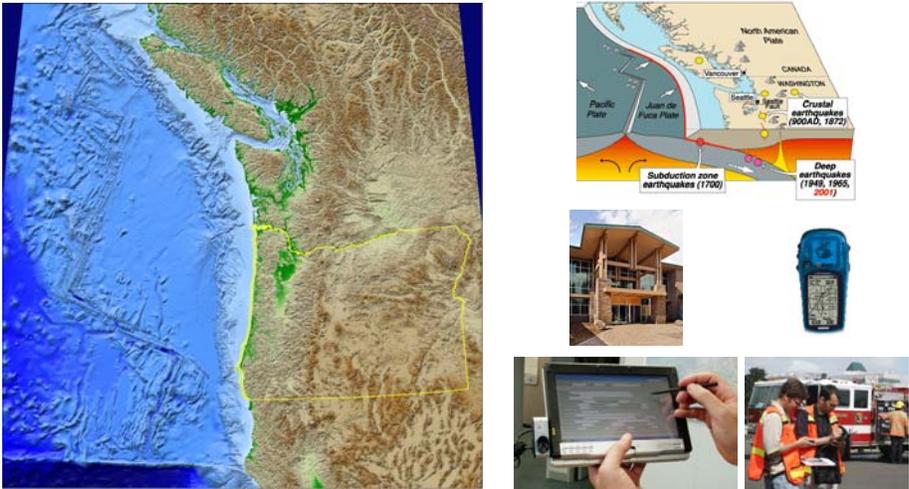
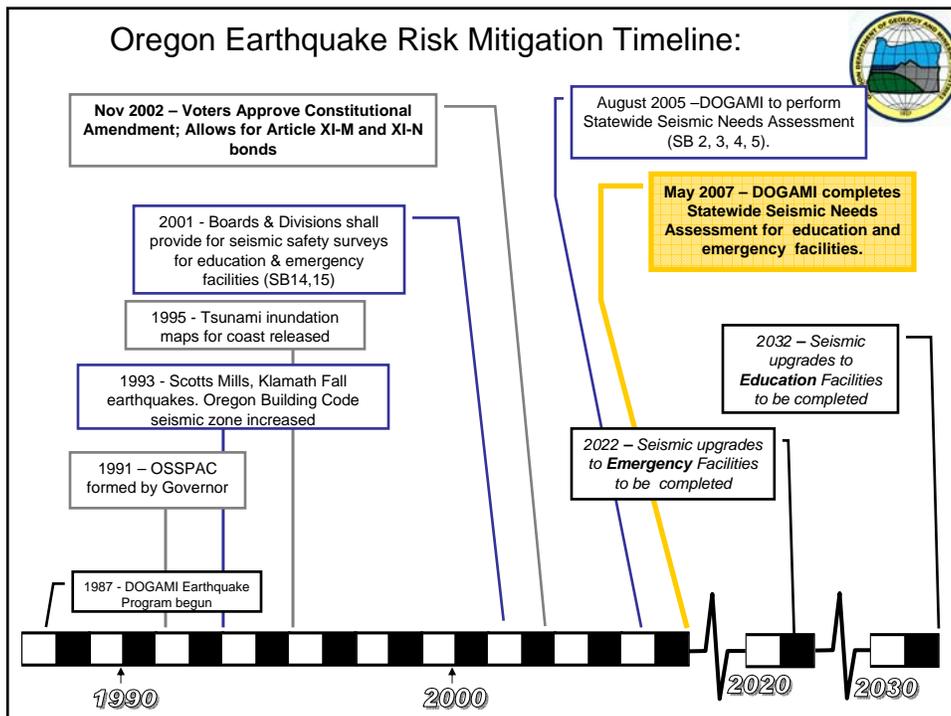
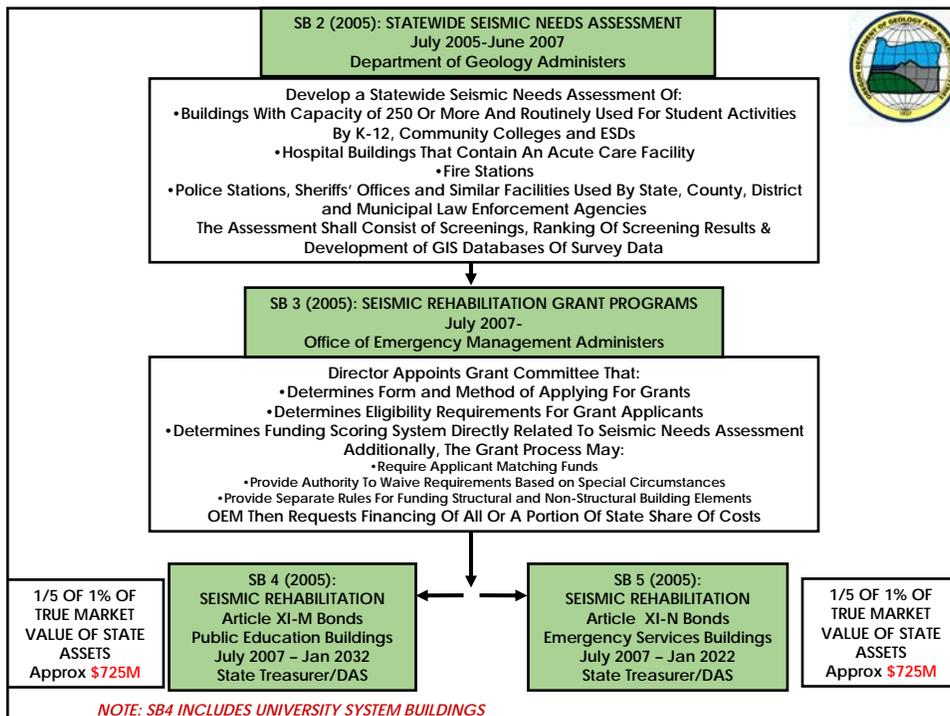
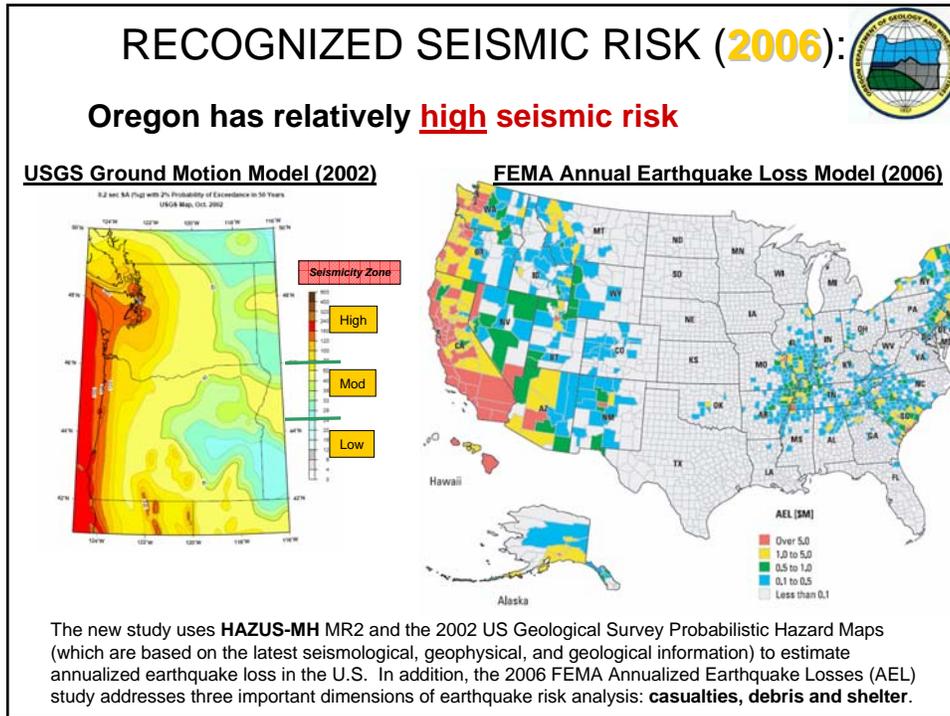


## OREGON SEISMIC NEEDS ASSESSMENT: Education & Emergency Facilities



**ANOTHER STEP IS ACHIEVED IN THE TWO DECADE-LONG EFFORT TO INCREASE AWARENESS & MITIGATE SEISMIC RISK IN OREGON**

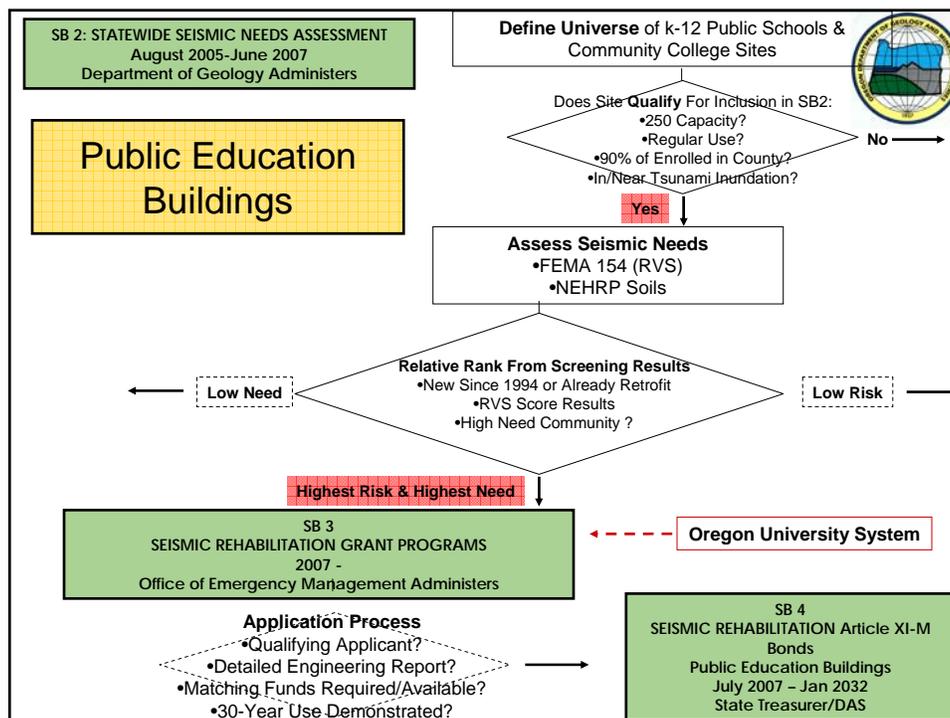


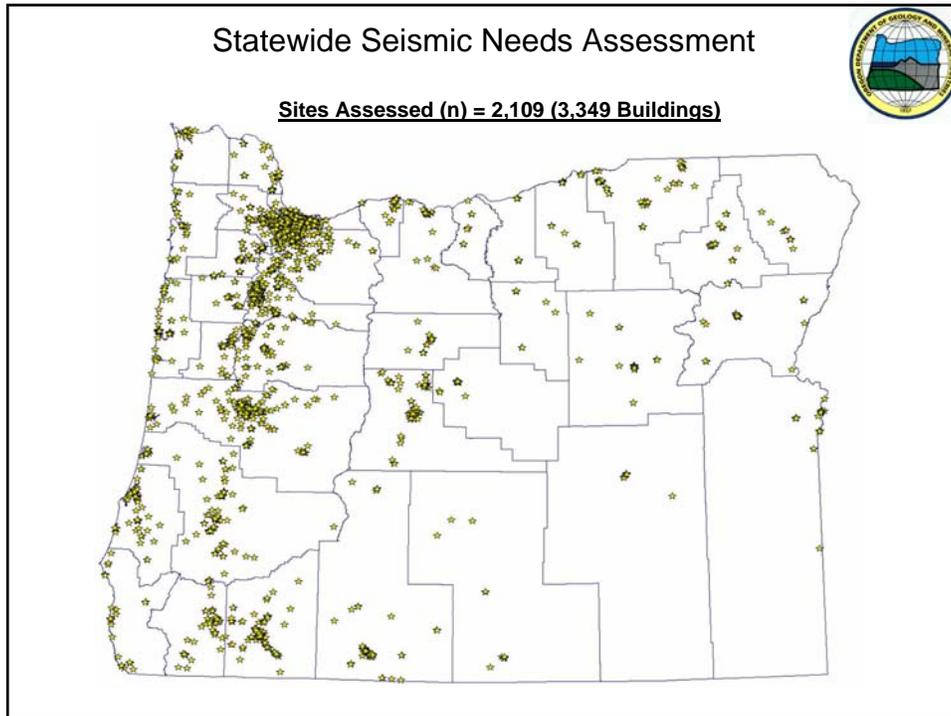


## SENATE BILL 2 INSTRUCTIONS:



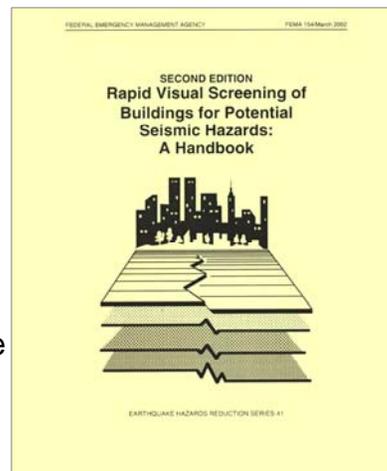
- Surveys consist of:
  - **Rapid visual screenings of the buildings specified, in accordance with FEMA-154, or an equivalent standard;**
  - The **ranking** of the rapid visual screening results in risk categories based on:
    - **Need**
    - **Importance** of the building to the community
    - Risk to the building posed by its **location**
    - Risk posed to the community by the **collapse** of the building during a seismic event
    - *Projected cost of the necessary rehabilitation*
    - **Other categories** determined necessary by DOGAMI
  - The development of **geographic information system** (GIS) databases of survey data and the sharing of that data with interested parties.





### FEMA 154-What it is:

- **Rapid Visual Screening**
  - Developed for a broad audience
  - Creates building **inventory**
- Purpose is to identify:
  - Older buildings
  - Buildings on soft or poor soils
  - Buildings “having performance characteristics that negatively influence their seismic response”



## FEMA 154-What it is *not*.

- RVS 154 known as “Sidewalk Surveys”
  - *Medical Analogy: “Judging health based upon general factors like family history”*
- Are Not Engineering Studies
  - (as are FEMA 178 or ASCE 31)
  - *“Chemical analyses & physical examination by qualified professional”*
- Does Not Involve Invasive Tests
  - (as does FEMA 356)
  - *“Exploratory surgery performed by qualified and experienced surgeon”*



## SEISMIC RISK (FEMA 154):

### Five Key Factors Drive Building Collapse<sup>1</sup> Potential

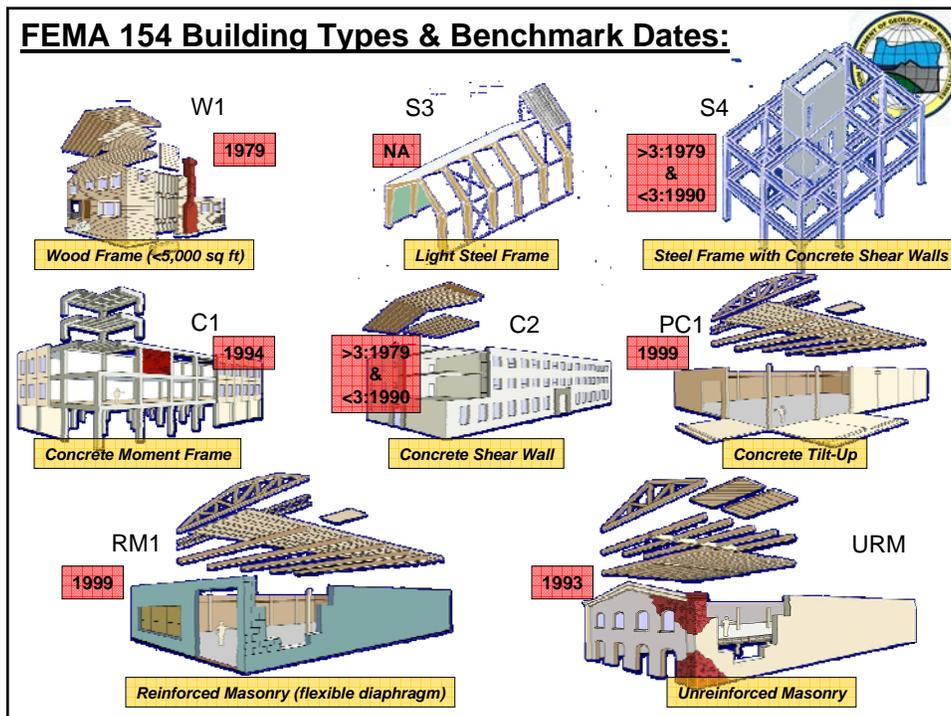
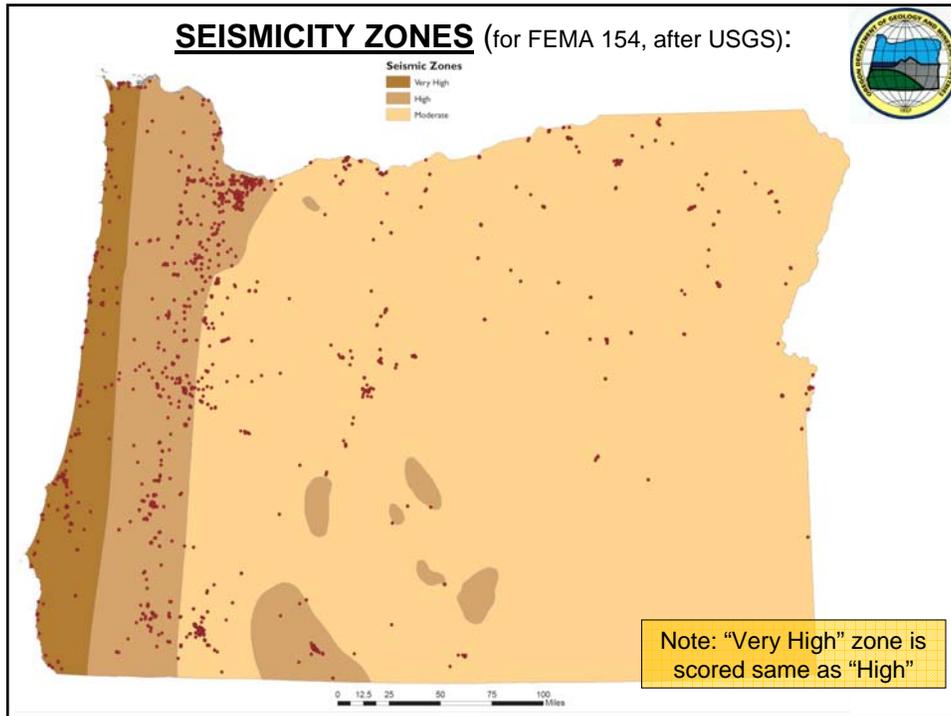
1. **Seismicity Zone** (USGS Ground Motion, %g)
2. **Building Structural Type** (15 FEMA possibilities)
3. **Building Irregularities** (Plan and Vertical)
4. **Original Construction Date** (vs. Building Codes)
5. **Soil Type** (A to F; amplify motion up to 10x)

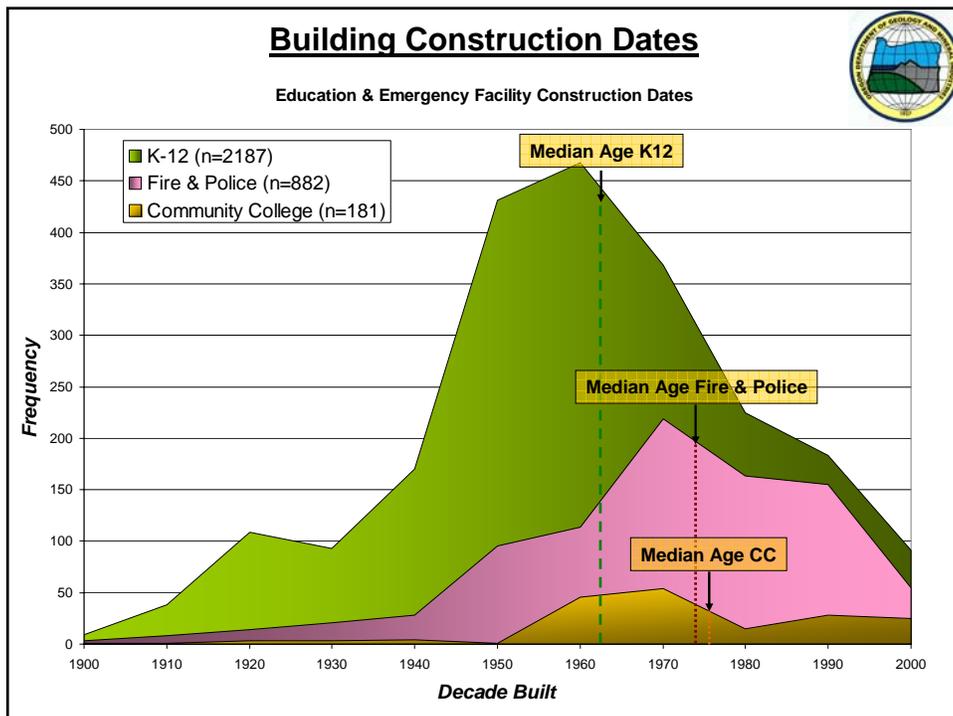
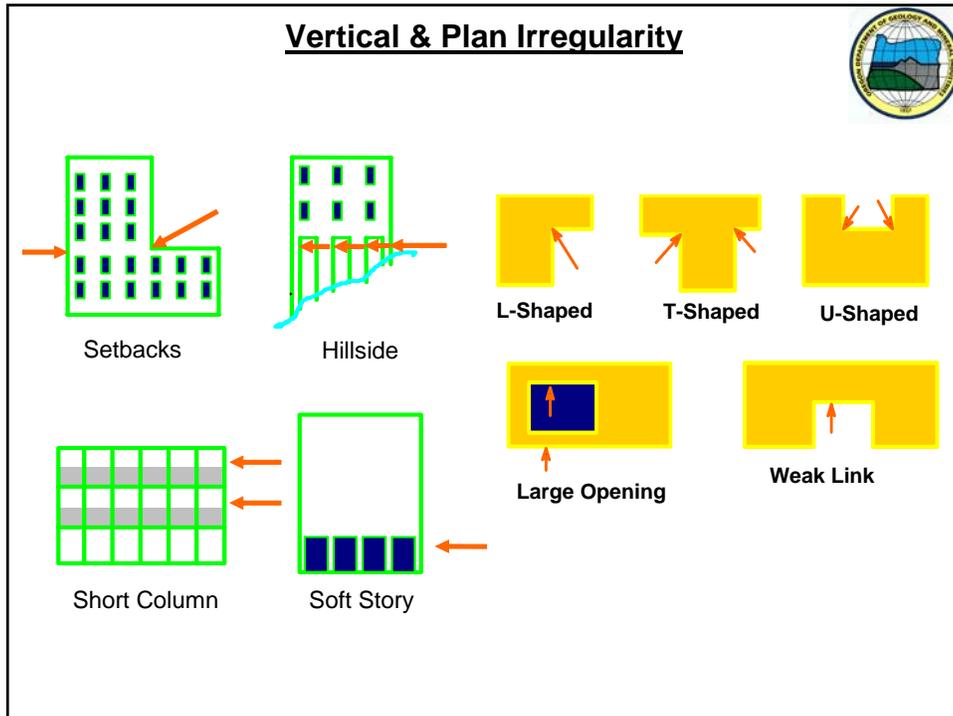
Oregon Seismic Risk Awareness Increased in Past 20 Years:

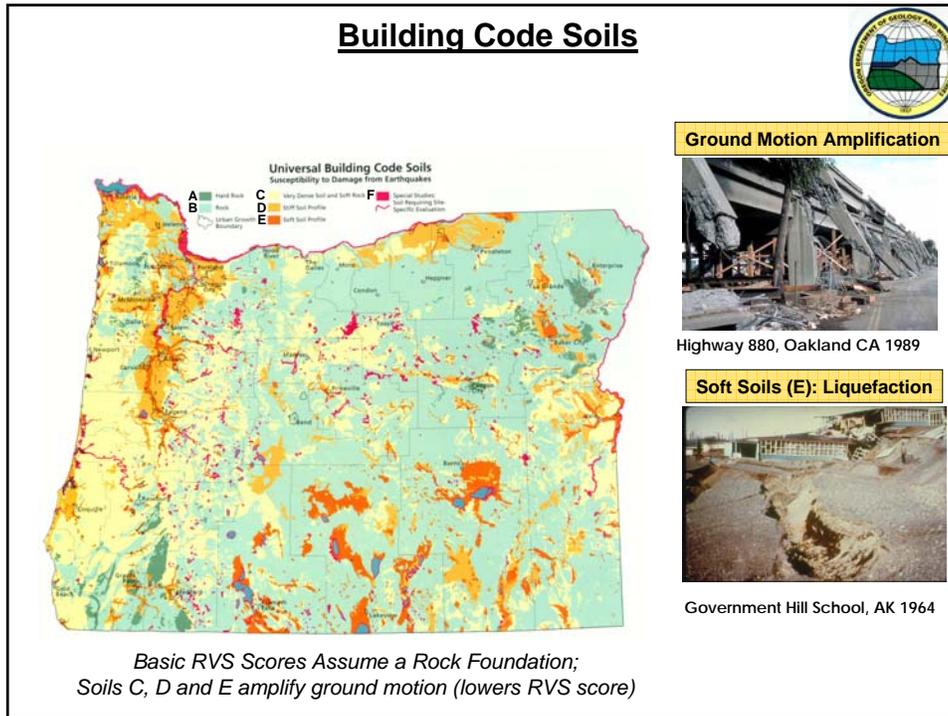
- **Impacts Building Code for Many Structural Types**
- Engineering Design Follows Building Code Modifications
- Code Exceptions Cause Other Issues (*RM may be URM*)

<sup>1</sup>: “Collapse” is the word chosen by the Applied Technology Council, who advises FEMA on these matters. However, each building will structurally fail in varying ways & have varying impacts on occupants









### Rapid Visual Screening Scoring

Example of Calculating a FEMA 154 RVS Score:

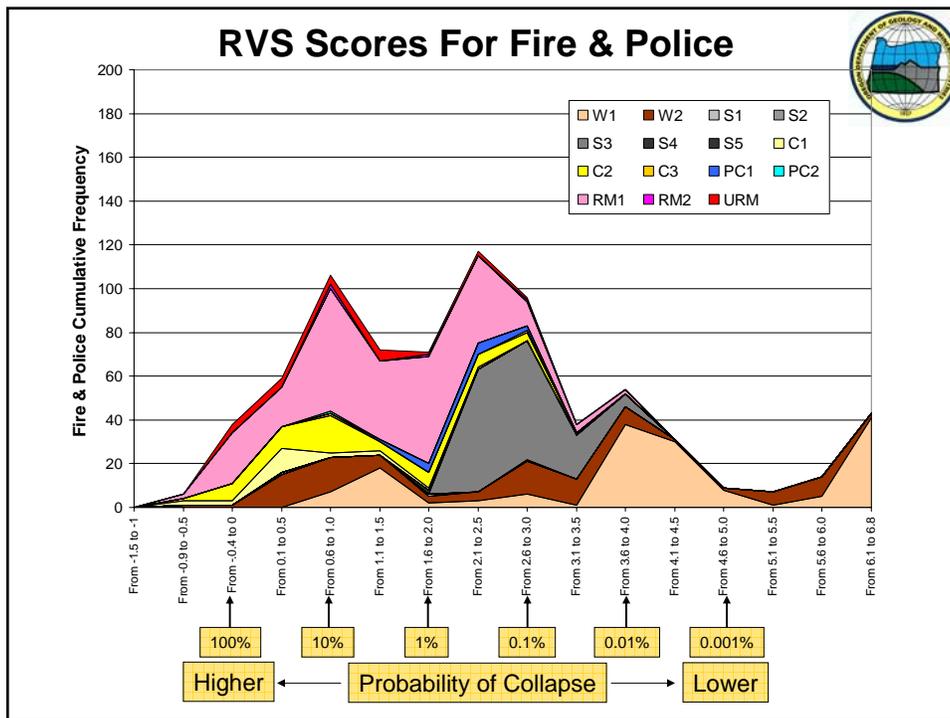
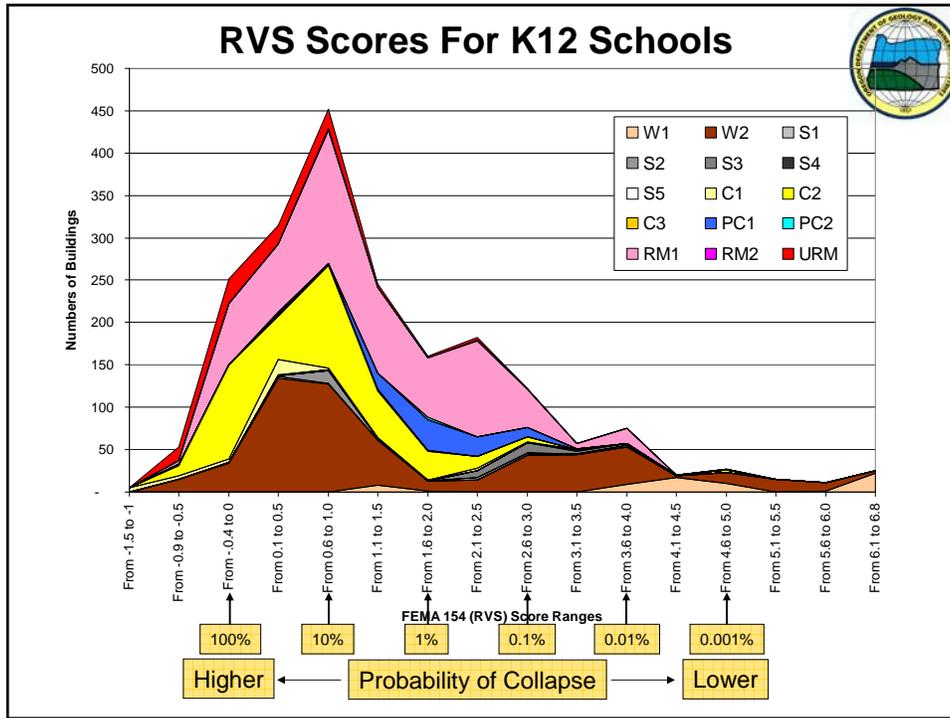
Seismicity Zone: **High**      Precode: **1941**

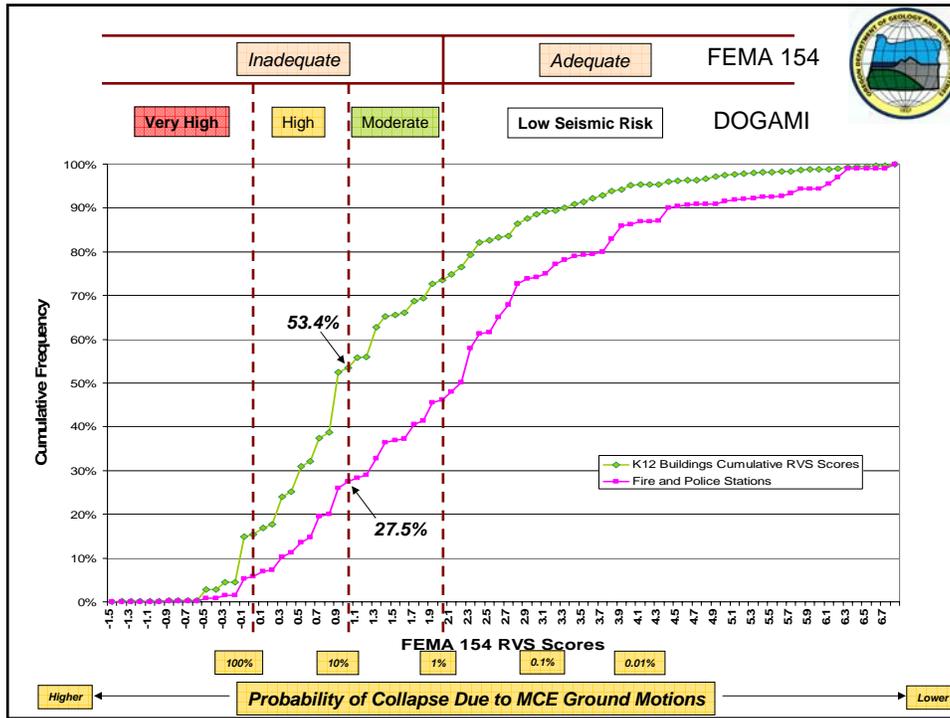
|                                | <u>Primary Choice</u><br>Wood (<5,000 sq ft) | <u>Secondary</u><br>Concrete (Shear Wall) | <u>Tertiary</u><br>Reinforced Masonry |
|--------------------------------|--|---|---------------------------------------|
| Building Type                  | W2   | C2  | RM1                                   |
| Year Constructed               | 1986   | 1986                                      | 1986                                  |
| Basic Score                    | 3.8  | 2.8                                       | 2.8                                   |
| Pre-code Modifier              | 0  | 0   | 0                                     |
| Plan Irregularity Modifier     | (0.5)  | (0.5)                                     | (0.5)                                 |
| Vertical Irregularity Modifier | (2.0)  | (1.0)                                     | (1.0)                                 |
| Post-Benchmark Year for Code   | <b>1979</b>                                  | <b>1990</b>                               | <b>1999</b>                           |
| Post-benchmark Modifier        | 2.4  | 0   | 0                                     |
| Soil Type E Modifier           | (0.8)  | (0.8)                                     | (0.4)                                 |
| <b>Final RVS Score</b>         | <u>2.9</u>                                   | <u><b>0.5</b></u>                         | <u>0.9</u>                            |

→ *Lowest Score Selected*

**Oregon Structural Type Frequencies:**

|                   | W1         | W2         | S1 | S2 | S3         | S4 | S5 | C1        | C2         | C3 | PC1 | PC2 | RM1        | RM2 | URM |
|-------------------|------------|------------|----|----|------------|----|----|-----------|------------|----|-----|-----|------------|-----|-----|
| K12 Schools       | 68         | <b>563</b> | 4  | 27 | 25         | 3  | 2  | 38        | <b>409</b> | 9  | 90  | 6   | <b>668</b> | 3   | 101 |
| Community College | 2          | 19         | 1  | 5  | 3          | 2  | 2  | <b>30</b> | 20         | -  | 3   | 17  | <b>30</b>  | 2   | 3   |
| Fire & Police     | <b>160</b> | 100        | 1  | 2  | <b>136</b> | 2  | -  | 21        | 58         | 2  | 12  | 1   | <b>241</b> | 4   | 21  |
|                   | 230        | 682        | 6  | 34 | 164        | 7  | 4  | 89        | 487        | 11 | 105 | 24  | 939        | 9   | 125 |

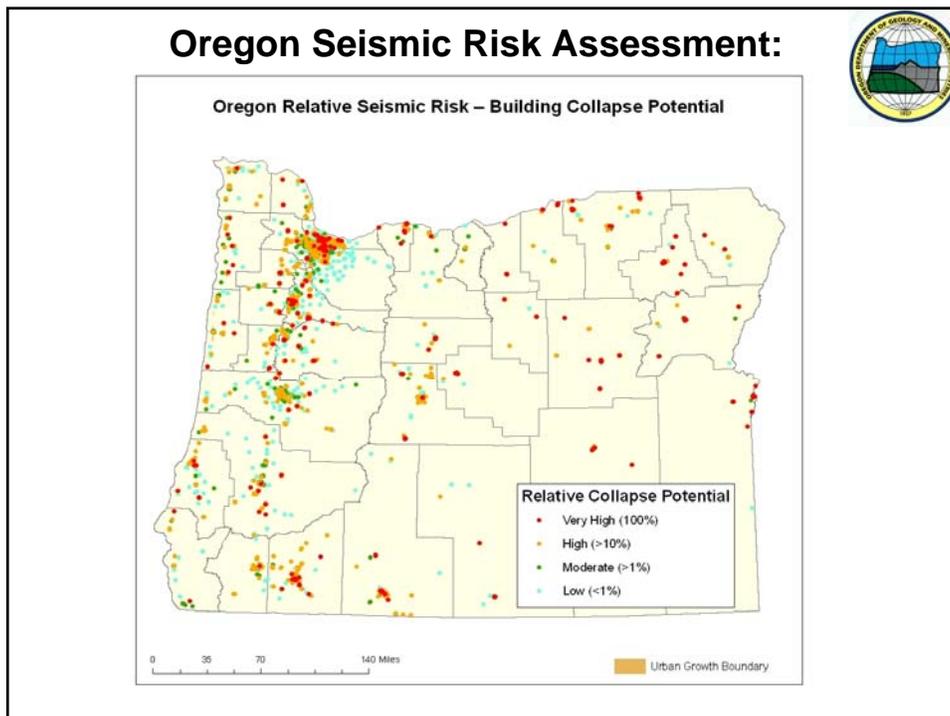
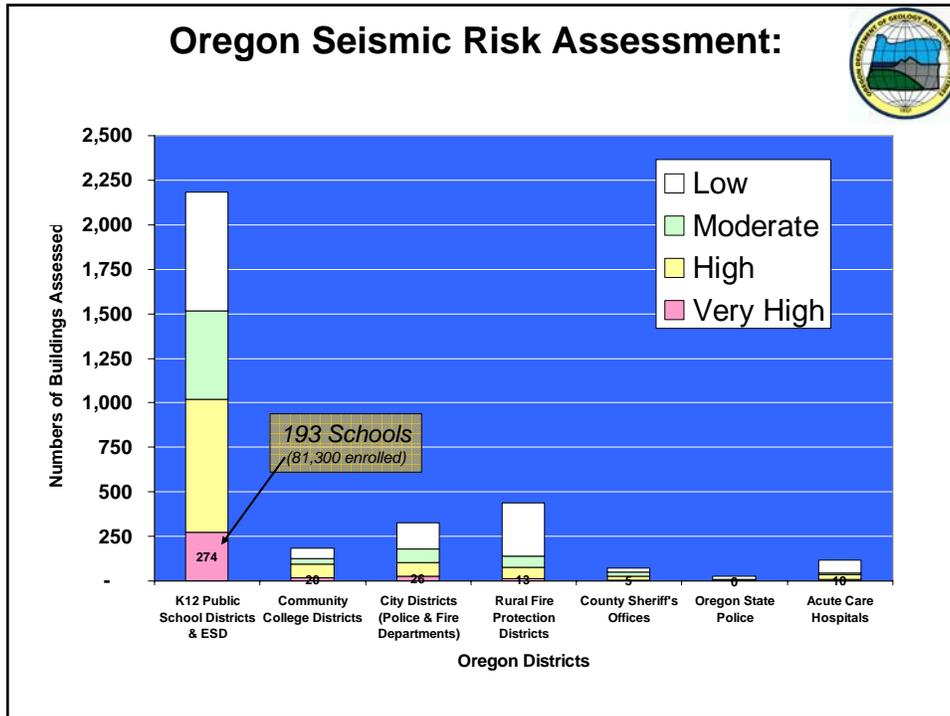


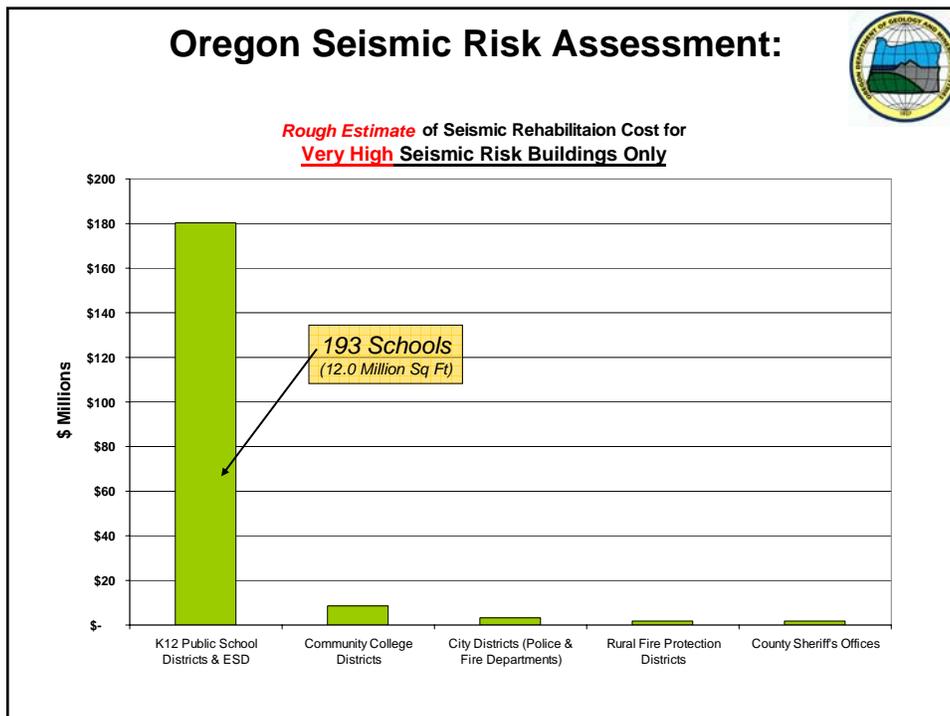
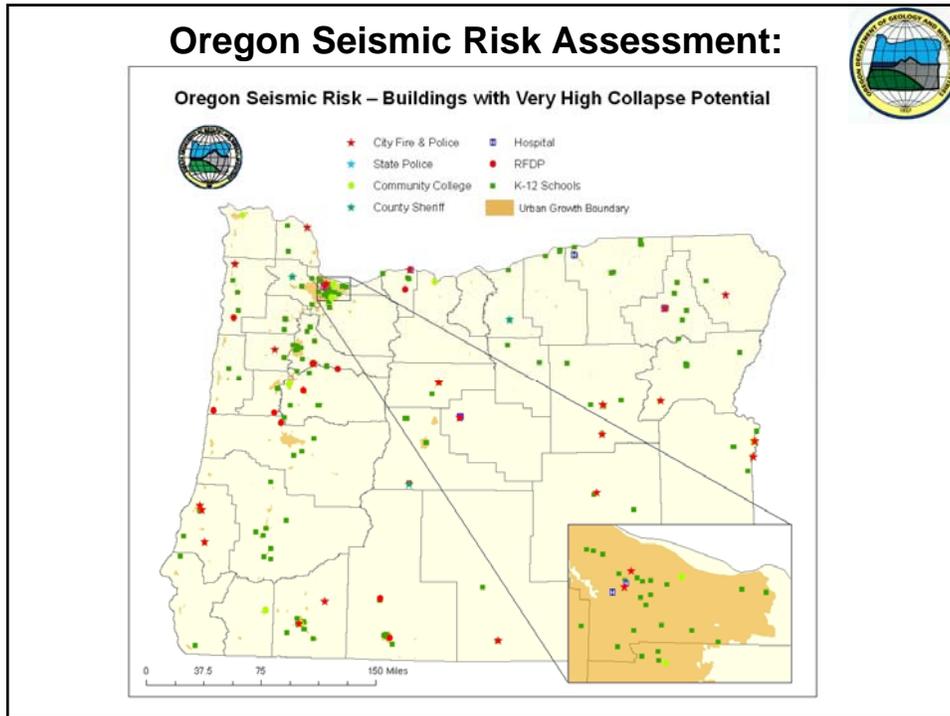


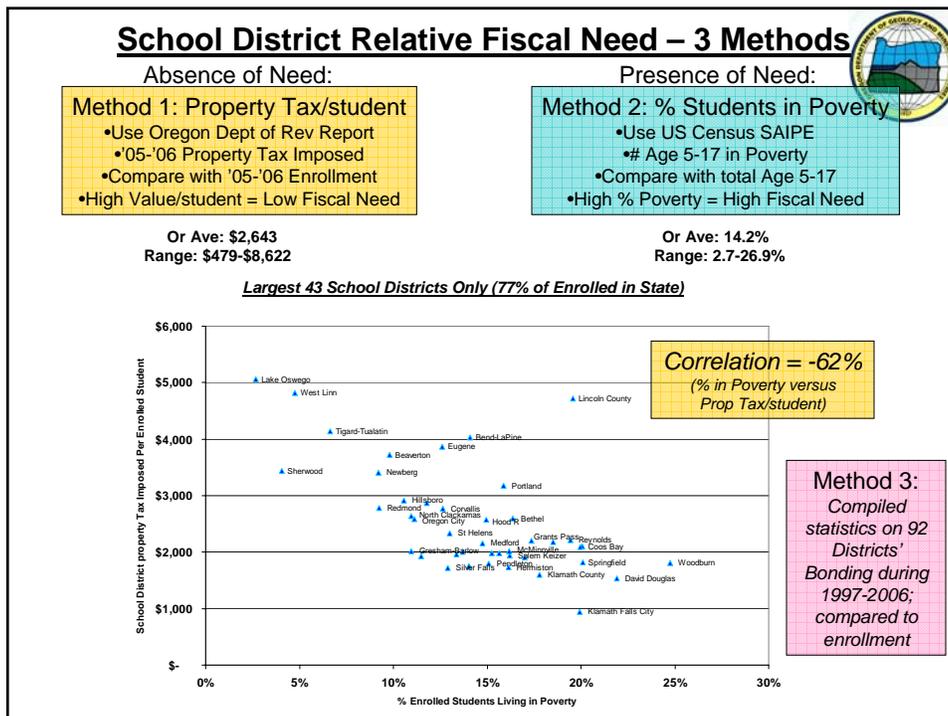
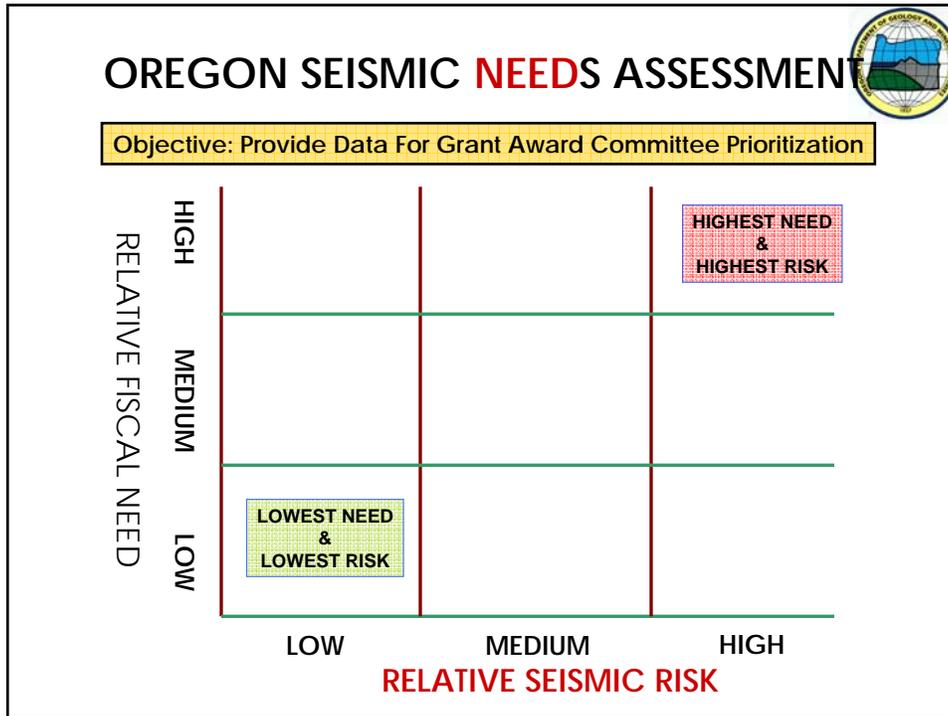
### Seismic Risk Assessment: RESULTS

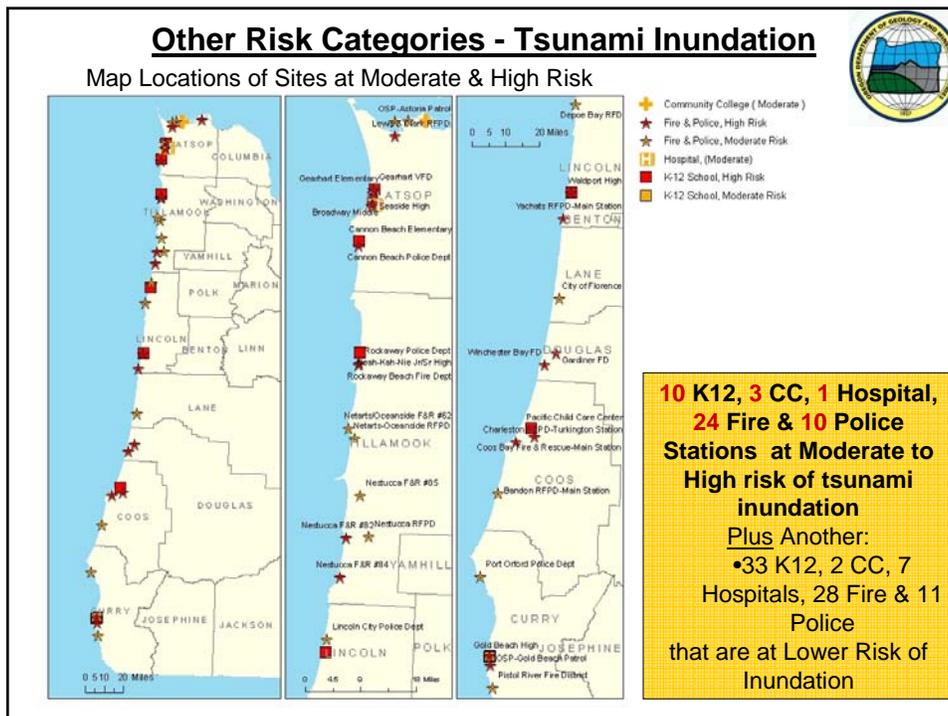
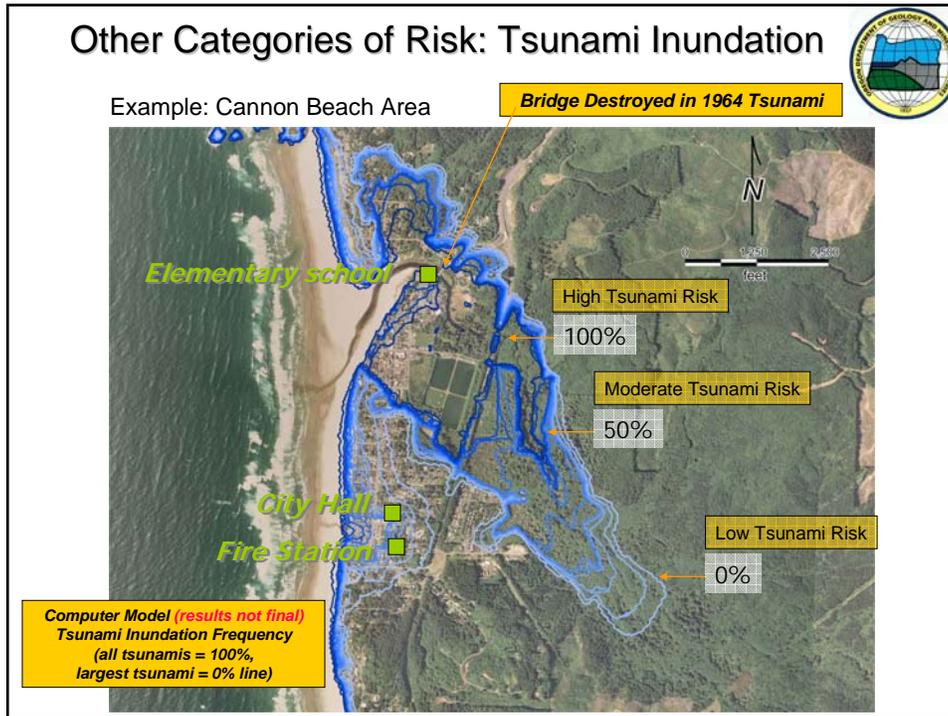
**Summary of Seismic Risk for all Qualifying Sites & Buildings**

| Seismic Needs Assessment District          | # of Districts | # of Schools | # of Buildings | FEMA 154-Based Collapse Potential |             |            |             |
|--|----------------|--------------|----------------|-----------------------------------|-------------|------------|-------------|
|  |                |              |                | Very High                         | High        | Moderate   | Low         |
| <b>Education:</b>                          |                |              |                |                                   |             |            |             |
| K12 Public School Districts & ESD          | 170            | 1101         | 2182           | 274                               | 744         | 497        | 667         |
| Community College Districts                | 17             | 179          | 184            | 20                                | 74          | 33         | 57          |
| <b>Sum Education</b>                       | <b>187</b>     | <b>1280</b>  | <b>2366</b>    | <b>294</b>                        | <b>818</b>  | <b>530</b> | <b>724</b>  |
| <b>Emergency:</b>                          |                |              |                |                                   |             |            |             |
| City Districts (Police & Fire Departments) | 143            |              | 327            | 26                                | 78          | 75         | 148         |
| Rural Fire Protection Districts            | 191            |              | 440            | 13                                | 62          | 62         | 303         |
| County Sheriff's Offices                   | 34             |              | 73             | 5                                 | 24          | 18         | 26          |
| Oregon State Police                        | 1              |              | 26             | 0                                 | 5           | 4          | 17          |
| Port of Portland                           | 1              |              | 1              | 0                                 | 0           | 0          | 1           |
| Acute Care Hospitals                       | 58             |              | 116            | 10                                | 26          | 10         | 70          |
| <b>Sum Emergency</b>                       | <b>428</b>     |              | <b>983</b>     | <b>54</b>                         | <b>195</b>  | <b>169</b> | <b>565</b>  |
| <b>SUM ALL:</b>                            |                |              | <b>3349</b>    | <b>348</b>                        | <b>1013</b> | <b>699</b> | <b>1289</b> |
|  |                |              |                | 10%                               | 30%         | 21%        | 38%         |









## Search Information Online

[http://www.oregongeology.org/projects/rvs/site\\_search.html](http://www.oregongeology.org/projects/rvs/site_search.html)



### Statewide Seismic Needs Assessment Using Rapid Visual Screening (RVS)

[Oregon Senate Bill 2 (2005)]



Use this form to search for individual site reports in PDF format. You need the free Adobe PDF Reader to view PDF files. You can download the reader from [Adobe](#).

Site Summary Report Search

**By City:**  
Examples: Baker City or Baker

- OR -

**By Facility Name:**  
Examples: Bandon Police or Mult

- OR -

**By County:**

- OR -

**By Facility Type:**

[Statewide Seismic Needs Assessment Home](#)

## Search Results – Tables & Site Reports

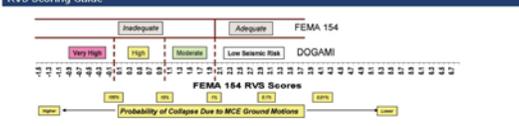


### Statewide Seismic Needs Assessment Using Rapid Visual Screening (RVS)

[Oregon Senate Bill 2 (2005)]



**RVS Scoring Guide**



For more information see the [report to the 76th Oregon Legislative Assembly](#).

[Return to Site Search page](#)

**Search results for 'city' like 'Portland'**

Click on a "Facility Name" link to view the site summary report. To sort by column, click on the column header text.

| Facility Name                                     | Site Type | Address                                    | County    | Soil Type | RVS Score | Collapse Potential |
|---|-----------|--|-----------|-----------|-----------|--------------------|
| <a href="#">Happy Valley Elementary School</a>    | School    | 13845 Se King Rd, Portland, OR 97236       | Clackamas | C         | 1.9       | Moderate (>1%)     |
| <a href="#">Happy Valley Elementary School</a>    | School    | 13845 Se King Rd, Portland, OR 97236       | Clackamas | C         | 0.9       | Moderate (>1%)     |
| <a href="#">Happy Valley Elementary School</a>    | School    | 13845 Se King Rd, Portland, OR 97236       | Clackamas | C         | 0.9       | Moderate (>1%)     |
| <a href="#">Mount Scott Elementary School</a>     | School    | 11201 SE Stevens Rd, Portland, OR 97266    | Clackamas | C         | 3.3       | Low (<1%)          |
| <a href="#">Mount Scott Elementary School</a>     | School    | 11201 SE Stevens Rd, Portland, OR 97266    | Clackamas | C         | 5.8       | Low (<1%)          |
| <a href="#">Sedona Mountain Elementary School</a> | School    | 11445 Se Mesa Ln, Portland, OR 97236       | Clackamas | C         | 4.8       | Low (<1%)          |
| <a href="#">Seasומר School</a>                    | School    | 1595 SE Oak Grove Blvd, Portland, OR 97237 | Clackamas | C         | 2.4       | Low (<1%)          |
| <a href="#">Alameda Elementary School</a>         | School    | 2732 NE Fremont St, Portland, OR 97212     | Multnomah | C         | -0.1      | Very High (100%)   |
| <a href="#">Adela Elementary School</a>           | School    | 5139 SE 66th Ave, Portland, OR 97206       | Multnomah | C         | -0.1      | Very High (100%)   |
| <a href="#">Aster Elementary School</a>           | School    | 5601 N Yale St, Portland, OR 97203         | Multnomah | D         | 0.5       | Moderate (>1%)     |
| <a href="#">Adkinson Elementary School</a>        | School    | 5800 SE Division St, Portland, OR 97206    | Multnomah | D         | 0.5       | Moderate (>1%)     |
| <a href="#">Ball Elementary School</a>            | School    | 4212 N Wells Blvd, Portland, OR 97203      | Multnomah | C         | 0.9       | Moderate (>1%)     |
| <a href="#">Beach Elementary School</a>           | School    | 1710 N Humboldt St, Portland, OR 97217     | Multnomah | C         | -0.1      | Very High (100%)   |

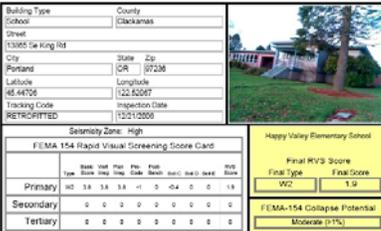
**Happy Valley Elementary School**  
North Clackamas ISD 12

Clac\_sch10A

|                  |  |                 |
|------------------|--|-----------------|
| Building Type    |  | County          |
| School           |  | Clackamas       |
| Sheet            |  |                 |
| 13845 Se King Rd |  |                 |
| City             |  | State Zip       |
| Portland         |  | OR 97236        |
| Latitude         |  | Longitude       |
| 45.54758         |  | 122.52087       |
| Tracking Code    |  | Inspection Date |
| RETROFITTED      |  | 11/01/2006      |

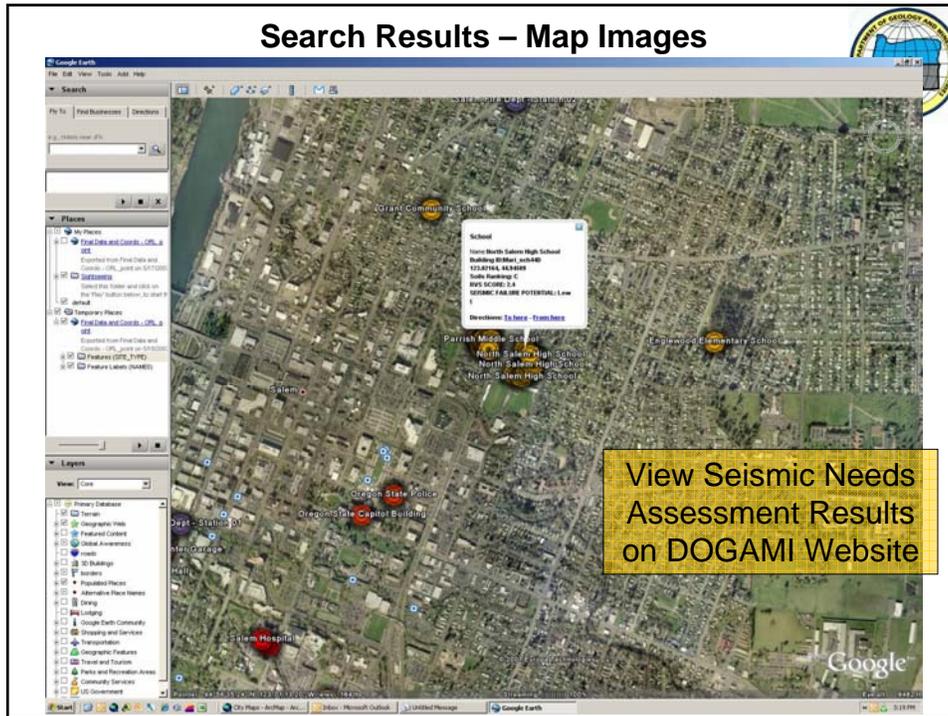
Seismicity Zone: High

| FEMA 154 Rapid Visual Screening Score Card |    |    |    |    |    |    |    |    |     |     |
|--|----|----|----|----|----|----|----|----|-----|-----|
| W1   | W2 | W3 | W4 | W5 | W6 | W7 | W8 | W9 | W10 | W11 |
| 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | 0   |
| Final RVS Score                            |    |    |    |    |    |    |    |    |     |     |
| Final Type                                 |    |    |    |    |    |    |    |    |     |     |
| W2   |    |    |    |    |    |    |    |    |     |     |
| Final Score                                |    |    |    |    |    |    |    |    |     |     |
| 1.9  |    |    |    |    |    |    |    |    |     |     |
| FEMA-154 Collapse Potential                |    |    |    |    |    |    |    |    |     |     |
| Moderate (>1%)                             |    |    |    |    |    |    |    |    |     |     |



**Happy Valley Elementary School**

OregonGeology Rapid Visual Screening - Senate Bill #2 - Seismic Needs Assessment  
Oregon Department of Geology and Mineral Industries



## RECOMMENDATIONS

- Form Seismic Rehabilitation Grant Committee
  - Establish Qualifications
  - Determine Application Requirements
    - Engineering Feasibility Study
- Districts Hire Seismic Rehabilitation Consultants to Test & Confirm Findings, and Perform More Detailed Evaluations
- Compare and Contrast Cost of Rehabilitation versus Benefit of Reconstruction