



*Cal* OES

GOVERNOR'S OFFICE  
OF EMERGENCY SERVICES

# California Earthquake Early Warning Advisory Board Meeting

October 27, 2021



# Roll Call

- Secretary of Natural Resources Agency
- Secretary of California Health and Human Services
- Secretary of Transportation
- Secretary of Business, Consumer Services, and Housing
- Speaker of the Assembly appointee representing the interests of private businesses.
- Governor's appointee representing the utilities industry (vacant)
- Senate Committee on Rules appointee representing county government.
- Chancellor of the California State University
- President of the University of California



# **Review of August 5, 2020 Minutes**

The logo of the University of North Carolina is a shield-shaped emblem. It features a white silhouette of a bear walking to the left, set against a gold background. Above the bear's head is a gold sunburst with rays. A pink five-pointed star is positioned to the left of the bear's head. The shield has a light blue border.

# **General Program Update**

**Nate Ortiz – Assistant Director**



# General Program Update

Since August 2020 advisory board meeting:

- 10/17/21
  - 32<sup>nd</sup> anniversary of Loma Prieta Earthquake
  - 2<sup>nd</sup> anniversary of EEW in CA
- 41 events have met alerting criteria
  - 41 MyShake warnings sent
  - 2 WEA warnings sent
- Seismic network build out progression
  - 74% built out (69% August 2020, revised)
  - 95.5% of stations funded (91% August 2020)
- ShakeAlertLA retired on December 31, 2020
  - Angelenos called on to download MyShake
- 2 ShakeOuts!
- New branding implemented

# ShakeAlert and July 8, 2021 Antelope Valley Earthquake

# ShakeAlert™

Doug Given, USGS  
and the ShakeAlert Project Team

## Public Alerting Rollouts

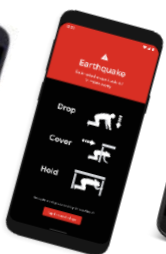
- [California](#) [October 19, 2019](#)
- [Oregon](#) [March 11, 2021](#)
- [Washington](#) [May 4, 2021](#)

Android

QuakeAlertUSA



WEA



MyShake



ShakeReadySD



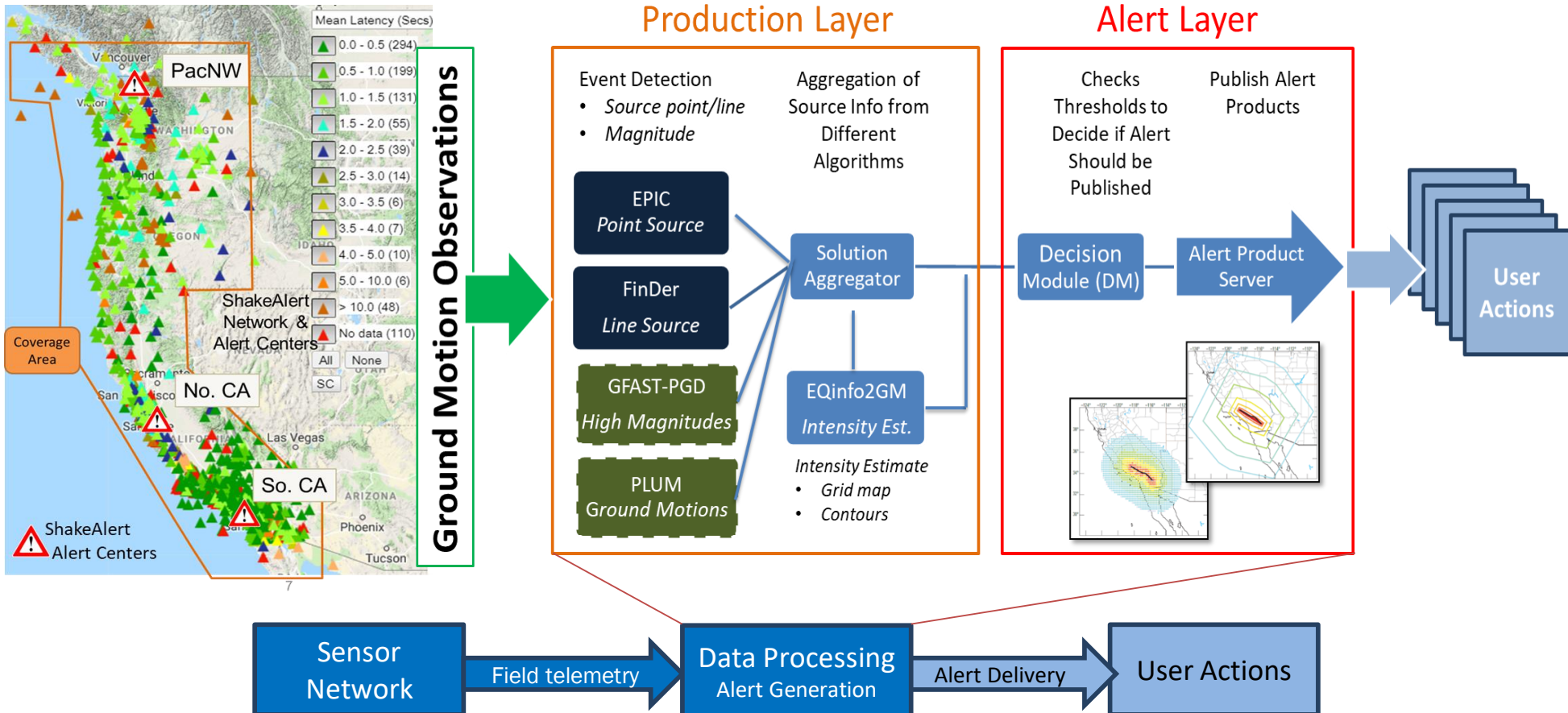
## 10 Licensed Operators (LtOs)

50 Installations

- **Early Warning Labs:** App, PA and system controls
- **Global Security Systems:** ALERT FM & receivers
- **Google:** Android Alerts
- **UC Berkeley:** MyShake™ alerting app
- **RailPros:** Metrolink positive train control system
- **RH2 Engineering:** water and sewage system controls
- **San Francisco Bay Area Rapid Transit District (BART):** train control
- **SkyAlert:** PA and system controls
- **Valcom:** PA and system controls
- **Varius:** water and sewage system controls



# Shake!ert™ Data Processing Overview

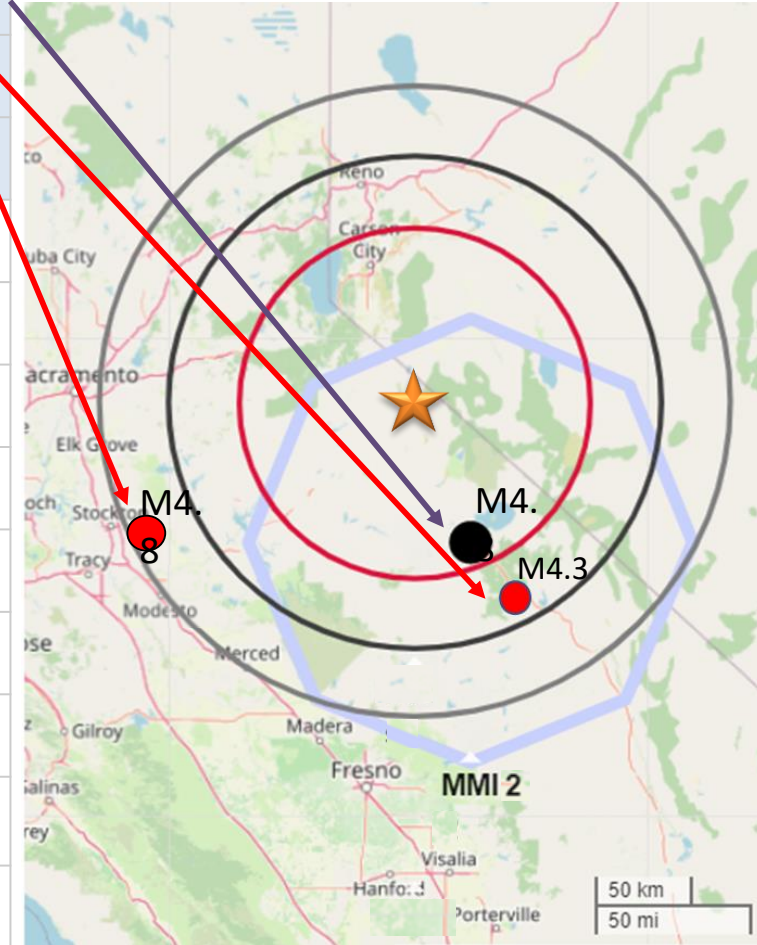




# M6.0 Antelope Valley – ShakeAlert Solutions

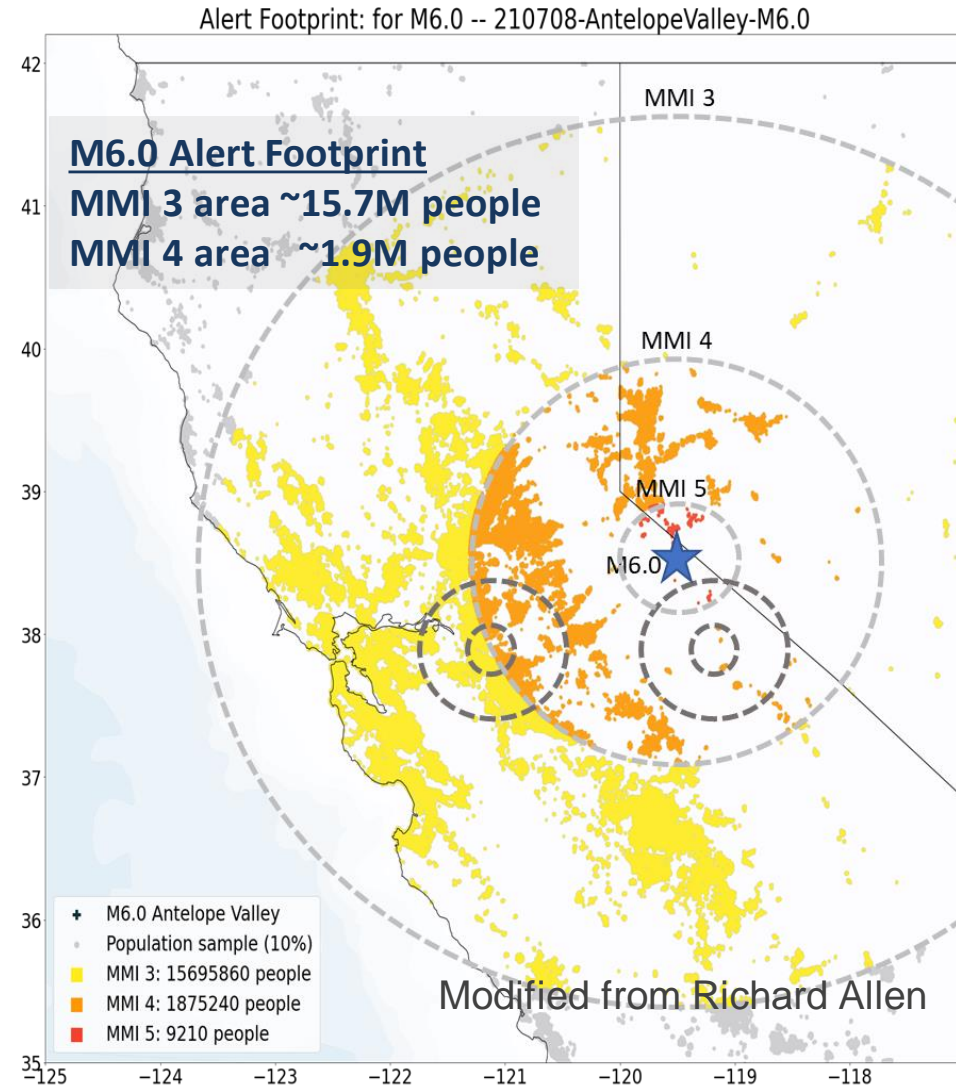
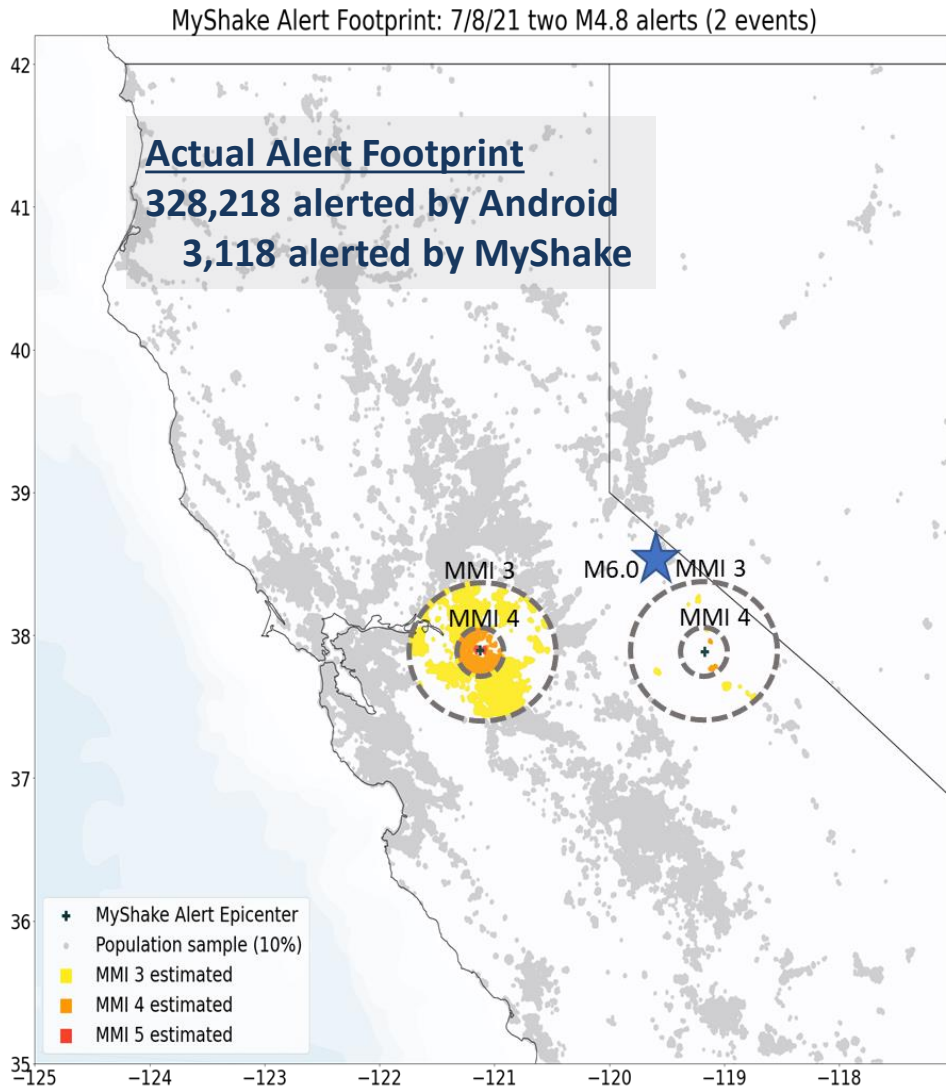
One week of aftershocks M3.5+

Event Origin Time (UTC)	Peak SA Mag	RSN Mag	Lat	Lon	Review Result
2021-07-08 22:50:01	4.8*	6.0	37.8864	-119.1695	Qualified Alert
2021-07-08 22:50:04	4.3	"	37.6660	-118.9557	False Alert
2021-07-08 22:50:13	4.8*	"	37.8952	-121.1256	False Alert
2021-07-08 23:11:01	3.5	3.6	38.6324	-119.5301	N/A
2021-07-08 23:33:41	4.8*	4.9	38.4741	-119.5543	True Alert
2021-07-08 23:44:41	3.6	3.5	38.5513	-119.4879	N/A
2021-07-08 23:47:43	3.6	3.7	38.5386	-119.5533	N/A
2021-07-08 23:58:54	4.2	4.5	38.5249	-119.5279	True Alert
2021-07-09 00:05:22	3.5	4.0	38.4488	-119.5025	N/A
2021-07-09 00:27:47	4.1	4.4	38.4347	-119.6189	True Alert
2021-07-09 01:46:01	3.9	4.9	38.0247	-119.4051	Qualified Alert
2021-07-09 05:04:18	* 3.8 App alert	4.3	38.5198	-119.5247	N/A
2021-07-09 05:10:36	4.6*	4.7	38.5638	-119.5305	True Alert
2021-07-14 03:46:14	4.0	4.1	38.5469	-119.4630	True Alert
2021-07-15 14:18:29	3.8	4.0	38.5280	-119.4846	N/A





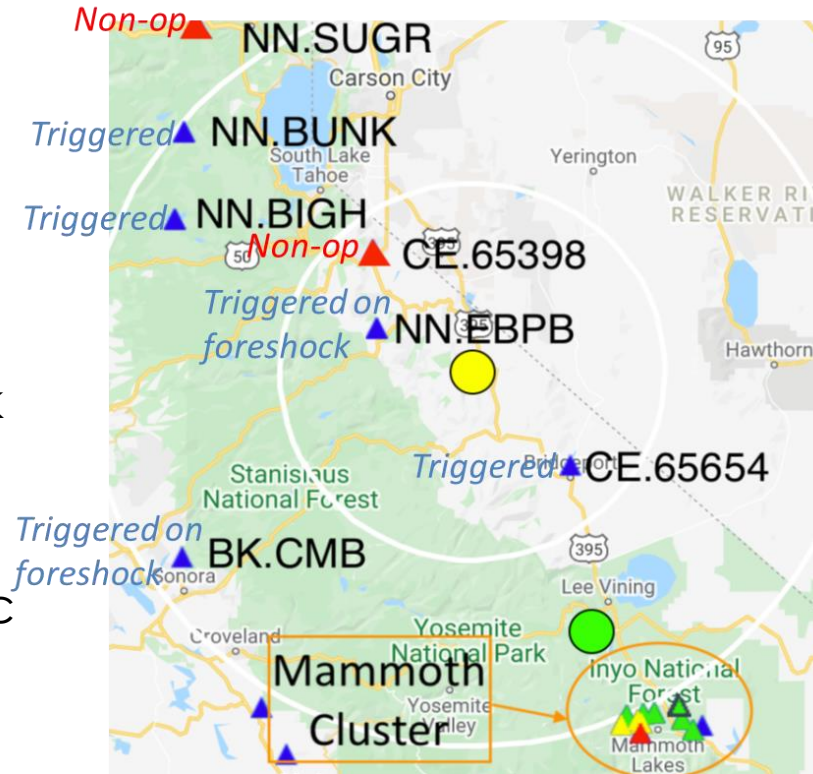
# M6.0 Antelope Valley – ShakeAlert Solutions



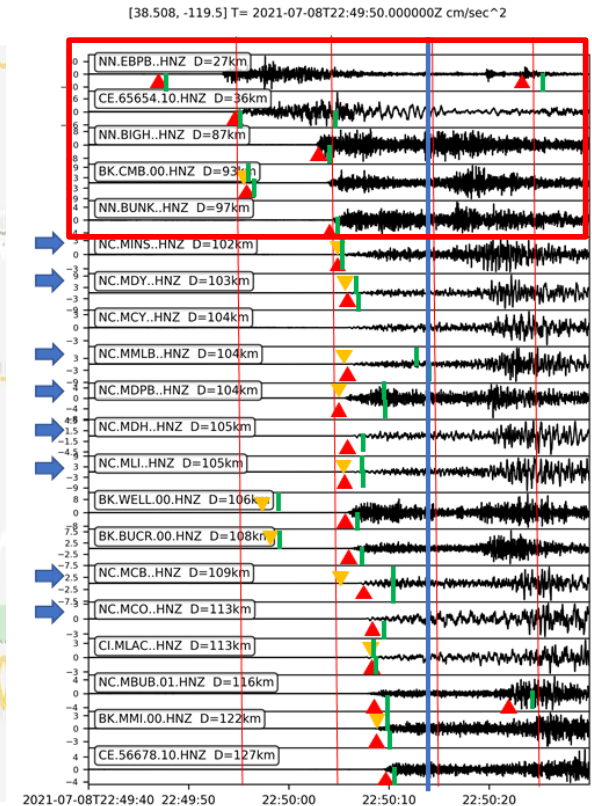
Apps alert the MMI 3 area for M4.5+ events

# Summary of AAR Key Findings

- Sparse station coverage
  - Only 6 stations <100km
  - Two non-op stations
  - Edge of network
  - Not built 100% out here
- Station Cluster Logic Mammoth cluster
- Aggregation logic did not prevent split
- Foreshock 9s before mainshock



Yellow dot = M6.0 location  
Green dot = SA location



Blue arrows indicate stations that formed the ShakeAlert solution near Mono Lake

# Highlights of AAR Recommendations

- Seismic Networks and Stations
  - Continue building-out ASAP
  - Prioritize active areas
  - Streamline station acceptance process
- EPIC algorithm
  - Review station cluster logic, HN/HH handling, 10 second post-event window, *MaxNEtoZ*, etc.
  - Explore better use of amplitude info
- FinDer algorithm
  - Allow FinDer alert alone for large events
- Solution Aggregator logic
  - Implement better event association, based on stations used (reduce splits)
- Post-event Review & Web Integration
  - Revise procedure for handling splits
  - Improve background info on webpages
- Messaging and User Engagement
  - Continue to improve messaging about EEW limitations

The logo of the University of North Carolina is a shield-shaped crest. It features a white silhouette of a bear walking to the right on a tan background. Above the bear's head is a pink five-pointed star. The top of the shield has a tan background with white rays emanating from the top center. The shield is outlined in a light blue-grey color.

# **System Operations**

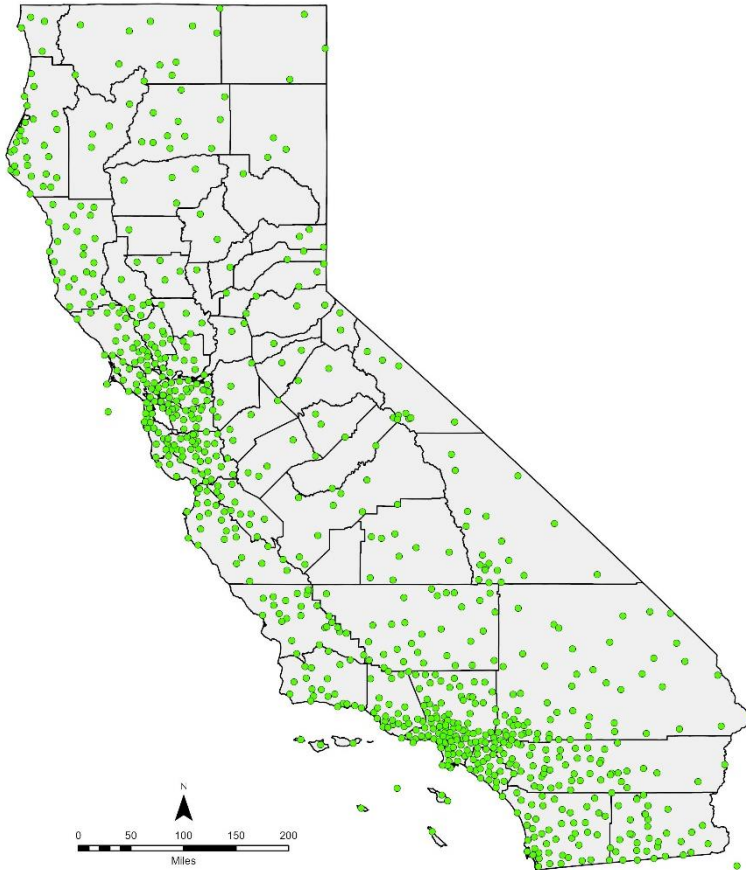
**Dana Ferry – Project Manager System Operations**



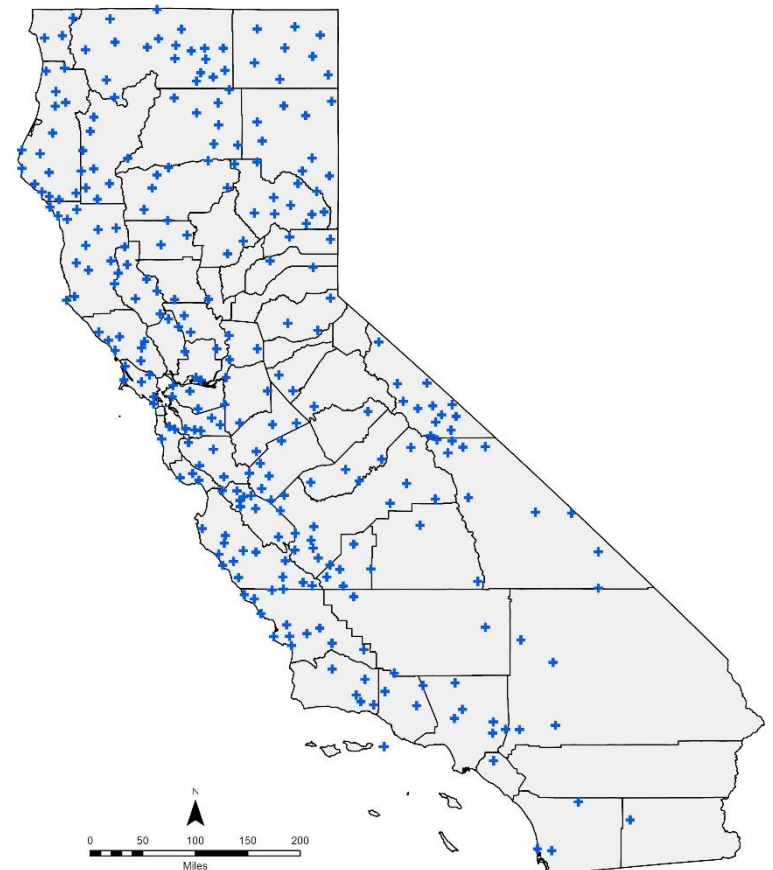


# CEEWS Network Goal of 1115 Stations

## October 2021 Status



820 stations in CA contributing  
to ShakeAlert™



295 stations to go!!

245 funded, 50 unfunded



# CEEWS System Ops Overview 2016-2021



Caltech



## Accomplishments

- Funded **577** new and updated EEW/real-time stations
- Completed **332** new and updated EEW/real-time stations
- Connected **58** EEW stations to State Microwave
- Connected **2** of the 5 partners to the State Microwave. (UCB, CGS, DWR coming in 2022)

	Funded New/Updated EEW Stations	Completed	Remaining
<b>CA Geological Survey</b>	192	142	50
<b>US Geological Survey</b>	142	98	44
<b>UC Berkeley</b>	118	70	48
<b>Caltech</b>	101	10	91
<b>Department of Water Resources (DWR)</b>	24	12	12
<b>Total</b>	<b>577</b>	<b>332</b>	<b>245</b>

	Funded EEW Microwave Connection	Completed	Remaining
<b>Public Safety Communications (PSC)</b>	<b>350</b>	<b>58</b>	<b>292</b>



# CEEWS Seismic Station Build Out 2021 Challenges

- COVID-19 restrictions
- Obtaining new and renewed land-use permits / leases
- Wildfires
- On-going funding for operations & maintenance
- Equipment delivery delays





# CEEWS System Ops Highlights 2021

First **58** EEW stations connected to  
Microwave Project

Constructed **55** New Stations



UCB Processing Center ready to be  
connected to Microwave Project



UCB Warren Hall Data Center



# **Research and Development**

**Jennifer Strauss – MyShake Product Manager**

Enhancing  
with the



*CEEWS*

**MyShakePlatform**

Faster alerts to everyone in California

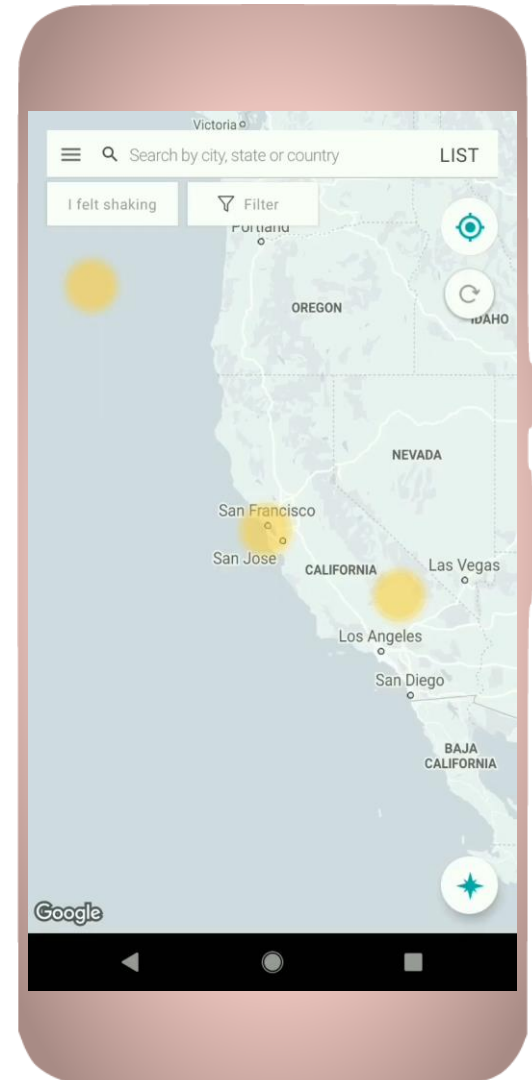
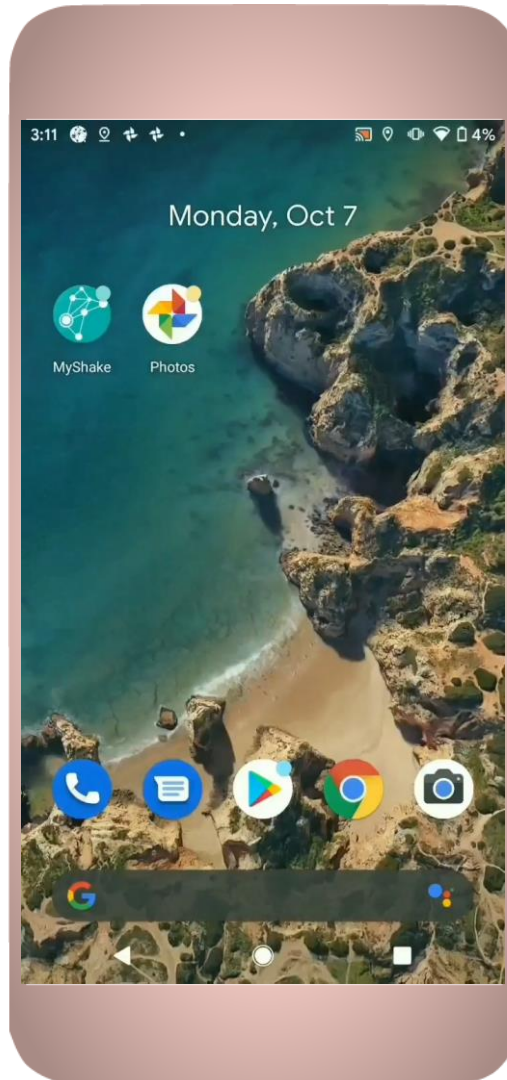
*progress update*



Jenn Strauss  
Product Manager



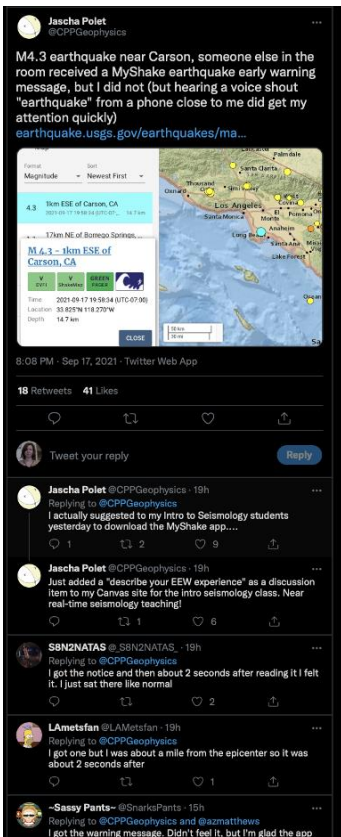
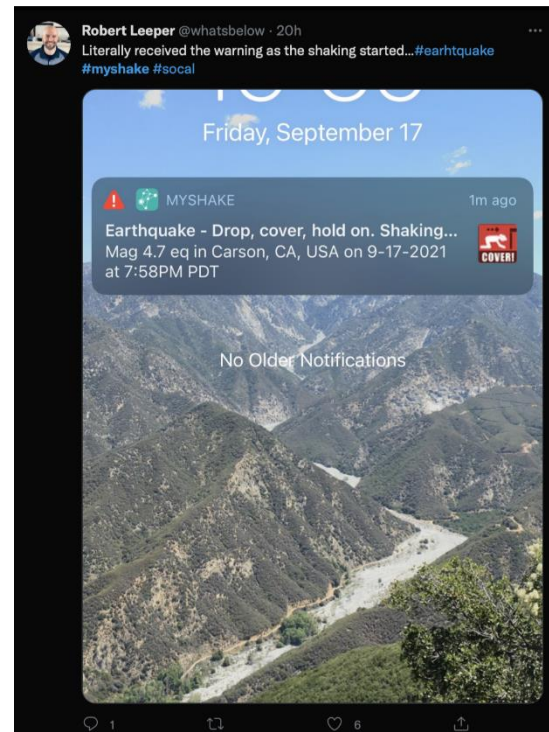
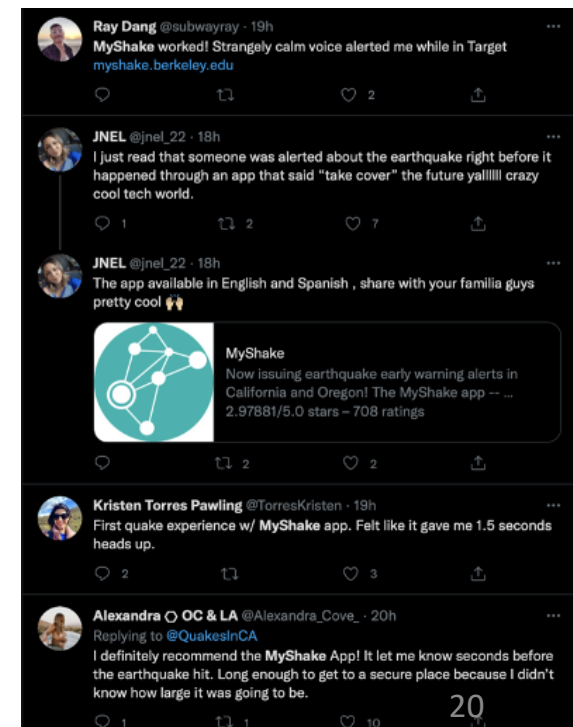
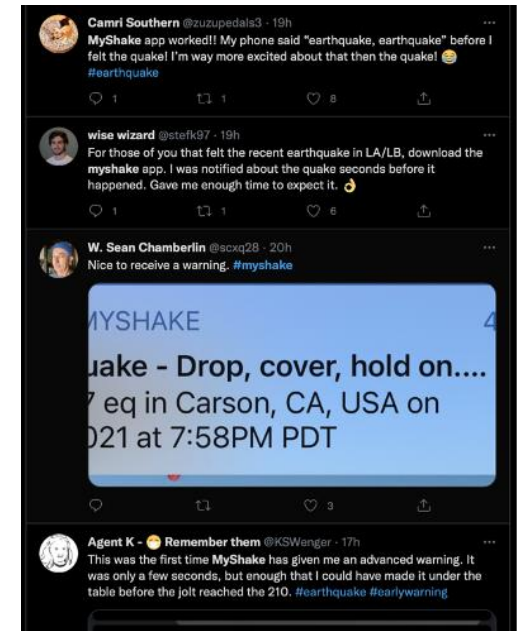
# The MyShake app



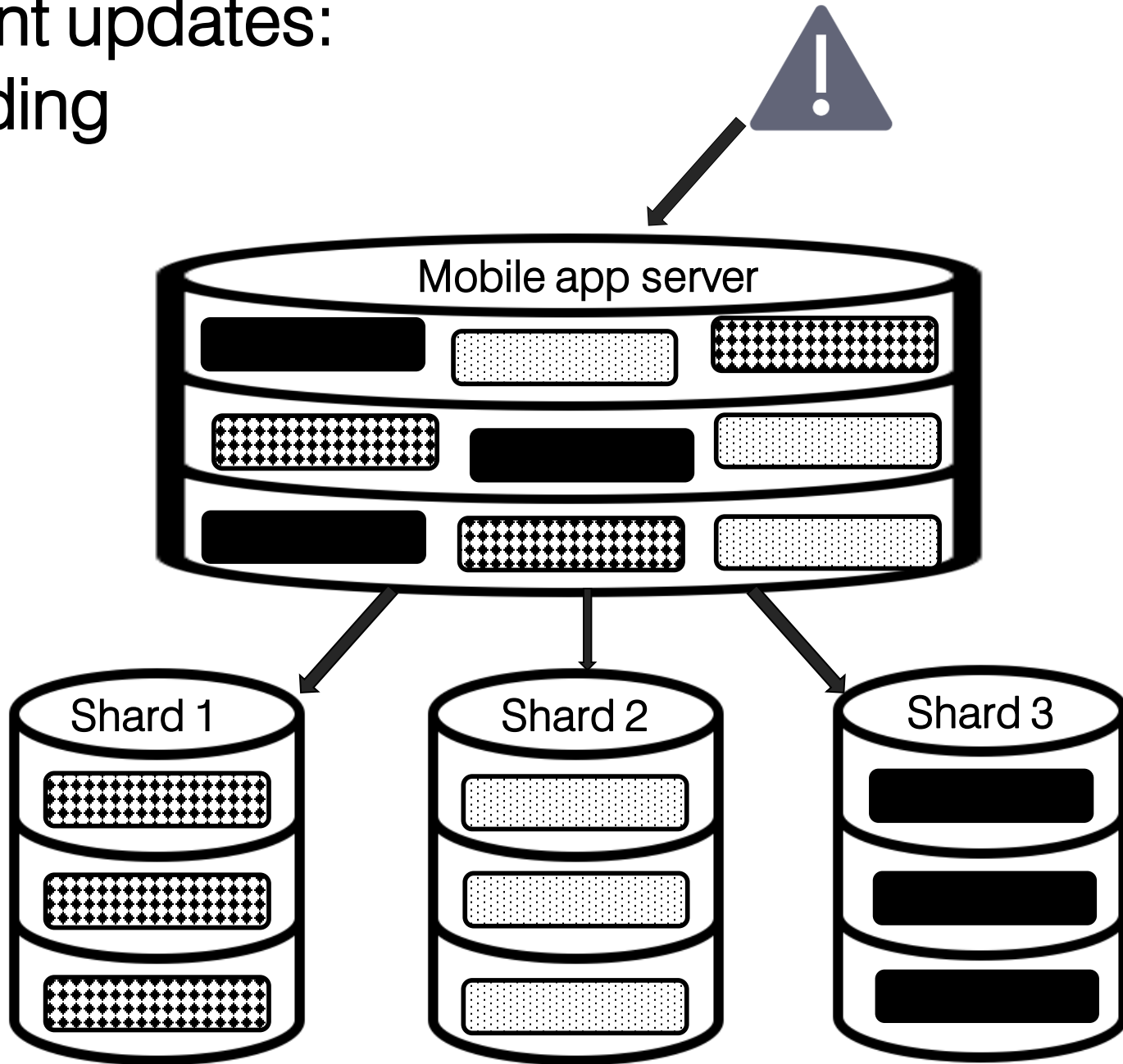


# The MyShake user experience

- 1,580,000+ registered users
- 105,000+ experience reports
- 46 alerts sent since launch
- Feedback from users



# Recent updates: Sharding



# Recent updates: Safety

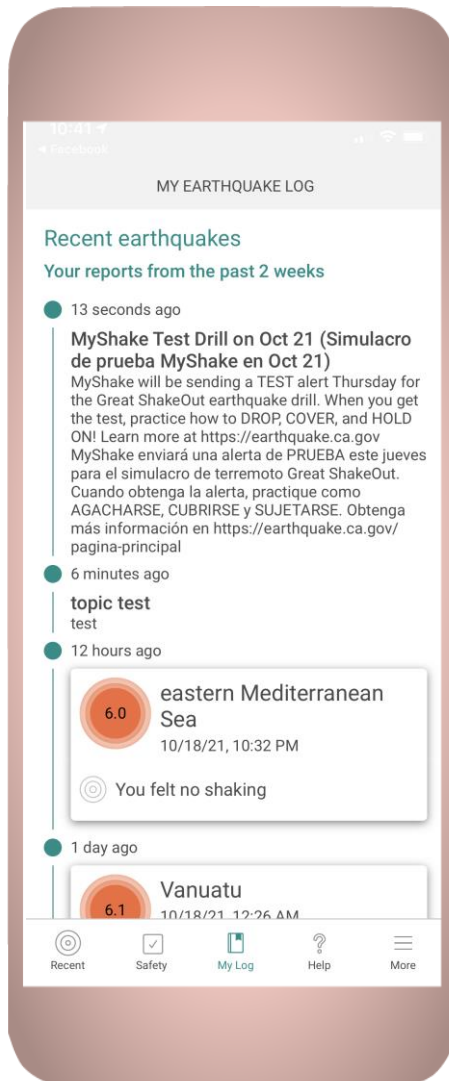
More inclusive safety images



Increased  
VoiceOver  
compatability



# Recent updates: Drills and improvements



TEST of the earthquake warning system. No action required.  
Mag 6.5 eq in San Francisco, CA on Mon Aug 10 at 12:34 pm PDT

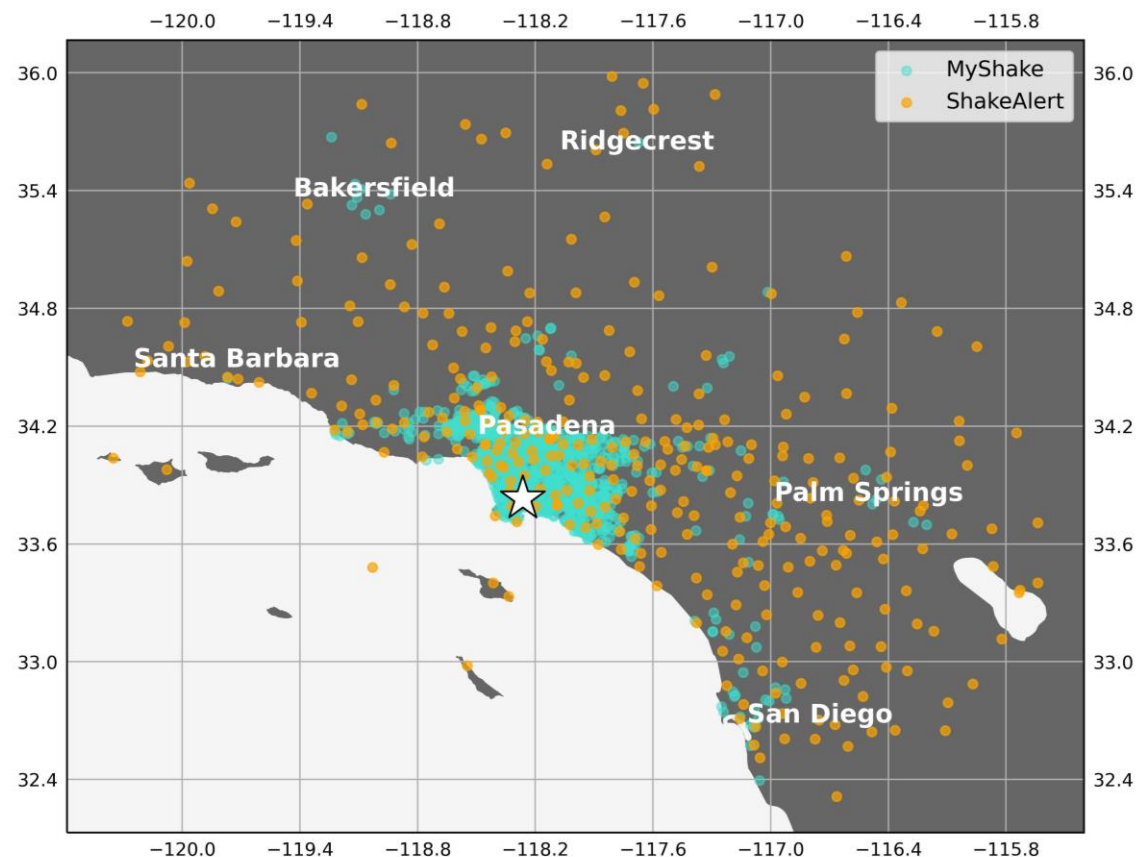


PRUEBA del sistema de alerta de sismos. No se requiere acción.  
Mag 6.5 eq en San Francisco, CA el Mon Aug 10 at 12:34 pm PDT



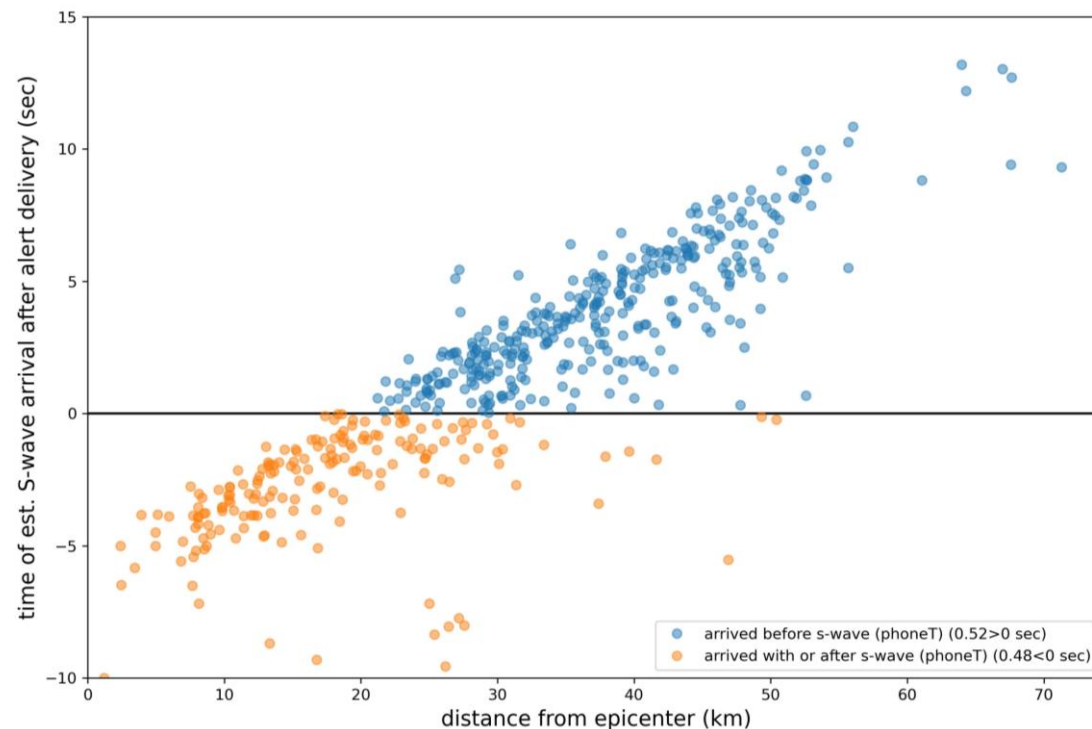
# Enhanced earthquake detection

- Earthquake detections for the M4.7 Carson earthquake (Sept. 17, 2021)
- Orange dots represent the ShakeAlert stations that triggered.
- Turquoise dots represent MyShake phones that triggered; some as far away as Bakersfield and San Diego.



# Enhanced earthquake detection

- Alert receipt times relative to the estimated S-Wave arrival time.
- The blue points represent phones who received an alert before the estimated S-wave arrival.
- The orange are phones are those who received the alert at or after the S-wave arrival time.
- About half of MyShake users received an alert before the S-wave arrived at their location even though the earthquake was situated right under the population center.



# Next steps

## Rollout and testing

1.5 M downloads

Second test drill on Oct 21, 2021

## Ongoing improvements

UI improvements for AFN

UI improvements for alert locations

Preparations to scale to 4M



## Research and development

Enhanced earthquake detection

# Finance



**Lori Nezhura – Deputy Director**



# 2020-21 Budget Allocations

- \$17.283 million one-time General Fund to finish the build-out of the California Earthquake Early Warning System
- Includes:
  - New and updated seismic stations installation
  - Improving telemetry
  - Continuing statewide education and outreach campaign
  - MyShake mobile application
  - Research and development



# 2021-22 Budget Allocations

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  - MyShake mobile application
  - Research and development



The crest of the University of Alberta is a shield-shaped emblem. It features a white silhouette of a bison standing on a yellow field. Above the bison's head is a yellow sunburst with rays extending upwards. To the left of the bison's head is a pink five-pointed star. The shield has a light blue border.

# **Education and Outreach Overview**

**Pulsar Advertising**



# Education & Outreach Campaign

## August 2020 to Present

- Paid and earned media and outreach activities began in August and will run through March 2022
- TV spots have been flighted in 2 week runs to leverage key events and outreach activities:

- August 31—September 13, 2020
- October 5—18, 2020
- November 16—29, 2020
- April 5—18, 2021

- May 3—16, 2021
- June 7—20, 2021
- September 6—19, 2021
- October 4—24, 2021



Television, digital banner & social media ads created in 6 different languages with multiple executions.

Creative executions adapted throughout the course of the campaign to achieve greatest engagement with all audiences.





# Strategic Approach

- Campaign launch goal to generate awareness of new program name, educate audiences on alert options and direct users to newly designed website
- Reach and educate ALL Californians.
- Focus on digital strategies and provide broad outreach via TV
- Engage with influential organizations and groups
- ***Adaptable***



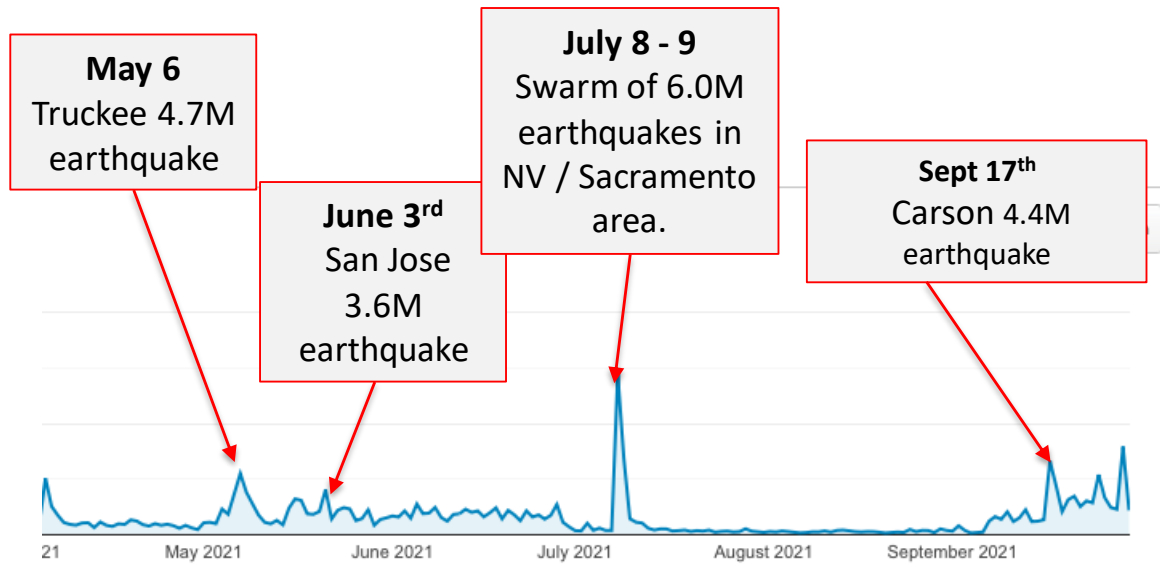
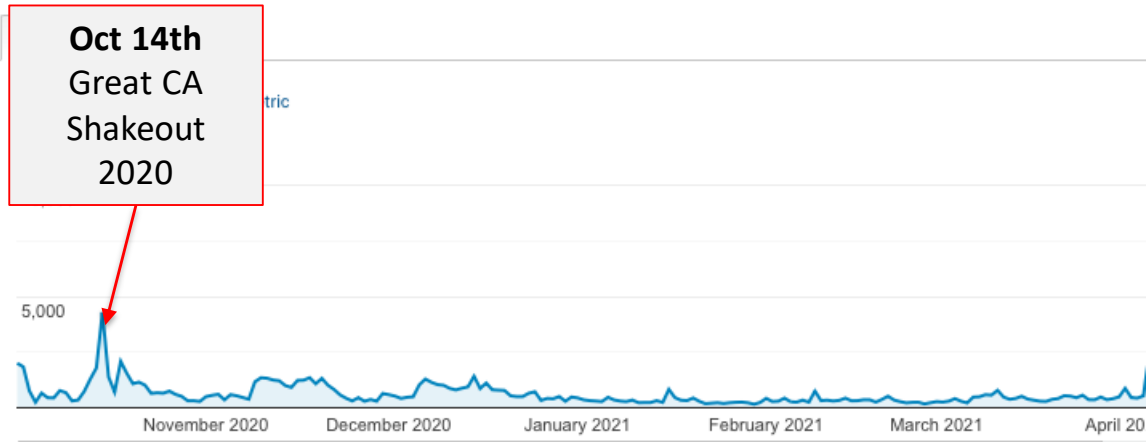
# Strategic Approach

- ***Adaptable***

- Campaign results showed greatest web traffic and app download activity immediately after an earthquake
- Rapid Response Plan developed to immediately deploy paid media assets in radio, weather & broadcast sponsorships, TV, digital and social



# Timeline





# Rapid Response Creative

GET EARTHQUAKE  
WARNINGS BEFORE YOU  
FEEL SHAKING WITH



MyShake™


GET IT ON Google Play Download on the App Store

Download now for FREE and  
learn more at: [earthquake.ca.gov](http://earthquake.ca.gov)



**EARTHQUAKE  
WARNING  
CALIFORNIA**

Download MyShake



**EARTHQUAKE  
WARNING  
CALIFORNIA**

Before the next quake  
download MyShake



**EARTHQUAKE  
WARNING  
CALIFORNIA**





# Added Value - TV



EARTHQUAKE  
WARNING  
CALIFORNIA



# Earned Media

**Activities include** media  
pitching, media relations, op-  
eds, Public Service  
Announcements, press releases.

Coordination with QuakeBot to  
include MyShake info with  
automated earthquake alerts

**More than 2,000 media stories**  
since August 2020 relating to  
Earthquake Warning California  
and the MyShake App.

abc10

News

Weather

Near Me

VERIFY

Watch  
Live



UPLOAD

LINKS

DOLLARS & SENSE

FIRE · POWER · MONEY

## California Earthquakes Latest: Cal OES talks magnitude 6 earthquake Northern California

California Earthquakes Latest: Cal OES talks magnitude 6 ...



## The Antelope Valley Time

POLITICS EDUCATION HEALTH BUSINESS OPINION

ands throughout L.A. County

ate in earthquake drill

y

1, 2021 — [Leave a Comment](#)

## BEACH POST Ne

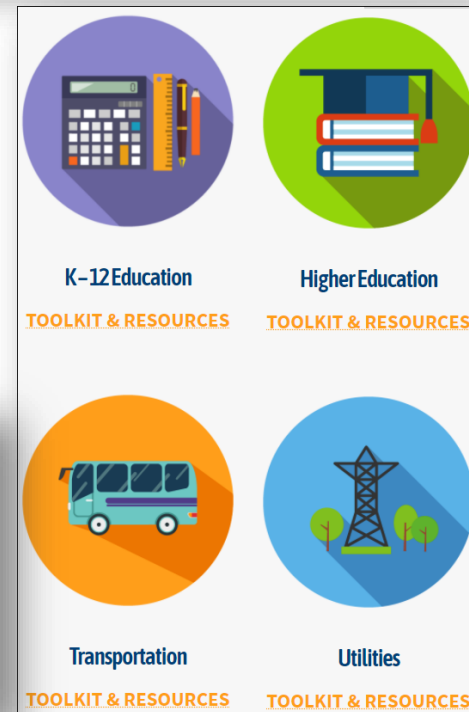
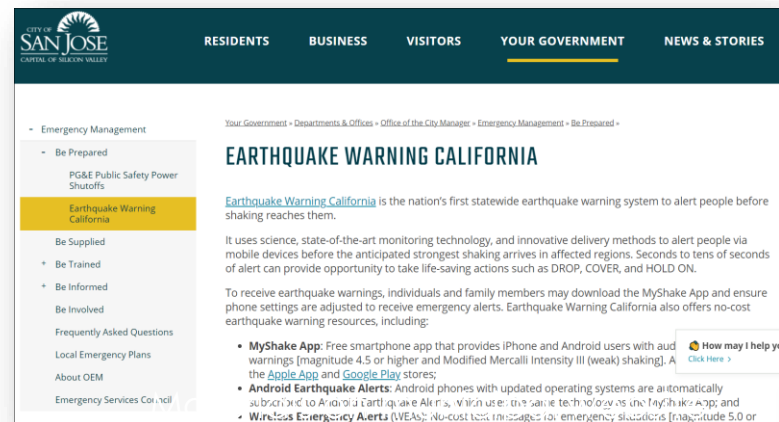
ng Beach leaders charted a disastrous course for the

Out earthquake dr



# Third Party Engagement

- **Third party partners:** credible third parties that have agreed to share information about Earthquake Warning California with their members, followers, and staff.
- **Activities include** presentations (delivered by Cal OES or 3rd party), social media, newsletters, comments, social media, op-eds, etc.





# Results

- The campaign is in its 54<sup>th</sup> week, **combined impressions** of paid and earned media of **10 billion**
- Unaided awareness of the MyShake™ App has more than doubled
- **Unaided recall** of State of California as the sponsor has **tripled**
- Over **430 Third Party Partners**
- **\$20+ million ad value equivalency** for earned media
- Website and app download apps spiked post event incidents
- **Daily website users** more than triple with new design and functionality with a current weekly user base of **237,000**

# Earthquake Warning California Grants

Inland SoCal United Way: What We're Doing

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## **Partnerships to expand reach to underserved communities**

Partner Agencies:

- El Sol Neighborhood Education Center
- United Way of the Desert

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## **Outreach and events to increase understanding/use of Earthquake Warning Systems**

- Actionable Communication via Flyers, Ads, Brochures, Incentives, Videos, Social Media
- Local Community Events
- 211 Contact Center Interactive Peer to Peer Engagement



# Earthquake Warning California Grants

Inland SoCal United Way: Approach

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## Partnerships

- Linguistic and Geographic Coverage of Area
- Training and Materials for Partners
- Establish Data Tracking Methods

## Outreach/Events

- Multilingual Flyers, Ads, Brochures, Incentives, Videos, One-on-One, and Q&A
- Web Page, Text Campaign, 211 Phone Calls, Community Events, Canvassing, Virtual Townhalls



# Earthquake Warning California Grants

Inland SoCal United Way: Current Progress

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## Partnerships

- Partner Contracts Secured
- Hiring and Training Underway
- Event Scheduling and Strategy Planning In Process
- Data Tracking Method Established

## Outreach/Events

- Marketing: Creating Bilingual Flyers, Ads, Brochures, Incentives, Videos, Social Media
- Community Events Scheduled including Resource Fairs and Programs for Housing Assistance
- 211 Contact Center Interactive Engagements

# Earthquake Warning California Grants The Approach

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- Trusted community messengers to deliver the message with care
- Accessible information in multiple languages
- Integrate with systems that are accessed by the target population

44

# Earthquake Warning California Grants

## The Plan

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- 211 texts and call specialists' conversations
- Grants for awareness and outreach activities:
  - Local disaster preparedness and relief coalitions
  - Independent Living Centers, Senior Centers, and other organizations that support this target population
- Community based organizations such as family resource centers, school-based services,

# Earthquake Warning California Grants The Progress

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In summary, we have been planning...

- Marketing planning meetings
- 211 planning meetings
- SF CARD and CADRE SV meetings
- Internal UWBA program team planning meetings

The background of the slide features a large, light blue shield. Inside the shield, there is a white silhouette of a bear walking towards the left. Above the bear's head, there is a pink five-pointed star. In the upper left corner of the shield, there are several yellow sun rays emanating from a point.

# **The Great ShakeOut**



# **Discussion & Next Steps**





# Discussion Points

- Looking into the future:
  - Integrate EEW into industry, buildings and infrastructure
    - Regulations
    - Training
    - Outreach
  - System operations
    - Operations and maintenance
    - New technologies



# Next Steps

- Working together to increase EEW adoption
  - Among the public
  - Automated actions in industries represented by board members
- Resources for board members
  - [earthquake.ca.gov](http://earthquake.ca.gov)
    - Share toolkits, videos, and FAQs
  - [ListosCalifornia.org](http://ListosCalifornia.org)
    - Disaster Ready Guide and other resources
  - [Caloes.ca.gov](http://Caloes.ca.gov)
    - Preparedness Ambassadors curriculum

The crest of the University of Alberta is partially visible on the right side of the slide. It features a shield with a gold background. At the top, there are gold rays emanating from a point. Below the rays is a white silhouette of a bison or caribou standing and facing left. A pink five-pointed star is positioned to the left of the animal's head.

# **General Public Comment**