



California
**Department of
Conservation**

California Geological Survey



Cal OES
GOVERNOR'S OFFICE
OF EMERGENCY SERVICES

Preparing for Earthquakes and Tsunamis Reconnaissance with the use of Scenarios

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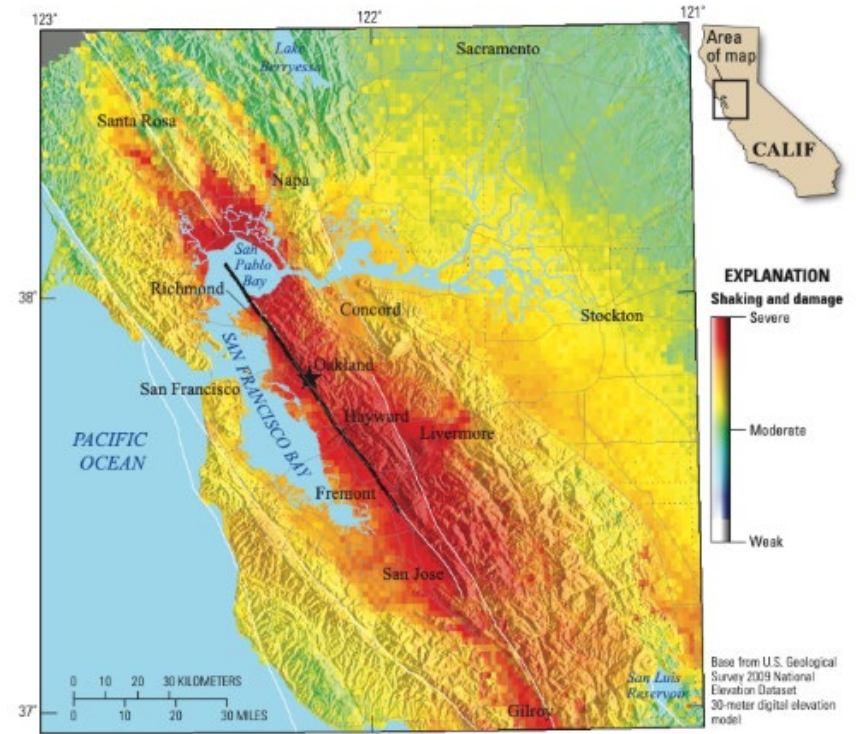
Scenario Importance



California's Recent Scenario Exercises: Haywired Scenario

Scenario information:

- M7.0
- Rupture is 52 miles along the Hayward Fault, across a highly urbanized, commercial, and technologically interconnected region.
- Damage from strong shaking is expected to radiate up to 150 miles along the length of the rupture and beyond, and approximately up to 30 miles away from the fault rupture if not more.



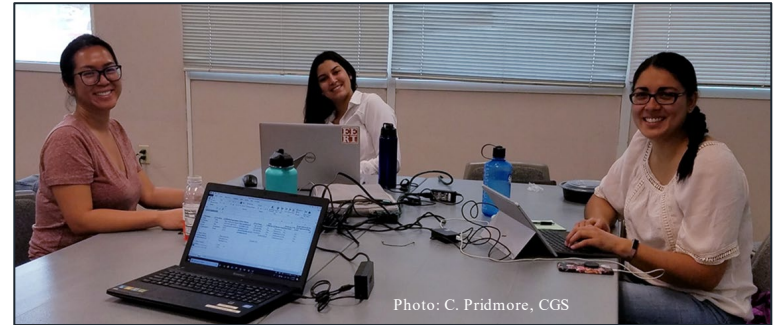
California's Recent Scenario Exercises: Haywired Scenario

Exercise Discussions:

- Multiple clearinghouses
- Communication
- Support needed

Exercise Outcomes:

- Virtual Clearinghouse until we can establish a physical Clearinghouse
- Cal OES Created request forms to ask for needed resources (i.e., communication)
- We still needed to work on ways of sharing data quickly



California's Recent Scenario Exercises: Cascadia Megathrust

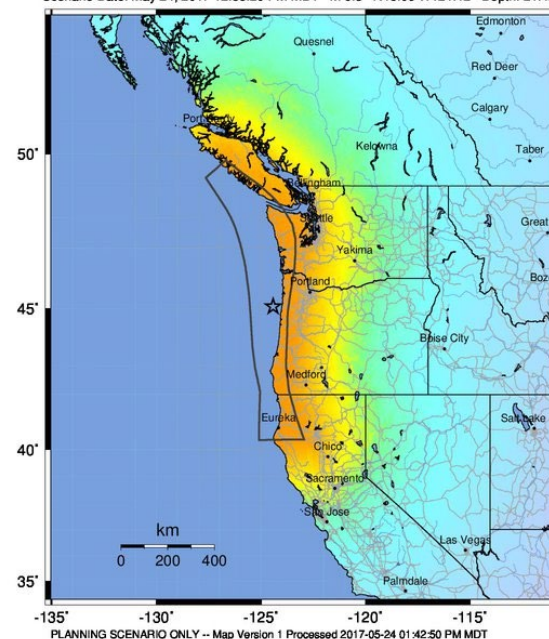
Scenario information:

- M9.3
- Depth 21.4 km
- Rupture of 1,000 km (620 miles)
- 4-6 minutes shaking
- subsidence and/or uplift of coastal areas
- liquefaction, landslides, and tsunamis
- Numerous aftershocks of M7 or greater

New to CA Scenarios

- HAZUS data

-- Earthquake Planning Scenario --
for Cascadia Megathrust - whole CSZ Characteristic largest M branch - Median ground motion
Scenario Date: May 24, 2017 12:58:20 PM MDT M 9.3 N45.06 W124.42 Depth: 21.4km



PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2013)

California's Recent Scenario Exercises: Cascadia Megathrust

Exercise Discussions:

- Clearinghouse activation and communications
- Data acquisition and data sharing
- Sharing of resources across statelines



Exercise Outcomes:

- Communication should start between States ASAP and continue daily
- Need common communication platform
- Data dictionary should accompany shared data
- Concerns about sharing raw data – MOUs?
- Field staff may not be needed but help with logistics
- Regional Clearinghouse
- Determine in advance aerial data collection platforms
- National Guard dependencies
- Meet yearly – working groups/exercise

California Tsunami Program Scenario Exercises



10+
years

State of California

CA Tsunami Program's Annual Tsunami Playbook Response Communications Exercise

- ✓ Distant, regional, and local tsunamigenic earthquakes
 - Cascadia, Kamchatka, northern Chile, northern Mariana Trench, Alaska, southern Kuril, southern Japan, etc.
- ✓ ~200 PARTNERS include: Cal OES Seismic Hazards, CA Geological Survey, 20 Coastal CA County EMs, Harbormasters/Port officials, Cal OES Region reps., USMC, US Navy, USCG, CA Parks, CA DWR, CA NWS WFOs, CA DOT, Cal State Universities, CA Tribes

15+
years

State of California

CA Tsunami Program's Internal Tsunami Response Exercises

- ✓ Distant and local tsunamigenic earthquakes
- ✓ INTERNAL PARTNERS include:
 - Cal OES- Seismic Hazards group, CA State Warning Center, CA SOC, Cal OES Regions
 - California Geological Survey (CGS) Seismic Hazard Tsunami Unit
 - CA National Weather Service Weather Forecast Offices (Eureka, Monterey, Oxnard, San Diego)



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California Tsunami Program Scenario Exercises



CA Tsunami Program Workshop/Exercise Support

- ✓ **Distant, regional, and local tsunamigenic earthquakes**
 - Tsunami scenario(s) are selected based on our partner's exercise objectives
- ✓ **Short List of Supported PARTNER WORKSHOP/EXERCISES:**

- US Navy Region Southwest "Citadel Rumble"
- US Coast Guard (PACAREA, D11 & Sectors)
- Santa Cruz (County/City, Central Fire, SC Harbor)
- Port of San Diego (Unified Port, County, SD Bay Cities)
- CSU Tsunami Functional Exercise "CSUNAMI"
- Cal Guard & Cal OES Tsunami "JAHHAX" exercise
- Monterey County TTXs
- Humboldt County TTXs & functional exercises
- Redwood Coast Tsunami Workgroup
- Multi-agency "BEACON" exercise (EQ & tsunami)



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Questions?