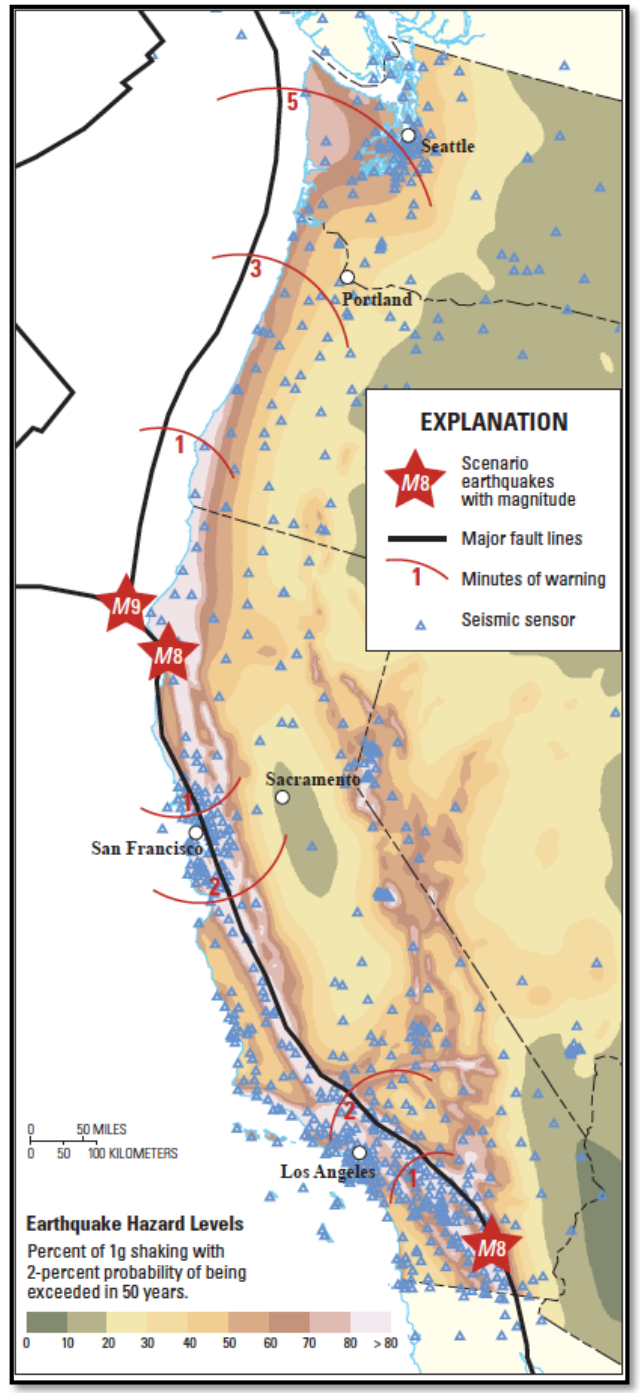
ShakeAlert™

Earthquake Early Warning System

- Public safety project for west coast of North America
- A well-coordinated coalition of federal, state, and university partners in Oregon, Washington, and California
- 2014 & 2018 technical implementation plans define system



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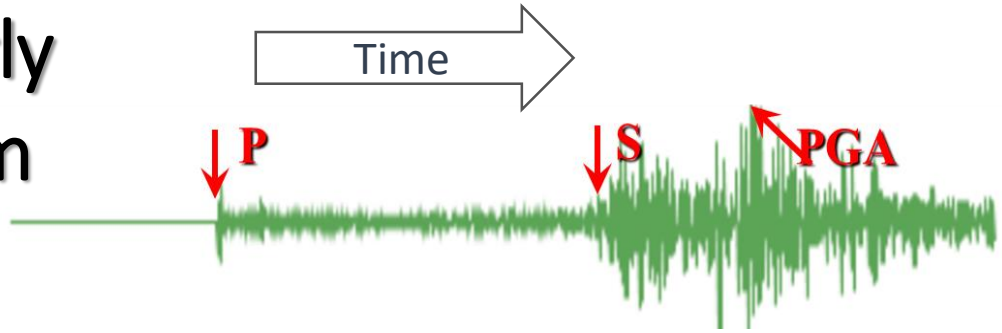
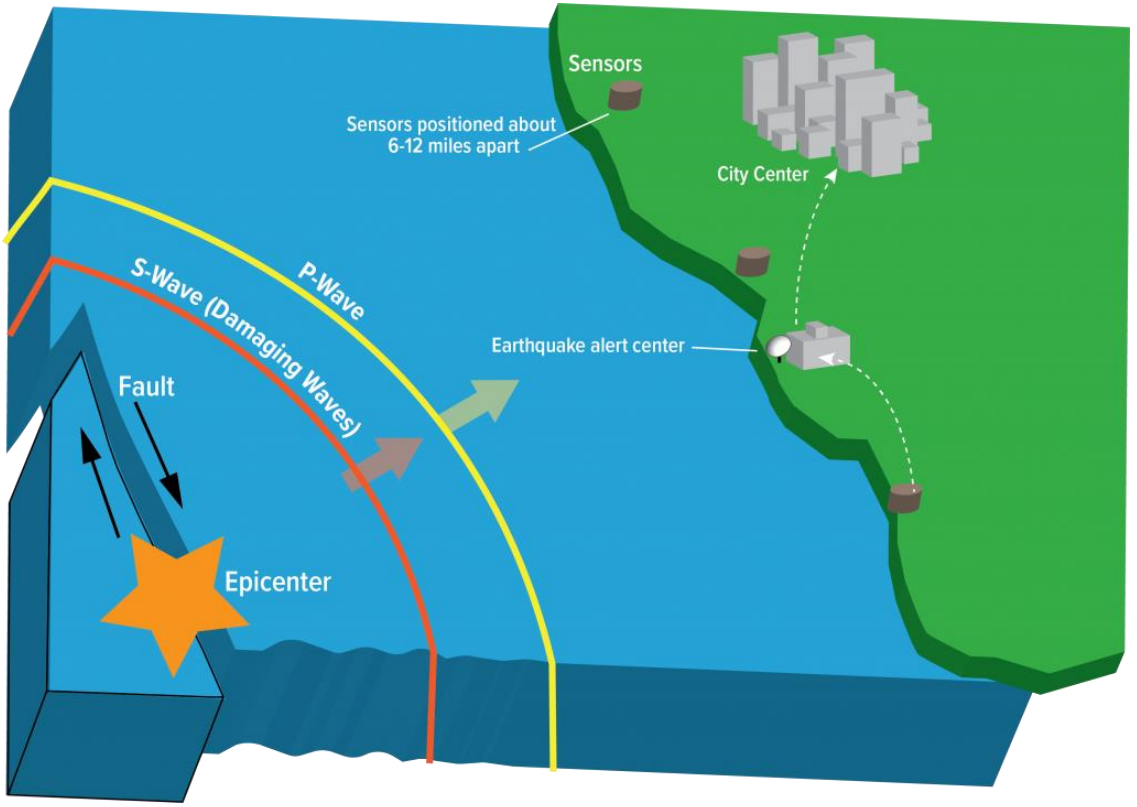


EEW Concepts

- P-wave
  - Faster ~ 3.5 mi/sec
  - **Less destructive**
- S-wave
  - Slower ~2.0 mi/sec
  - **More destructive**
- Fault rupture and magnitude take time to grow to final size (~2 miles/sec)
- Warning time depends on your distance to epicenter
- Shake level depends on your distance to rupture



ShakeAlert: Timeline and Public Release

- Phase 1: Oct. 2018
  Limited alerting
  - 60+ organizational users and commercial developers
  - No “public” alerting
  - Machine-to-machine
  - Alerts to personnel, clients
  - Developing cell phone apps

- Phase 2: Jan. 2019
  Test of public alerting
  - ShakeAlertLA cell phone app
  - Los Angeles County only

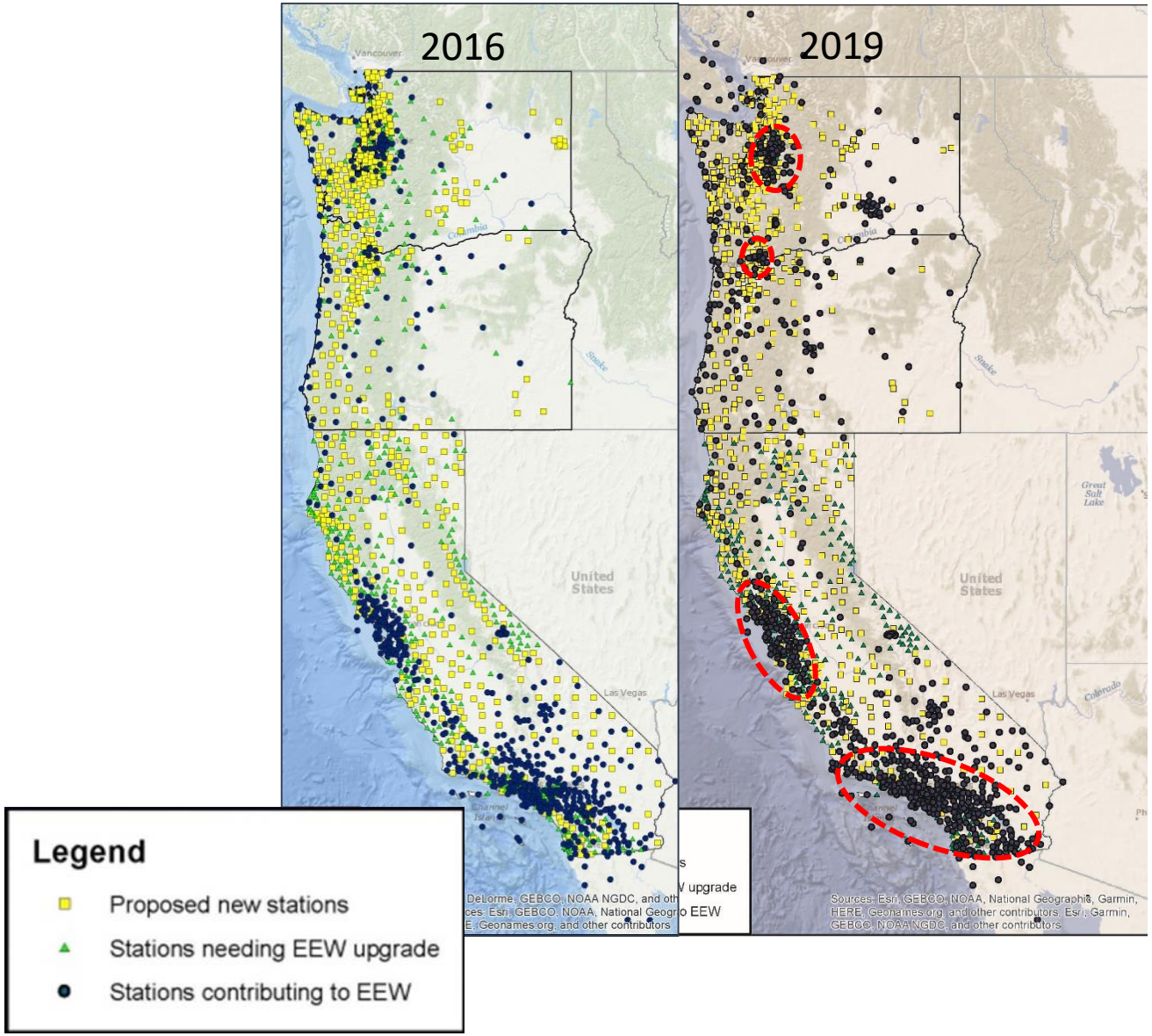
- Phase 3: Oct. 17, 2019
  Test of public alerting in California
  - MyShake app
    - CA Statewide
    - M4.5+
    - Alert MMI 2+ area
  - WEA
    - CA Statewide
    - M5.0+
    - Alert MMI 4+ area
  - Public education efforts

- **Phase 4: Oct. 2020**
  - **Test of public alerting in PNW possible**

Seismic Station Build-Out Progress

ShakeAlert Seismic Station Inventory	PNSN OR/WA
Target Number	560
Contributing now	285
Percent complete	*51%*
Stations to be built	***275***
Stations unfunded	*166*

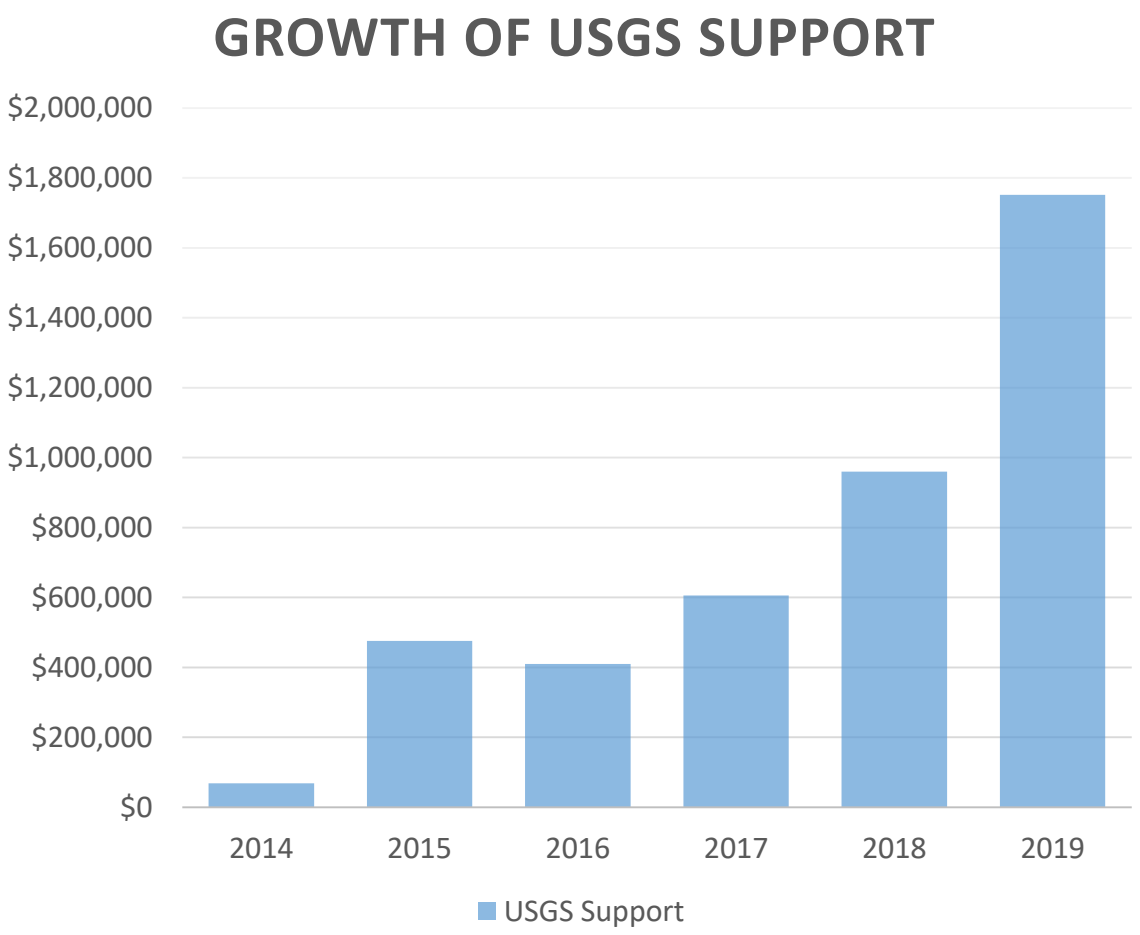
Wedderburn, Oregon

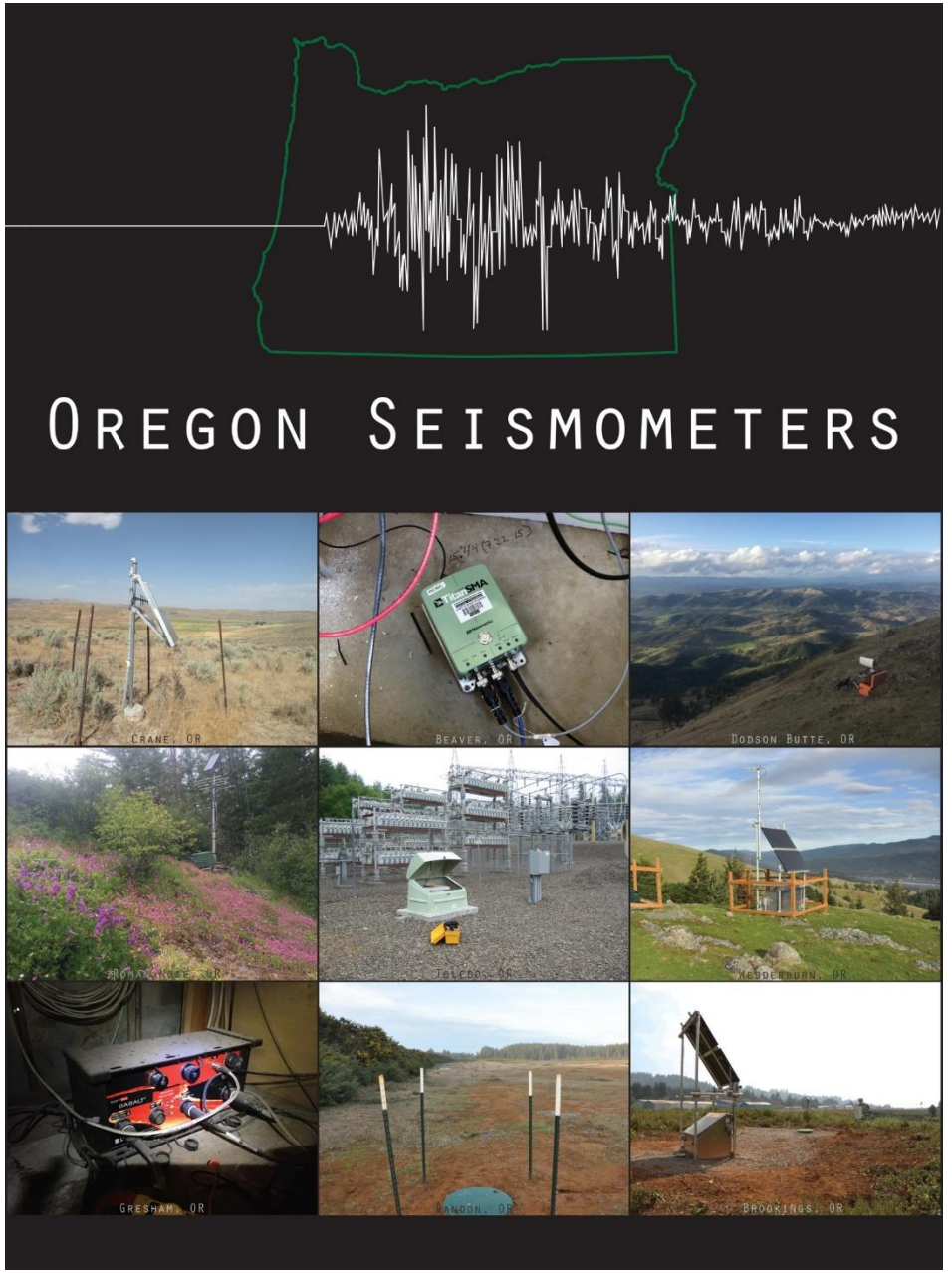


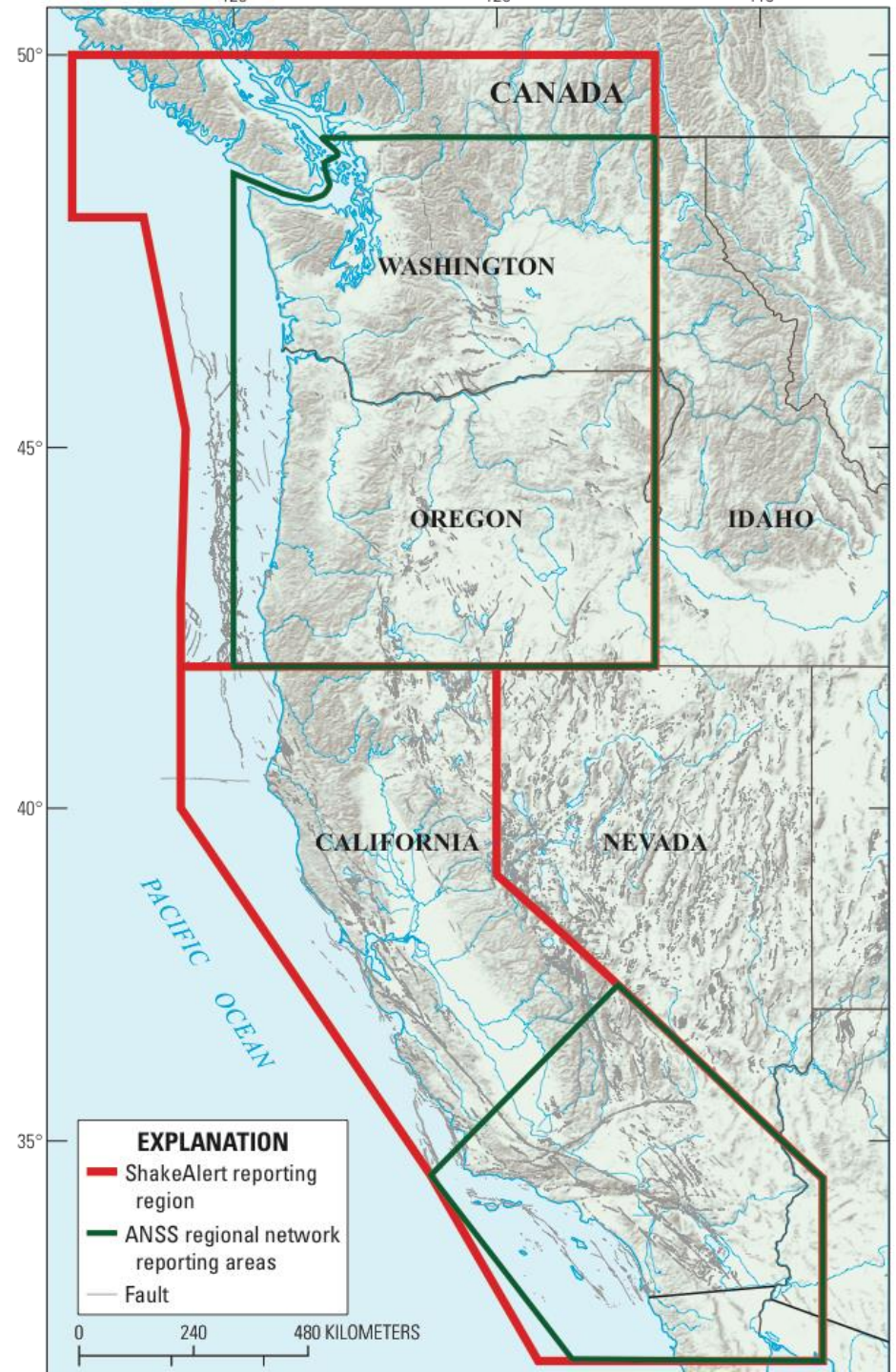
How will State Funds be Used?

- Complete ShakeAlert by 2023 in Oregon
- Purchase and install 83 ShakeAlert Sites
- ShakeAlert certification of new Oregon sites
  - Real-time delivery of data to 3 west coast alerting centers (Seattle, San Francisco, Los Angeles)

State support leverages USGS funding of O&M







What is the Impact if Oregon Lags Behind?

- Because Oregon lies in the center of the Cascadia subduction zone, our performance impacts the entire west coast
- By not completing ShakeAlert, we not only put Oregonians at greater risk, we impact the resiliency of Washington, California, and British Columbia
- An incomplete network generates more **False Alerts** that undermine the confidence of the public and private sectors

What can you do with Seconds of Warning?

- Schools: **Beaverton School District**
  - Send protective action warning over PA system to students, staff, faculty
  - Protect 47,000 lives
- Fuel: **CEI Hub**
  - Shut off flow of fuels in short-length pipelines, disconnect barges from fuel hose
  - Retain fuel supply for immediate use in recovery and prevent environmental cleanup
  - Prevent loss of fuel for PDX
- Water: **City of Grants Pass**
  - Trip switch to shut off flow of drinking water from water tank
  - Save clean drinking water for 40,000 citizens & $200K in mitigated damage
- First Responders: **Portland Fire & Rescue**
  - Open bay doors, alert on and off-duty command staff of an imminent event
  - Protect 750 first responders & deploy engines from 31 fire stations

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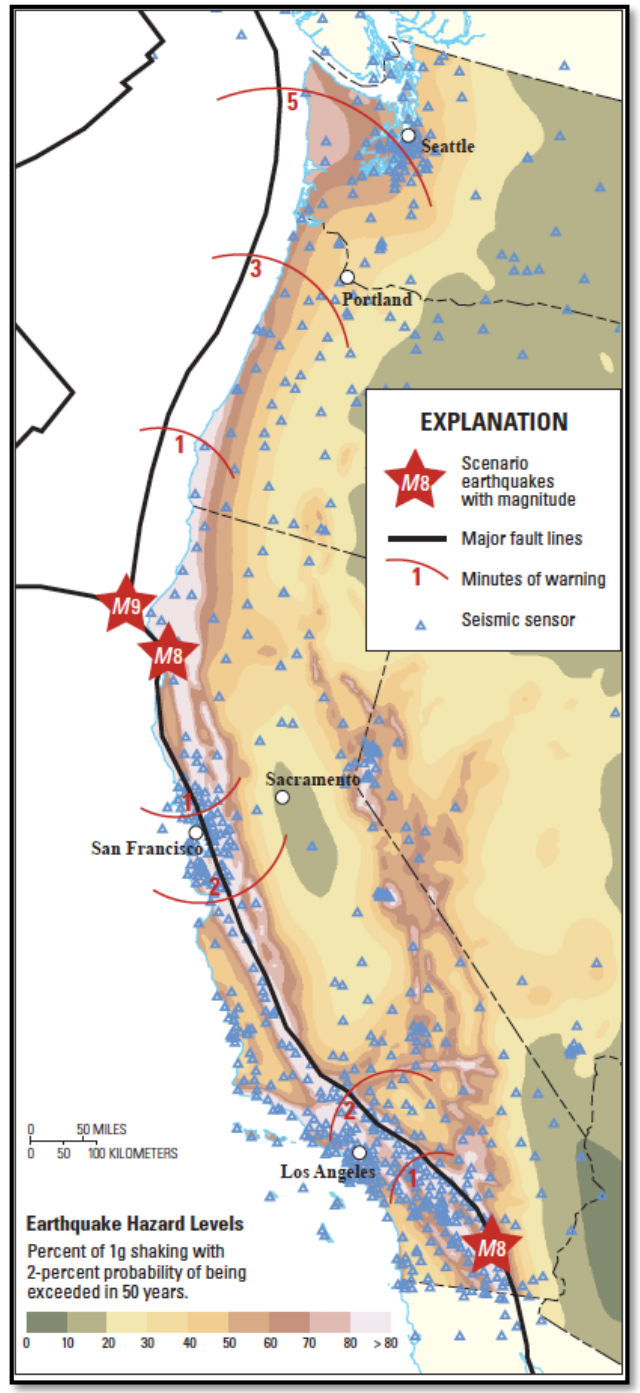

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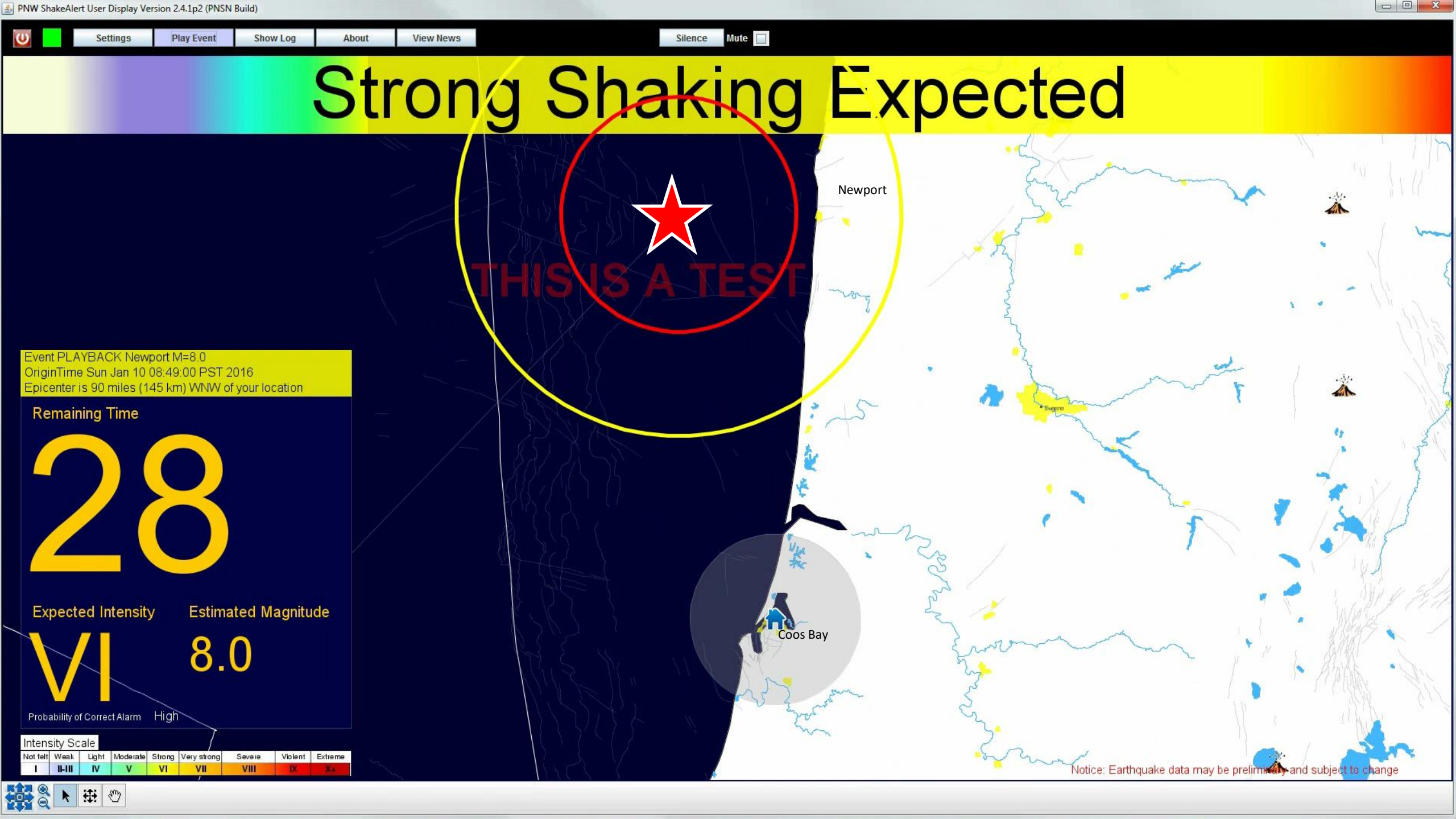
PNW ShakeAlert User Display Version 2.4.1p2 (PNSN Build)
Settings
Play Event
Show Log
About
View News
Silence
Mute
Strong Shaking Expected
THIS IS A TEST
Newport
Coos Bay
Event PLAYBACK Newport M=8.0
OriginTime Sun Jan 10 08:49:00 PST 2016
Epicenter is 90 miles (145 km) WNW of your location
Remaining Time
28
Expected Intensity
VI
Estimated Magnitude
8.0
Probability of Correct Alarm
High
Intensity Scale
Not felt
Weak
Light
Moderate
Strong
Very strong
Severe
Violent
Extreme
I
II-III
IV
V
VI
VII
VIII
IX
X+
Notice: Earthquake data may be preliminary and subject to change