

Seismic Mitigation

A presentation from our state agency partners sharing the latest on hazard mitigation for seismic hazards.

INTRODUCTIONS

- Wendy Bohon, DOC
- Jose Lara, Cal OES
- Janiele Maffei, California Residential Mitigation Program
- Mark Benthien, ECA



California
**Department of
Conservation**
California Geological Survey

Seismic Hazards

Dr. Wendy Bohon

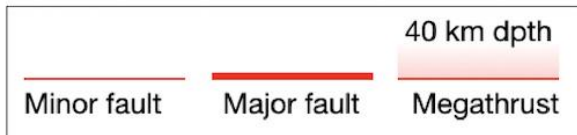
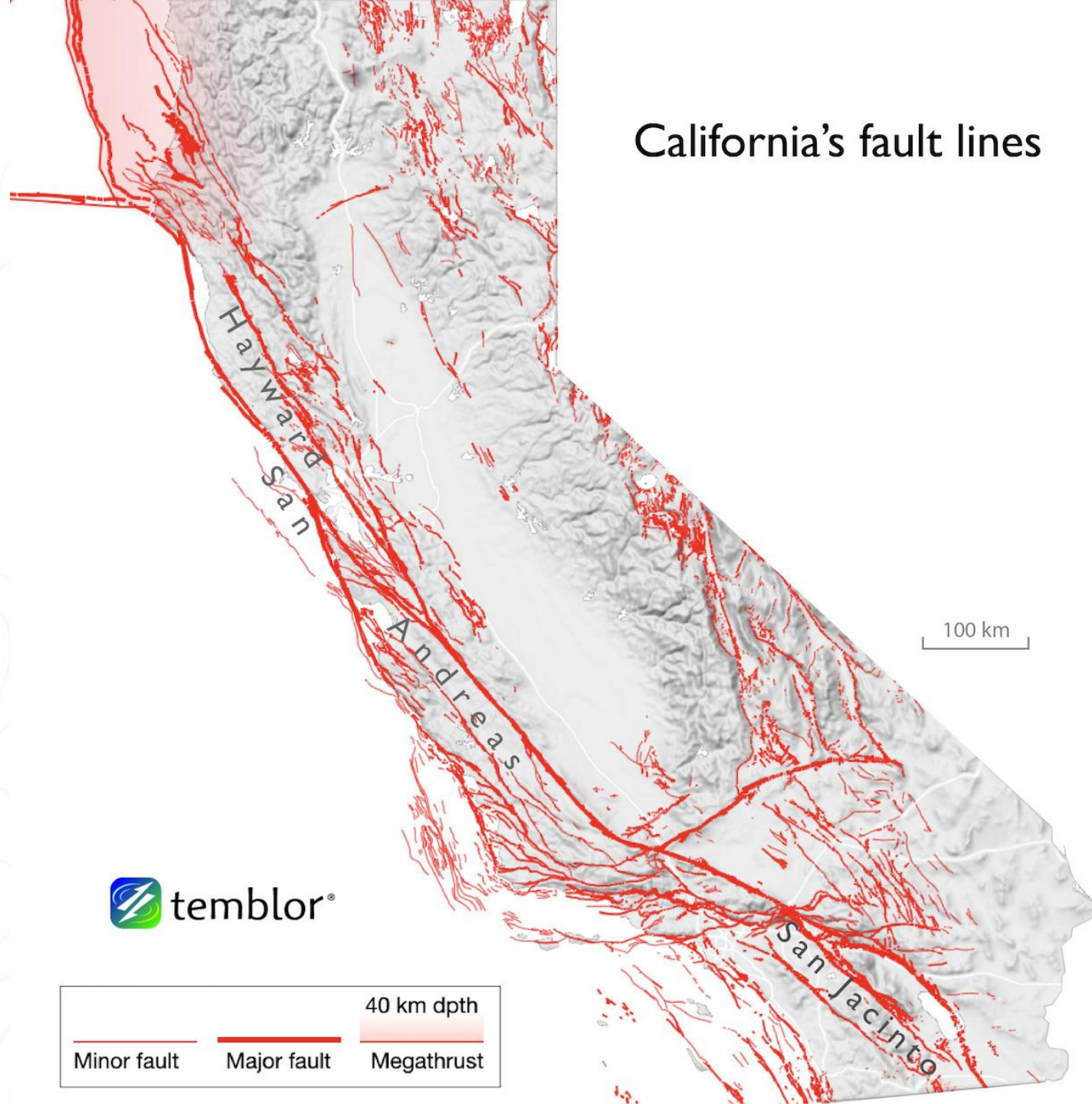
California Geological Survey

Branch Chief

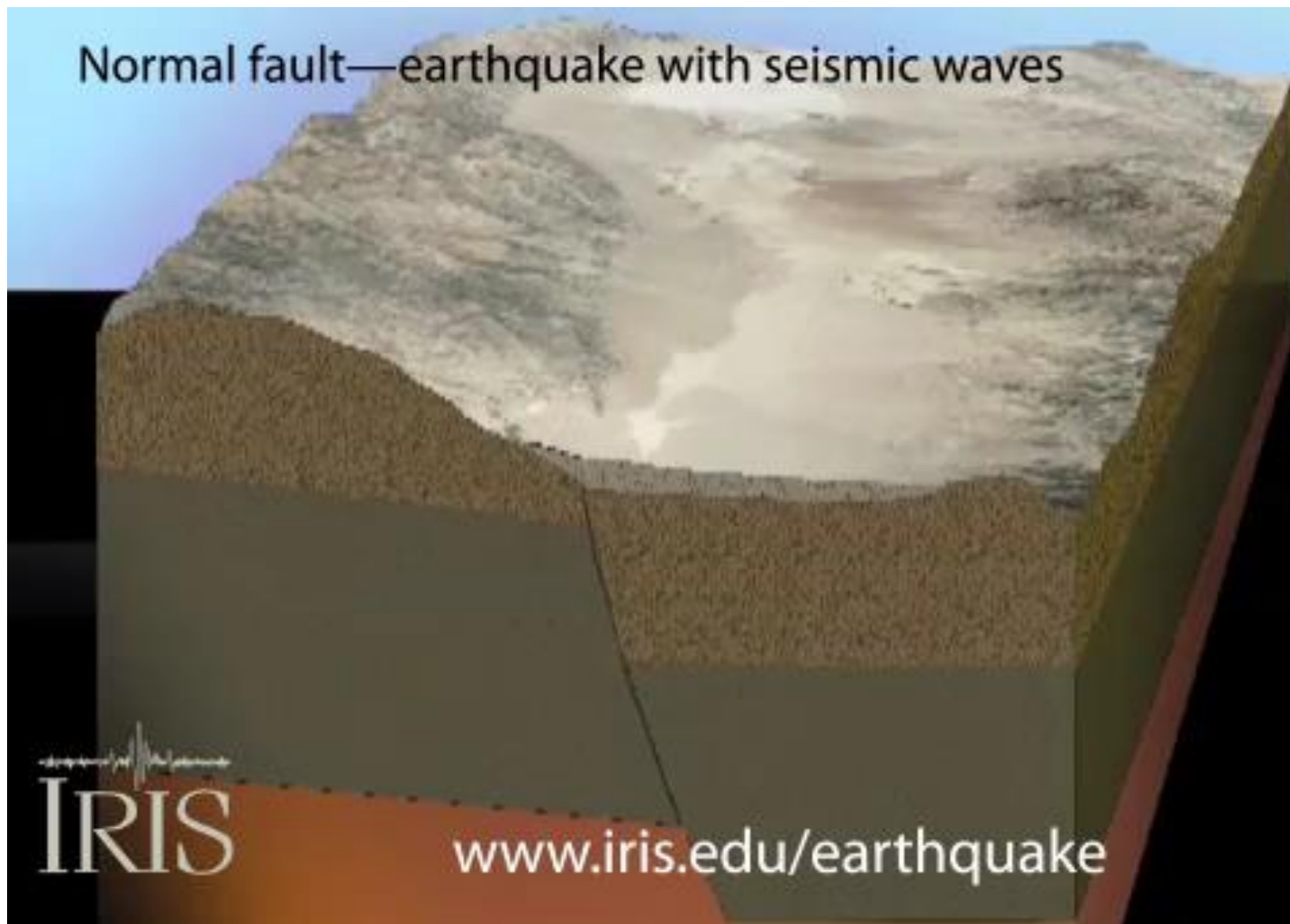
Seismic Hazards & Earthquake Engineering



California's fault lines



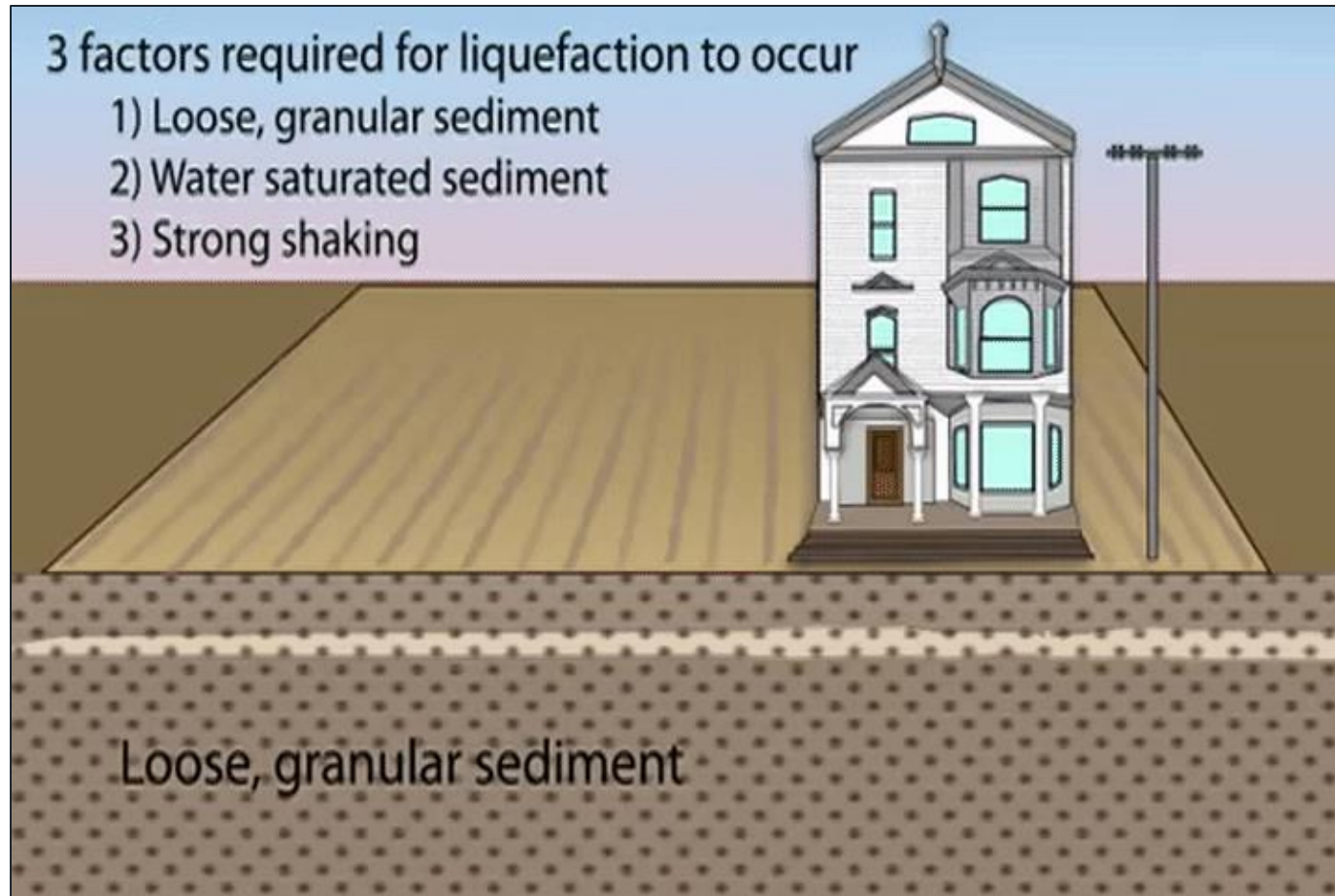
Normal fault—earthquake with seismic waves



Ground Shaking



Liquefaction



Temporary loss of strength in saturated sands/soils due to shaking

Requires:

- Loose sand, silt or gravel
- High groundwater (<50' deep)
- Moderate to strong ground shaking (~M5.5+)

Most common near rivers, lakes, marshy areas.

Earthquake-Induced Landslides

Landslides are caused when the strength of the hillslope materials is overcome by the forces from gravity and earthquake shaking.

It requires:

- Steep slopes
- Weak geologic materials
- Moderate to strong ground shaking (~M5.5+)



1971 San Fernando Earthquake

- Date: Feb 9, 1971
- Magnitude: 6.6
- Deaths: 64
- Damage: ~\$500 million

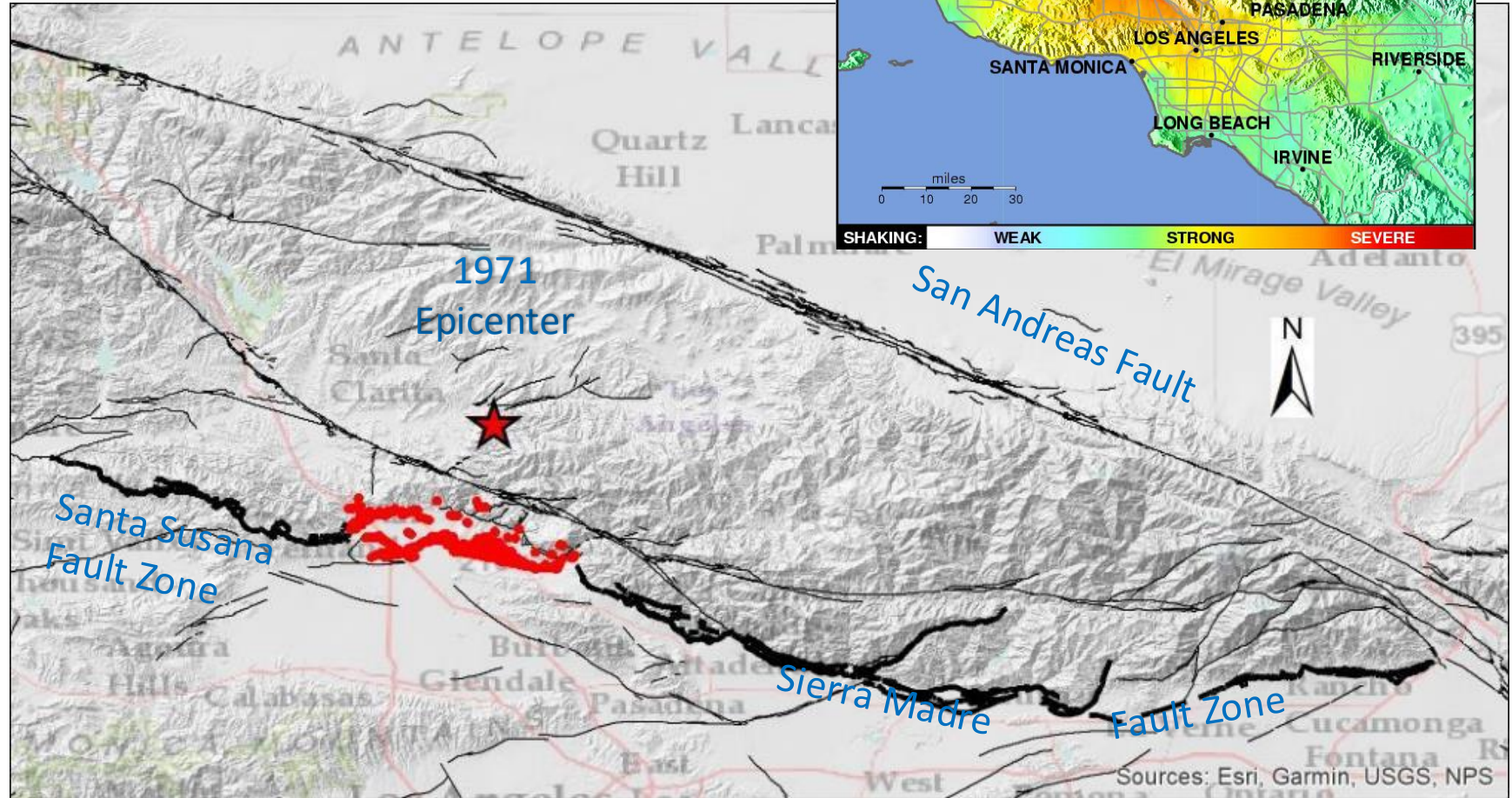
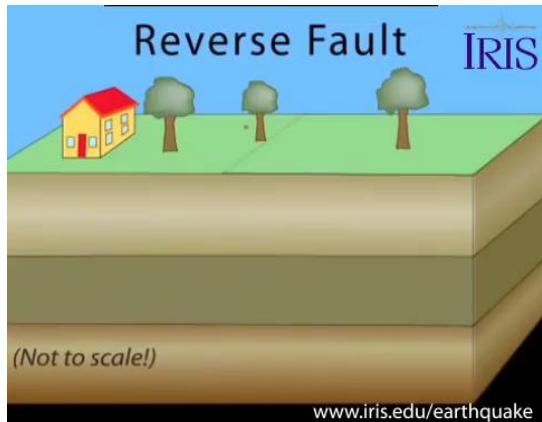


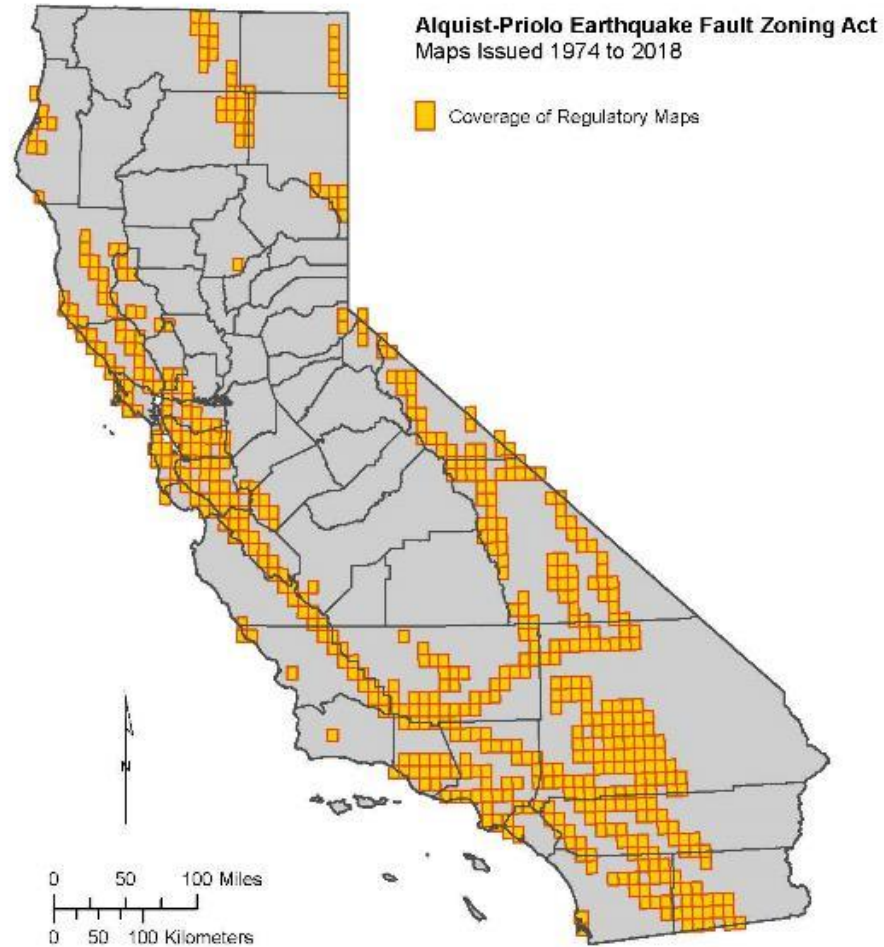


Photo: AP Photo/Wally Fong

Photo: U.S. Geological Survey

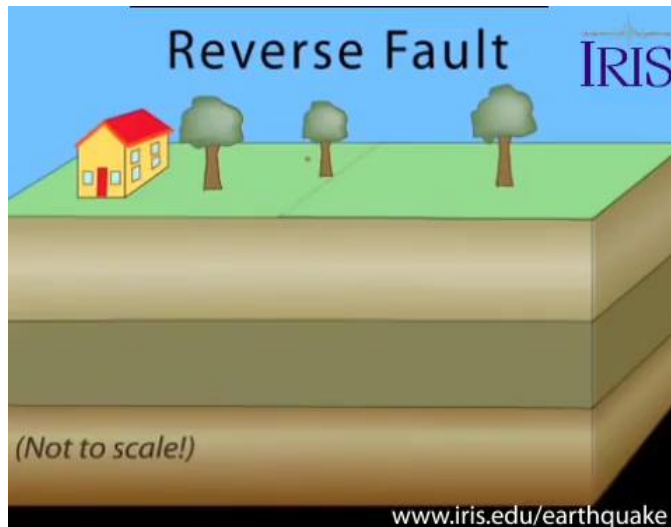
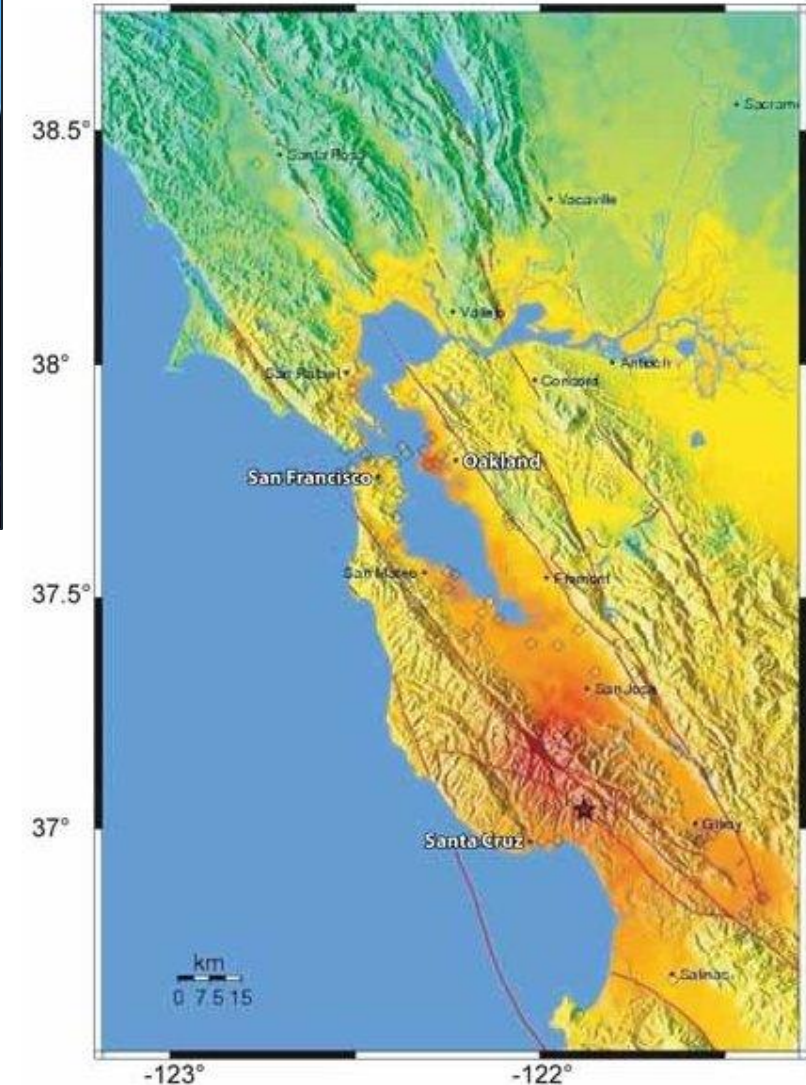


Alquist-Priolo Fault Zoning Act



1989 Loma Prieta Earthquake

- Date: Oct 17, 1989
- Magnitude: 6.9
- Deaths: 63
- Damage: ~\$6 billion



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
MODIFIED MERCALLI INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Seismic Hazards Mapping Act

Seismic Hazards Mapping Act



California State Legislature

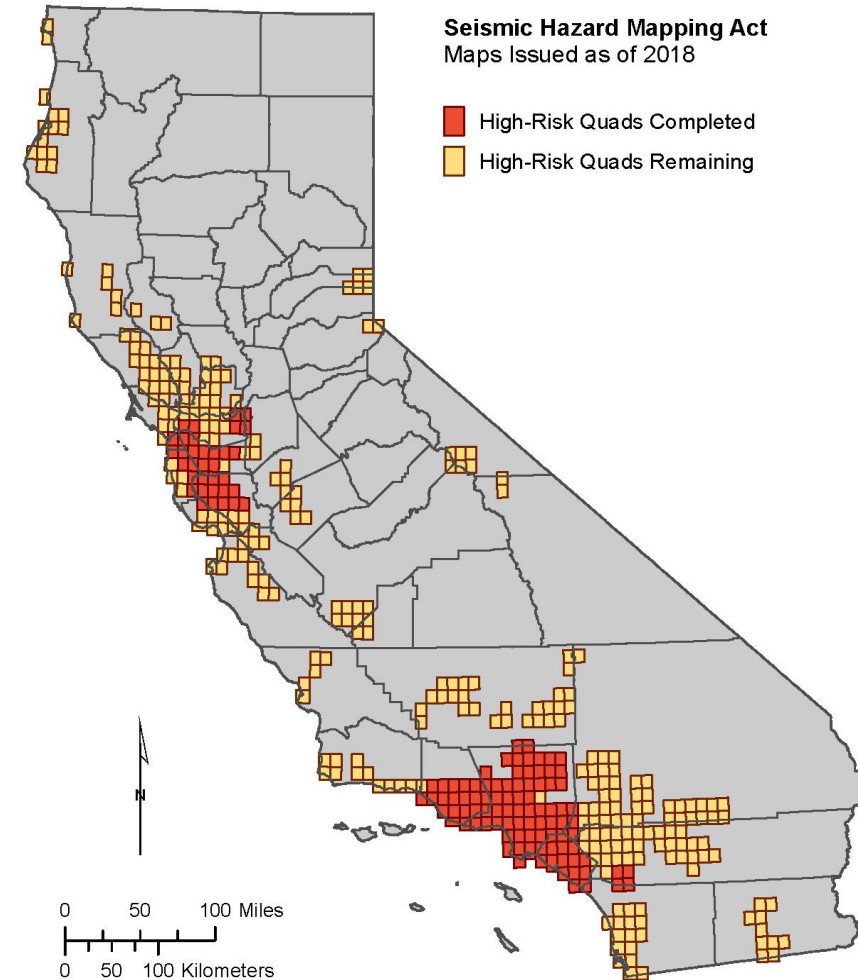
Full name An act to amend Sections 2621.9 and 2622 of, to amend, repeal, and add Sections 2705 and 2706 of, and to add Chapter 7.8 (commencing within Section 2690) to Division 2 of, the Public Resources Code, relating to seismic safety, and making an appropriation therefor.

Introduced March 1, 1990

Assembly voted August 31, 1990 (77-0)

Senate voted August 31, 1990 (39-0)

Signed into law September 21, 1990



CGS Information Warehouse Map Portal



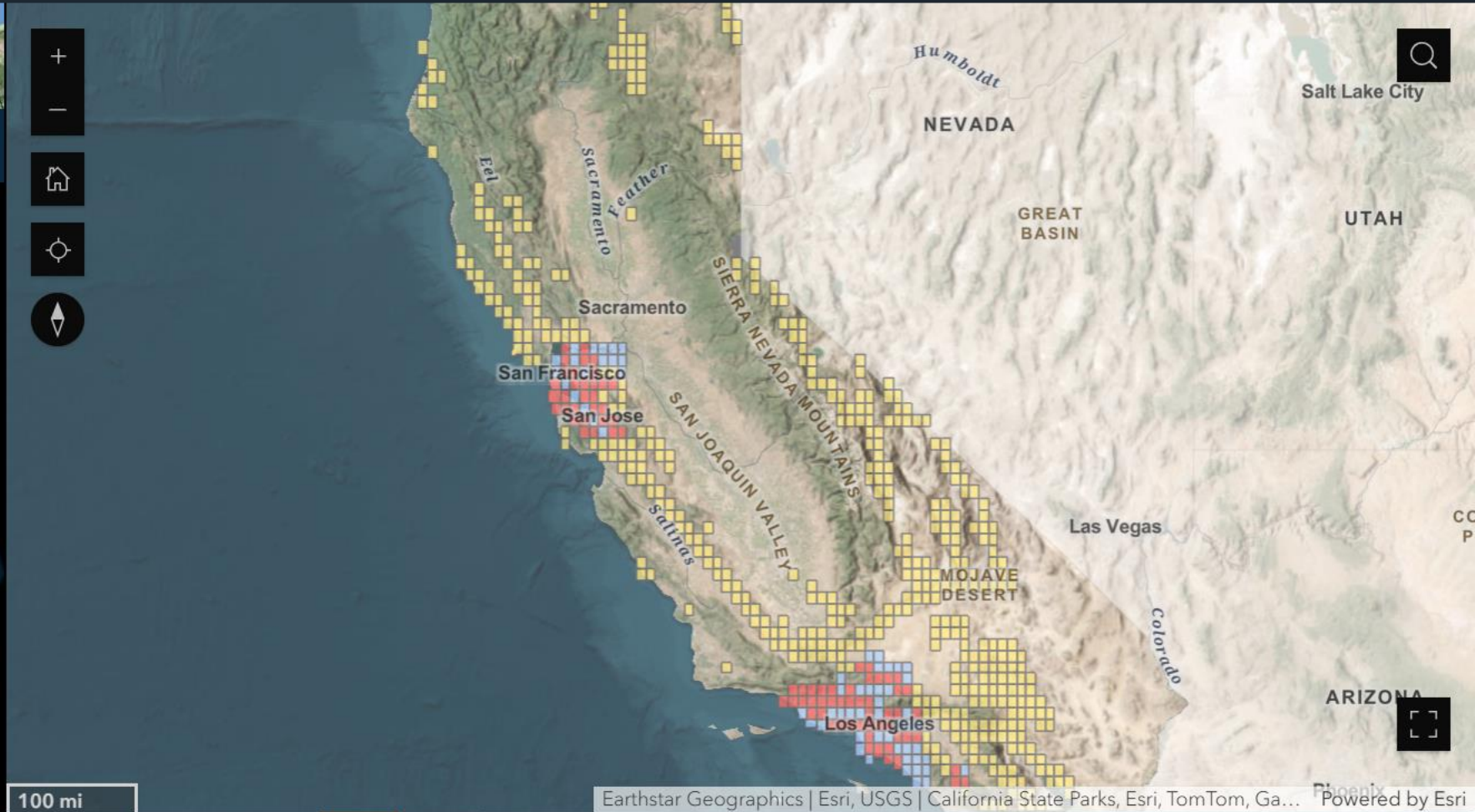
Earthquake Zones of Required Investigation Maps and Reports



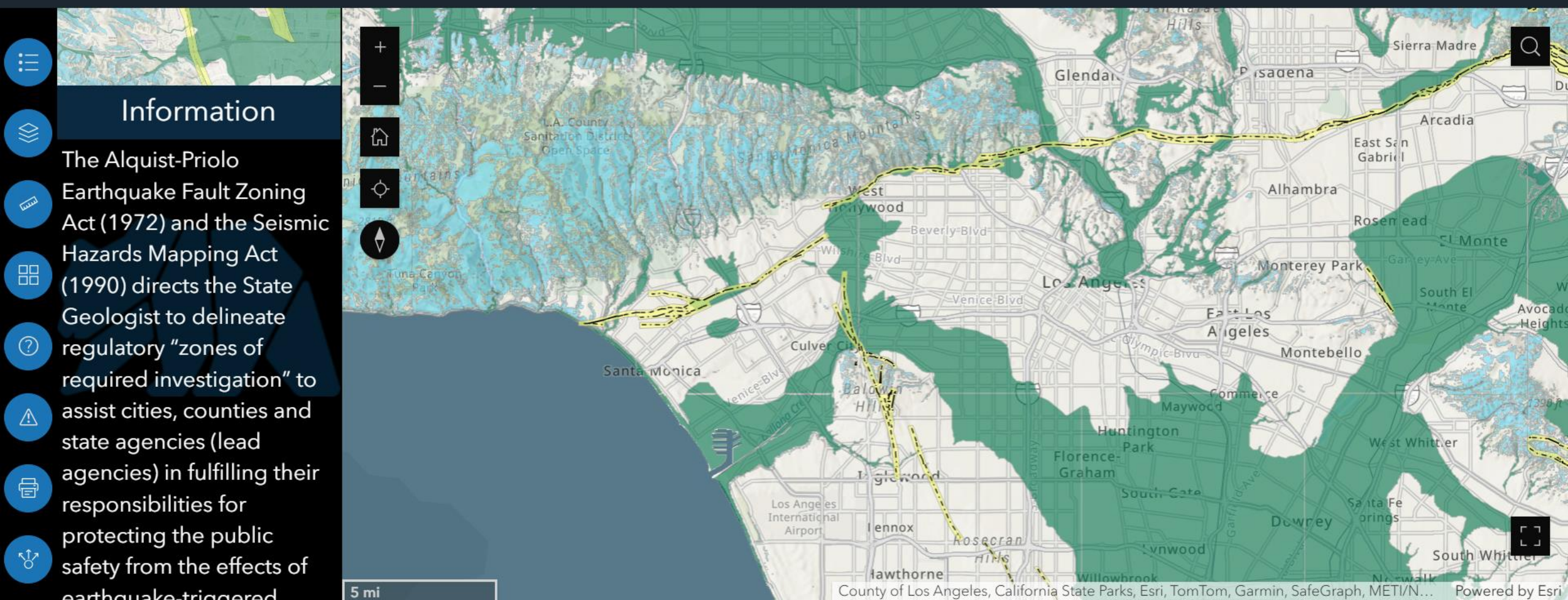
Information

Use this app to find and download CGS Earthquake Zones of Required Investigation Maps (EZRIM), Fault Evaluation Reports (FER), and Seismic Hazard Zone Reports (SHZR). These publications provide information regarding official earthquake fault zones, liquefaction zones, and earthquake-induced landslide zones.

The Alquist-Priolo Earthquake Fault Zoning Act (1972) and the Seismic Hazards Mapping Act (1990) direct the State Geologist to delineate regulatory "Zones of Required Investigation" to



Earthquake Zones of Required Investigation





Address: 7871 HILLSI...
1 of 4

APN	5551004010
City	LOS ANGELES
Address	7871 HILLSIDE AVE
Fault Zone	All or a portion of this parcel LIES WITHIN an Earthquake Fault Zone.
Liquefaction Zone	This parcel is NOT WITHIN a Liquefaction Zone.
Landslide Zone	All or a portion of this parcel LIES WITHIN a Landslide Zone.

EARTHQUAKE
WARNING
CALIFORNIA



California Office of Emergency Services
Seismic Hazards Branch

2024



Seismic Hazards Branch

Earthquake Early Warning

- The California Earthquake Early Warning (EEW) System uses the latest technology to provide individuals with an earthquake warning as soon as shaking is detected by ground motion monitoring.
- EEW system is country's first publicly available, statewide warning system that could provide life-saving seconds of notification.
- Earthquake alerts are triggered for seismic events of M4.5 or greater.
- The system triggers automated actions in public utilities and infrastructures, such as slowing down trains and opening firehouse doors.

Earthquake, Tsunami, & Volcano Program

- **Earthquake Program:** Promotes efforts to reduce earthquake risks
 - Strengthening resilience and reducing vulnerabilities to seismic hazards across California
- **Tsunami Program:** Enhances tsunami planning, preparedness, and hazard mitigation among coastal communities
 - Seeks funding support from the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) Tsunami Activities Grant Program
- **Volcanic Program:** Promotes volcanic awareness, planning, and preparedness in vulnerable areas within California

Mitigation is Our Mission

- Cal OES Seismic Hazards Branch Mission is to foster a culture of resiliency in California
- Goal is to implement tools and practices, and promote policies that strengthen seismic hazards resiliency.



Why Mitigate?

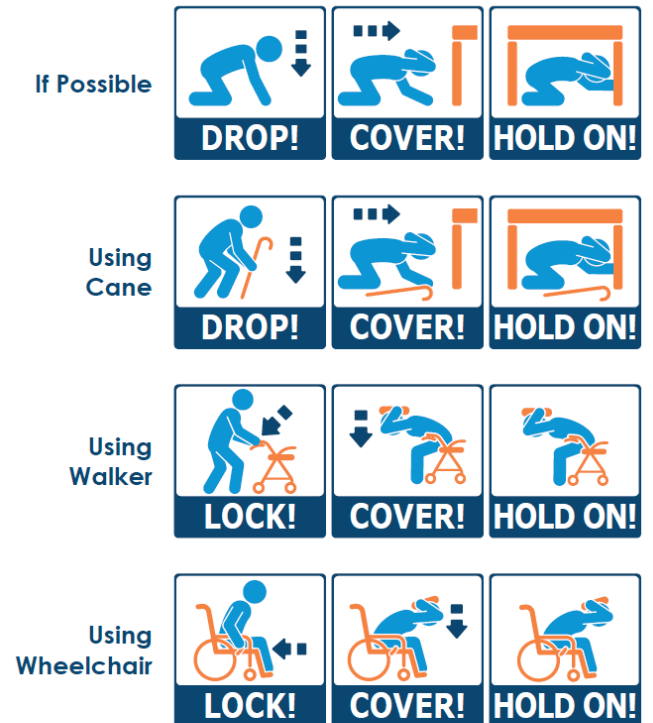
- Napa Earthquake (Aug. 2014)
 - Woman struck by her television
 - \$4 strap would have saved her life
- San Simeon Earthquake (Dec. 2003)
 - Two people ran outside
 - Struck by falling bricks
 - Drop, Cover, Hold On would have saved these lives
- Northridge Earthquake (Jan 1994)
 - 55% of injuries caused by falling furniture or objects
 - 1% of injuries caused by building damage
 - Many injuries caused by people falling or other dangerous actions



Importance of Mitigation

- Most injuries during an earthquake:
 - People fall while trying to walk during shaking
 - People are hit by falling, flying or sliding household items – nonstructural items
 - People are struck or trapped by collapsing walls or other building parts during larger earthquakes.

If You Feel Shaking or Get an Alert:



EarthquakeCountry.org/step5



Strengthening Critical Community Resources



- Cal OES Earthquake Program funds the Disaster Resistant Business Toolkit (DRBTW) Workgroup to provide technical support to critical community resources
- DRBTW Facilitates structural and nonstructural assessments
 - Current Project: Food Banks
 - HMG applications in process to fund mitigation opportunities identified during assessments
 - Future Project: Independent Living Centers

Seismic Hazard Mitigation



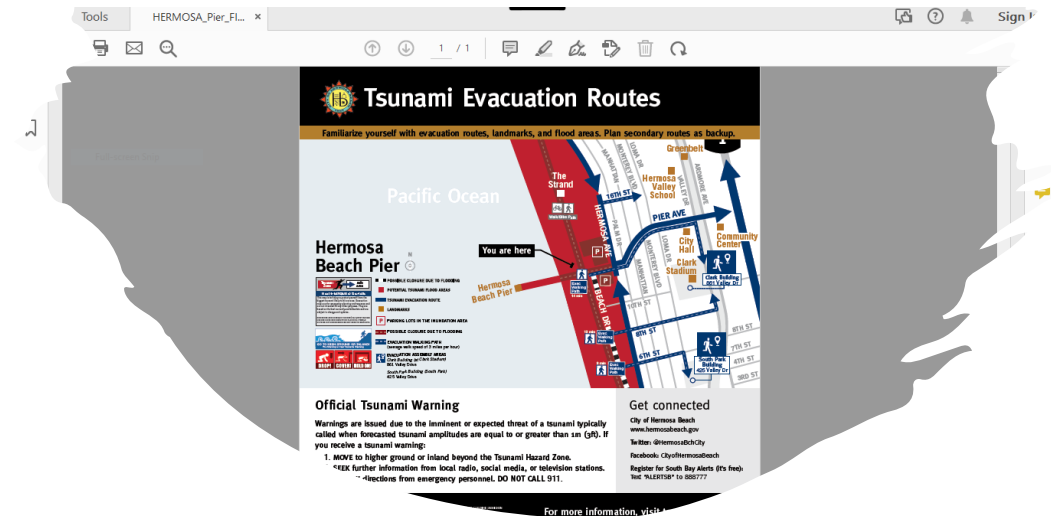
- Mini Awards – Statewide California Earthquake Center/Earthquake Country Alliance Project
 - Funded by Cal OES via FEMA NEHRP Grant
 - Non-structural Mitigation (Straps, latches, putty, etc.)
 - Expanded to Year-round Program
 - Bolt bookcases to wall
 - Secure water heaters
 - Strap television/secure artwork
 - Secure valuables/breakable items
 - Store equipment/supplies in safe and accessible location

Tsunami Hazard Mitigation

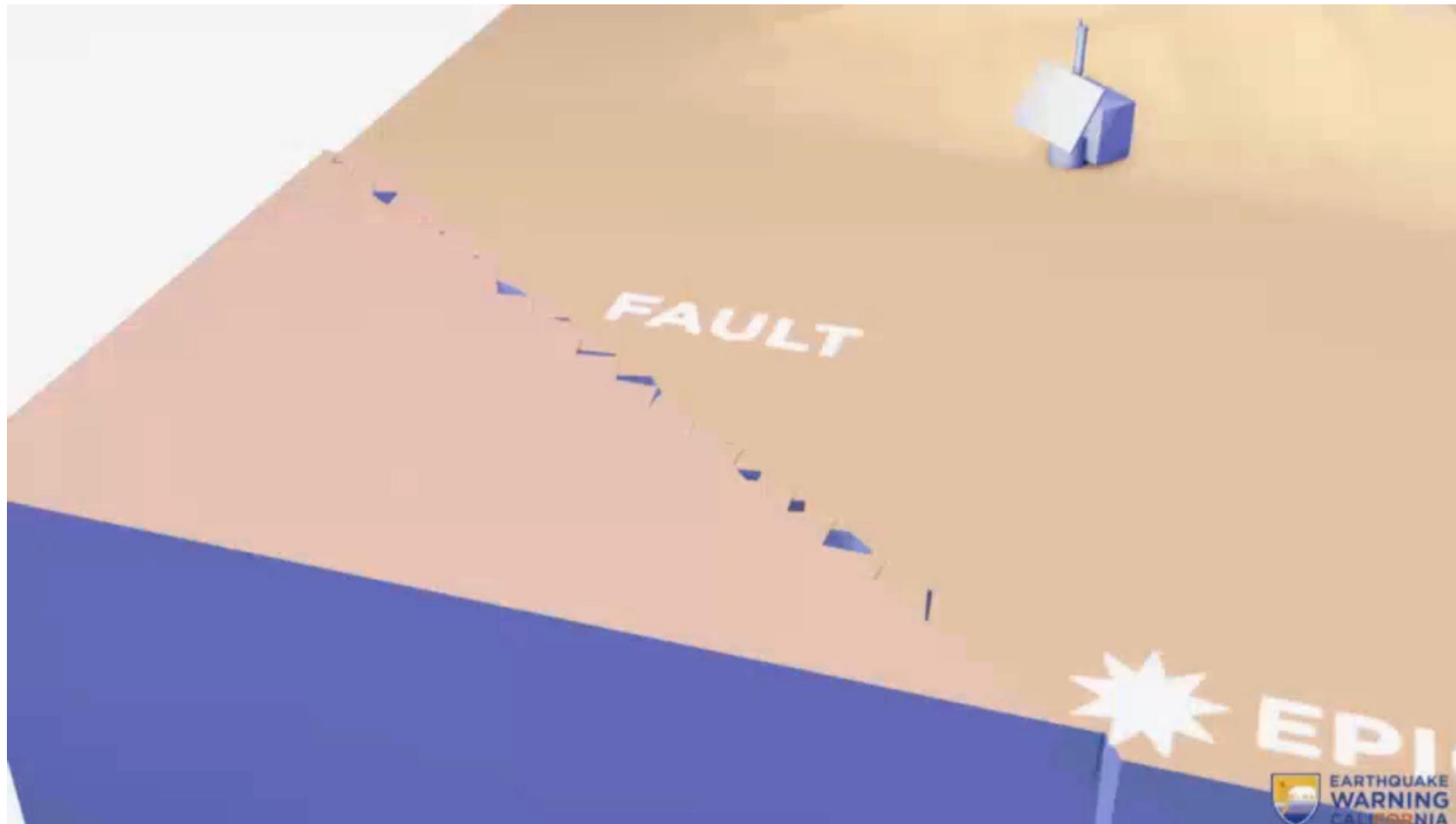


Cal OES Tsunami Program funds the purchase of:

- tsunami signs
- tsunami evacuation route graphics
- kiosks



Earthquake Early Warning



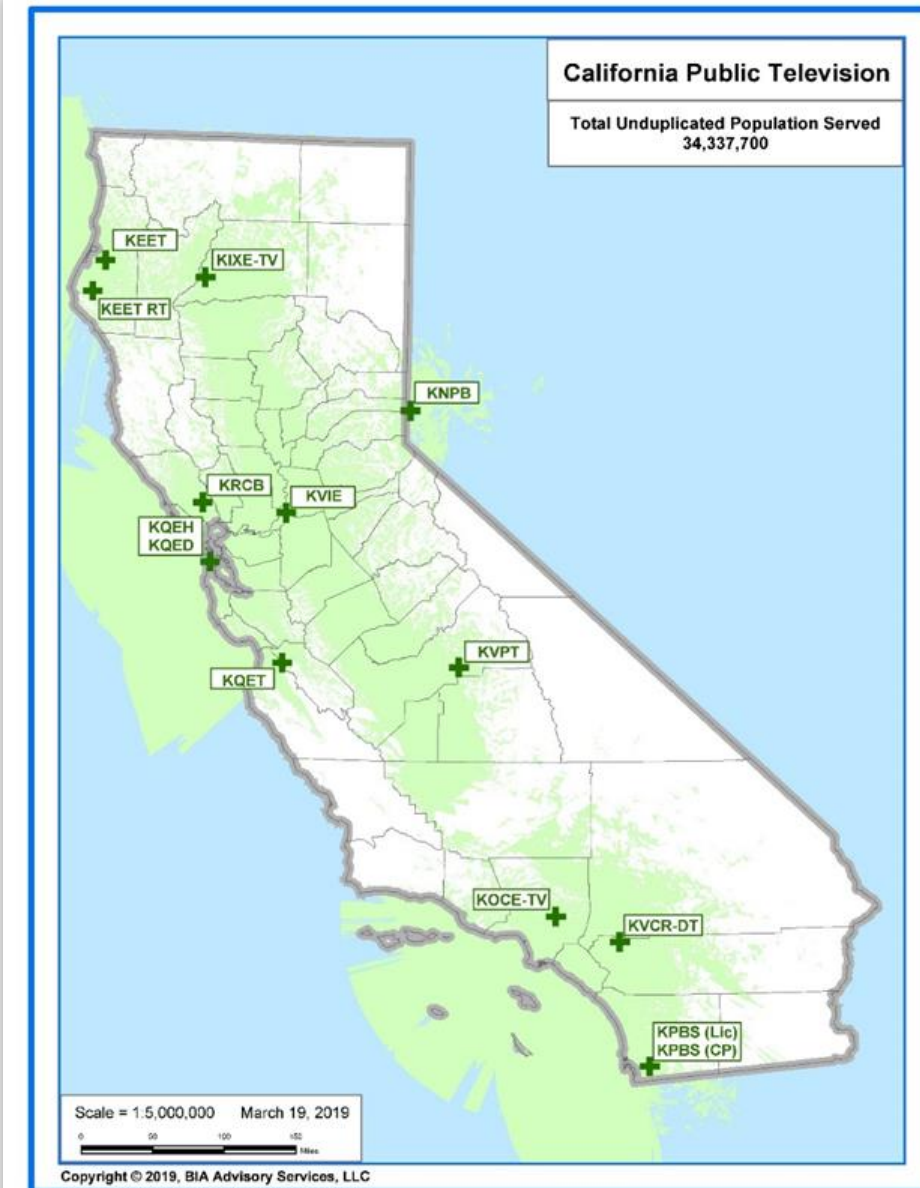
MyShake Mobile Application

- Launched in 2019, MyShake is a major success in California with more than 3.7 million downloads
- Goal is to reach 4 million downloads – 10% of CA population
- MyShake can be installed on Android and iOS devices as an app
- The app provides alerts of incoming ground shaking and information
- The service expands to Oregon and Washington.



Research & Development

- Datacasting
 - Station buildout complete
 - Next step - Receiver distribution
- Fire Stations
 - \$500,000 grant
 - Automated action implementation
- Distributed Acoustic Sensing
 - On and off-shore shaking analysis
- Benefit-Cost Analysis
 - Evaluation of the EEW system
- Airport Feasibility
 - Identifying hurdles for EEW implementation



Education & Outreach

- Comprehensive Education & Outreach campaign
- Education and training to maximize public safety benefits of the EEW System
- Coordination with agency partners to provide coverage to hard to reach communities in seismically active areas
- ShakeOut Tour
- Outreach grants
 - United Way
 - Listos
 - NEHRP



EEW Rapid Response Plan

- Rapid Response Protocols
 - Preparedness Messaging
 - Media Buys
 - Earned Media Strategy



Success Stories

- Develop video content that highlights utilization of EEW resources in the community.
- Completed videos
 - MyShake
 - MetroLink/Bart
 - Menlo Park Fire District
- In Development:
 - Datacasting
 - Regatta Seaside



Success story video shoot with Robert Sides from the Regatta Condominiums in Marina Del Rey

EARTHQUAKE
WARNING
CALIFORNIA



Jose Lara, Branch Chief
Seismic Hazards
Jose.Lara@caloes.ca.gov

2024





Park Boulevard Historic District, San Diego, CA

Mitigation: A Culture of Earthquake Resilience

JANIELE MAFFEI, S.E.

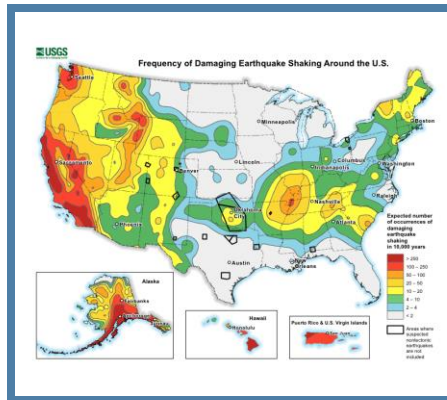
CHIEF MITIGATION OFFICER

December 6, 2024

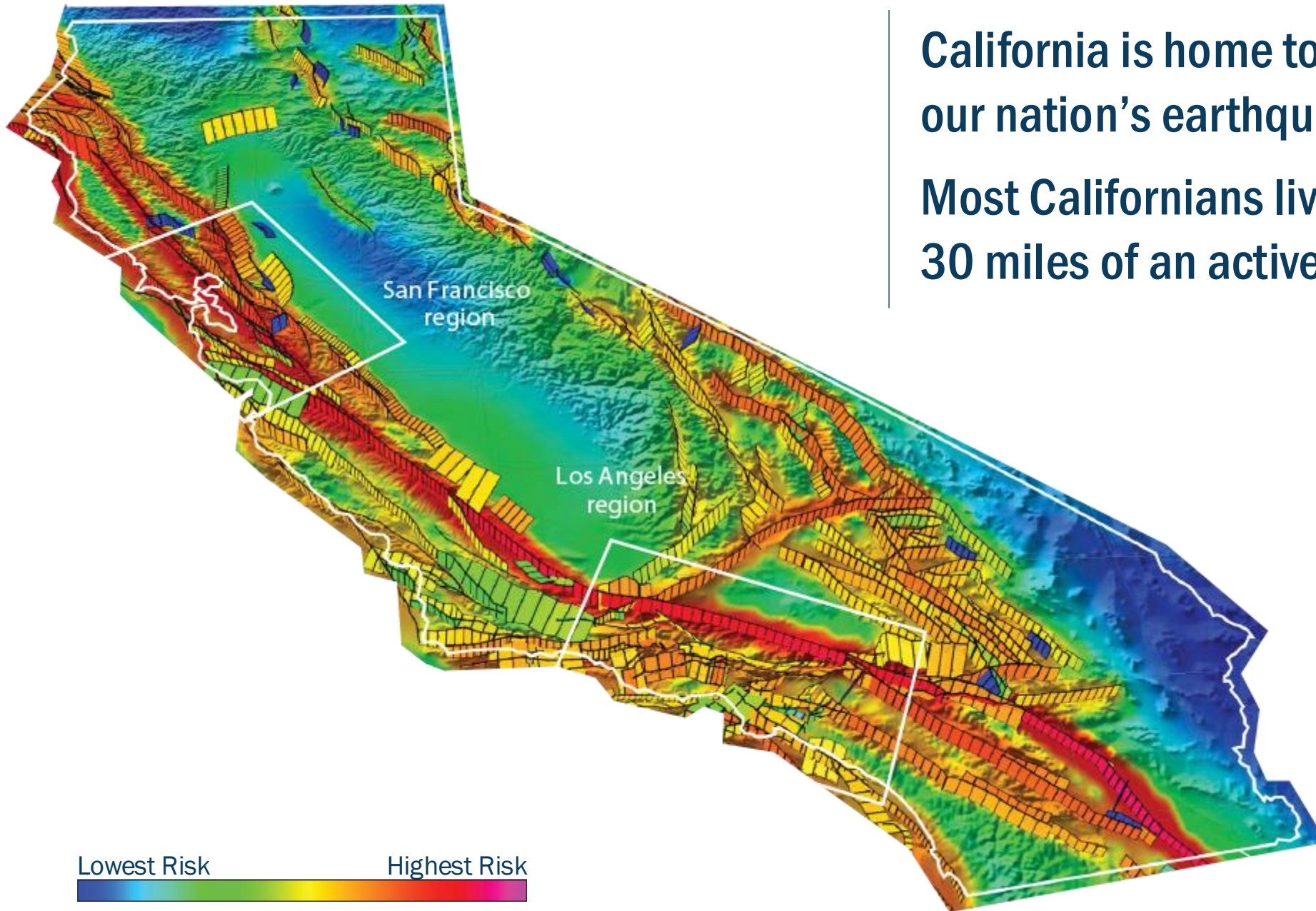


Things to Know About Earthquake Risk

RISK = HAZARD + VULNERABILITY + EXPOSURE



California is home to two-thirds of our nation's earthquake risk.
Most Californians live within 30 miles of an active fault.



California Earthquake Authority

CEA is a not-for-profit residential earthquake insurer.



CALIFORNIA: MANDATORY OFFER LAW

Earthquake coverage is excluded from homeowner's insurance policy.

However, insurance companies are required to offer a separate earthquake insurance policy at time of homeowner policy sale.



WHEN M6.7 NORTHRIDGE EARTHQUAKE STRUCK IN 1994:

- One of the costliest natural disasters in U.S. history.
- Caused **\$20 billion** in residential damage.
- Destroyed or severely damaged thousands of single-family homes.
- Left about 22,000 people homeless.
- Most insurance companies stopped writing Homeowners insurance; prompted creation of CEA.

Publicly Managed • Privately Financed

A not-for-profit provider of residential earthquake insurance

Governing Board:

Governor
Insurance Commissioner
State Treasurer



Governor
Gavin Newsom



Insurance Commissioner
Ricardo Lara



State Treasurer
Fiona Ma

Non Voting:

Assembly Speaker
Senate Rules Chair



Assembly Speaker
Robert Rivas



Senate Rules Chair
Mike McGuire

Privately Financed:

1,132,605 Policyholders

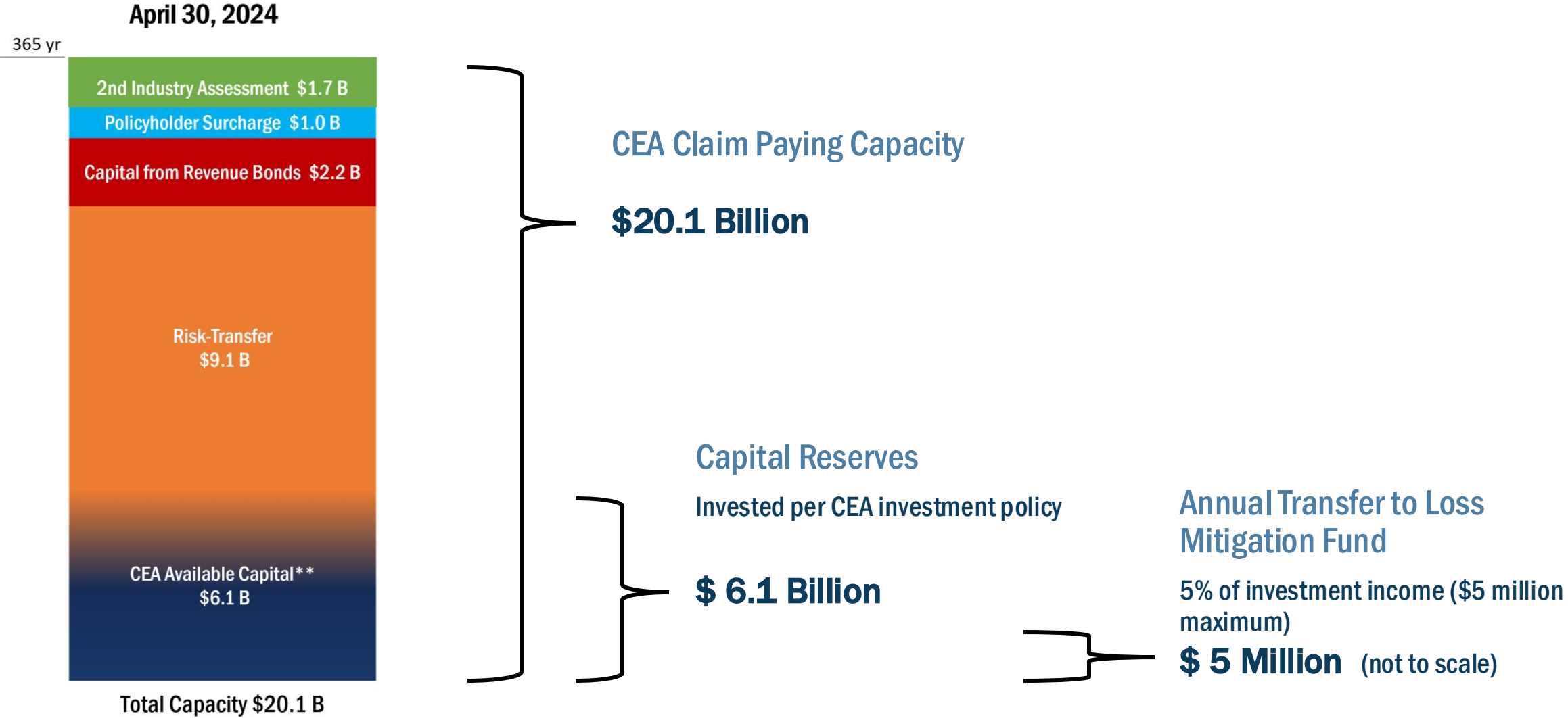
Mission:

Educate
Mitigate
Insure

CEA Participating Insurers



CEA Insurance Claim Paying Capacity and Mitigation Funding



CEA Mitigation

Standards • Research • Incentives

FEMA P-1100 Pre-Standard – Earthquake Vulnerabilities

CRMP Grant Programs Available



Crawlspace Walls



Living-space-over garage



Hillside House



Chimney

Crawlspace Walls and Unbraced Water Heater Vulnerability

2014 M6.0 South Napa Earthquake



Mitigation Research – Quantification of Savings for Retrofitted House

PEER Cripple Wall Damage Project (2020)

How Much Could I Save In “The Big One” If I Retrofit My House*?

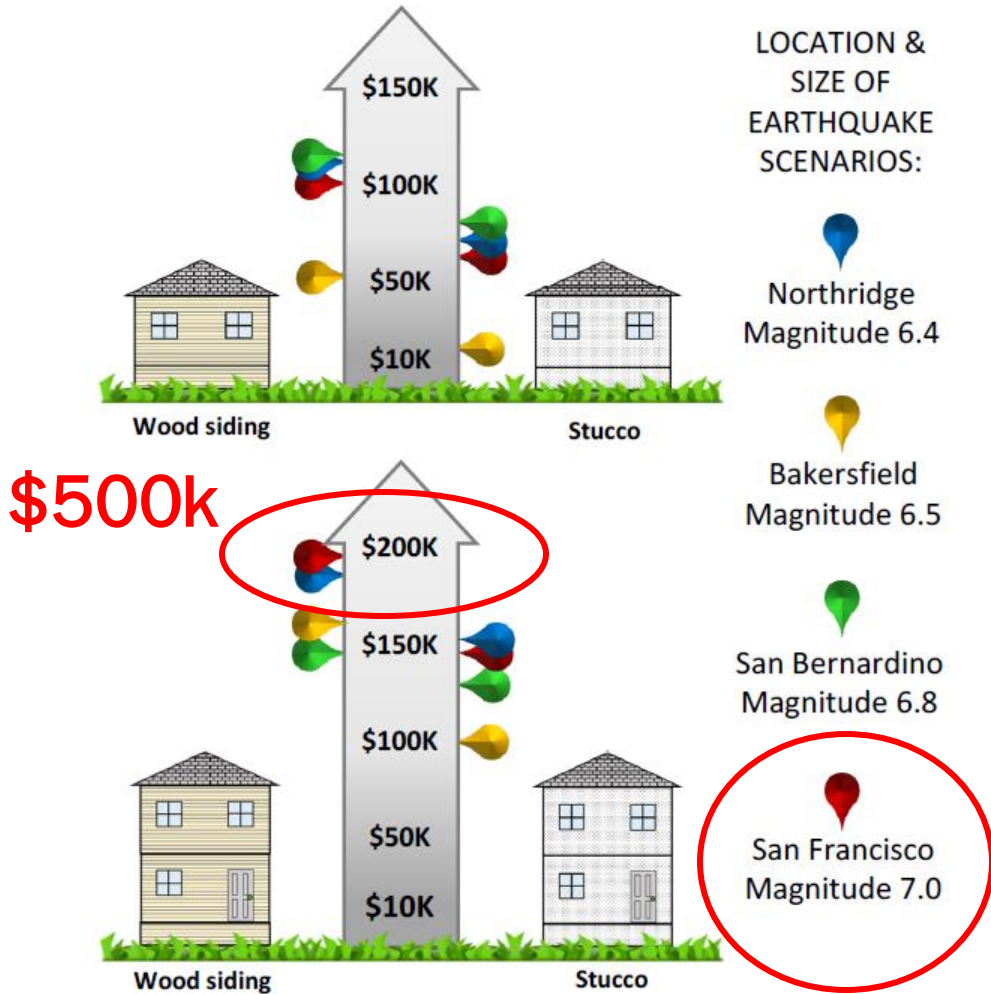


Figure 1. Estimated average savings for four generic house types in four scenario earthquakes.

*Note: Savings are average repair costs avoided in thousands of 2019 US dollars. Values assume a one-story 1,200 sq.ft. house (UPPER) and a two-story 2,400 sq.ft. house (LOWER), at a construction cost of \$200 per sp.ft. Potential savings depend on the actual size, age, location, and configuration of the house, the quality, and types of construction materials, the intensity of earthquake shaking, and regional construction market conditions.

M 7.0 Scenario Earthquake in SF: Retrofitted two-story house with wood siding would have \$200,000 less damage (based on \$200/SF replacement cost) X 2.5

Mitigation Incentive Programs

CEA jointly manages the California Residential Mitigation Program (CRMP) with Cal OES through a Joint Powers Agreement (JPA).

CRMP Single-Family Crawlspace Retrofit Grant Programs



Funded by \$84m FEMA HMGP grants
Open to owner-occupied houses in select ZIP Codes



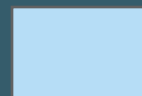
Funded by CEA
Open to policyholders in select ZIP Codes

Earthquake Brace & Bolt

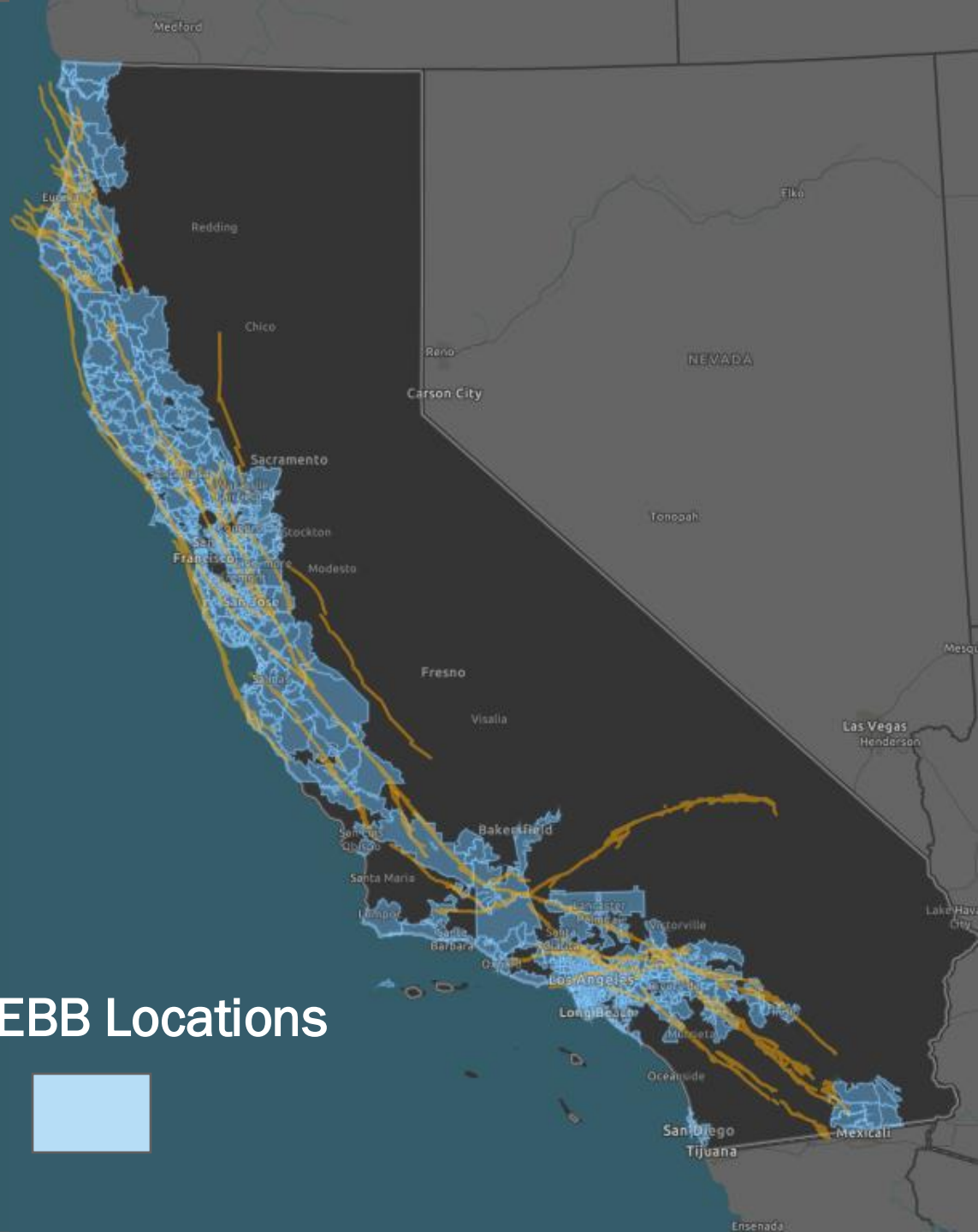
Registration Open:

January 10, 2024 – February 21, 2024

EBB Locations



EarthquakeBraceBolt.com



Earthquake Brace + Bolt Retrofit - EBB

California Residential Mitigation Program Retrofit Grants - Earthquake Brace + Bolt



Earthquake Brace + Bolt Program:

- Retrofits crawlspace with plywood bracing and new bolting
- Provides up to \$3,000 grant
- Currently requires owner-occupied
- In select ZIP Codes with high seismic hazard
- Has collected **important data**:
 - Retrofit averages \$5,200 in CA
 - More expensive in Northern CA
 - Number of retrofitted houses in a City

REGISTRATION OPENS JANUARY 2025

EBB Program includes supplementary grants for income qualifying households.

The supplementary grant:

- Will provide, in most cases, 100% OF THE FUNDS needed
- Offered in all EBB ZIP Codes

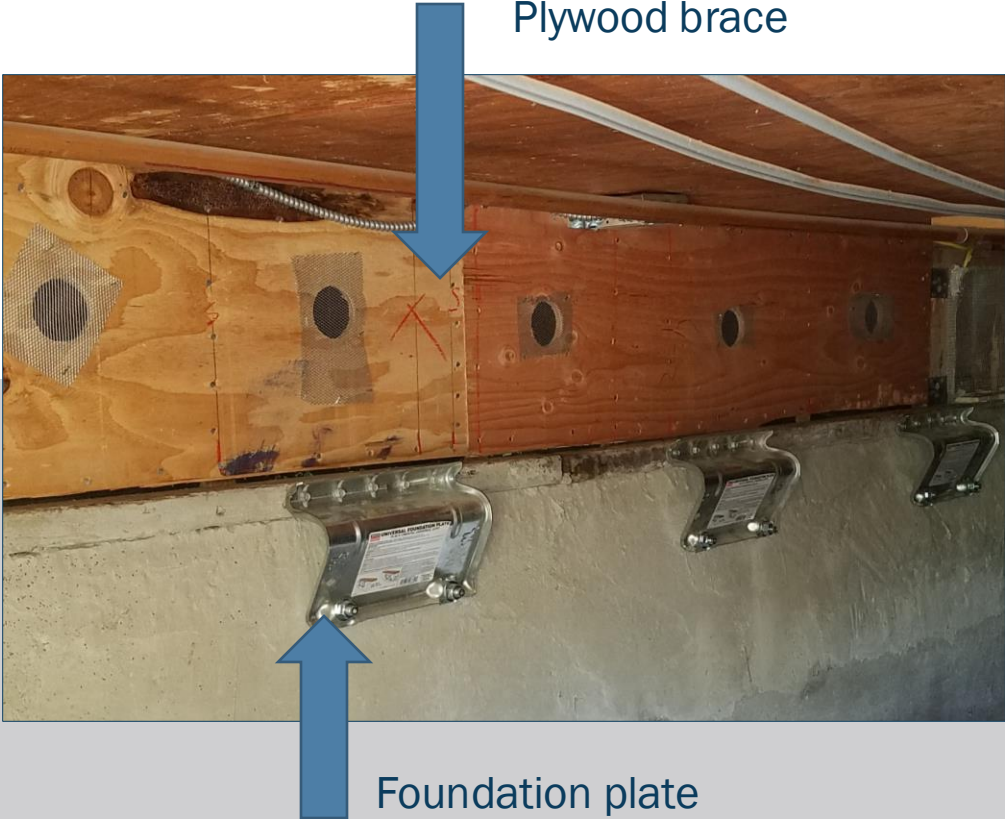


Earthquake Brace + Bolt

Short Cripple Wall Requires Framing Clips, Foundation Plates, and Plywood



Crawlspace **Before** Retrofit



Crawlspace **After** Retrofit

CRMP Single-Family Retrofit Grant Programs

EBB, CEA BB, and ESS



Funded by \$5m FEMA HMGP grants
Registration re-opens October 15, 2024

Earthquake Soft-Story (ESS)

Living-Space-Over-Garage (Soft-Story) Found in Pre-2000 Houses



1971 San Fernando EQ



1989 Loma Prieta EQ



1994 Northridge EQ



2014 Napa EQ

Earthquake Soft-Story (ESS)

Adding the earthquake protections found in new houses

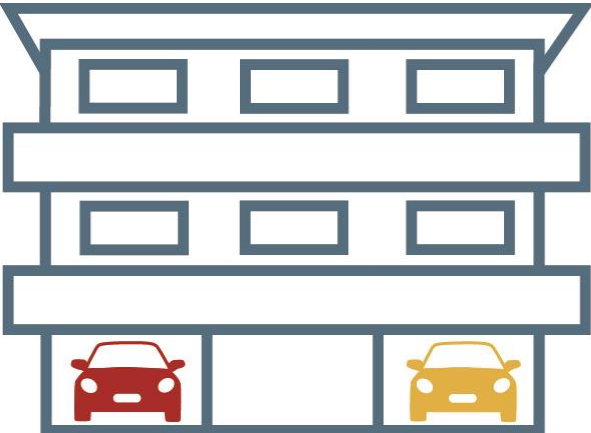


Plywood or OSB on first-floor walls

New steel shear walls either side of garage door opening

CRMP Multi-Unit Retrofit Grant Program

EMR



EARTHQUAKE **MULTI-UNIT RETROFIT**

Funds to Strengthen Residential Structures

Funded by \$40m FEMA BRIC grants

Multi-Family Soft-Story Retrofit Program



Photo credits: LA Times

Northridge Meadows Apartments – Northridge M6.7 Earthquake 1994

Multi-Family Soft-Story Retrofit Program

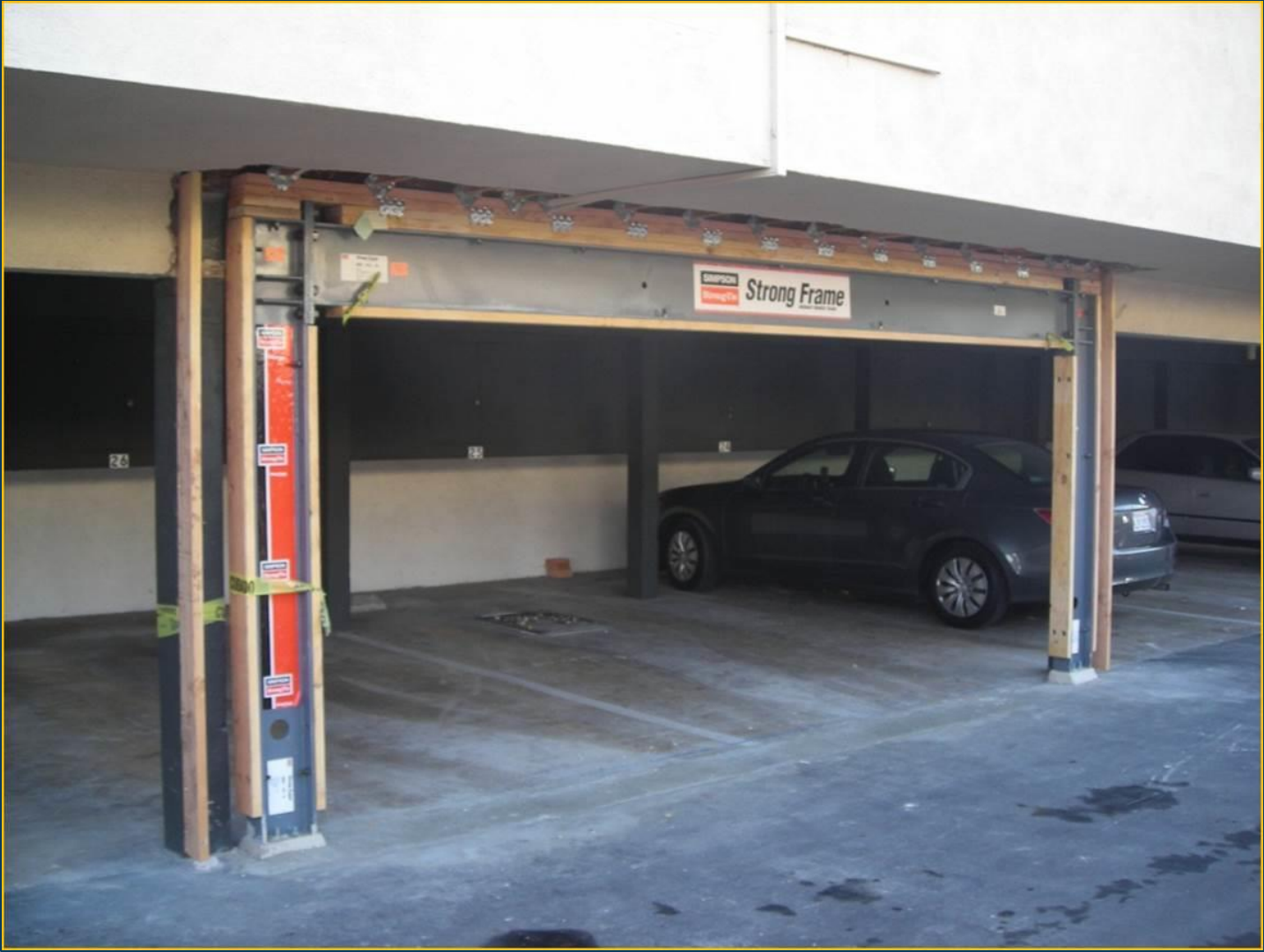


Photo credit: Janiele Maffei

Steel frame around garage door opening

2014 M 6.0 Napa Earthquake



Unretrofitted – Red Tagged

Retrofitted – Green Tagged

2022 M 6.4 and 2023 M 5.4 Ferndale Earthquakes



Unretrofitted – Red Tagged

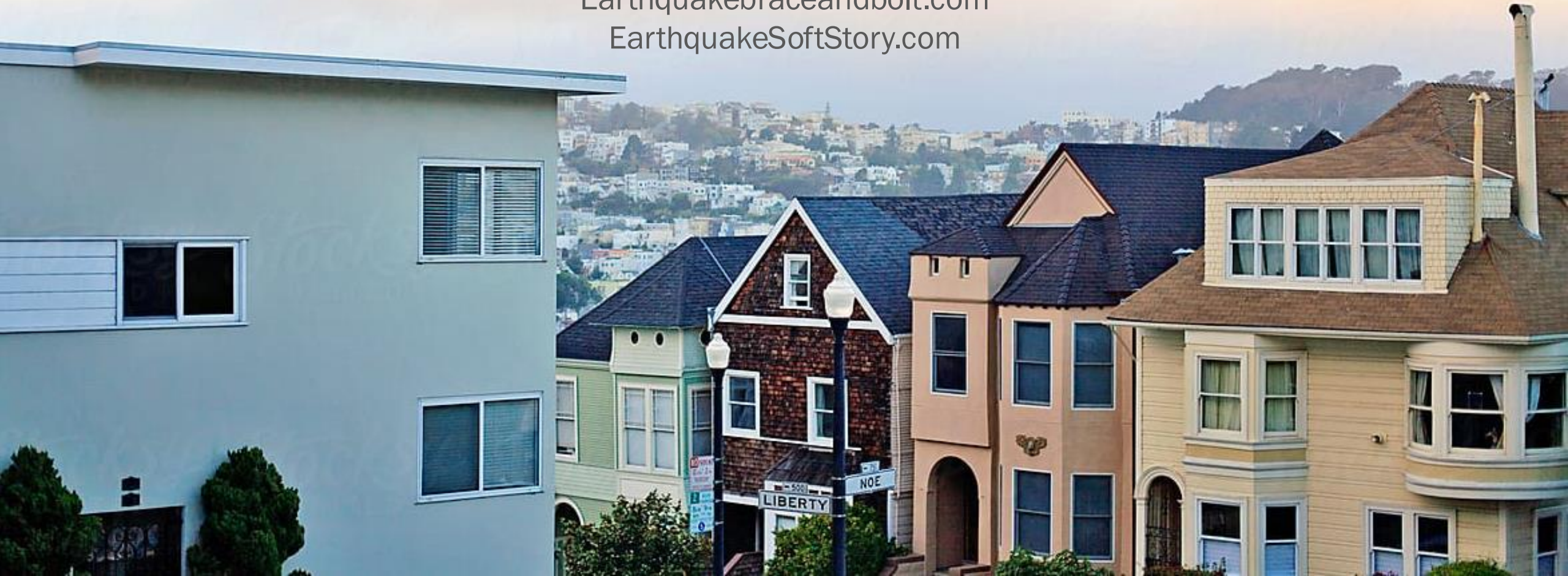
Retrofitted – Green Tagged

Thank You.

CaliforniaResidentialMitigationProgram.com

Earthquakebraceandbolt.com

EarthquakeSoftStory.com



ECA Activities and Resources for Earthquake Mitigation and Preparedness

Mark Benthien

Director of Public Education and Preparedness
Statewide California Earthquake Center, USC

&

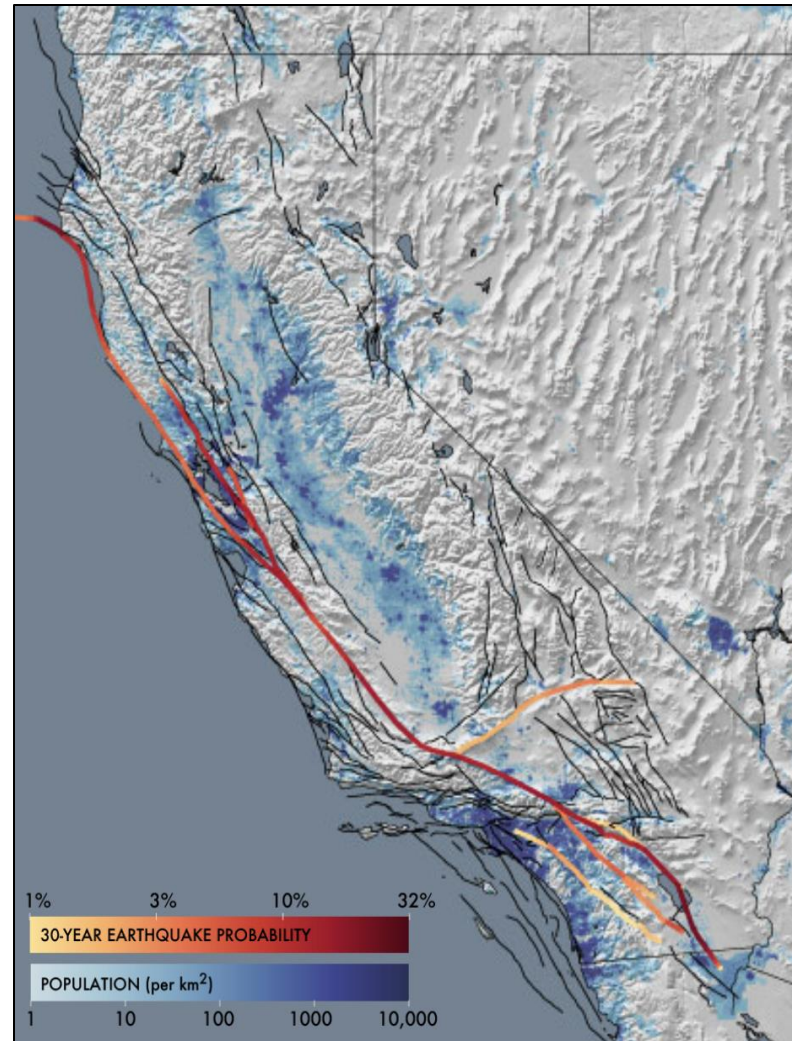
Executive Director, Earthquake Country Alliance





Statewide California Earthquake Center

SCEC is a collaborative research and education hub headquartered at USC that brings together a global network of experts across geoscience and related fields to advance the understanding of earthquake processes and apply that knowledge to reduce their impacts on society in California and beyond.



Community

SCEC is a consortium of more than seventy institutions and over a thousand individuals. Leadership teams guide our programs and collaborations to fulfill the Center's mission.

Mission

SCEC develops and shares cutting-edge earthquake system science to enhance California's resilience and to educate and inspire future scientists.

Vision

SCEC provides comprehensive, validated models of earthquake processes that inform mitigation and educational approaches to greatly reduce earthquake losses.



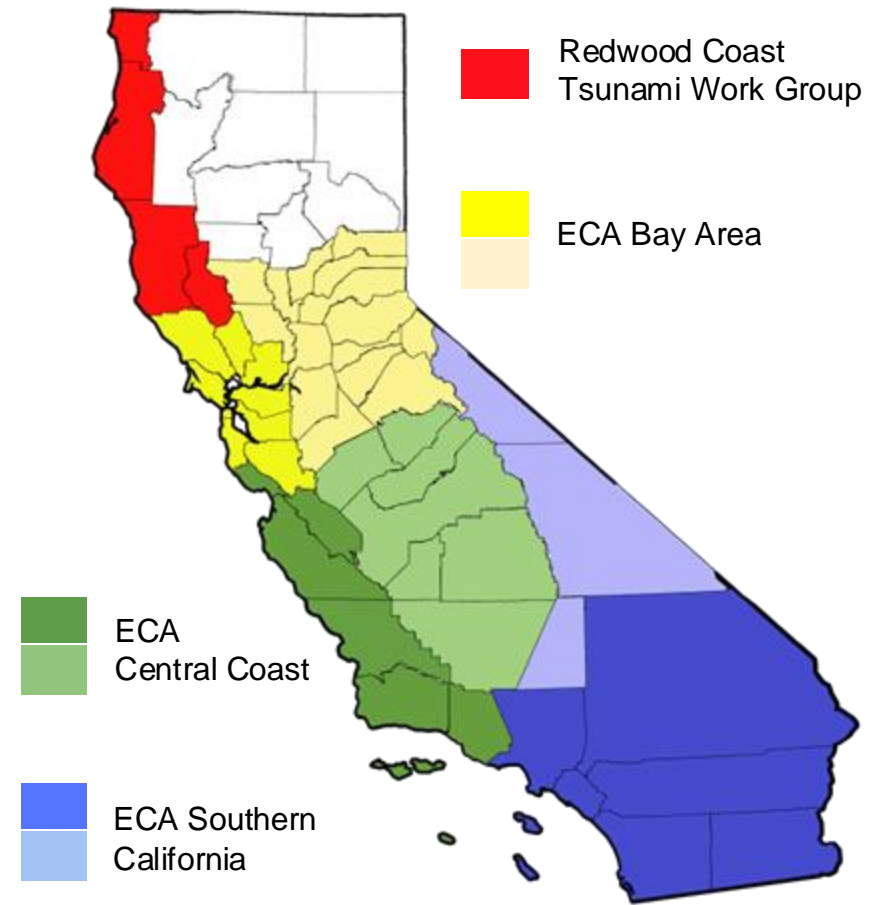
FEMA



USC

Earthquake Country Alliance

- 4000+ *Public-Private-Grassroots* leaders
- Subject matter expert *Committees* develop resources and programs
- *Regional Alliances* organize meetings and outreach activities
- California's Office of Emergency Services provides FEMA NEHRP funding for ECA earthquake mitigation activities
- USC's Statewide California Earthquake Center (SCEC.org) administers ECA



Join: EarthquakeCountry.org/join



ECA Statewide Activities

Develop Messaging and Resources:

EarthquakeCountry.org

EarthquakeCountry.org/resources

Terremotos.org



Support Tsunami Preparedness Week:

TsunamiZone.org/california



**March
22-30,
2025**

Created and Coordinate

The Great California ShakeOut:

ShakeOut.org/california



**Oct. 16,
2025**

Webinars & other events

EarthquakeCountry.org/calendar

ECA Regional Alliances

- Quarterly workshops (each with SCEC scientists) - online or in-person
- Speakers/event tabling
- Regional coordination among public, private, and grassroots organizations



View Past Workshops and more:
EarthquakeCountry.org/alliance



ECA Sector-Based Outreach Committees

- Public Sector
- Businesses
- Accessibility
- Non-Profit & Faith-Based Organizations
- Healthcare
- Higher Education
- PreK-12 Education

EarthquakeCountry.org/committees

Seven Steps To Earthquake Safety

1. Secure Your Space



2. Plan To Be Safe



3. Organize Supplies



4. Minimize Financial Hardship



5. Drop, Cover, and Hold On



6. Improve Safety



7. Reconnect and Restore



BEFORE

DURING

AFTER

Updated Materials in 16 Languages

If You Feel Shaking or Get an Alert:

If Possible **DROP! COVER! HOLD ON!**

Usin Can اگر لرزش زلزله ای را حس کردید یا هشدار دریافت کردید:

Usin Walkers **دربشید! پناه بگیرید! جگر را بگردانید!**

Si Siente Un Temblor o Recibe Una Alerta:

Si Es Posible **¡AGÁCHESE! ¡CÚBRASE! ¡SUJÉTENSE!**

Si Usa Bastón **Եթե ցնցում եք զգում կամ ահազանգ եք ստանում.**

Si Usa Andadera **Գործիքով օգնվելով նստանդալով**

Si Usa Silla de Ruedas **Գործիքով օգնվելով անդամազույգով**

EarthquakeCountry.org/step5

Kế Hoạch Hành Động

Bảy Bước Giữ An Toàn Khi Khẩn Cấp

EarthquakeCountry.org/step5

Cov Niam Tswv Yim Pab Thaum Muaj Av Qeeg

ShakeOut

Thaum Koj Muog Muaj Av Qeeg Co Ca los yog tav ib Qho Xov Xwm. Tiv Thav Koj Tus Kheej Kom Cov Khoom Poob Thob Los Rog

Yog Tav Ua Tau

KHOOV koj nyob ghov twg, muab ob txhais tes thiab hauv caug los nias hauv av. Qhov los khoov nyob nias hauv av li no thaum muaj av qeeg co co koj yuav tos yau thiab pab kom tej yam khoom sas poob los yog yv yuav tis nyaj tau koj dua.

NPOG Muab ob txhais tes thiab nyab los nrog koj taub hauv thiab caj dab.

- Yog muaj ib lub rooj khov los rooj saib ntawv nyob ze, nkag mus nkawm rau hauv qab noj
- Yog tis muaj ib qho chaw nkawm nyob ze, nkag mus nkawm rau ntawm ib sab qhov ntsa
- Qhov ceg twj ywnc, khov kam tiv thav tau tej raum siab ntawv

NYOB TWJ YIM LOS tuog thaum ghov av co co nres.

- Nkawm nyob rau hauv ib qho chaw: muab ib sab tes los tuav ghov khoom ntawv; nraj chav thaum ghov khoom ntawv txav.
- Tis muaj ghov chaw nkawm: muab ob txhais tes thiab nyab los mus nrog koj taub hauv thiab caj dab.

Los Yog Yang Rawv Koj Ghov Teeb Teem Muaj Ntawv

Yog tis muaj rau koj los mus khov nyob rau hauv av, los yog rov sawv tis tau dua yog tis muaj lem tus pab, ces xav kom ua rawv li nram qab no:

- Yog tis kaj zaum ib lub recliner los yog lub baj: Muab koj txhais nyab los yog ib lub tog hauv noo los nrog thav koj lub tau hauv thiab caj dab kom ghov av co co nres tso.
- Yog koj siv ib tug pas pab taug kev: Khov rau hauv av, Npoj, thiab rau los yog zaum ib lub rooj zaum, txaj thiab muab ob txhais tes los nrog koj taub hauv thiab caj dab. Muab koj tus pas pab taug kev cia ze koj thaum ghov av co co nres koj thaj li muab tau siv siv.
- Yog tis kaj siv lub taub pab mus kev los yog zaum lub taub XAUV cov log (yog tis muaj) Yog tis kaj siv lub taub pab taug kev nkawm kom qeeg li qeeg tau khov es muab ob txhais nyab, ib phau ntawv, los yog ib lub tog hauv noo los mus NPOG koj taub hauv/caj dab, Ces NYOB TWJ YIM twg rau thaum ghov av co co nres tso.

Xav paub ntawv mus rau ntawm EarthquakeCountry.org/step5.

EarthquakeCountry.org/step5

Pitong Hakbang sa Paghahanda sa Lindol

EarthquakeCountry Alliance

Sundan ang Pitong hakbang sa Paghahanda sa Lindol para maghanda sa kaligtasan at makabait sa susunod na prealis ng lindol Alamin pa sa EarthquakeCountry.org/pitonghakbang.

Maghanda

Hakbang 1: Patibayin ang iyong lugar sa pangangailala ng mga manganang na bagay at itali ang mga gumagaling na bagay.

Hakbang 2: Mag-plano sa kaligtasan sa pamamagitan ng paggawa ng plano sa emerhensya at magpasya kung paano makikipag-panayam o ugnayan.

Hakbang 3: Ayusin ang mga kagamitang pang-emerhensya sa mga lugar na maluwag.

Hakbang 4: Kawalan ang kahapang pamamahala sa mga manganang na gumagaling sa susunod na prealis ng lindol.

大加州 ShakeOut

ShakeOut

準備好#ShakeOut!

每年在全世界都有萬人一起練習「趴倒、掩護和待住」準備和其他地區安全行動。大多數人每年 10 月份的第三個星期四參加 加州ShakeOut日。您可以在任何一天舉行演練！

任何地方的每個人都可以參加！個人、家庭、學校、社區團體和其他組織可以在同一地點或各個地點一起演練。您還可以通過各種途徑進行演練。

您想演練嗎？請前往 ShakeOut.org/dropcoverholdon。

如何參與

計劃您的演練：

- Register at ShakeOut.org 您註冊 - 您的參與將幫助他人！！
- 訪問 ShakeOut.org/howtoparticipate 具體的演練方法。
- 請向參與您的演練的官員、教師以及老師進行。

為您的演練準備

- 調查您居住或工作的地點。在桌子上列出您準備準備出演的物品。
- 制定您的演練計劃。
- 制定您的演練時間。
- 參加您的演練。請在演練時下載 MyShake - 訪問 earthquake.ca.gov 了解更多。
- 訪問 EarthquakeCountry.org 了解關於地震準備的更多信息。

分享 ShakeOut

- 邀請您的家人、朋友、同事和社區團體參與。
- 訪問 ShakeOut.org/resources 為演練、傳播、宣傳和宣傳。
- 使用 #ShakeOut 在您的演練時和演練後。

EarthquakeCountry.org/step5

Recommended Earthquake Safety Actions

ShakeOut

Federal, State, and local emergency management experts and other official preparedness organizations agree that the actions described below will reduce injury and death during earthquakes.

In most situations, if you feel shaking or get an alert, immediately:

DROP where you are, onto your hands and knees. This position protects you from being knocked down and allows you to stay low and crawl to shelter if nearby.

COVER your head and neck with one arm and hand.

- If a sturdy table or desk is nearby, crawl underneath it for shelter.
- If no shelter is nearby, crawl next to an interior wall (away from windows).
- Stay on your knees; bend over to protect vital organs.

HOLD ON until the shaking stops.

- Under shelter: hold on to it with one hand; be ready to move with your shelter if it shifts.
- No shelter: hold on to your head and neck with both hands.

A small job might run out to be the start of a large earthquake, so always protect yourself immediately!

상점 내 지진 안전 조치

ShakeOut

가게에 들어실 때마다, 언제고 주위를 돌아보세요

- 당신 뒤나 주위에 지진 발생하면 움직이거나 떨어질 수 있는 것이 무엇입니까? 떨어지는 물체로 부터 자신을 보호할 판단력을 준비하세요

지진 발생 시 몸을 굽어 다니려다가 떨어지는 물체에 떨어졌거나 유리조각 또는 다른 위험한 것을 밟아 다치는 수가 있습니다.

진동을 느끼거나 지진경보를 받으면

주저앉으세요 계단 곳 어디에서든 - 진동으로 당신이 쓰러지거나 전에. 가리세요 물체를 찾아달로 머리와 목을 보호하여, 자신의 몸이 떨어지거나 나르는 물체로부터 비교적 작은 표적이도록 움직이세요

- 스텝 카트가 어느 정도 할까가 될 수 있습니다.
- 옷걸이 받침대 안으로 피하는 것이 어떨면 할까가 될 수 있습니다
- 높은 선반에는 물품이 없거나 (일단 해당이 있는 것 같은), 맨 밑바닥 선반에 숨는 것이 어떨면 할까가 될 수 있습니다.

붙잡고 지탱하세요 흔들리는 것들.

주저앉으세요! 가리세요! 지탱하세요!

가주에 거주하시면 지진 경보 메시지를 위한 마이셰이크(MyShake) 앱을 휴대전화에 다운로드 및 설치하십시오.

어디든, 국장을 포함, 다른 상황에 처하시면, 또는 물체가 사용하는 경우를 위한 지침은 다음에서 찾으세요, EarthquakeCountry.org/step5.

EarthquakeCountry.org/step5

Printed Materials Ordering Process

- Cal OES NEHRP funding now supporting printing & shipping of ECA materials to local governments, non-profits, and others (on approval)
- Request from many ECA printed materials in multiple languages
- Items will be printed and shipped to you for free
- Limits will apply per person/organization
- Intended for use at upcoming events (not to build a stockpile for general use)
- For larger quantities, purchases will be possible at discounted prices

If You Feel Shaking or Get

If Possible DROP! COVER!

Using Cane DROP! COVER!

Using Walker LOCK! COVER!

Using Wheelchair LOCK! COVER!

Recommended Earthquake Safety Actions Shake Out

Federal, State, and local emergency management experts and other official preparedness organizations agree that the actions described below will reduce injury and death during earthquakes.

In most situations, if you feel shaking or get an alert, immediately:

DROP where you are, onto your hands and knees. This position protects you from being knocked down and allows you to stay low and crawl to shelter if nearby.

COVER your head and neck with one arm and hand.

- If a sturdy table or desk is nearby, crawl underneath it for shelter.
- If no shelter is nearby, crawl next to an interior wall (away from windows).
- Stay on your knees; bend over to protect vital organs.

HOLD ON until the shaking stops.

- Under shelter: hold on to it with one hand; be ready to move with your shelter if it shifts.
- No shelter: hold on to your head and neck with one hand.

Shake Out

상점 내 지진 안전 조치 Shake Out

가게에 떨어질 때마다, 언제고 주위를 돌아보세요

- 당신 뒤나 주위에 지진 발생하면 움직이거나 떨어질 수 있는 것이 무엇입니까?
- 떨어지는 물체로 부터 자신을 보호할 판단력을 준비하세요

Si Siente Un Temblor o Recibe Una Alerta:

Si Es Posible ¡AGÁCHESE! ¡CÚBRASE! ¡SUJÉTESE!

Si Usa Bastón ¡AGÁCHESE! ¡CÚBRASE! ¡SUJÉTESE!

Si Usa Andadera ¡FRENE! ¡CÚBRASE! ¡SUJÉTESE!

Si Usa Silla de Ruedas ¡FRENE! ¡CÚBRASE! ¡SUJÉTESE!

Terremotos.org/paso5

가게에 떨어질 때마다, 언제고 주위를 돌아보세요

진 발생 시 종종 걸어 다니러다가 떨어지는 물체에 떨어졌거나 무리조각 또는 다른 위험한 것을 걸어 다리는 수가 있습니다.

가나 지진경보를 받으면

계신 곳 어디에서든 - 진동으로 당신이 쓰러지기 전에, 몸을 찾아달로 머리와 목을 보호하여, 자신의 몸이 떨어지거나 나르는 물체로부터 떨어지도록 움직이세요.

트트가 어느 정도 방해가 될 수 있습니다. 발밑에 안으로 치하는 것이 어하면 방해가 될 수 있습니다. 만일 있는 물물라면 (같은 책상에 있는 것 같은), 맨 밑바닥 선반에 숨는 것이 방해가 될 수 있습니다.

세요 흔한 것들.

주지않으세요! 가리세요! 지행하세요!

시진 지진 경보 메시지를 위한 마이셰이크(MyShake) 앱을 휴대전화에 다른 권장합니다.

용 포함, 다른 상황에 처하지만, 또는 물체로 사용하는 경우를 위한 지침은 www.earthquakecountry.org/step5.

© 2011 Earthquake Country Alliance

ECA “Secure Your Space” Mini Awards

- **Purpose:** provide materials for projects that improve earthquake resilience by promoting and implementing mitigation, awareness, and preparedness
- **Eligibility:** Any non-profit organization or community group; project manager must be or become an ECA Member (free)
- **Purchases:** *\$500 sets of earthquake safety fasteners sent to you*
- **Items:** For 2024 you can fully customize the materials for your project (furniture straps, cabinet latches, TV/computer straps, etc.)
- **2024 Awards:** Apply by Dec. 10! Items must be installed by Jan. 31, 2025
- Learn More and apply at EarthquakeCountry.org/miniawards

Share the Gift of Earthquake Safety

Have you “secured your space” for earthquakes?
Have your family, friends, and colleagues?

It’s the season of giving, and helping those you care about be safer before, during and after earthquakes is a great way to show you care.

Visit EarthquakeCountry.org/giftofsafety to receive 25-30% discounts on earthquake safety fasteners for furniture, TVs, and other items, plus other emergency supplies!



Share the Gift of Earthquake Safety

Save 25%
on fasteners
for furniture,
TVs and other
items!

Earthquake
Country
Alliance

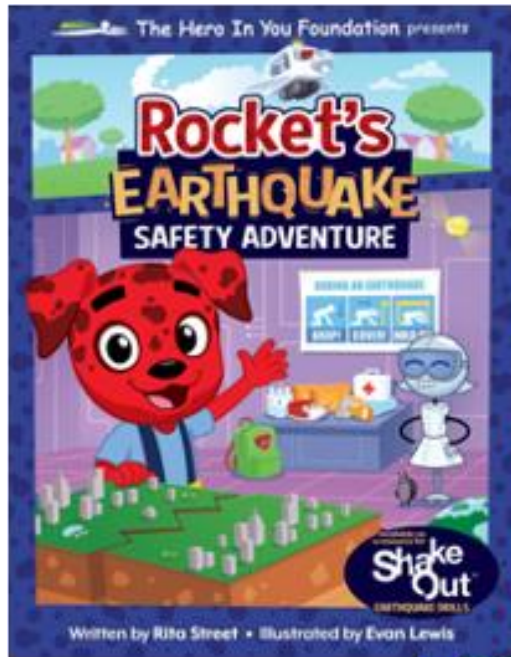
EarthquakeCountry.org/giftofsafety

Secure Your Space Online Training

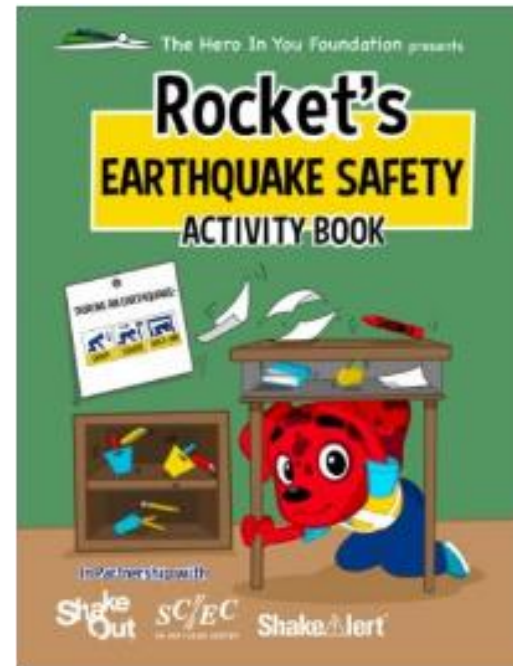
- This online training workshop provides basic understanding and skills for how to reduce damage or injuries by *properly* [securing your space](#) (at home or work)
- December 12, 1-3pm
- Learn more and register:
EarthquakeCountry.org/sysdec24



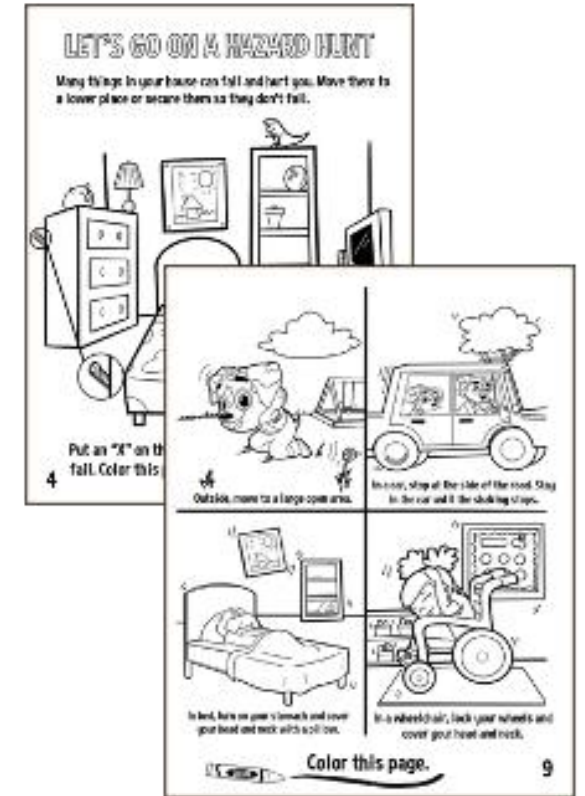
Materials for Children Ages 4-9



English and Spanish Story Books



Many Languages



RocketRules.org/earthquake (videos & more)



HayWired Scenario EXERCISE TOOLKIT

A **guide** for creating
discussion-based exercises
using the HayWired
Earthquake Scenario



USGS HayWired Scenario

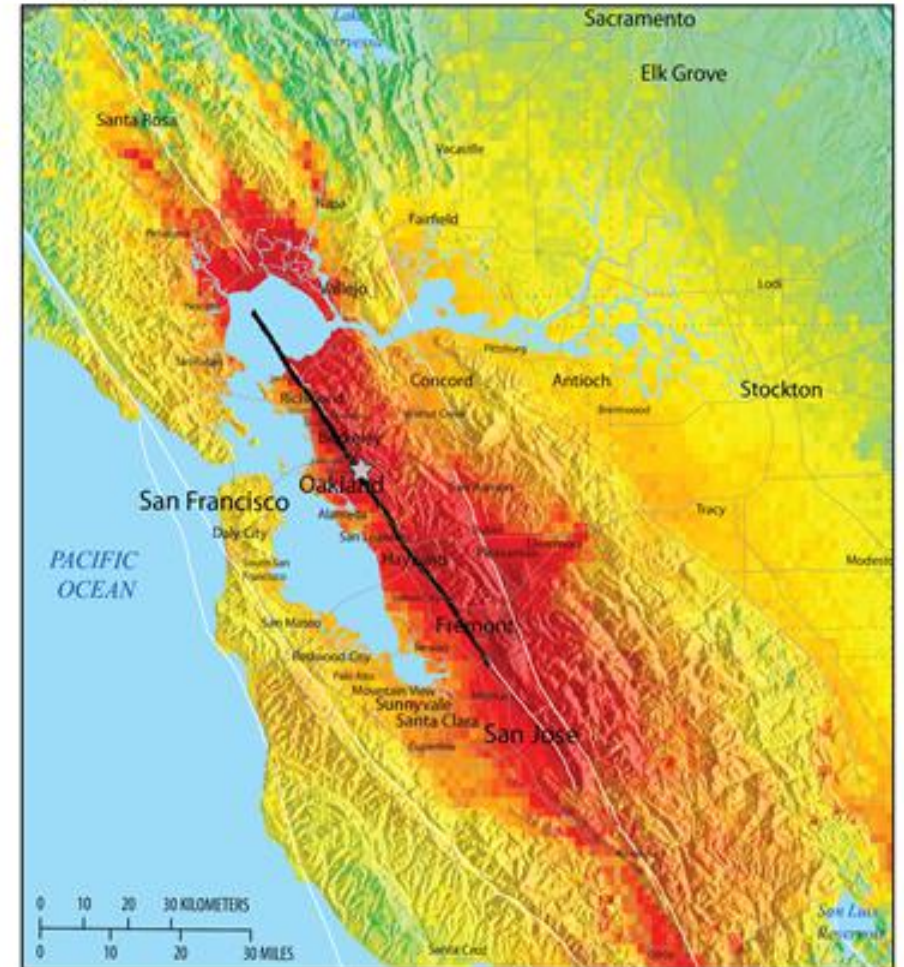
HayWired Scenario
Exercise Toolkit

- Comprehensive assessment of what would happen due to a Magnitude 7 earthquake on Hayward fault
- Emphasizes impacts from modern society's lifeline interdependencies and reliance on the Internet
- Last similar earthquake was in 1868, when there were far fewer buildings, infrastructure, and people
- Learn more and download a toolkit for discussions based on the scenario at EarthquakeCountry.org/HayWired



Together, we can #OutsmartDisaster

OUTSMART
DISASTER

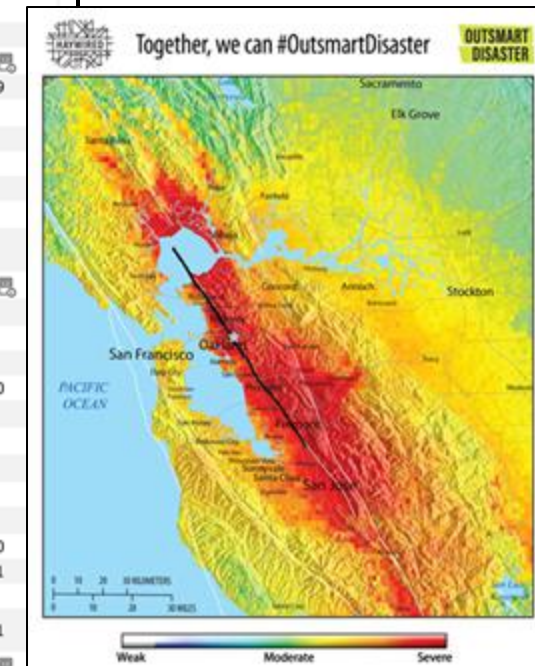


Weak Moderate Severe

Exercise Themes & Ideas

- The Scenario is a comprehensive assessment of the impacts of a M7 earthquake on the Hayward fault
- The Toolkit identifies **30 Themes** addressed in the Scenario, spanning **45 ideas** for discussion-based exercises, organized within each emergency management phase.
- **17 Facilitator Tools** have been developed based on the suggested ideas (3 more soon)

	Planning and Preparedness	Response	Recovery	Mitigation
Access to Data & Information		29		39
Accounting for Employees		29		
Aftershocks & Fault Afterslips			35	
Alternate Locations	23		36	
Building Content				39
Clean-up				39
Communications & Internet	23 & 24	29 & 30		
Customer Base			36	
Economic Impact			36	
Elevators		31		
Employee Commutes and Residences	24			
Employee Retention & Staffing Shortage		31	37	
Fires After the Earthquake				40
Fuel (Gasoline and Diesel)	24	31		
Generators	25			
Insurance			37	
Lifeline Infrastructure in Fault Zones				40
Mail Package Delivery		32		
Mental Wellbeing			37	
Natural Gas	25	32		
Payroll	26			
Power (Electricity)	26	33	38	
ShakeAlert®	26			40
Shutting Off Utilities				41
Slow Return to Normal			38	
Structural & Non-Structural Building Damages				41
Supply Chain Movement of Goods	27			41
Water	27	33 & 34		
Wastewater Sewer	27	34		
Working Remotely	28			



Facilitator Tools

- Each set of *Facilitator Tools* includes:
 - *Discussion Guide*
 - Suggested exercise objectives
 - Recommended participants
 - Discussion questions to select from
 - Locations of relevant data in the Reports
 - *Imagery Slideset*
 - Relevant maps, charts, and tables
- Facilitators can follow closely, or use as inspiration for their exercises



Download and Learn More

- All materials are available at EarthquakeCountry.org/haywired
- **2024-2025 Trainings and Outreach:**
 - We have support for several local workshops through June 2025. Email benthien@usc.edu if you can host a workshop or know someone who may be interested.
 - Ideal audiences: Businesses, business associations, non-profits, government agencies, and others looking to improve planning and resilience.





Quake Heroes



- 54-minute documentary featuring stories of people who experienced the 1994 Northridge earthquake in Los Angeles, and how they helped others
- Key moments tied to the *Seven Steps to Earthquake Safety*
- Scientists and engineers share how they informed the public about what happened, inspected damage, and learned lessons for reducing future losses.
- Encourages viewers to become trained (CERT, CPR, etc.) so they are prepared to help others
- Production sponsored by FEMA, NSF, USGS, Structural Engineers Association of Southern California, Simpson Strong-Tie, Hero in You Foundation, Safe-T-Proof, and others



**RETROSPECTIVE
INTERVIEWS**

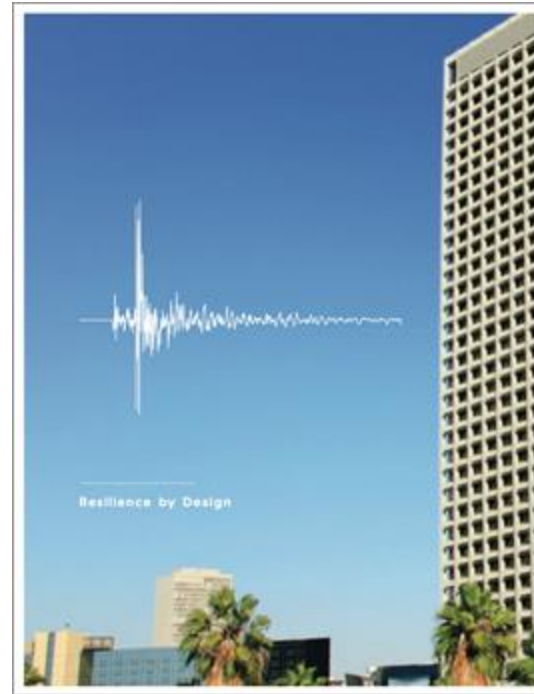


**ARCHIVAL NEWS
FOOTAGE**



**CINEMATIC
RE-ENACTMENTS**

Quake Heroes: Focus on Soft-Story Retrofitting



Displays for Events



3D Model of Northridge Meadows
Apartment Complex



Model Showing Issues with Tuck-
Under Parking Apartment Buildings

Quake Heroes Expos

- Organized to motivate preparedness actions by large community groups, businesses, faith-based organizations, local governments, and their members, employees, and constituents.
- After viewing the film, attendees take actions at a **Seven Steps to Earthquake Safety** resource and information fair where they can:
 - register for CERT and other trainings
 - receive free or low-cost disaster supplies & earthquake safety fasteners
 - learn about earthquake insurance & retrofitting
 - sign up for alerts
 - experience an earthquake simulator

California Seismic Safety Commission Grant to SCEC:

10 Expos in underserved communities across the state, through May 2025 (including at least one event fully in Spanish, possibly also one in Chinese) - now seeking partners / communities for these events.

Learn more at [QuakeHeroes.org](https://www.quakeheroes.org)



The poster for the Quake Heroes Expo @ Cal State Northridge features a dark blue background. At the top, the text "QUAKE HEROES" is written in a white, stylized font with a jagged underline. Below this are five colorful triangles containing icons: a red triangle with a white plus sign, a green triangle with a white lightning bolt, a purple triangle with a white anchor, an orange triangle with a white house, and a yellow triangle with a white person. A red banner below the triangles contains the text "EXPO @ CAL STATE NORTHRIDGE" in white. The central part of the poster shows a collage of images: a group of people in green vests, a crowd at an expo, a person in a yellow jacket working in a dark space, and a "QUAKE COTTAGE" simulator. To the right, the text "SATURDAY, FEBRUARY 3" is written in large yellow letters, with "10AM - 4PM" below it. At the bottom, there is a white section with a QR code, the text "Learn More and Register Visit QuakeHeroes.org", and the logo for "JOHN LEE LOS ANGELES CITY COUNCILMEMBER - DISTRICT 12". Below this, there are four promotional phrases: "Watch a film based on true stories!", "Ride an earthquake simulator!", "Discounts on preparedness supplies!", and "Sign up for safety trainings!". At the very bottom, there are logos for "SCEC", "Watch the Trailer", and "EARTHSCOPE".

QUAKE HEROES

EXPO @ CAL STATE NORTHRIDGE

SATURDAY, FEBRUARY 3
10AM - 4PM

Learn More and Register
Visit [QuakeHeroes.org](https://www.quakeheroes.org)

JOHN LEE
LOS ANGELES CITY COUNCILMEMBER - DISTRICT 12

Watch a film based on true stories!
Discounts on preparedness supplies!

Ride an earthquake simulator!
Sign up for safety trainings!

SCEC | Watch the Trailer | EARTHSCOPE

Connect with ECA

- EarthquakeCountry.org
- info@earthquakecountry.org
- Terremotos.org
- [Twitter.com/eca](https://twitter.com/eca)
- info@earthquakecountry.org

