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**Testimony
United States House of Representatives
Committee for Transportation and Infrastructure
Subcommittee on Economic Development, Public Buildings, and Emergency
Management**

“Pacific Northwest Seismic Hazards: Planning and Preparing for the Next Disaster”

May 19, 2015

Good morning Mr. Chairman and Members of the Committee. My name is Scott Ashford, Dean of the College of Engineering at Oregon State University. I am pleased to be before you today, testifying on my role as Chair of the Governor’s Task Force on Resilience Plan Implementation. In my role as task force chair, I was responsible for advancing the state of Oregon on a path towards resilience in the face of the upcoming mega-quake along the Cascadia Subduction Zone, perhaps the greatest impending natural disaster in the United States of America.

I have a Ph.D. in geotechnical engineering and my expertise is in earthquake engineering. I have seen firsthand communities destroyed by earthquakes from my participation on post-earthquake reconnaissance teams, many funded by the National Science Foundation. In the magnitude 8.8 2010 Chile earthquake, I was struck how the 500,000 residents of Concepcion were cut off from help from the southern half of the country because ALL of the bridges over the river through the city had failed. In 2013, I was shocked to see the Central Business District in Christchurch, New Zealand, fenced off and virtually abandoned still two years after a sequence of magnitude 6 and 7 earthquakes. And in Japan, I saw the devastation left by the 2011 earthquake and tsunami that killed over 15,000 people and wiped entire communities off the map. This magnitude 9.0 subduction earthquake is the mirror image of what we expect in Northwest from the Cascadia Subduction Zone.

While the damage I observed in Chile, New Zealand, and Japan was overwhelming, the destruction could have been much worse. All of these countries are known for their earthquake risk. Much of their infrastructure was built for seismic resilience, and the people have the experienced the necessary earthquake response. All these countries are better prepared than we are as a state, region, and country for the unique threat of the Cascadia Subduction Zone.

The Cascadia Subduction Zone extends from British Columbia to northern California. It separates the Juan de Fuca and North American Plates. Numerous studies, including research conducted by scientists at Oregon State, indicate that the question is not if but

when a major earthquake will occur. The body of research establishes likelihood for a 9.0 magnitude earthquake, with strong shaking lasting three to five minutes, and a tsunami inundating much of the coastline. Furthermore, according to research conducted by Oregon State researchers, and published by the U.S. Geological Survey, by the year 2060, if we have not had a significant earthquake, we will have exceeded 85 percent of all known intervals between major occurrences over the past 10,000 years.

However, in Oregon, the historical intervals between major seismic events in the Cascadia Subduction Zone are much less frequent than in countries like Chile or Japan, where the more common experience with a major seismic event has in many ways forced them to adopt a culture of preparedness. Comparatively, in the Northwest, a major earthquake has not occurred since the year 1700. There is no structure standing today that withstood that earthquake. We have no practical experience with the major earthquakes or tsunamis which historical trends lead us to expect to occur this century.

The biggest challenge for Oregon is our legacy infrastructure — vulnerable buildings, bridges, pipelines, electrical substations — that were built before anyone was aware that the Cascadia Subduction Zone was active. This problem is not unique. Arkansas and Kentucky, states in the New Madrid fault zone, are also seismically vulnerable because of their legacy infrastructure.

In 2011, Oregon leaders recognized the need to prepare for the eventual likelihood of a major seismic event and called for a statewide plan. The Oregon Resilience Plan was completed in 2013, which can be accessed here:

http://www.oregon.gov/OMD/OEM/osspace/docs/Oregon_Resilience_Plan_Final.pdf

This landmark report to the Oregon Legislature was the result of the volunteer work of over 150 professionals from the business community, government agencies, and academia. The Plan assessed where Oregon is today, and laid out priorities to allow the people of Oregon to survive and bounce back from the expected magnitude 9.0 Cascadia earthquake and tsunami. Our vision is that 50 years from now, our people, businesses, infrastructure, and communities will have the resilience to recover from this mega-quake. The 300-page report contains over 140 different recommendations. And frankly, it was difficult to figure out where to start its implementation.

To find a path forward, the Legislature formed the Governor's Task Force on Resilience Plan Implementation later in 2013. As chair, my mission was to work with the task force to determine the most important first steps that the State could achieve in the next two years. Our specific recommendations, covering eight areas, were submitted to the Legislature in September 2014 in a two-page report, which I have submitted as part of my testimony.

I would like to focus today on just three where the federal government plays a key role in working in partnership with the state and private enterprise to achieve our earthquake and tsunami preparation and mitigation objectives.

1) Transportation

Mobility is critical to rescue, relief, and recovery efforts following a natural disaster; and for the economy to start moving so people can get back to work. Reports from the Oregon Department of Transportation indicate that following a magnitude 9.0 Cascadia Subduction Zone earthquake, all of U.S. Highway 101 along the West Coast would be shut down, all routes to the coast would be shut down, and only parts of Interstate 5 would be open. This is a life-safety issue for those who will have survived the earthquake and tsunami, but are increasingly compromised because they are cut off from help and cannot be rescued. Our task force recommended that the state find a way to fund the first phase of a comprehensive seismic retrofit program for Oregon's major access highways. The "Oregon Highways Seismic Plus Report" can be found here:

http://www.oregon.gov/ODOT/HWY/BRIDGE/docs/2014_Seismic_Plus_Report.pdf

The entire seismic retrofit program is over \$5 billion, and is overwhelming for a state the size of Oregon. The first phase price tag to strengthen bridges and prevent landslides only along a lifeline backbone route is \$1 billion alone. This is definitely an area where enhanced state-federal partnership is needed, where the state is stuck with a plan but no money to act.

2) Liquid Fuels:

Ninety percent of all liquid fuel used in Oregon comes into the state through pipelines that cross the Columbia River and land northwest of Portland at a site highly vulnerable to liquefaction and lateral spreading in a Cascadia earthquake. Due to the interstate nature of the liquid fuel transmission, Oregon has no regulatory authority. Rather than take this on, our task force recommended the state pursue a public-private partnership to develop an alternative source of liquid fuel. This is an area where the federal government can work with affected states to require seismic resilience of federally regulated utilities.

3) Research:

I am a professor, and this may sound self-serving, but our task force recommended support of earthquake research. The key here is that businesses, public utilities, homeowners, and the state are facing several billion dollars of investment to improve resilience. With the unique combination of a mega-quake and legacy infrastructure, applied research is the way that we can assure that precious tax-payers dollars are used in the most value- and cost-informed manner possible.

Businesses already understand this. Companies like Portland General Electric and Northwest Natural Gas have joined the Bonneville Power Administration, the Port of Portland, and the Oregon Department of Transportation to form the Cascadia Lifelines Program at Oregon State University. These lifeline providers pool and direct their research dollars towards finding solutions to the seismic challenges they jointly face.

The Oregon Legislature also understands the need to act. In response to the Task Force recommendations for next steps to improve resilience, 18 related bills were submitted for

consideration during the current legislative session. Four legislative proposals have made it to the Ways and Means Committee where they sit today. These include our most important recommendation, the appointment of a Resilience Policy Advisor to the Governor, as well as tsunami preparedness legislation. Passage of these bills in the Oregon Legislature is a critical first step towards building resilience.

State and private resources alone, however, are not enough to address the scope and scale of what's needed to improve resilience in Oregon and throughout the Pacific Northwest, as well as in other regions across the country vulnerable to natural disasters. The federal government must also be an active partner. Key legislative opportunities this Congress that would facilitate effective public-private partnership for applied research are:

- The Highway Bill: University Transportation Centers can support seismic research.
- Reauthorization of the National Earthquake Hazards Reduction Program.
- Supporting seismic research funded by the National Institute of Standards and Technology (NIST), the National Science Foundation (NSF), U.S. Geological Survey (USGS), and the Federal Highway Administration (FHWA)

In closing, the Cascadia Subduction Zone is estimated to be the single greatest natural threat to the United States. Oregon is taking steps on its own to mitigate this threat. Other West Coast states and those in the New Madrid Fault Zone, including Arkansas and Kentucky, can follow our example. It will take decades and significant resources to improve our resilience, but we need to start now and we need to all work collaboratively across governments, academia, and the private sector. The federal government is a critical partner in our ability as a state, a region, and a country to effectively prepare for this impending natural disaster.

Thank you, Mr. Chairman and Committee Members, for the opportunity to appear before you today. I stand ready to answer any questions you might have.

Attachments

- (1) Cover Letter to Governor's Task Force on Resilience Plan Implementation Report
- (2) Governor's Task Force on Resilience Plan Implementation Report

Date: September 30, 2014

TO: The Honorable Members of the Oregon State Legislature

FROM: Scott Ashford, Chair, Governor's Task Force on Resilience Plan Implementation

The Governor's Task Force on Resilience Plan Implementation (ORTF) is pleased to submit this report on Resilience Plan Implementation Recommendations.

In accordance with SB 33, this report presents the Governor's Task Force on Resilience Plan Implementation recommendations on priority actions for seismic resilience. The Oregon Resilience Plan (ORP), completed in February 2013, presented more than 140 recommendations aimed at reducing risk and improving recovery for the next Cascadia earthquake. The ORTF studied these and other recommendations, including those specified in SB 33, and brought forward the most critical to be implemented in the 2015-17 biennium.

As was stated in the ORP's central finding, "Very large earthquakes will occur in Oregon's future, and our state's infrastructure will remain poorly prepared to meet the threat unless we take action now to start building the necessary resilience." The ORTF strongly concurs with that assessment, and with the need to commit tangible resources toward a common goal.

The charge was to address ORP *implementation* to encourage a sustained commitment over an extended period of time. That commitment includes capital expenditures toward our built environment, changes in some of our rules and strategies in how we develop our communities, and a greater effort toward restoring a resilient culture in our state. Our highest priority, however, is sustained leadership in this process. Only with continued oversight, engagement, and stewardship can we make substantial progress toward a more resilient Oregon.

This report can be found online at <http://www.oregon.gov/OMD/OEM/Pages/Resilience-Taskforce.aspx>

Task Force Members:

Scott A. Ashford, Chair	Oregon State University (Scientific Community Rep.)
Jeff N. Rubin, Vice-Chair	Tualatin Valley Fire and Rescue (SDAO Rep.)
Senator Arnie Roblan	SD 5, Oregon State Legislature
Senator Alan Olsen	SD 20, Oregon State Legislature
Rep. Debbie Boone	HD 32, Oregon State Legislature
Rep. Jim Weidner	HD 24, Oregon State Legislature
Heidi Moawad	Public Safety Policy Advisor to Governor Kitzhaber
Greg Wolf/Mark Ellsworth	Regional Solutions Director for Governor Kitzhaber
Commissioner Mark Labhart	Tillamook County Commission (AOC Rep.)
Mayor George Endicott	City of Redmond (LOC Rep.)
Jeff Soulages	Intel Corporation (Private Business Rep.)
Paula Negele	American Red Cross (Private Nonprofit Rep.)
Dave Ferre	Oregon Military Department
Dave Stuckey	Office of Emergency Management

Jay Wilson
Lucinda "Luci" Moore
Mike Harryman

OSSPAC Chair
Oregon Department of Transportation
Oregon Health Authority

**Senate Bill 33
Implementation of the Oregon Resilience Plan**

**Report to the 77th Legislative Assembly dated October 1, 2014
From the Governor’s Task Force on Resilience Plan Implementation**

In accordance with Senate Bill 33, this report presents the Governor’s Task Force on Resilience Plan Implementation (ORTF) recommendations on implementation of the Oregon Resilience Plan (ORP). The ORP, dated February 2013, presented more than 140 recommendations aimed at reducing risk and improving recovery for the next Cascadia earthquake. The ORTF studied these and other recommendations, including those specified in SB 33, and brought forward the most critical to be implemented in the 2015-17 biennium. For the eight categories listed below, we recommend:

A. Oversight

1. The State establish a Resilience Policy Advisor to the Governor. This requires a specific appointment, with defined responsibilities. We recommend that this position be appointed by, and report directly to, the Governor. The ORTF considers it essential that the State establish ongoing, long-term, statewide resilience oversight; it is not sustainable, practical, or good government to attempt to establish resilience through a series of temporary, unfunded, volunteer committees.

B. Transportation

1. Additional revenue be identified to complete the most critical backbone routes identified in ODOT’s Seismic Options Report within a decade, and the complete program by 2060. The funding source should be ongoing and pay as you go, rather than financed through bonding, to provide resources for all phases over the course of several decades. Research would be incorporated into the program to ensure the most current technology and efficient methods are applied.
2. The State conduct a thorough inventory and assessment of transit, air and marine port, and rail assets.

C. Land Use

1. Per the process defined in OAR 632-005, the DOGAMI Governing Board adopt the “L” line from the most recent tsunami hazard maps, redefining the inundation zone for construction as defined in ORS 455.446 and 455.447.
2. In advance of formal statewide adoption as described in the preceding item, local governments adopt the latest version of tsunami hazard maps and analyses in comprehensive plan policies and development code regulations.
3. New funding of \$5 million be made available by the State through existing programs for resilience planning by the coastal communities most at risk of severe impacts from a tsunami.
4. The Urban Reserve Rules (OAR 660-021) be revised to make them more useful for recovery planning prior to a tsunami.

D. Energy

1. The OPUC require energy providers it regulates conduct seismic assessments of its regulated facilities. Furthermore, we recommend the OPUC allow cost recovery for prudent investments related to assessments and mitigation of vulnerabilities identified during those assessments.
2. In order to further reduce vulnerability, the State establish a public-private partnership to mitigate and evaluate diversification of locations for storing liquid fuels, and identification of new liquid fuel energy corridors.

E. Critical Facilities and Seismic Rehabilitation Grant Program (SRGP)

1. DOGAMI be funded with up to \$20 million to update and enhance the statewide inventory and provide preliminary evaluation of critical facilities.
2. The OBDD/IFA Seismic Rehabilitation Grant Program (SRGP) be funded with a minimum initial amount of \$200 million in the next biennium, and that funding continue to the program in each subsequent biennium with a similar or higher level of funding.
3. As demolition costs for unsafe buildings can be prohibitive to local jurisdictions, “seismic rehabilitation” is defined to include demolishing unsafe (based on construction and/or location) structures: (ORS 455.020, 455.390, 455.395 and 455.400, OAR 123-051-0200).
4. Rules governing SRGP eligibility be modified to allow grant dollars to be used toward replacement facilities (as opposed to solely rehabilitation) for projects that must be moved out of a tsunami inundation zone.

F. Research

1. The State establish a research initiative that would provide \$1 million annually for research aimed at improving Oregon’s earthquake resilience. The initiative would be administered by DOGAMI and would provide 1:1 matching funds to the State’s public universities for state-, federal- or industry-funded earthquake research.
2. A formal center of excellence for resiliency research and initiatives not be established.

G. Training and Education

1. Funding OEM at \$500,000 to lead a process for the 2015-17 biennium, in partnership with key stakeholders, of developing and disseminating improved educational materials for agencies, businesses, and the public, including: a) Revising and standardizing information provided to the public and businesses to recommend an emergency preparedness goal of at least two weeks; b) Training and education specifically relating to disaster preparedness, response, recovery and mitigation for decision-makers in the public, private, and not-for-profit sectors; c) Supporting education, training, and related professional development for emergency managers, consistent with but beyond standard FEMA dissemination. This may include programs offered through institutions of higher education, conferences and other special events, and programs provided by professional associations; d) Establishing an electronic clearinghouse of educational and technical information for emergency responders and planners, technical specialists, workplaces, and the general public.
2. Funding the Department of Education at \$500,000 for the 2015-17 biennium to lead a process of adopting standardized educational content and associated resources for K-12, applicable to the entire State as well as for specific hazard areas (e.g., coastal communities), and to establish an electronic clearinghouse for curriculum and supporting resources.
3. Business Oregon, in partnership with OEM, strongly encourages continuity assessment and planning for all businesses.

H. Water/Wastewater

1. Water providers complete a seismic risk assessment and mitigation plan as part of the existing requirement for periodic updates to water system master plans.
2. Wastewater agencies complete a seismic risk assessment and mitigation plan as part of periodic updates to facility plans.
3. Firefighting agencies, water providers, and emergency management agencies to establish joint standards for use in planning the firefighting response to a large seismic event.

This is the required two-page report to the legislature. This report can be found at:

<http://www.oregon.gov/OMD/OEM/Pages/Resilience-Taskforce.aspx>