INFORMATION BRIEFING Earthquake Scenarios & Seismic Policies



Michael Germeraad ABAG | MTC 16% Southern Green Valley

San Andreas

8%

کر Hayward

33%

San Gregorio

Information adapted from USGS Fact Sheet 2016-3020

Maacamas

22%

: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNE3/Alrous DS, USDA, USGS, AerodRID, IGN, and tite GIS <u>User Community</u>

6%

Calaveras

26%

Mainshock

- 7.0 earthquake
- April 18, 2018, at 4:18 p.m.
- Wind is mild
- No rain, average temperature
- Rupture starts under Oakland, runs North to San Pablo Bay & South to Fremont (53 miles)
- 2 meters (6.5 feet) of fault offset

Shaking Intensity MMI < 5 - Light MMI 6 - Moderate MMI 7 - Strong MMI 8 - Very Strong MMI 9 - Violent

Data Source: B. Aagaard et al. (2010)

Aftershocks

Next two years:

- 16 registering magnitude 5 or greater
- Up to 30 miles from the Fault
- Some ground shaking stronger than the mainshock

Aftershocks Earthquake Magnitude

•	2.5 - 3.0
٠	3.0 • 3.9
•	4.0 - 4.9
	5.0 - 5.9
\bigcirc	6.0 - 6.9

Data Source: USGS (2015)

Fire

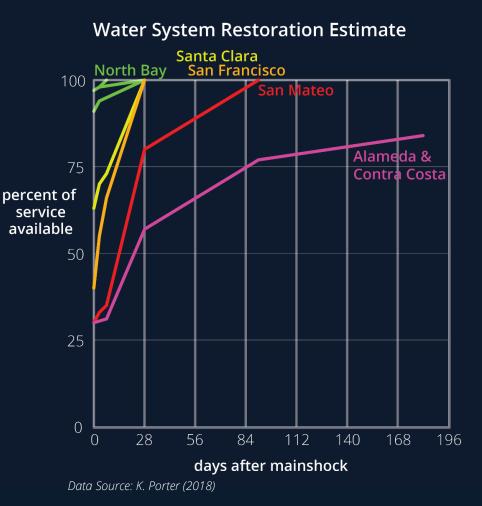
- Over 400 ignitions occur simultaneously
- Fire services overwhelmed
- Water systems disrupted
- Fire fighting difficult or impossible
- Fires spread

Fire Losses in millions of dollars 1 - 10 10 - 50 50 - 100 100 - 500 500+

Data Source: C. Scawthorn (2018)

Water System Impacts

- Shaking, liquefaction, and fault rupture results in extensive water main breaks
- Water system failures make fire fighting difficult or impossible
- Chart shows multi-month restoration timelines for some Counties



Building Damage

- 50% extensively or completely damaged
- \$43B in damage
- Fires double total to \$80B
- Comparison:
 - 1989 Loma Prieta quake totaled \$12B¹
 - 2017 North Bay Fires totaled ~\$10B
 - ¹ adjusted to current dollars

undeveloped land
0 - 5%
5 - 10%
10 - 20%
20 - 30%
30 - 40%
40 - 50%
more than 50%

Data Source: Seligson Consulting (2018)

How can we work together? bayareametro.gov

HayWired Scenario

Objectives

- Advance knowledge of, and inform action to reduce earthquake risks.
- Help build community capacity to respond and recover.
- o Improve understanding of earthquake early warning.
- Educate about building code performance and public perception.
- Facilitate conversations about utility lifeline restoration interdependencies.

Resilience Policies

- 1. <u>Survey existing buildings</u> and enact retrofit standards to save lives and preserve housing.
- 2. Expand financing measures to support resilience initiatives.
- **3.** <u>Retrofit the California Building Code</u> to provide immediate occupancy standards <u>for all new construction</u>.
- 4. <u>Convene a Regional Lifelines Council</u> to address interdependencies among cities, special districts, and private utilities.