

Malibu Earthquake Hazards & How to Prepare



Chris Dean
City of Malibu Geologist

Susan Duenas
Public Safety Manager

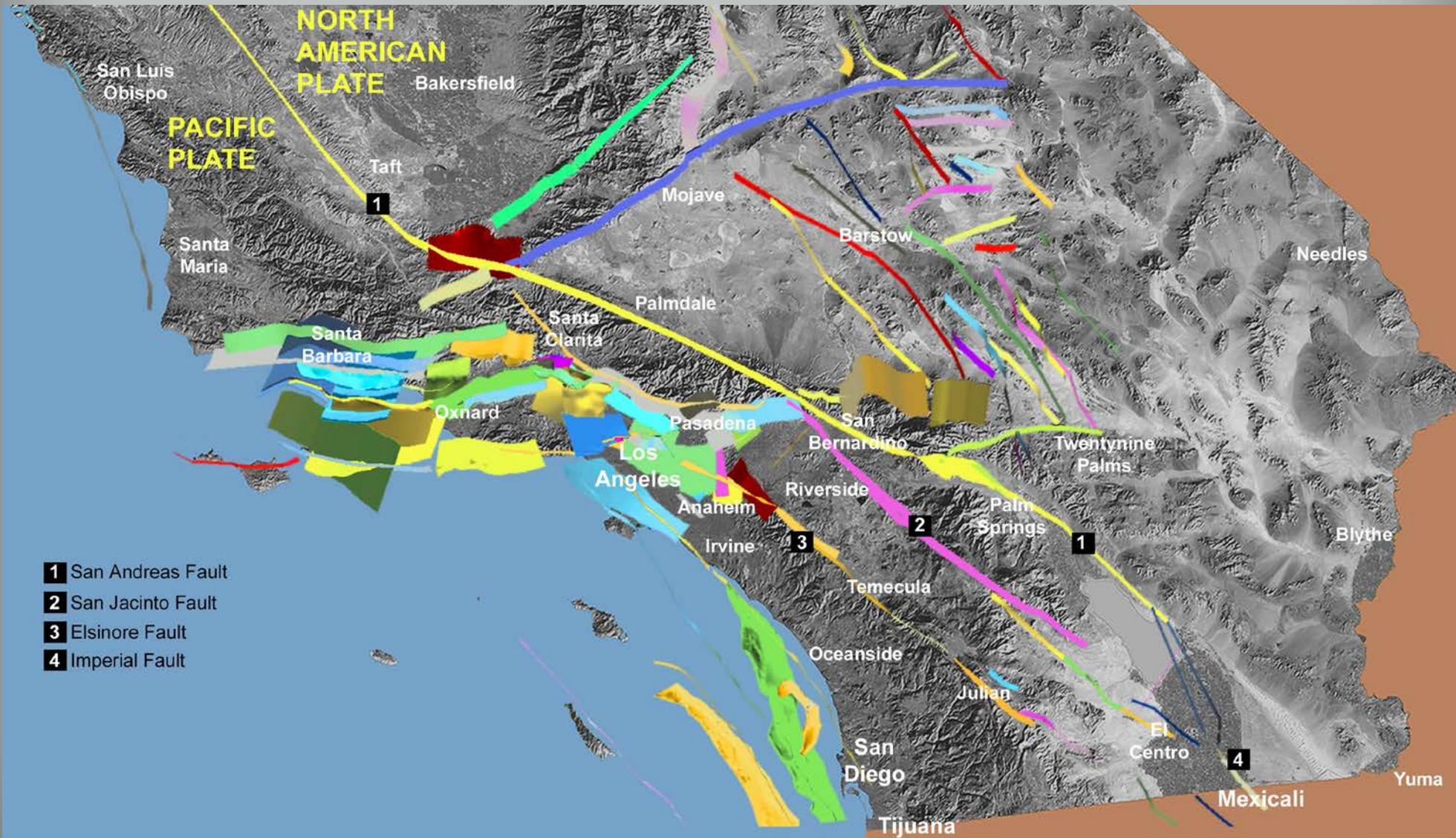
Overview

- Earthquake hazards effecting Malibu
- Potential impact on Malibu
- What the State is doing to prepare
- What the City is doing to prepare
- What you should do to prepare

Chris Dean

- City of Malibu Consulting Geologist
 - Master's Degree, Geology
Texas A&M University
 - With Malibu Since 1994
-

What is our earthquake risk?



Malibu Area Faults



Malibu Area Faults

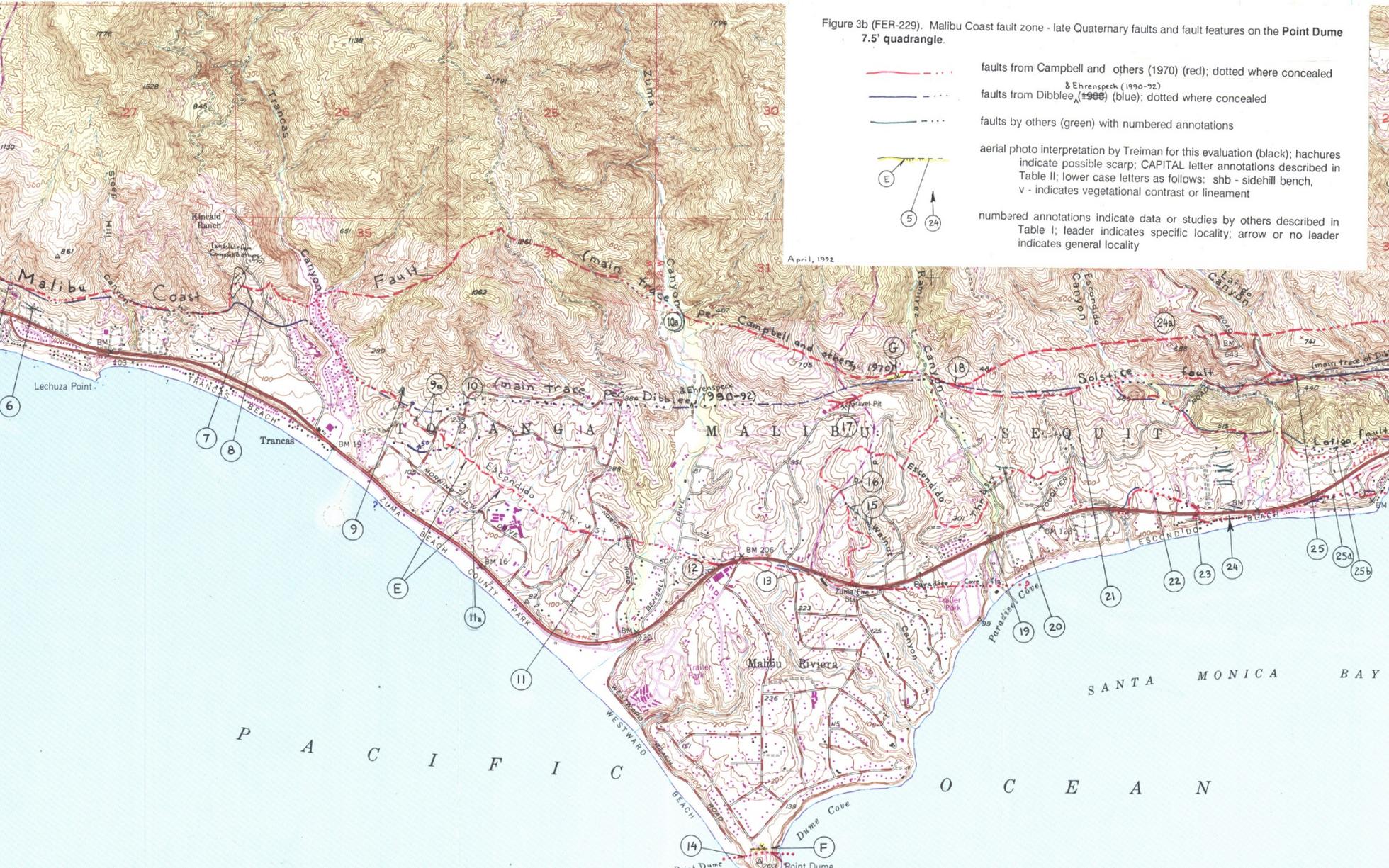


Figure 3b (FER-229). Malibu Coast fault zone - late Quaternary faults and fault features on the Point Dume 7.5' quadrangle.

- · — · faults from Campbell and others (1970) (red); dotted where concealed & Ehrenspeck (1990-92)
- · — · faults from Dibblee (1968) (blue); dotted where concealed
- · — · faults by others (green) with numbered annotations
- aerial photo interpretation by Treiman for this evaluation (black); hachures indicate possible scarp; CAPITAL letter annotations described in Table II; lower case letters as follows: shb - sidehill bench, v - indicates vegetational contrast or lineament
- numbered annotations indicate data or studies by others described in Table I; leader indicates specific locality; arrow or no leader indicates general locality

April, 1992

Landslides Resulting From an Earthquake

- Both homes and highways are susceptible to land and rock slides during an earthquake
- Malibu has three landslide assessment districts with active landslides



Tsunami Resulting From an Earthquake



Cal OES
GOVERNOR'S OFFICE
OF EMERGENCY SERVICES

MyHazards

Cal OES My Location

Helping reduce your risks from natural hazards

Home Earthquake Risk Flood Risk Fire Risk Tsunami Risk **All Risks**

High Risk Moderate Risk

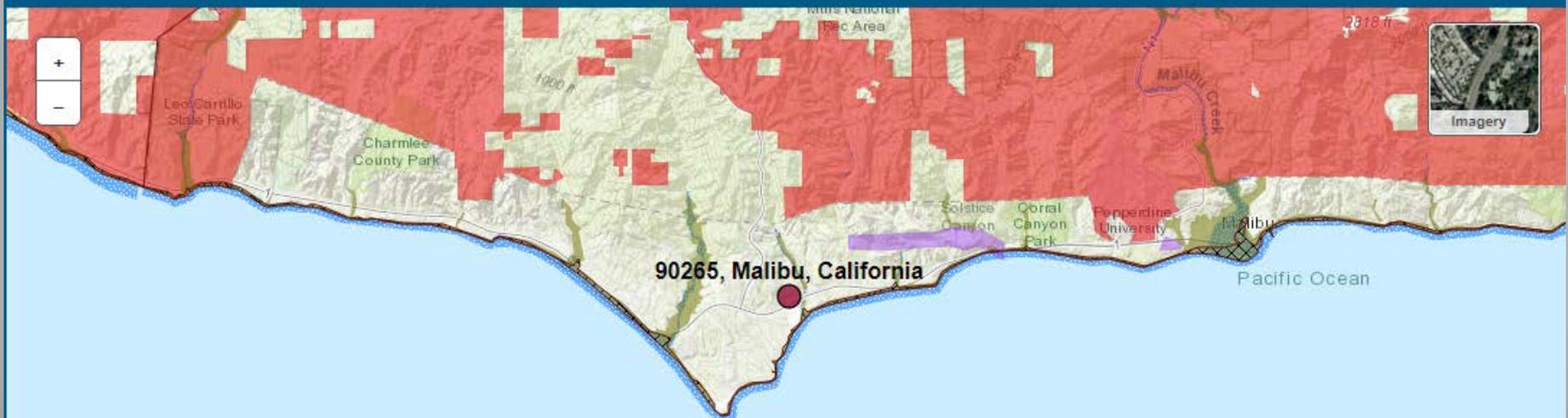
How does MyHazards work?

MyHazards is a tool for the general public to discover hazards in their area (earthquake, flood, fire, and tsunami) and learn steps to reduce personal risk. Using the MyHazards tool, users may enter an address, city, zip code, or may select a location from a map. The map targets the location, and allows users to zoom and scroll to their desired view. The screen then presents information on the risks identified within the search radius, and recommended actions. MyHazards website performs best when using Internet Explorer. Hazard Data is approximate and data layer visibility are subject to the extent of the Map.

Type in your address below to learn how to address natural hazards in your area.

Search

Print



Tsunami Alerts

Tsunami Alert Bulletins: During the typical tsunami alert, the Warning Center provides information about the tsunami in “bulletins” to the state and local jurisdictions. There are four levels of “alert” that can be sent by the NTWC (from least to greatest significance):

Tsunami Information Statement - Issued to inform and update emergency managers and the public that an earthquake has occurred, or that a tsunami Watch, Advisory or Warning has been issued elsewhere in the ocean.

Tsunami Watch - Issued to alert emergency managers and the public of an event which may later impact the Watch area. May be upgraded to an Advisory or Warning - or canceled - based on updated information and analysis.

Tsunami Advisory - Issued due to the threat of a tsunami which may produce strong currents or waves dangerous to those in or near the water; typically called when forecasted tsunami amplitudes are between 0.3m and 1m (1ft and 3ft) above existing tidal conditions are expected. Coastal communities are advised that beach and harbor areas could expect rapid, moderate tidal changes and strong currents.

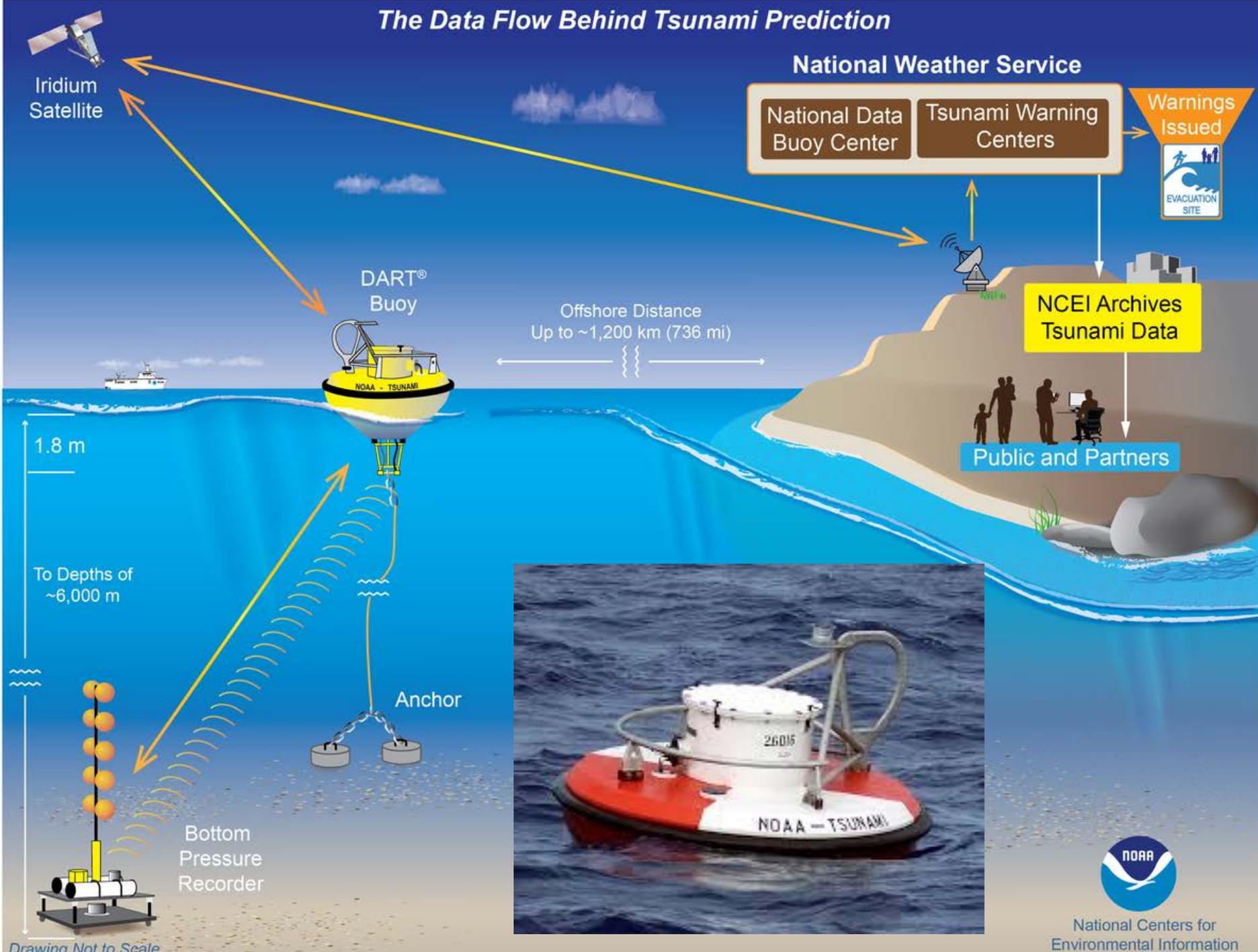
Tsunami Warning - Issued when a tsunami with significant widespread inundation is imminent or expected; typically called when forecasted tsunami amplitudes are equal to or greater than 1m (3ft). Coastal communities are advised to evacuate people from low-lying areas identified as vulnerable to tsunamis.

Tsunami Source Scenario Model Results for Los Angeles County

Near shore tsunami heights (flow depths) for both local and distant source scenarios, in FEET above Mean Sea Level. NOTE: The projections do not include any adjustments for ambient conditions, such as storm surge and tidal fluctuations, and model error (it is very important to note this difference, as those numbers can increase the projected water height during an event).

	TSUNAMI SOURCES	Approximate Travel Time	Leo Corrillo State Beach	Malibu Beach/Lagoon	Santa Monica Pier	Marina Del Rey	Manhattan Beach	Redondo Beach	Palos Verdes Hills	San Pedro-POLA	Long Beach Middle Harbor-POLB	Long Beach	Naples-Alamitos Bay
Local Sources	M7 Newport-Inglewood Fault	10-15min								2	3	3	3
	M7.5 Channel Isl. Thrust Fault	10-15min	4		3	2	3	3	3				
	M7.2 Anacapa Dume Thrust Fault	10-15min		8	6	3	6	6	5				
	Palos Verdes Landslide 1	10-15min			7	4	6	10	20	4	4	4	5
	Palos Verdes Landslide 2	10-15min								6	5	5	5
	M7.1 Santa Monica Thrust Fault	10-15min		4	5	3	3	4	3				
	M7.7 Catalina Fault	15-20min	4	6	6	5	6	6	6	5	7	7	7
Distant Sources	M9 Cascadia-full rupture	2hr			4	4	4	4	3	3	4	4	4
	M9.2 Alaska 1964 EQ	6hr	5	5	7	6	5	4	4	8	7	9	8
	M8.9 Central Aleutians I	6hr	3		5	5	4	4	4	4	5	5	4
	M8.9 Central Aleutians II	6hr			3	4	3	4	3	3	3	4	4
	M9.2 Central Aleutians III	6hr	6	7	10	10	7	6	5	13	10	11	13
	M9 Kamchatka 1952 EQ	9hr	3										
	M8.8 Kuril Islands II	10hr			3	2	3	2	2	2	3	3	3
	M8.8 Kuril Islands III	10hr			3	3	3	3	2	2	3	3	3
	M8.8 Kuril Islands IV	10hr			3	3	3	3	2	2	3	3	3
	M8.8 Japan II	11hr			3	3	3	3	2	2	3	3	3
	M9.5 Chile 1960 EQ	13hr			5	5	4	4	4	4	7	9	10
	M9.4 Chile North	13hr	5	5	5	6	5	5	5	4	10	9	11
	Maximum Runup - Local Source		4	9	8	5	7	11	24	7	8	8	8
	Maximum Runup - Distant Source		7	9	11	11	8	7	5	15	12	13	15

The Data Flow Behind Tsunami Prediction



Impact On Malibu



BUILDINGS



INTERNET



CELL TOWERS

Distant Source Earthquake

- Structures will likely have minor to moderate damage
- Long-term infrastructure disruption
- Emergency resources will be stretched for many days
- Malibu will probably not be a priority



WATER



GAS



ELECTRICITY

= Less Local Damage + Less Help

Impact On Malibu



BUILDINGS



INTERNET



CELL TOWERS

Near Source Earthquake

- Structures will likely have moderate to severe damage (from shaking and liquefaction)
- Could result in fires
- Short-term infrastructure disruption
- Emergency resources will be stretched in first days
- Malibu will receive a vast amount of mutual aid

= More Local Damage + More Help



WATER

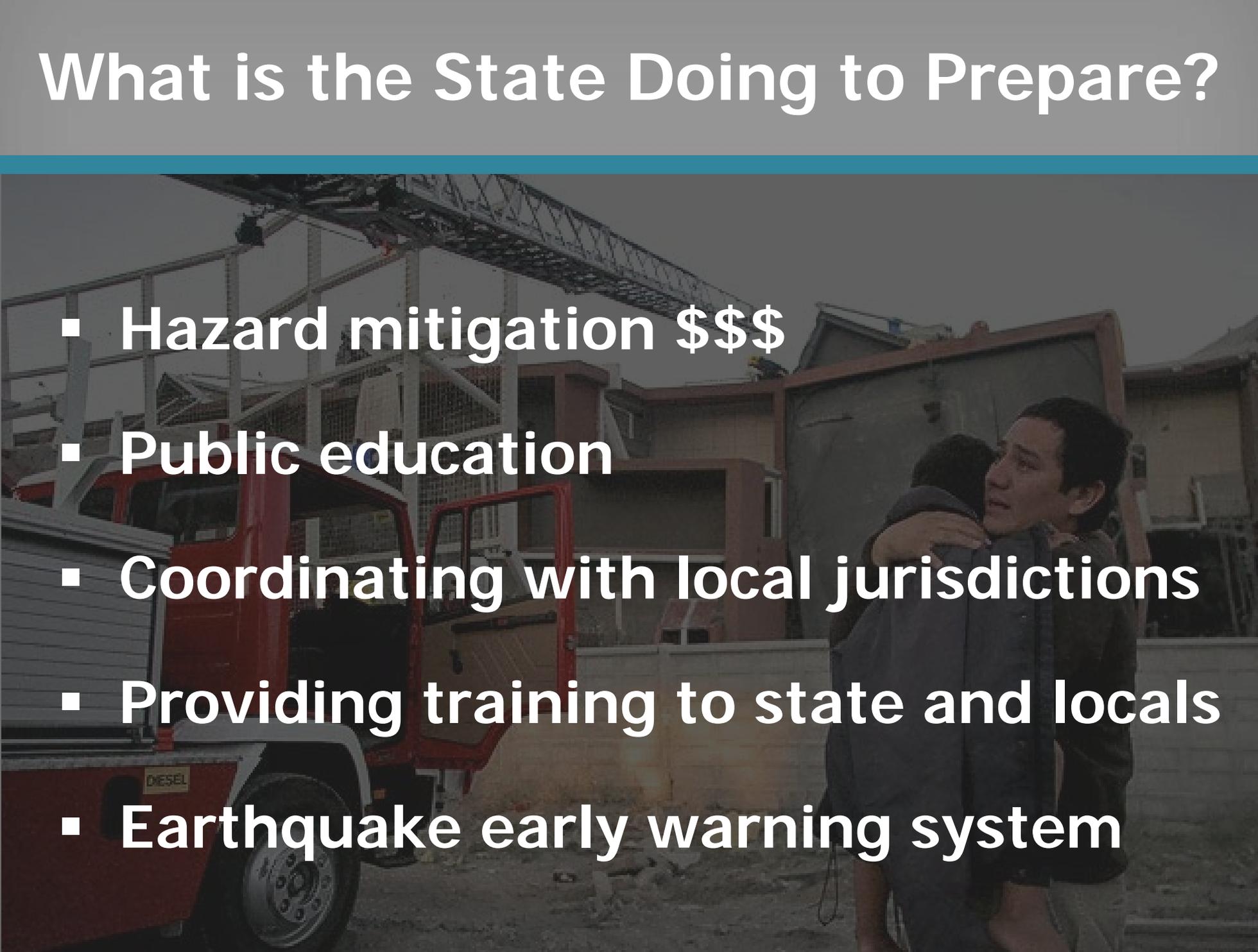


GAS



ELECTRICITY

What is the State Doing to Prepare?

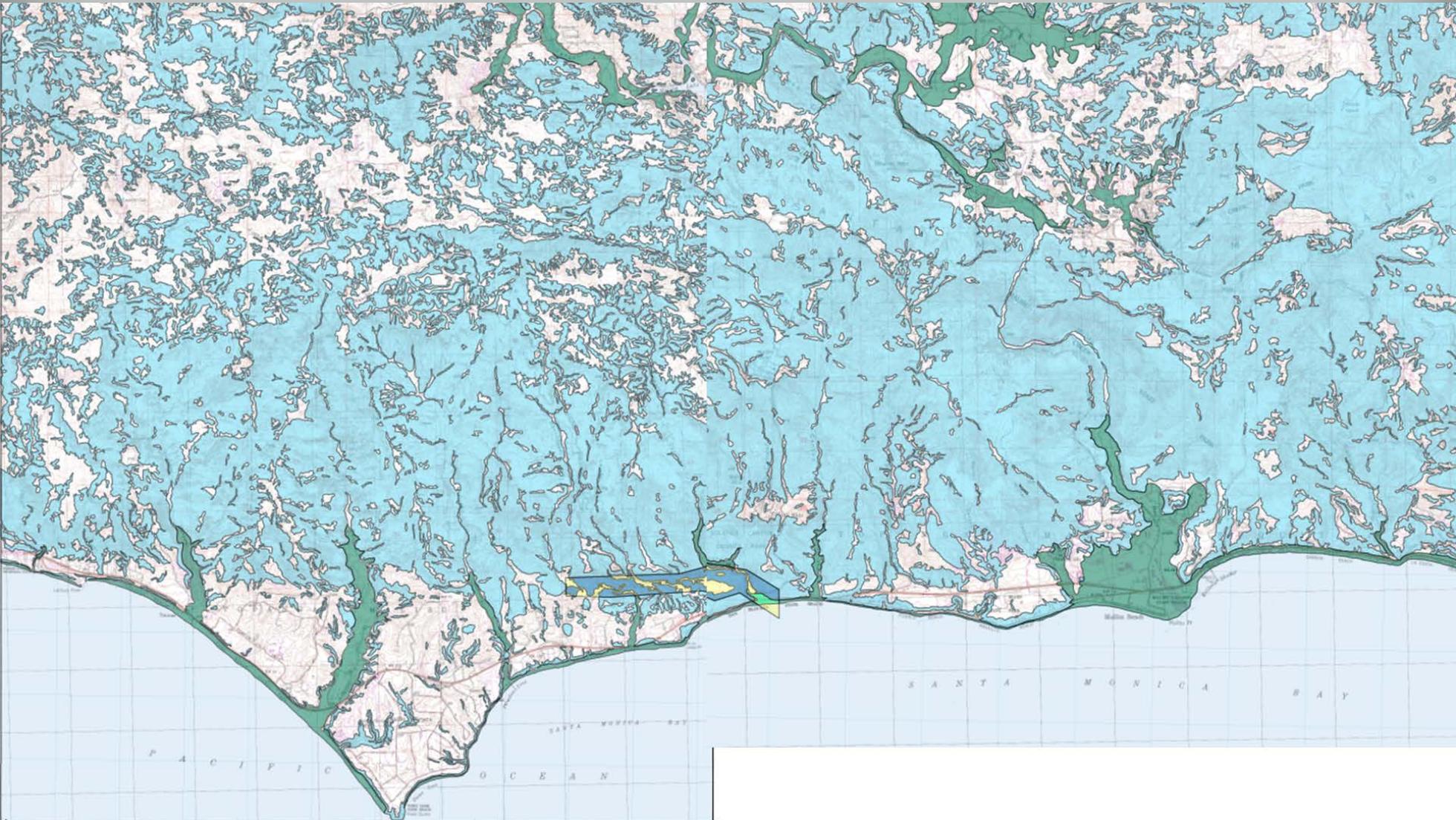
- Hazard mitigation \$\$\$
 - Public education
 - Coordinating with local jurisdictions
 - Providing training to state and locals
 - Earthquake early warning system
- 
- A photograph showing a man in a dark jacket hugging a child. They are standing in front of a building that appears to be under construction or in a state of significant damage. A red truck is visible on the left side of the frame. The overall scene suggests a context of disaster recovery or community support.

What is the State Doing to Prepare?

Alquist-Priolo Earthquake Fault Zoning Act

- ❑ Passed in 1972
- ❑ Intent: to mitigate the hazard of surface faulting to structures for human occupancy
- ❑ Purpose: Direct result of the 1971 San Fernando Earthquake
 - Extensive surface fault ruptures that damaged numerous homes, commercial buildings, and other structures.

Seismic Hazard and Earthquake Fault Zone Maps



What is the State Doing to Prepare?

Seismic Hazards Mapping Act

- ❑ Passed in 1990
- ❑ Intent: Directs the Department of Conservation, California Geological Survey to identify and map areas prone to liquefaction, earthquake-induced landslides and amplified ground shaking.
- ❑ Purpose: The SHMA was passed by the legislature following the 1989 Loma Prieta earthquake.

What is the City Doing to Prepare?

- Building codes and standards
- Geotechnical standards (Guidelines)
- Public education
- Training volunteers
- Maintaining emergency supplies
- Training staff to respond
- Earthquake Resiliency Initiative

Geotechnical Guidelines

The screenshot shows a web browser window with the URL <https://www.malibucity.org/Search?searchPhrase=geotechnical%20guidelines&page=1&perPage=10>. The page features a navigation bar with the Malibu logo and menu items: MY GOVERNMENT, OUR COMMUNITY, ABOUT MALIBU, and HOW DO I?. A sidebar on the left contains links to AGENDA CENTER, ALERT CENTER, CONTACT US, E-NOTIFICATIONS, and MUNICIPAL CODE. The main content area displays a search bar with the text 'geotechnical guidelines' and a magnifying glass icon. Below the search bar, it shows '1 - 10 of 2348 results (0.19 seconds)'. The first search result is a document titled 'Geology Guidelines Nov2013' dated Sep 10, 2013, with a file size of 936 KB. The document content includes the text: 'Prepared by: Fugro Consultants, Inc., and City of Malibu Environmental Sustainability Department November 2013 Guidelines for Geotechnical Engineering Reports November 2013 i 1 INTRODUCTION'.

Malibu, CA - Official Website | Home Page - Cal MyHazard | New tab

https://www.malibucity.org/Search?searchPhrase=geotechnical%20guidelines&page=1&perPage=10

+myConnections: Engage your community - connect to news, events and information you care about. [View more information...](#) [Sign In](#)

Malibu CALIFORNIA

MY GOVERNMENT | OUR COMMUNITY | ABOUT MALIBU | HOW DO I?

You are here: Home > Search

AGENDA CENTER | ALERT CENTER | CONTACT US | E-NOTIFICATIONS | MUNICIPAL CODE

Search

geotechnical guidelines [Advanced Search](#)

1 - 10 of 2348 results (0.19 seconds)

Geology Guidelines Nov2013 - Sep 10, 2013
<https://www.malibucity.org/documentcenter/view/215>
Prepared by: Fugro Consultants, Inc., and City of Malibu Environmental Sustainability Department
November 2013 **Guidelines** for **Geotechnical** Engineering Reports November 2013 i 1
INTRODUCTION
936 KB

Public Education

- Presentations for community groups
- Public Safety Town Halls
- Community Emergency Response Team (CERT) training
- Community events



City Staff & Supplies

- Emergency Operations Center (EOC)
Team training
- City staff training
- Maintain emergency supplies

Earthquake Resiliency Initiative

- Partnering with Southern California Association of Governments and Lucy Jones Center for Science and Society
- Striving to make Malibu more resilient
- Identify vulnerable buildings and identify incentives for strengthening

What should you do to prepare?

- Eliminate non-structural hazards
- Check your insurance policy
- Make a plan
- Obtain supplies for your home and car
- Attend training – CERT
- Sign up for Disaster Notifications
- Talk to your neighbors

Malibu Alert Systems

- AGENDA CENTER 
- ALERT CENTER 
- CONTACT US 
- E-NOTIFICATIONS 
- MUNICIPAL CODE 

You are here: [Home](#) > [Alert Center](#)



Alert Center

Alert Center allows you to view all alerts and emergencies in your area. If there are alerts or emergencies, they will be listed below by category. To be instantly notified of alerts and emergencies subscribe to [Notify Me](#) or [RSS](#).

▼ Beach Advisories

0 Alerts

There are currently no alerts for this category.

▼ Emergencies

0 Alerts

There are currently no alerts for this category.

▼ Public Health Advisories

0 Alerts

There are currently no alerts for this category.

▼ Traffic Advisories

1 Alert



September 29, 2017 2:00 PM

#Malibu Cyn Pole Replacement, Harbor Vista to Piuma, nights 9PM-5AM, days 9AM-3PM through March 2018

Construction on the Southern California Edison (SCE) Malibu Canyon Pole Replacement Project resumes October 2, 2017, after a summer hiatus, with project completion expected by the end of March 2018. No construction will take place on holidays or "red flag..."

[Read On...](#)

Search



All Categories 

Tools

 [RSS](#)

 [Notify Me](#)

 [Show Archived](#)

Categories

All Categories

- ▾ [Beach Advisories](#)
- ▾ [Emergencies](#)
- ▾ [Public Health Advisories](#)
- ▾ [Traffic Advisories](#)
- ▾ [Utility Advisories](#)
- ▾ [Weather Advisories](#)

Malibu Alert Systems

The screenshot displays the Everbridge Malibu Alert Systems interface. At the top, a browser window shows the URL <https://manager.everbridge.net/universe>. The main navigation bar includes 'Dashboard', 'Universe' (highlighted), 'Notifications', 'Contacts', 'Reports', and 'Settings'. A 'New Notification' button is visible in the top right corner.

The central map shows the Malibu area with numerous colored dots representing contact points. A 'Select Contacts' sidebar on the left offers options like 'Find Contacts', 'Filter contacts', 'Highlighting contacts', 'Map Layers', and 'Change map'. A 'Contact Layers' panel on the right lists data sources:

- View by: Record Types Groups
- BBC Portal Data
- BBC Client Data
- Verizon Landlines
- New Self Registration
- Manual Registration

The bottom of the screen shows a Windows taskbar with the search bar and system tray, including the date and time: 10:02 AM 1/24/2018.

Resources for More Information

- City of Malibu
Malibucity.org
- California Geological Survey
conservation.ca.gov/cgs
- Earthquake Country Alliance
earthquakecountry.org/prepare
- My Hazards
myhazards.caloes.ca.gov/
- United State Geological Survey (USGS)
earthquake.usgs.gov/earthquake
- Department of Homeland Security
Ready.gov