

# Oregon's Seismic Rehabilitation Grant Program

## Alaska Seismic Hazards Safety Commission

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Commission



# Overview

- What Problem?
- Oregon's Legislative History on Schools
- Pilot efforts:
  - 2004 Clackamas County schools study
  - 2005 Oregon Universities seismic program
- Statewide risk study (DOGAMI, 2007)
  - ~1,100 "dangerous" school buildings
- 2009 Seismic Rehabilitation Grant Program
- 2010 first awardees of Courtney grants
- Goal: eliminate dangerous schools by 2032



# Is there a Problem?

## Yes, Schools Largely Unprepared

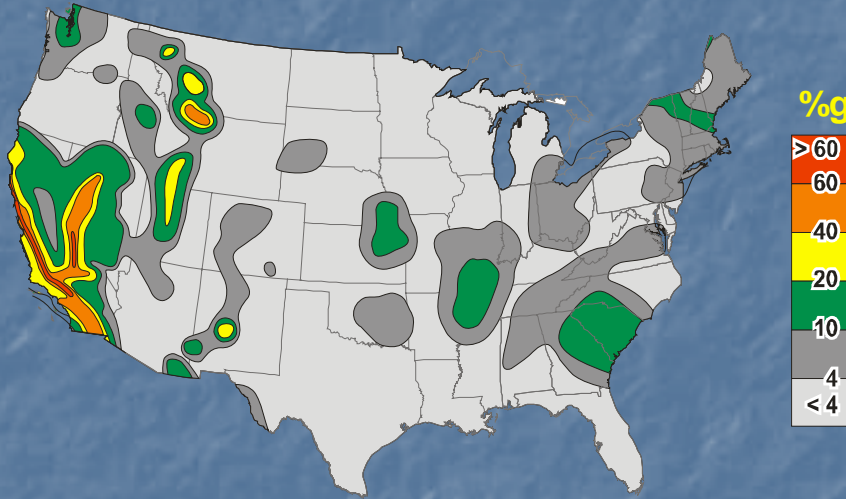
- Late knowledge of earthquake hazards
- Insufficient building codes (up until 1994)
- Many vulnerable pre-1994 buildings
  - 1,100 school buildings with high-very high risk of collapse in major earthquake



# 1976

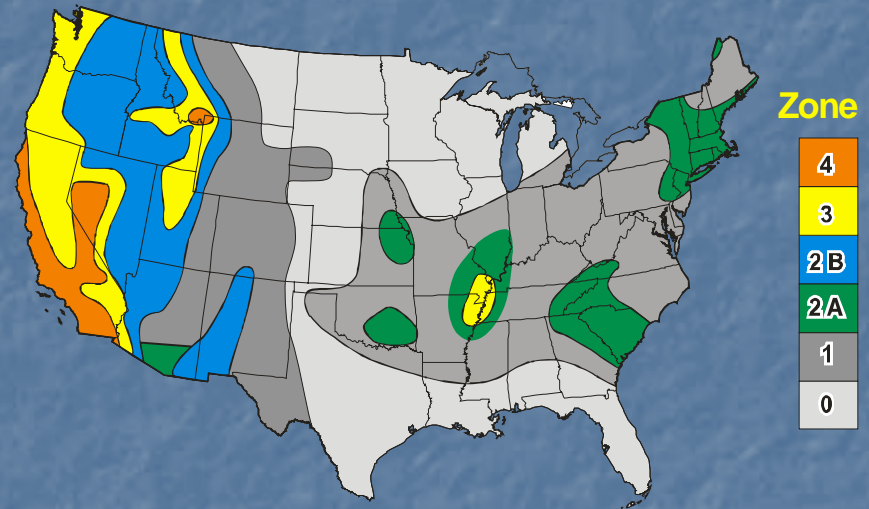
## (10% PE in 50 yrs)

(Algermissen & Perkins)



# 1994

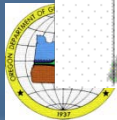
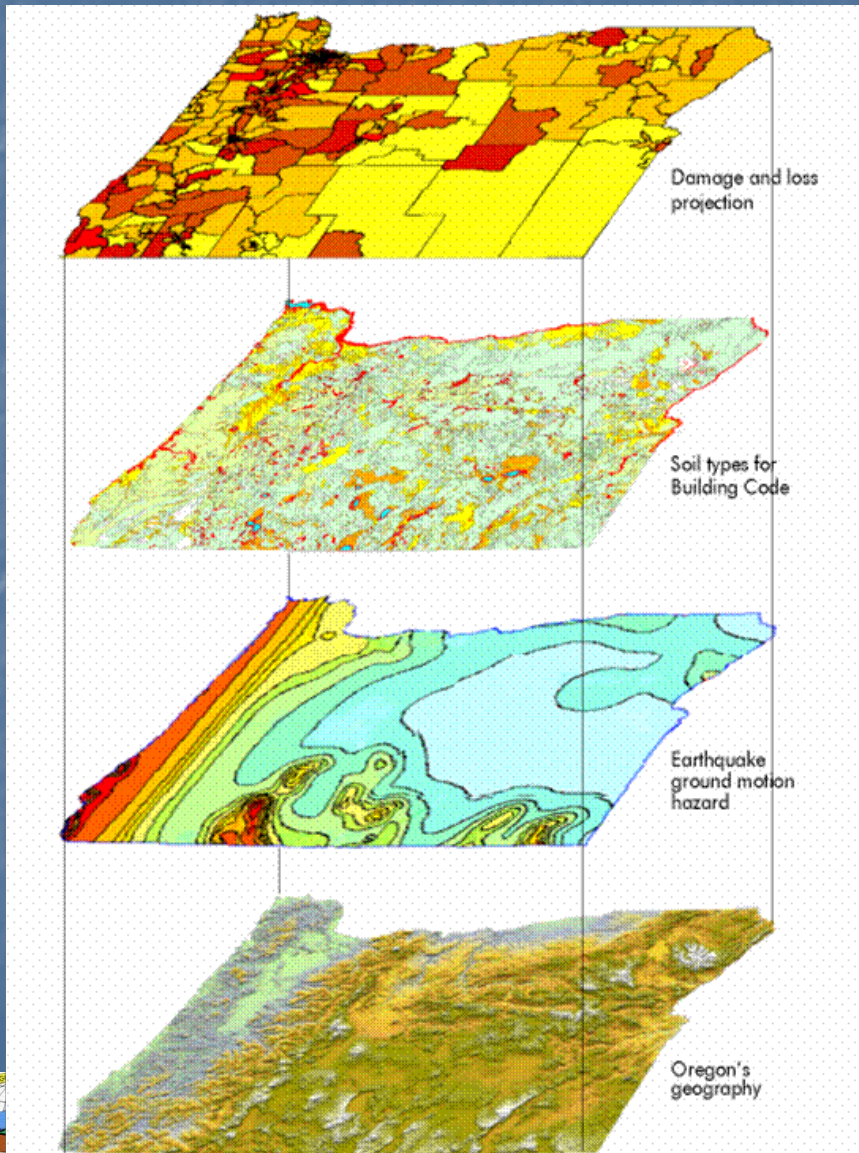
## (UBC Map)



# Oregon Earthquake Risk Assessment

## Cascadia Scenario (Wang, 1998 & 1999)

- Magnitude 8.5
- Shaking
- Coastal Tsunami
- >5k fatalities (OR)
- >\$30 B buildings (OR)
- How bad are schools?



# Oregon's Seismic Safety History

- 2001 ORS 455.400 requires "life safety" in schools by 2032
- 2002 Ballot Measure 15 amended Constitutional Article XI-M to allow state bonds to fix schools
- 2005 4 Bills (evaluate schools-Dogami 2007)
- 2009 Seismic Rehabilitation Grant program is established. \$30 M (\$15M schools, \$15M for emergency response facilities)
- 2010 First awardees of Courtney grants



# "Pilot" Studies that help lead to statewide effort

- 2004 Clackamas County study
  - Rapid Visual Screening (RVS) using FEMA 154 for schools & emergency facilities
  - About 1/3 buildings potential problems
- 2005 Oregon's 7 Public Universities
  - RVS and Enhanced RVS major buildings
  - FEMA funded mitigation projects
  - Established program that includes seismic, deferred maintenance, & energy needs



# OREGON UNIVERSITY SYSTEM

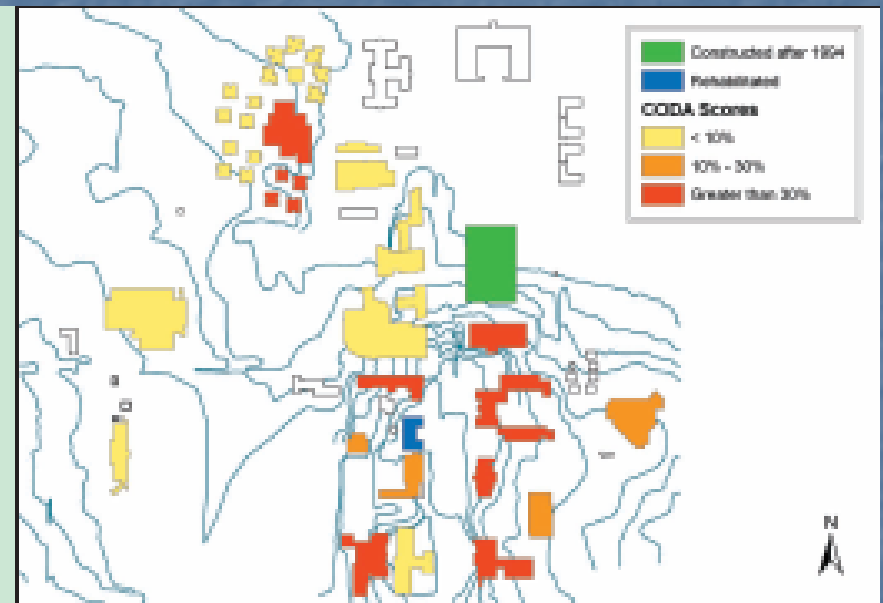
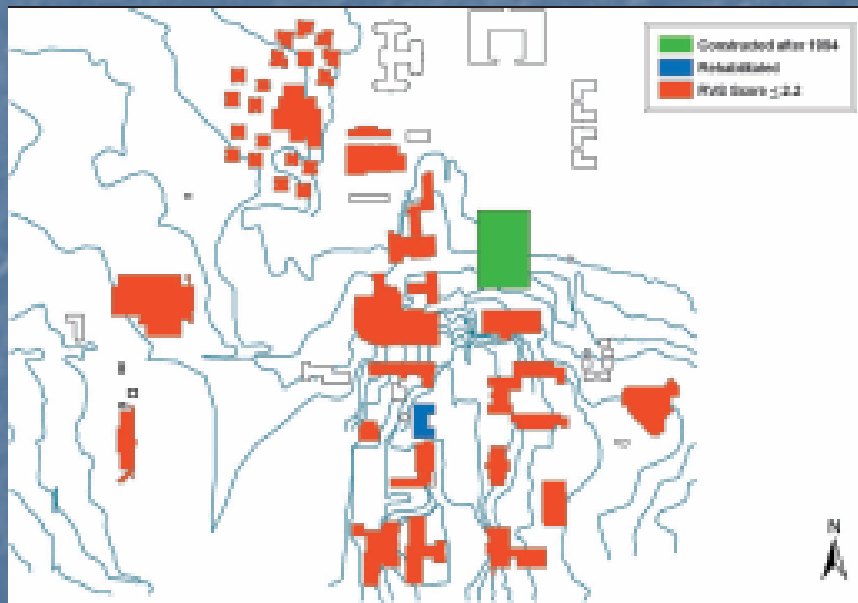
## E-RVS

Enhanced Rapid Visual Screening method

Western Oregon University

RVS method

E-RVS method





# Oregon University System

## Seismic upgrades using FEMA grants

### Oregon's DHS-FEMA PDM03 Rehab Projects



**Portland State University  
15-story residential hall**



**1916 Historic URM residential  
hall at Portland State University**



**Admin. Bldg. at Oregon Institute of  
Technology where numerous buildings  
were damaged in 1993 quake**



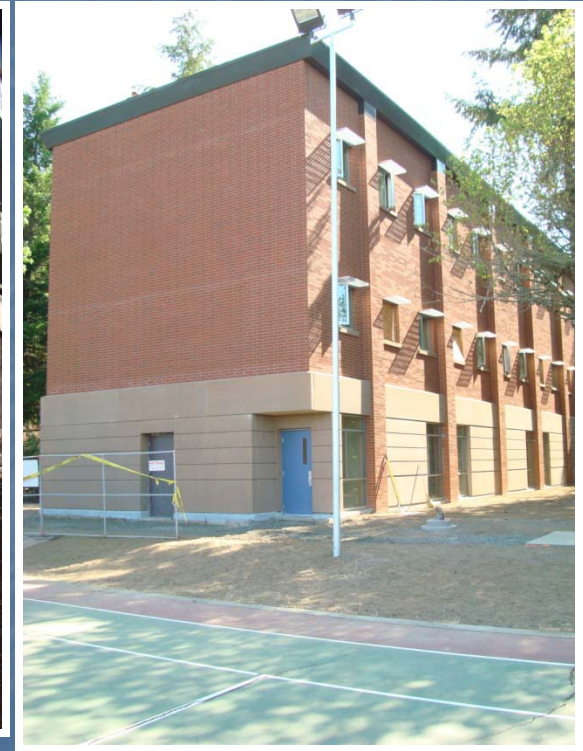
# Oregon University System

**2005 Institutionalized program on seismic safety**

Seismic mitigation program, with deferred maintenance, & energy efficiency improvements



**WOU HSS building:  
Soft-story collapse hazard**



# DOGAMI's REPORT (2007)

Risk Scores for Schools & Emergency Service Buildings (2007 DOGAMI report)

[www.oregongeology.org/sub/projects/rvs/default.htm](http://www.oregongeology.org/sub/projects/rvs/default.htm)

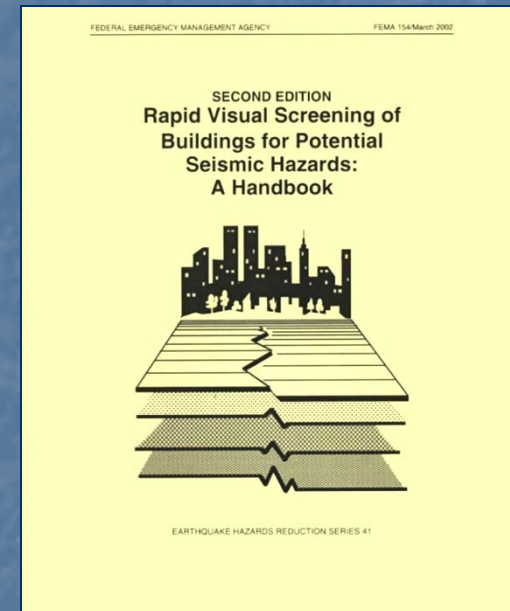
2,185 School Buildings

**273 Very High Risk**

**745 High Risk**

**501 Moderate Risk**

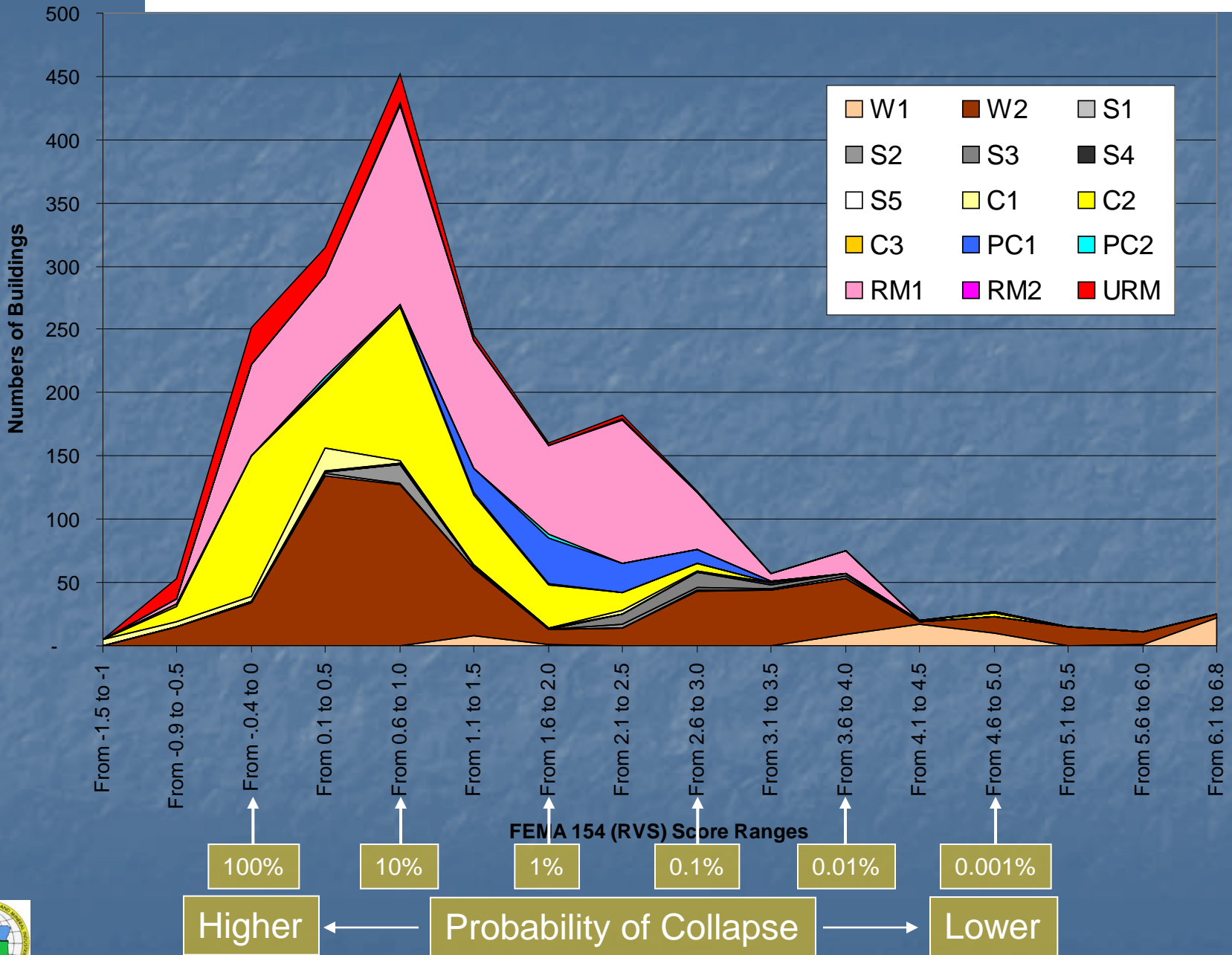
**666 Low Risk**



**1,198 school buildings built before 1950**



# RESULTS: RVS Scores For K12 Schools



# Buildings with Highest Risk (often not consistent w/RVS score)

- Unreinforced masonry (URM)
  - ~100 buildings
- "Soft story"
- Older tilt-ups
- Tsunami ~ 50 buildings



# URMs: unreinforced masonry



# Concrete & Masonry: non-ductile



# Soft-Stories





# Tilt-up construction

... Architect in other conditions  
mechanical and electrical plans.  
dimensions not shown.  
job.  
Wind 15 PSF. Seismic: \_\_\_\_\_  
steeper than a one to one slope to the bottom of

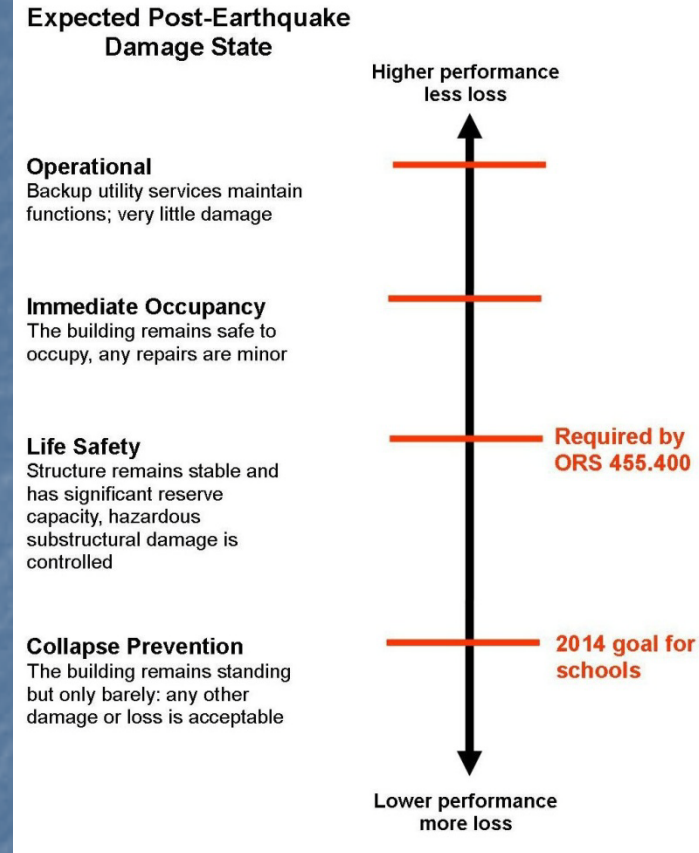


# ~50 Schools with Tsunami Hazards



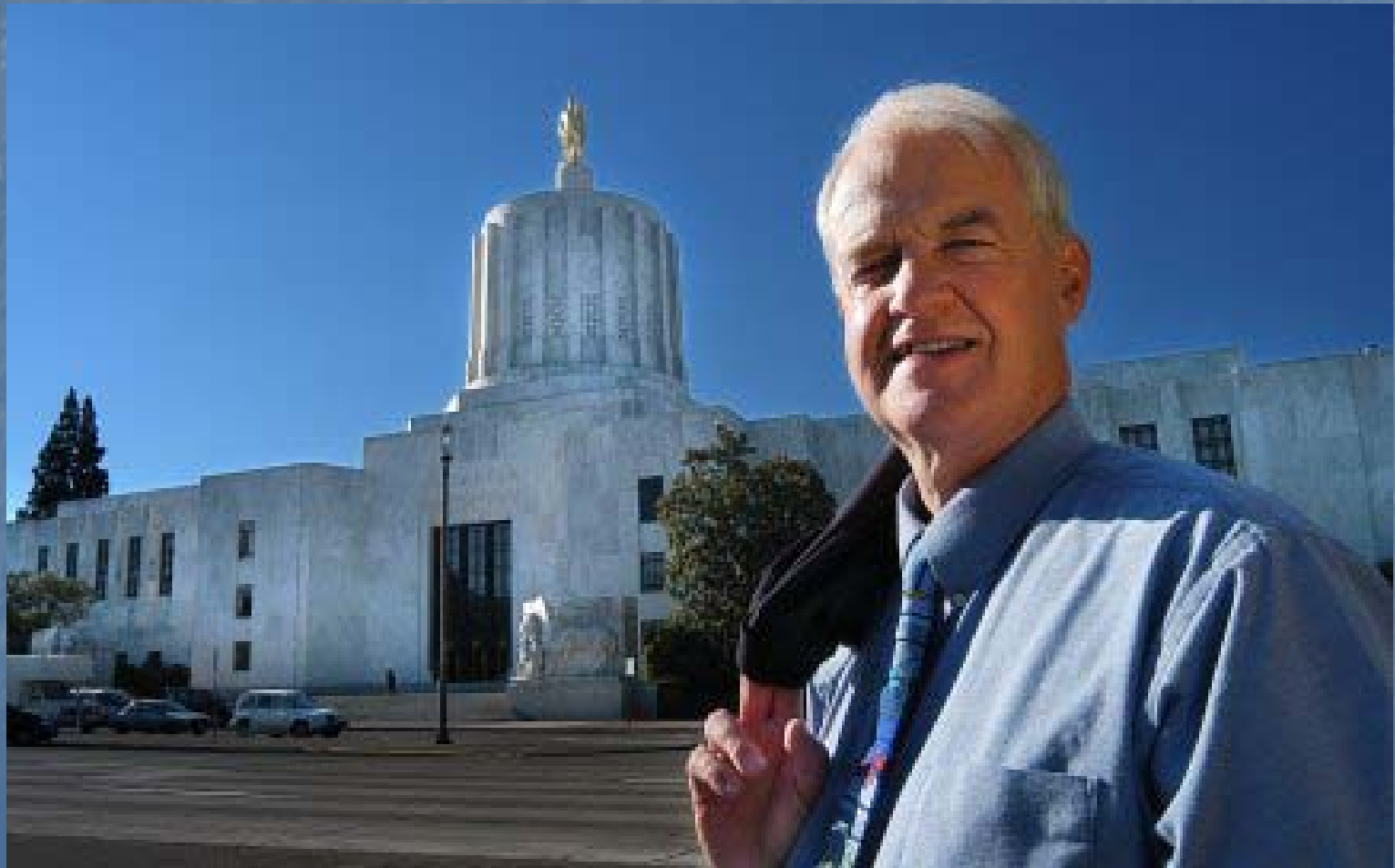
# Oregon Seismic Rehabilitation Grant Program

- **Goals:**
  - **Eliminate potential for mass student casualties in collapse-prone schools**
  - **Improve community preparedness by strengthening fire, police, hospitals**



# Peter Courtney Oregon Senator

## Champion: "The Earthquake Kid"



# Oregon Seismic Rehabilitation Grant Program

- **State grant funds for upgrades to Schools & Emergency Facilities**
- **First awards summer 2010 with \$15M**
- **24 schools & emergency buildings**
- **Round 2: \$15 M started in July 2010**
- **Round 3: amount TBD**

[www.oregon.gov/OMD/OEM/](http://www.oregon.gov/OMD/OEM/)



# Risk Management Approach

- *Prioritize Risk*
- *Promote "life safety" law*



# 1<sup>st</sup> Round Awarded School Projects early 2010, \$15 million

- Linn Benton Community College
- Three Rivers School District, Applegate Elementary School
- Beaverton School District, McKay Elementary School
- Beaverton School District, Cooper Mountain Elementary School
- Beaverton School District, Elmonica Elementary School
- Beaverton School District, Oak Hills Elementary School
- Western Oregon University, Todd Hall
- Lake County School District, Lakeview High School
- Lake County School District, Fremont Elementary School
- Medford School District, Washington Elementary School
- Medford School District, Medford Opportunity High School
- David Douglas School District, Floyd Light Middle School
- Yamhill Carlton School District, Yamhill Carlton Intermediate School
- North Clackamas School District, Milwaukie Elementary School



# 2010 Beaverton School press event





# State Resources

- Oregon Emergency Management 2009 Grant Program:  
<http://www.oregon.gov/OMD/OEM/>
- Oregon Department of Education Quake Safe Schools:  
<http://www.ode.state.or.us/go/quakesafeschools>
- DOGAMI seismic needs assessment study (O-07-02):  
<http://www.oregongeology.org/sub/projects/rvs/default.htm>
- Oregon Seismic Safety Policy Advisory Commission (OSSPAC):  
<http://www.oregon.gov/OMD/OEM/osspace/osspace.shtml>
- 2007 Oregon Structural Specialty Code:  
[http://www2.iccsafe.org/states/oregon/07\\_Structural/Building07\\_Frameset.htm](http://www2.iccsafe.org/states/oregon/07_Structural/Building07_Frameset.htm)

