and bells ring
VI	Strong	5 to 6	Trees sway, some damage from overturning and falling object
VII	Very Strong	6	General alarm, cracking of walls
VIII	Destructive	6 to 7	Chimneys fall and there is some damage to buildings
IX	Ruinous	7	Ground begins to crack, houses begin to collapse and pipes break
X	Disasterous	7 to 8	Ground badly cracked and many buildings are destroyed. There are some landslides
XI	Very Disasterous	8	Few buildings remain standing; bridges and railways destroyed; water, gas, electricity and telephones out of action.
XII	Catastrophic	8 or greater	Total destruction; objects are thrown into the air, much heaving, shaking and distortion of the ground

# Local Faults



# San Andreas Fault

**TYPE OF FAULT:** Right-lateral strike-slip

**LENGTH:** 1200 km (746 miles) - 550 km south from Parkfield; 650 km northward

**NEARBY COMMUNITY:** Parkfield, Frazier Park, Palmdale, Wrightwood, San Bernardino, Banning, Indio

**LAST MAJOR RUPTURE:** January 9, 1857 (Mojave segment, 8.0); April 18, 1906 (Northern segment 7.9)

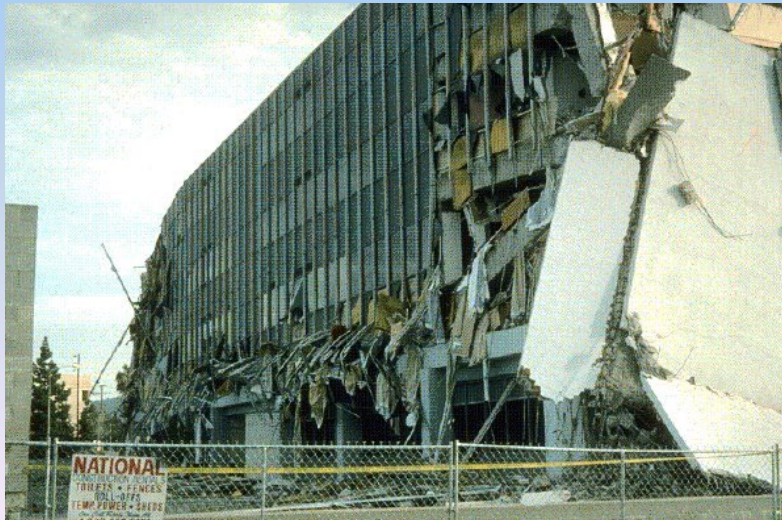
**SLIP RATE:** about 20 to 35 mm per year

**INTERVAL BETWEEN MAJOR RUPTURES:** average of about 140 years on the Mojave segment; recurrence interval varies greatly -- from under 20 years (at Parkfield only) to over 300 years

**PROBABLE MAGNITUDES:**  $M_w$  6.8 - 8.0

# Will it Happen Here?

- Let me ask you..
- Science take
- History



# What will happen?

Shakeout



# The Big One

## Los Angeles

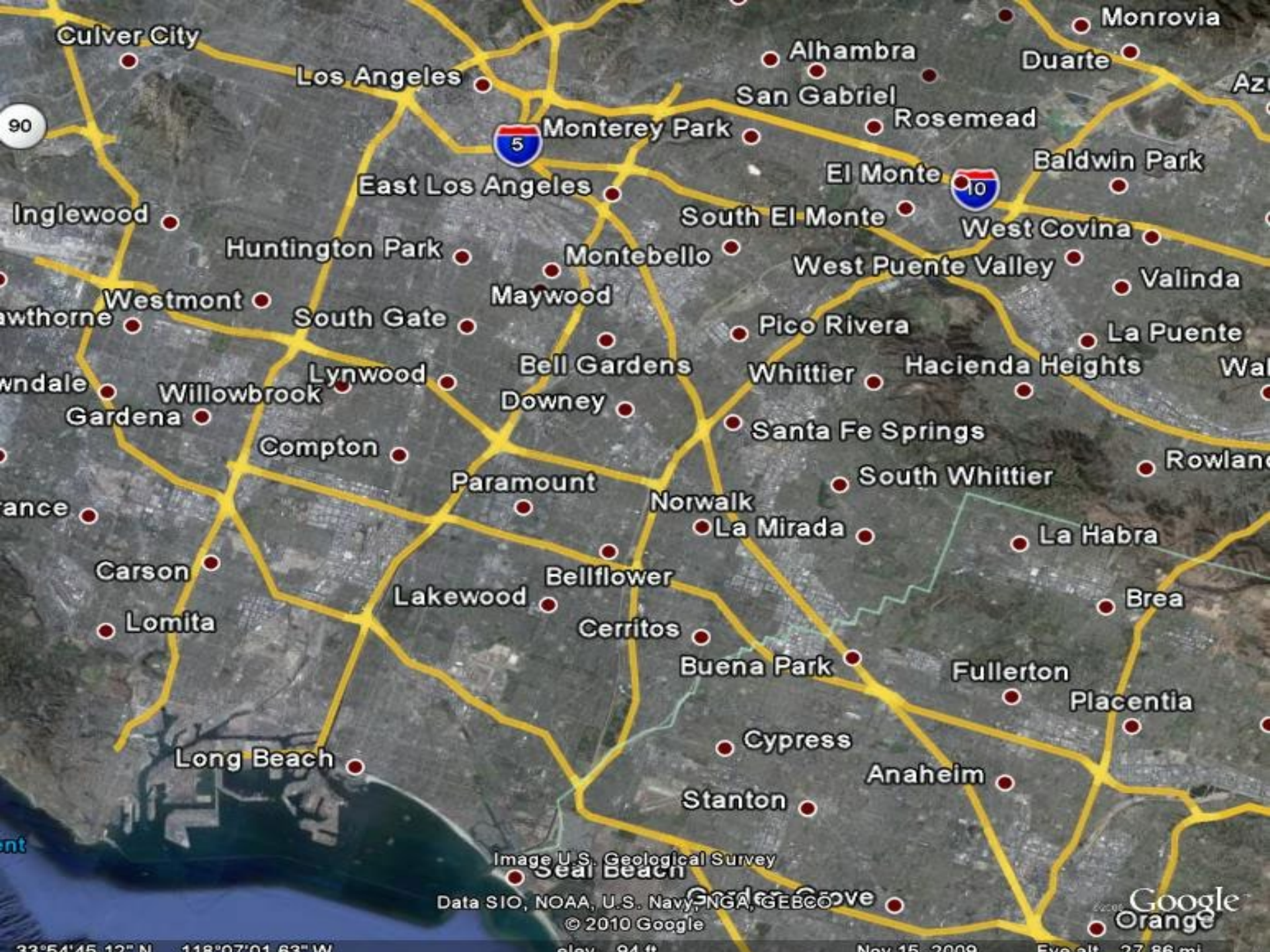
Max displacement: 0.7 m (2 ft)

Max velocity: 0.6 m/s (2 ft/s)

## Watts

Max displacement: 1.2 m (4 ft)

Max velocity: 1.2 m/s (4 ft/s)



90

5

10

Image U.S. Geological Survey

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

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Google  
Orange

33°54'45.12" N 118°07'01.63" W

alt. 94 ft

Nov 15, 2009

Eye alt. 27.86 mi

# Seven Steps to Earthquake Safety:



Source: *Earthquake Country Alliance, 2010*

# #1: Identify

- Secure your space!!
- Conduct a "hazard hunt" to help identify and fix things such as unsecured televisions, computers, bookcases, furniture, unstrapped water heaters, etc.
- Gas Wrench? Get one for you and buy them for all your neighbors for Christmas (have an early Christmas...). The house you save will be yours!

# #2 Plan

- **Get trained** in first aid and in damage assessment techniques (CERT, ARC, etc.)
- Evacuation and reunion plans
- Your out-of-state contact person's name and number
- The location of your emergency supplies
- Likely Red Cross shelter locations
- Other pertinent information?
- Earthquake insurance?

# Comparison of CA Earthquake Authority Available Policies

Policy Type	Homeowners	Condominium Unit Owners
Dwelling/Building Property	\$700,000	\$75,000
Deductible (\$)	\$105,000	\$11,250
Deductible (%)	15%	15%
Building Code Upgrade	\$20,000	NA
Personal Property	\$50,000	\$50,000
Deductible (\$)	\$7,500	\$7,500
Deductible (%)	15%	15%
Coverage for Breakable Items	Optional	Optional
Loss of Use	\$15,000	\$15,000
Loss Assessment	NA	\$50,000
Deductible (\$)	NA	\$7,500
Deductible (%)	NA	15%
Monthly Premium	\$17.17	\$17.17
Annual Premium	\$206.00	\$206.00

Source: Berg Insurance Agency: <https://berginsurance.com/earthquake-insurance/>

# The Big One

## Huntington Beach

Max displacement: 0.7 m (2 ft)

Max velocity: 0.6 m/s (2 ft/s)

# #3 Equip

- **THERE POTENTIALLY WILL BE NO LOCAL WATER IN SO. CAL FOR MONTHS!**
- Get water
- Containerize water
- Store water
- Have water available
- Other supplies too (Fire extinguishers, first aid, food and cooking, can opener, meds, money, tools, pet stuff, generator, fuel, lighting, etc). If you think you may need it, put it in there!
- Get more water!!!



# Water Consequences

- Apart from immediate casualties, the greatest threat to the area is the disruption of water supplies.
- The Los Angeles Aqueduct and the California Aqueduct from the north will both be broken along the San Andreas Fault, and will not be repaired for 36 months.
- The Colorado River Aqueduct may be the only available re-supply (presuming it does not break where the Colorado River Aqueduct crosses the fault farther south).
- Thousands of breaks in the water-supply network with massive leakage.
- Massive shortage of water for fire-fighting.
- Sewage leaks will pollute most waterways and will pose a significant health hazard.

# Other Equipment and Supplies

- Home
- Work
- Community
- Other resources..

# The Big One

## Palm Springs

Max displacement: 1.3 m (4 ft)

Max velocity: 1.3 m/s (4 ft/s)

# #4 Bolster

- Foundation bolts
- Inadequate foundations
- Un-braced cripple walls
- Soft first stories
- Unreinforced masonry
- Vulnerable pipes

# #5 Drop, Cover, and Hold On!!!

Learn it..

Know it..

Live it!!!



# The Big One

## Ontario

Max displacement: 0.8 m (3 ft)

Max velocity: 0.6 m/s (2 ft/s)

# #6 Check it out!!

- Check for injuries and damages that need immediate attention
- Administer first aid
- Identify hazards such as damaged gas, water, sewage and electrical lines
- Look around for other hazards
- Be prepared to report damage and injuries to responders

# #7 Communicate and Recover

- Have and test a communications plan
- Do not rely on cell phones or land lines (have secondary means)
- Turn on your portable radio for information and safety advisories
- If your home is damaged, contact your insurance agent right away to begin your claims process
- For most Presidentially declared disasters, resources will also be available from federal, state, and local government agencies



# Sign up for Zot Alerts!!



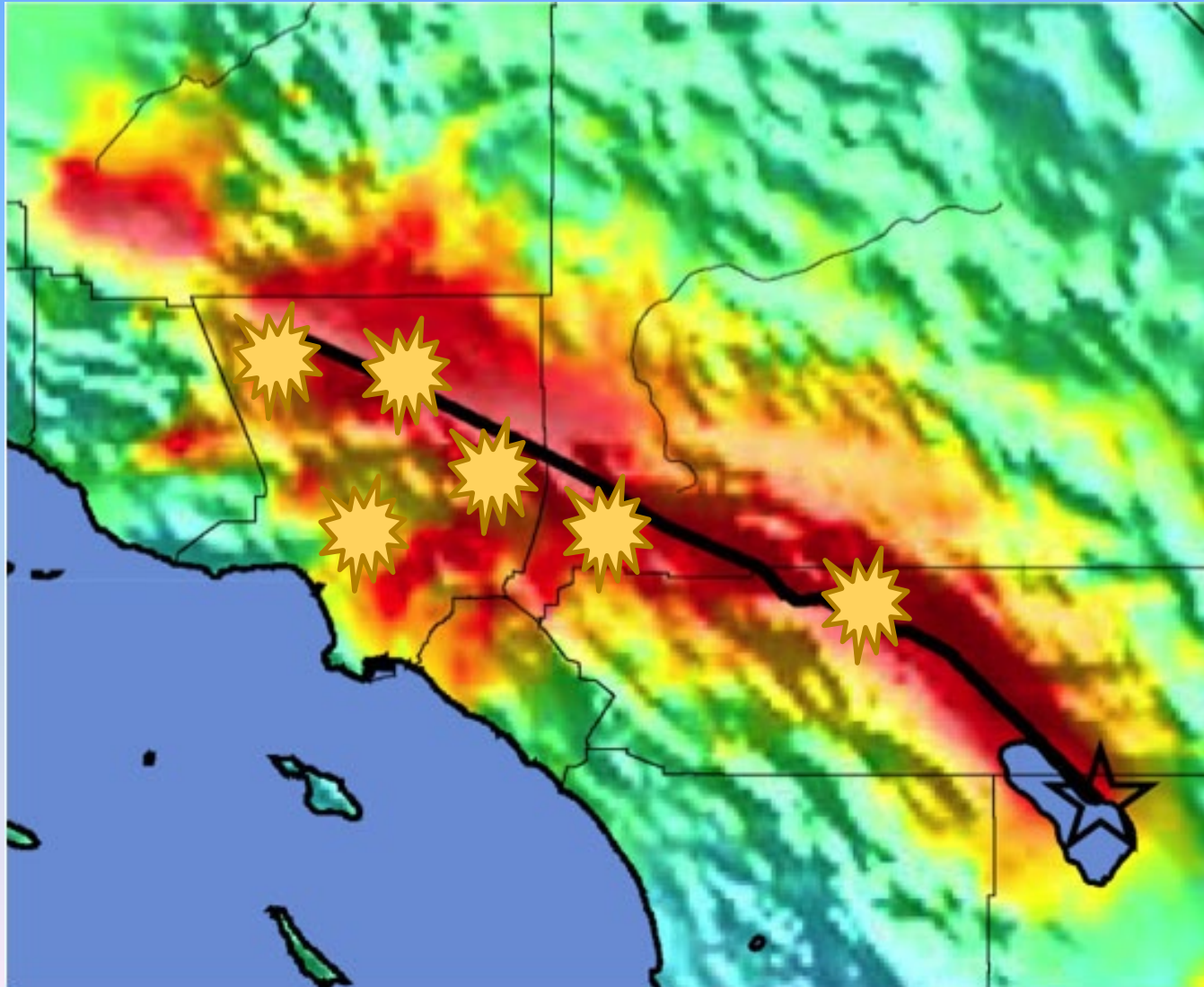
# The Big One

## Cajon Pass

Max displacement: 3.1 m (10 ft)

Max velocity: 1.9 m/s (6 ft/s)

# Evacuation?

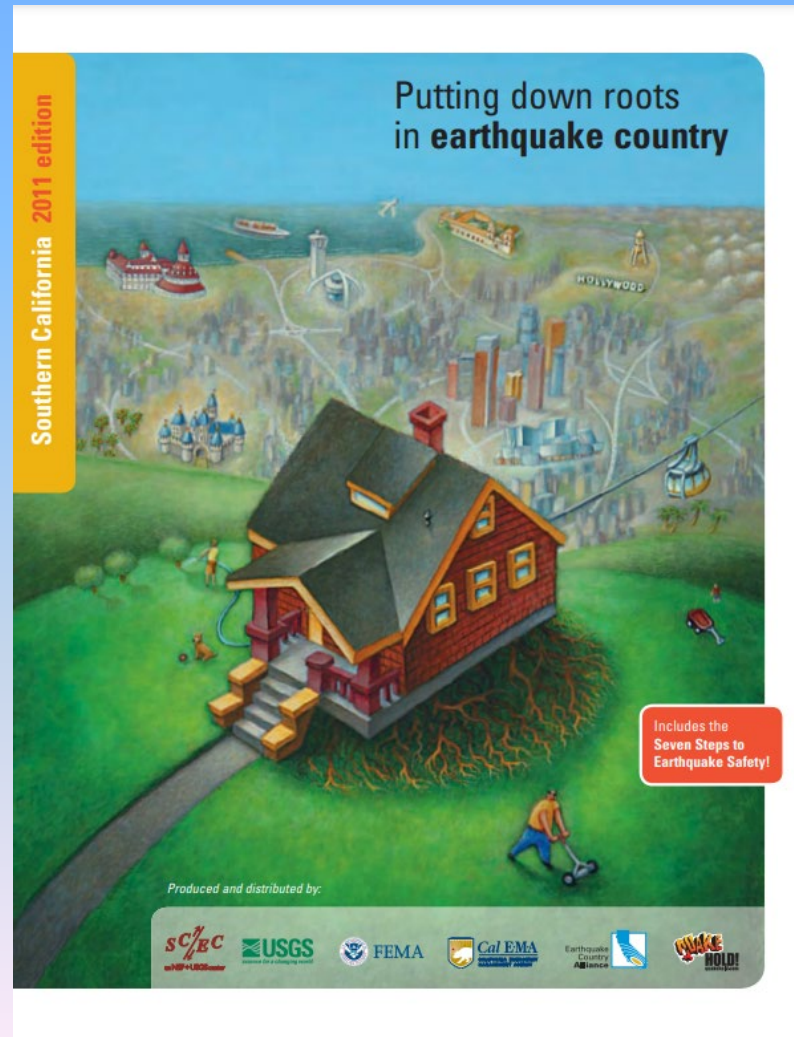


# Evacuation? Where?

- 20 Million people in the LA/Orange County basin
- Total destruction of the I-10 from Indio to L.A., I-15 in Cajon Pass, I-5N from L.A. to Tejon.
- Rte 101 severely damaged or destroyed near Woodland Hills; Rte 14 destroyed in Santa Clarita
- That leaves I-15 & I-5 south to San Diego and eventually the 8 – IF they are passable.
- Face it, we are not going anywhere...

# So. Cal. Earthquake Resources:

- <http://www.earthquakecountry.info/>



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Questions?

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# More Info:

- Earthquake Country Alliance ([www.earthquakecountry.org](http://www.earthquakecountry.org))
- US Geological Survey: ([www.earthquake.usgs.gov](http://www.earthquake.usgs.gov))
- Great California Shakeout ([www.shakeout.org](http://www.shakeout.org))
- Ready.gov ([www.ready.gov/earthquakes](http://www.ready.gov/earthquakes))
- UCI Emergency Management ([www.em.uci.edu](http://www.em.uci.edu))

Thank You!