WSSPC
WESTERN STATES SEISMIC POLICY COUNCIL

We develop seismic policies and share information to promote programs intended to reduce earthquake related losses.

A non-profit earthquake consortium for the western states

Winter 2020
e-Newsletter

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In This Issue

WSSPC NEWS

Last Chance to Nominate Someone for our Awards Program!

Nominations for 2020 WSSPC Awards are coming to a close! Recognize outstanding colleagues and projects that have had an impact on seismic risk reduction with a nomination for the WSSPC Awards in Excellence, Lifetime Achievement Award, or WSSPC Leadership Award. The nomination deadline is January 3, 2020. Nomination forms and eligibility guidelines can be found on the website at: *https://www.wsspc.org/awards/call-nominations/*

- **WSSPC 2020 Polices have been returned to the committees with the Board's comments and recommendations .** The public view of thte revised drafts are on our WSSPC website at: https://www.wsspc.org/public-policy/2020-wsspc-draft-policy-recommendations/ . We ask that you complete your second reviwe and return your edits/recommendations to WSSPC NLT February 21, 2020. This will allow for a few weeks to collate and get them out to the Board prior to the Spring Board and Annual Business Meeting in March at the National Earthquake Conference
- **The WSSPC 2020 Policy Recommendation Implementatin Survey** has been sent out. Please complete and return by February 14, 2020. Again, this allows time for the colaltion of results and to prepare it for presenting at the Annual Businesss and Board Meeting in March.
- **Information on registering for the National Earthquake Conference in San Diego** can be found at: https://federalalliance.regfox.com/2020-national-earthquake-conference-72nd-annual-eeri-annual-meeting-nepm-meeting
- **The 2020 FALL WSSPC Board meeting will NOT be held in Sacramento.** The Board has determined that the Fall Board meeting should be held in different WSSPC Member jurisdictions. This will allow for greater transparency, better connections with members, and provide an additional opportunity for the Board to hear directly from the members. If your jurisdiction has an interest in "hosting" the meeting, please contact Matthew Wall at: mwall@wsspc.org .
- **WSSPC Social Media Outreach** is increasing. If we haven't "followed" your organization in either Twitter or Facebook, please let us know. We also ask that you follow us. Let's supprot each other in getting our messages out. If you have a targeted audience you want to reach, let us know.
- **WSSPC, California Geological Survey, and EERI in coordiantion with the American Geosciences Institute presented a webinar on Earthquake Clearinghouses** on November 14, 2019. The webinar had attendees from nine countries and multiple sectors. It was recorded and can be found at: https://www.americangeosciences.org/webinars.

Upcoming Meetings and Conference!

National Earthquake Program Managers Meeting

The National Earthquake Program Manager's (NEPM) Meeting will be held on **Monday and Tuesday, March 2-3, 2020** in advance of the 2020 National Earthquake Conference in San Diego, CA at the Sheraton San Diego.

WSSPC Annual Meeting

The WSSPC Annual Meeting will be held on **Friday, March 6, 2020** atfter the conclusion of the 2020 National Earthquake Conference in San Diego, CA at the Sheraton San Diego.

2020 National Earthquake Conference

The 2020 national Earthquake Cionference will be held **Wednesday—Friday. March 4—6, 2020** in San Diego at the San Diego Sheraton. Agenda and registration information can be found at: https://earthquakeconference.org/

Thank You 2020 WSSPC Affiliate Members

WSSPC welcomes all members of the professional community who share the common goal of reducing losses from earthquakes.

Government

City of Las Vegas Building and Safety
Clark County Building and Fire Prevention

Non-Profit

Applied Technology Council

Remember, It's Not Too Late to Join WSSPC as an Affiliate Member for 2020

Your benefits will include:

- Recognition of support with a link on the WSSPC website to your organization
- The opportunity to participate on WSSPC Committees and provide input to policy recommendations
- Quarterly E-Newsletters and Monthly Bulletins
- Opportunities to exhibit and sponsor activities

Thanks one last time to our 2019 Affiliate Members! Your support of WSSPC is very much appreciated.

There are so many ways to stay connected!

Online- www.wsspc.org
Twitter- @WSSPC
Facebook- www.facebook.com/WSSPC

NEWS

California Releases first Statewide Earthquake Early Warning App

On October 17, the 30 year anniversary of the 1989 Loma Prieta quake that shook the bay area, California released the first statewide earthquake early warning (EEW) system. This new EEW app is a joint project of CalOES, USGS, UC Berkeley, CalTech, and others. The warnings will be available through a cellphone app called MyShake, as well as through Wireless Emergency Alerts to notify Californians to "Drop, Cover, and Hold On!" before an earthquake.

The system operates by using seismic monitoring sensors that are located throughout California that can detect the start of a quake. A computer than identifies the location and the strength of the quake to send out alerts before severe shaking occurs in an area. The further away the area is from the earthquake's epicenter, the more warning they will receive. These warnings will give people precious seconds to take life-saving action.

A report claims that if there were a repeat of the 1989 Loma Prieta earthquake, the app could have given residents in the Marina District of San Francisco 20 seconds of warning and those at the former site of Candlestick Park would have gotten 15 seconds. However, closer to the epicenter, San Jose would just get a few seconds while Santa Cruz would not have gotten any warning.

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CalOES has funded this program since June with $1.5 million over two years and lawmakers have set aside over $7 million in this year's budget alone to promote the app as they hope to have 4 million downloads by the end of 2020.

Resources:
https://www.npr.org/2019/10/16/770816723/california-to-unveil-earthquake-alert-system-thursday
https://www.latimes.com/california/story/2019-10-16/california-to-launch-statewide-earthquake-early-warning-system

Additional information about California's Early Earthquake Warning System can be found at: https://www.usgs.gov/news/all-systems-go-first-statewide-testing-shakealert-united-states?qt-news_science_products=1#qt-news_science_products

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Efforts from University of Oregon to speed up Tsunami Warnings

A new project using GPS in the Cascadia subduction zone hopes it deliver tsunami warnings within five minute of an earthquake. The National Oceanic and Atmospheric Administration (NOAA) hopes to use this new method to be able to meet that timing with precise forecasts of incoming wave sizes and their particular locations.

The project began September 1st, 2019 and is under a four year $800,000 grant from NASA. The grant is split between the University of Oregon and the University of Washington's Brendan Crowell, a research scientists and a member of the Pacific Northwest Seismic Network. NOAA is also a key player in the project and has been involved in collaboration with Central Washington University.

In sites around Cascadia's 600 mile long coastal swatch rom Northern California to British Columbia, newly developed algorithms are being incorporated into about 500 GPS monitoring sites. By running simulations of strong earthquakes, they hope to accurately forecast tsunami intervals ranging from one to 20 minutes after an earthquake. In Cascadia, a Tsunami would likely begin within 15 minutes of an earthquake. If they had a warning system that could give citizens a five minute warning, evacuations could begin sooner and there would be more time to protect coastal infrastructure like ports.

This project is not connected to the efforts to build out ShakeAlert, although University of Oregon is also involved with USGS in that effort. However, due to the promising future GPS data seems to have in early warning systems, it is being added at ShakeAlert Seismic stations.

Resources:

https://around.uoregon.edu/content/uo-leading-effort-speed-tsunami-warnings
https://www.klcc.org/post/nasa-grant-help-noaa-forecast-tsunami-strength-and-location

Updated FEMA P-58 Report Volumes have been published

The updated FEMA P-58 Report Volumes on Seismic Performance, Design, and Guidelines have been electronically published and are available for download.

Resource: http://femap58.atcouncil.org/reports

MITIGATION

New Washington State Tsunami Evacuation Maps

In Washington State, where a M9.2 earthquake and subsequent tsunami could result in as many as 10,000 fatalities, being prepared for the "Big One" can mean a matter of survival. In an effort to better prepare Washington residents for a tsunami, the Washington state Department of Natural Resources (DNR) Washington Geological Survey has published more tsunami evacuation walking maps.

Funded by the National Tsunami Hazard Mitigation Program (NTHMP), these new tsunami evacuation maps will serve both outer-coastal cities and inner-coastal cities along the Puget Sound. These maps first began when DNR started investing in them in 2017, with the first round of six city maps published spring of 2019. These new set of four maps were released in October 2019. These maps are based on walking speeds timed from when the ground starts shaking and includes the most efficient routes to high ground from starting points throughout each of the cities that have been mapped. They use the conservative walking speed of 24 minutes per mile to take into account those with restricted mobility issues.

Walking maps are particularly critical as research has found that driving after a disaster leads to increased hazards. Not only will road networks be virtually unusable as liquefaction, ground shaking, and landslides will destroy them, there will also be downed trees and power lines. According to Dr. Alireza Mostafiza from

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Oregon State University, based on a case study on the Oregon coast, "vehicular evacuation results in eight times higher mortality compared to 100% on-foot evacuation." These paths are recommended to be practiced by Washington residents with timed test-runs from frequented locations like work, home, or school to gauge their own pace in ideal conditions. Currently, Washington schools in inundation zones are required to perform at least one tsunami drill per year and all schools in the state are required to perform an annual earthquake drill as part of the state's efforts towards preparedness.

Resources:

https://crosscut.com/2019/10/new-tsunami-evacuation-maps-show-fastest-way-escape-big-one-foot

https://www.king5.com/article/news/local/disaster/dnr-releases-new-tsuanmi-safety-maps/281-e0a9544d-300d-4171-9e82-4dcc50b45889

An aditional interactive resource for Washington State tsunami information can be found at: https://www.americangeosciences.org/critical-issues/maps/interactive-map-tsunami-evacuation-information-washington

FEMA National Mitigation Investment Strategy (NIMS)

In August 2019, FEMA published its National Mitigation Investment Strategy. The NMIS obejtive is to, "identify and measure the effectiveness of mitigation investments, and inform decisions on when and where to make investments."

Per the document:

The implementation of the strategy is targeted using three goals:

- Show How Mitigation Investments Reduce Rick
- Coordinate MitigationInvestments to Reduce Risk
- Make Mitigation Investment Standard Practice

The Investment Stragety recognizes there are multiple facets and ways to achieve loss reduction. It identifies mulitple overlapping and stand alone components and recognizes that the process requires whole community involvement.

The Investment Strategy can be found at: https://www.fema.gov/media-library-data/1565706308412-19739d7deeca639415cc76c681cee531/NationalMitigationInvestmentStrategy.pdf

RESILIENCE AND RECOVERY

FEMA Disaster Recovery Reform Act (DRRA) Annual Report is Available

The FEMA DRRA Annual Report was finalized in October and electronically published December 19, 2019.

Highlights include:

- Alignment with FEMA's Strategic Goals to: Build a Culture of Preparedness; Ready the Nation for Catastrophic Disasters; Reduce the Complexity fo FEMA
- Discussion and descriptions of FEMA's work to implement the law

To date, FEMA notes it has implemented over half of the DRRA's 56 provisions—to include providing additional funding to individuals post-disaster.

The report can be found at: https://www.fema.gov/media-library-data/1576858019956-8ad76980a61611d59089ba4f88b2f1e1/DRRAAnnualReport.pdf

RESEARCH

Researchers look to Lakes to Learn about Quakes in Washington and Oregon

Researchers are looking at the the bottom of lakes in western Washington and Oregon to see how strongly the Pacific Northwest shook during great earthquakes in the past. Lake records can demonstrate how moving inland affects the shaking in these areas. Although models exist, these records serve as direct evidence.

The studies are looking at the region's major cities, which are more than 100 miles east of the Cascadia fault zone. They then test to see the absence or existence of underwater landslides through a thin layers in the samples they pull from the lake floors. The stripe is then carbon dated to see if the dates are recurring for samples from lakes over a wide area. It can then be inferred that the cause was most like a major earthquake or volcanic eruption. When this data has been analyzed, it was found that the strength of shaking "diminished considerably with distance from the offshore Cascadia fault. Although the shaking might be gently, it will go on for minutes, which the eastern Pacific Northwest's infrastructure of URMs and old pipelines could not handle.

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Resources:

https://www.usnews.com/news/best-states/washington/articles/2019-09-29/scientists-probe-northwest-lakes-to-learn-about-quakes

https://apnews.com/6da9810cee3b4004baac2dd29a452726

Two of Biggest US Earthquake Faults May be Linked

Chris Goldfinger, a geologist and palaeoseismologist at Oregon State University in Corvallis, presented a case at the American Geophysical Union meeting inSan Franciso on December 13, 2019 suggesting the Cascadia Fault and the San Andreas Fault may be linked.

He based his case on "turbidites" and a total of fourteen core samples—seven drilled off-shore from the Cascardia Region and seven drilled near the northern San Andreas.

Source: https://www.nature.com/articles/d41586-019-03769-w

Resources: https://agu.confex.com/agu/fm19/meetingapp.cgi/Paper/500809

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Models of Cascadia Give Researchers Better Idea of What Kind Seismic Activity Occurred During the 1700 Cascadia Earthquake

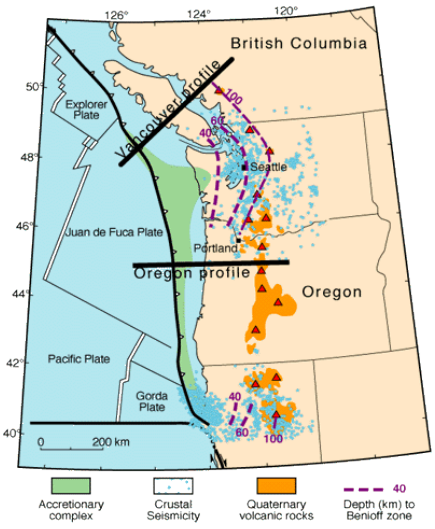
Researchers from the U.S Geological Survey have combined models of magnitude 9 to 9.2 on the Cascadia Subduction Zone with paleoseismic estimates to get a better idea of what kind of megathrust seismic activity was behind the 1700 Cascadia earthquake. This study could help improve seismic hazard estimate for the Cascadia region, including ground shaking intensity estimates in Portland, Seattle, and Vancouver.

The analysis by Erin Wirth and Arthur Frankel of USGS indicates that a rupture extending to just offshore for most of the Pacific Northwest could cause the pattern of coastal subsidence seen in geologic evidence from the 1700 earthquake, with an estimated magnitude between 8.7 and 9.2. The researchers concluded that "an earthquake rupture that also contains smaller patches of high stress drop, strong motion generation "subevents" matches the along-fault variations in coastal subsidence seen from southern Oregon to British Columbia from the 1700 earthquake." They found that the paleoseismic estimates for a magnitude 9 rupture along Cascadia does not match how the land level changed along the Pacific Northwest coast during the 1700 Cascadia earthquake.

Wirth and Frankel's study shows that variations in the coastal subsidence caused by the 1700 quake might be because of the locations of the subevents. However, the accuracy of paleoseismic estimates of how the land level changed along the Cascadia subduction zone must be improved to prove their theory. Understanding what and where the subvents are and whether they changed with time could improve seismic hazards estimate for modern Cascadia events by better anticipating where the strongest ground shaking might be in the case of a Cascadia earthquake.

Resources:

https://pnsn.org/outreach/earthquakesources/csz
https://www.sciencedaily.com/releases/2019/10/191029140722.htm



(Image source and credit: https://earthquake.usgs.gov/data/crust/cascadia.php

Geodetic Observations of Water Volume Changes in Dams Causing Stress Changes

(From the Summary)
"GPS measurements of surface motion, vertical and horizontal, near four dams in India, show that the surface moves when the water volume of the dam changes. These observations show that the water volume of the dam affects the stress of the surrounding rock. Thus the dams may contribute to stress changes and deformation, particularly triggering earthquakes nearby."

Resources: https://www.unavco.org/science/snapshots/environmental-hydrogeodesy/2019/dumka.html?fbclid=IwAR19lMkN2RorG0JSR5gj8J6Y7xiDY_q7Qj8niZaBRCYQ2c4DT_Isxio-Xj4

https://www.internationalrivers.org/earthquakes-triggered-by-dams

Earthquake risk perception: A picture is worth a thousand stats

A study by seismic engineers and psychologists in British Columbia, Canada tested imagry against statistisal information to determine which might better motivate people to appreicate earthquake risk better. Results of the findings were presented at the "Behavioural Insights in Canada Conference" in Vancouver on November 29, 2019.

Measures of response where determined using two groups—one which saw statistics and one which viewed images. The groups were given surveys to fill out indicating intentions to prepare for an earthquake and support for city-level initiatives.

Based on the survey, indications were the visual images cerasted more of an impetus towards action than the statstical

information.
Resources:
Image and article https://news.ubc.ca/2019/12/02/earthquake-risk-perception-a-picture-is-worth-a-thousand-stats/

https://www.collabra.org/article/10.1525/collabra.238/

PUBLICATIONS

(In the works) **Disaster Recovery Guide for Planning Practitioners**

- "APA is developing a post-disaster recovery guidebook for local planners, in partnership with Texas A&M University. The project builds on the seminal Planning Advisory Service (PAS) report, *Planning for Post-Disaster Recovery: Next Generation*."

(*source:* https://www.planning.org/nationalcenters/hazards/recoveryguide/

(In the works) **Building Coastal Resilience Through Infrastructure Planning**. Primary goals for the project are to:

- Identify and develop tools, techniques, and guidance documents that can be used by practitioners involved in the capital improvement process.
- Improve and enhance community capacity to incorporate data, research, and information related to coastal hazards and extreme weather into capital improvement planning.
- Implement resilience and adaptation measures in coastal infrastructure and public buildings.
- Understand and quantify the costs associated with the replacement, protection, or improvement of public buildings and infrastructure when coastal hazards and extreme weather are taken into account.

(*source:* https://www.planning.org/research/coastalresilience/)

3D Geologic Framework for Use with the U.S. Geological Survey National Crustal Model, Phase 1—Western United States

- The USGS framework is presented to improve seismic hazard assessment
- "The framework is based on 1:250,000 to 1:1,000,000-scale state geologic maps and depths of multiple subsurface unit boundaries. The geology at or near the Earth's surface is based on published maps with modifications to remove discontinuities across state borders. "

(*source:* https://pubs.er.usgs.gov/publication/ofr20191081

PEOPLE AND TRANSITIONS

Arrivals:

- **Claudio Berti** is the new State Geologist for Idaho
- **Justin Luna** is the new Zemergency Management Director for Nevada
- **Ramon Arrowmith**, Chairperson for the Arizona Council on Earthquake Safety

Welcome. We look forward to working with you!

Departures:

- **Lara Brodetsky** has left WSSPC.

We wish her well as she pursues her education and dream of retuyrning to teaching!