ShakeAlert Rollout

March 1, 2021

ShakeAlert
Early Earthquake Warning System

ShakeAlert is an infrastructure of sensors, technology and systems in place along the West Coast to detect significant earthquakes quickly so that alerts can reach people before shaking arrives.

- **Already operational for automatic-action systems** such as water utility valve shutoffs and starting back up generators
- Seconds of advance warning allows people and systems to take actions to protect life and property from destructive shaking
- The ability for the system to notify the public via Wireless Emergency Alerts will begin at 10 a.m. on March 11 in Oregon

Oregon Rollout

- Oregon will be the **second state to offer ShakeAlert public alerting to wireless devices**, after California did so in October 2019

- ShakeAlert technical partners in Oregon have been using the ShakeAlert system for triggering automated actions, such as closing water pipelines to support public safety

- Washington State conducted a WEA demonstration of the ShakeAlert system on February 25; the WA public rollout will be later in the year

- Oregon will conduct a WEA test for ShakeAlert this summer

WEA Alerts

- The delivery of alerts using the Wireless Emergency Alert system will go live at 10 a.m. on **March 11**, but a WEA demonstration for educational purposes is proposed for July 2021 to allow time for the State of Oregon, USGS and partners to broadly promote the system and effectively train the public on how to opt into the test and participate in a statewide interactive event.

- No action needs to be taken on March 11.
- No sign up is required.

Why March 11?

March 11 is the 10th anniversary of the M9.1 Great Tohoku, Japan earthquake and tsunami.

- The Tohoku tsunami inundated coastal communities in Oregon, causing millions of dollars in damages
- Like Japan, a subduction zone earthquake lies off the coast of Oregon, capable of generating M9.0 earthquakes

Alert Actions

- **Take protective action:** Drop, Cover and Hold On (DCHO)
  - Do not risk injury by moving to another location or outside; earthquakes occur without warning and may be so violent that you cannot run or crawl

- Guidelines for what to do if you are disabled, not at home/work and other locations at www.shakeout.org

How it Works – Alerts

ShakeAlert messages originate with the USGS and are disseminated via public and private partner channels

- Limited cell phone applications available (one in Oregon - QuakeAlertUSA)
  - Only QuakeAlertUSA app provides countdown to shaking
- Embedded in Android operating systems (OS)
- Transmitted via WEA
  - Distinctive notification sound, message appears on screen
  - English and Spanish
  - Users may opt out

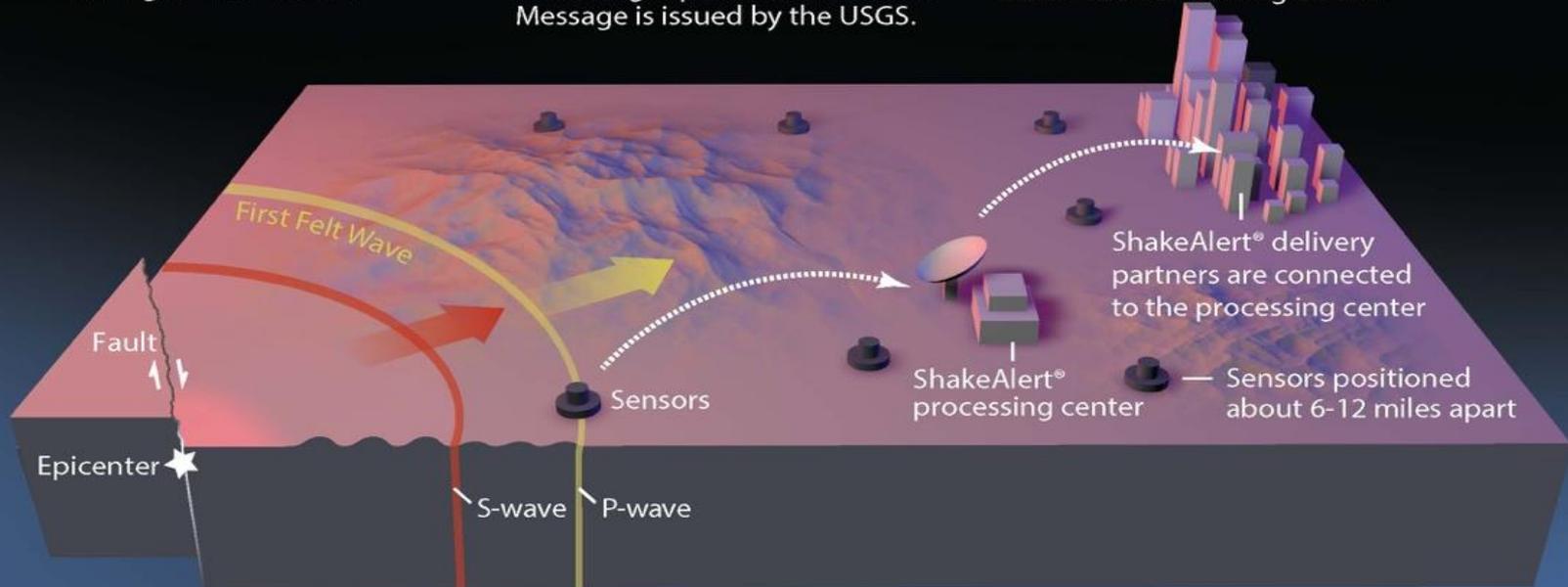# WEA Alert
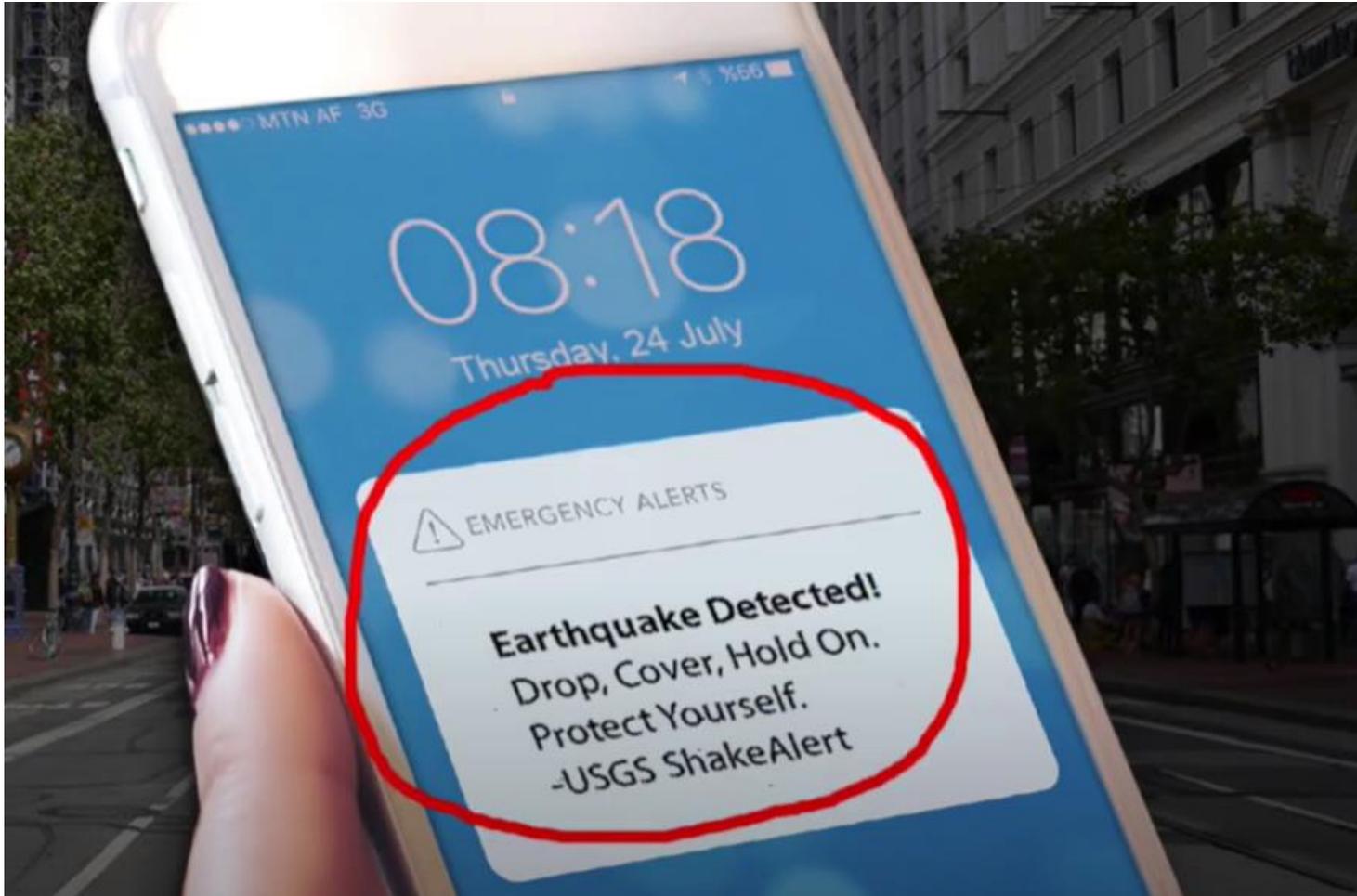
How it works - Technology

- A network of seismic sensors across CA, OR and WA are constantly measuring ground motion

- Data sent to USGS processing centers

- When quake occurs and sensors feel the ground motion, fast-working algorithms at USGS determine that an earthquake is occurring, estimates the location/magnitude and shaking intensities

- For a ShakeAlert message to be issued by the USGS, at least four seismic sensors need to detect the same ground motion

ShakeAlert® Earthquake Early Warning Basics

1 During an earthquake, a rupturing fault sends out different types of waves. The fast-moving P-wave is first to arrive, followed by the slower S-wave and later-arriving surface waves.

2 Sensors detect the P-wave and immediately transmit data to a ShakeAlert® processing center where the location, size, and estimated shaking of the quake are determined. If the earthquake fits the right profile a ShakeAlert® Message is issued by the USGS.

3 The ShakeAlert® Message is then picked up by delivery partners (such as a transportation agency) that could be used to produce an alert to notify people to take a protective action such as Drop, Cover, and Hold On and/or trigger an automated action such as slowing a train.

First Felt Wave

Fault

Epicenter

S-wave   P-wave

Sensors

ShakeAlert® processing center

ShakeAlert® delivery partners are connected to the processing center

Sensors positioned about 6-12 miles apart

Adapted from Erin Burkett (USGS) and Jeff Goertzen (Orange County Register). Updated by ShakeAlert® team (2020).

ShakeAlert Funding

Development of the ShakeAlert System has been made possible by investments from several sources including the USGS, the State of California, the State of Oregon, the Gordon and Betty Moore Foundation, and the Federal Emergency Management Agency (FEMA) through the California Governor's Office of Emergency Services (Cal OES) and the Los Angeles/Long Beach Urban Areas Security Initiative.

The ShakeAlert System leverages the national investment already made in earthquake monitoring by the USGS-lead Advanced National Seismic System (ANSS). In the Pacific Northwest this is the Pacific Northwest Seismic Network (PNSN), a collaboration among the USGS, the University of Washington and the University of Oregon.

Communications Goals/Objectives

- Announce Oregon roll out the testing of delivery of earthquake early warning alerts to wireless devices

- Coincide with March 11 anniversary of M9.1 Great Tohoku, Japan earthquake and tsunami

- Introduce the public to ShakeAlert and how to use it

- Recognize partners who are helping make ShakeAlert possible in Oregon

- Reinforce importance of emergency preparedness, 2 Weeks Ready

ShakeAlert Messaging
Equity and Inclusion

OEM and partner agencies are sensitive to the ability for limited English proficient (LEP) communities to be included in ShakeAlert messaging.

- News releases translated to Spanish, Vietnamese, Russian ShakeAlert toolkit available in English, Spanish, Chinese, Tagalog, Vietnamese and Russian
- Media events to include ASL interpreter

Links and Resources

- [ShakeAlert](#)
- [How does ShakeAlert work?](#) IRIS Video
- [USGS](#)
- [University of Oregon – Oregon Hazards Lab](#)
- [Pacific NW Seismic Network](#) -
- [Oregon Department of Mineral and Geologic Industries](#)
- [Two Weeks Ready](#)
- [Earthquake Safety Information](#)
- [Tsunami Safety Information](#)
- Living on Shaky Ground ([English](#)) ([Spanish](#))
- [Without Warning Earthquake](#)
- Without Warning Tsunami ([English](#)) ([Spanish](#))
- [Oregon Seismic Safety Policy Advisory Commission (OSSPAC)](#)
- [Oregon Resilience Plan](#)
- [Cascadia Region Earthquake Workgroup (CREW)](#)
- [Cascadia Island Mapping](#)