The Oregon Resilience Plan
Brief Overview

for

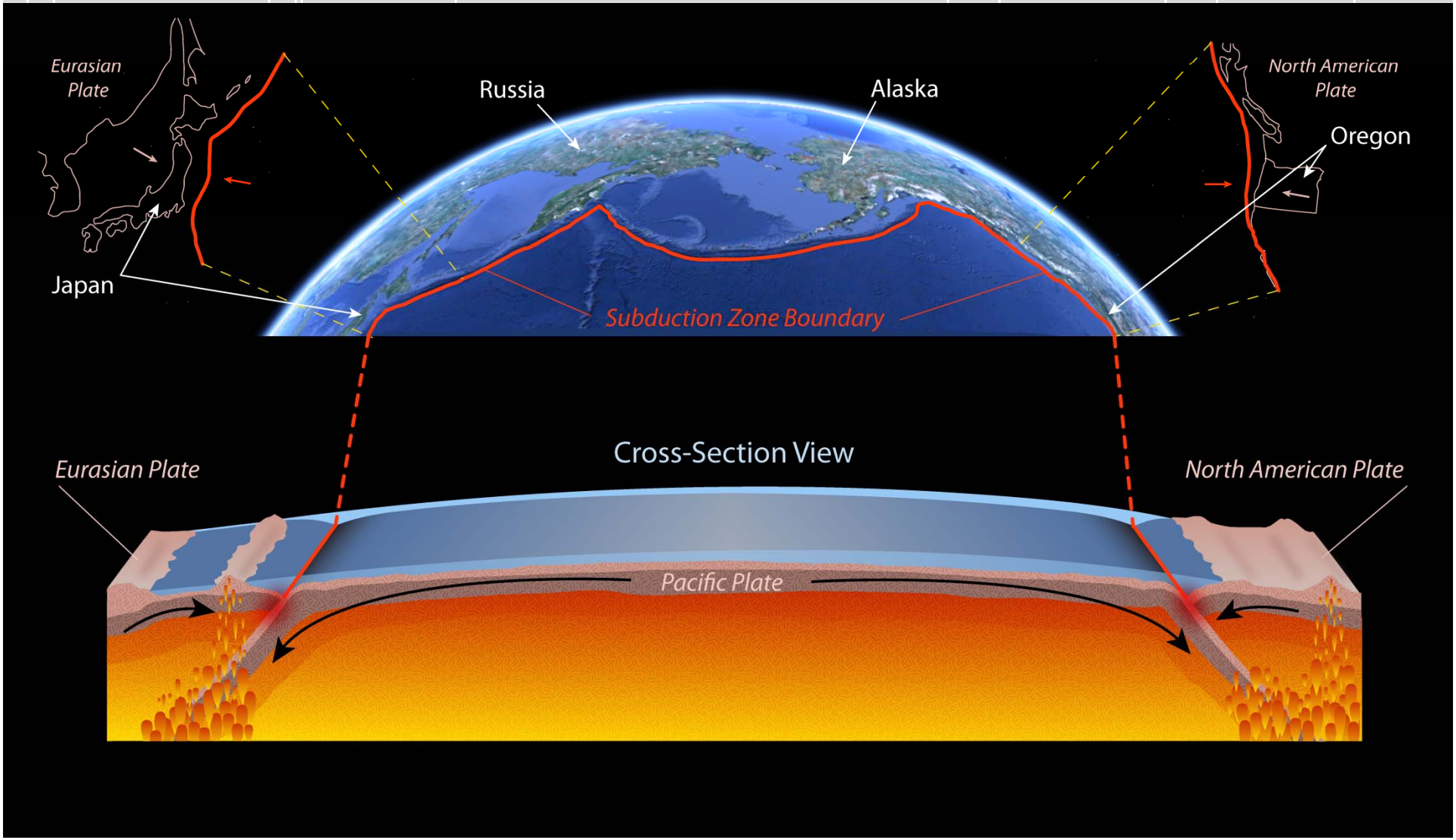
Multnomah County

Kent Yu, PhD, SE
Oregon Seismic Safety Policy Advisory Commission
Principal, SEFT Consulting Group
&
Jay Wilson, Chair
Oregon Seismic Safety Policy Advisory Commission
Emergency Manager, Clackamas County

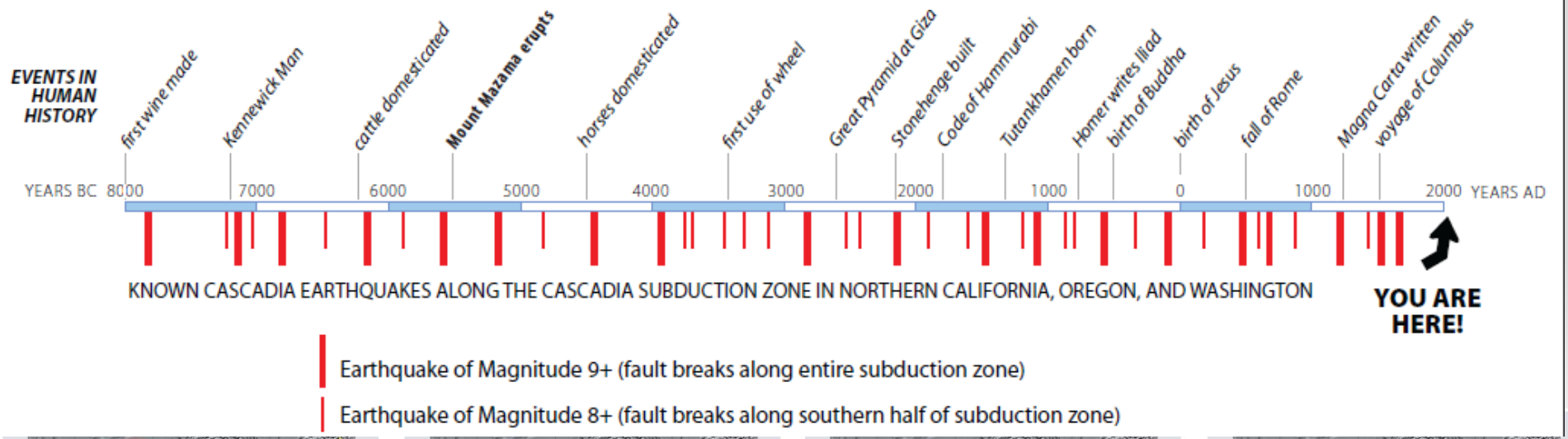
February 4, 2014

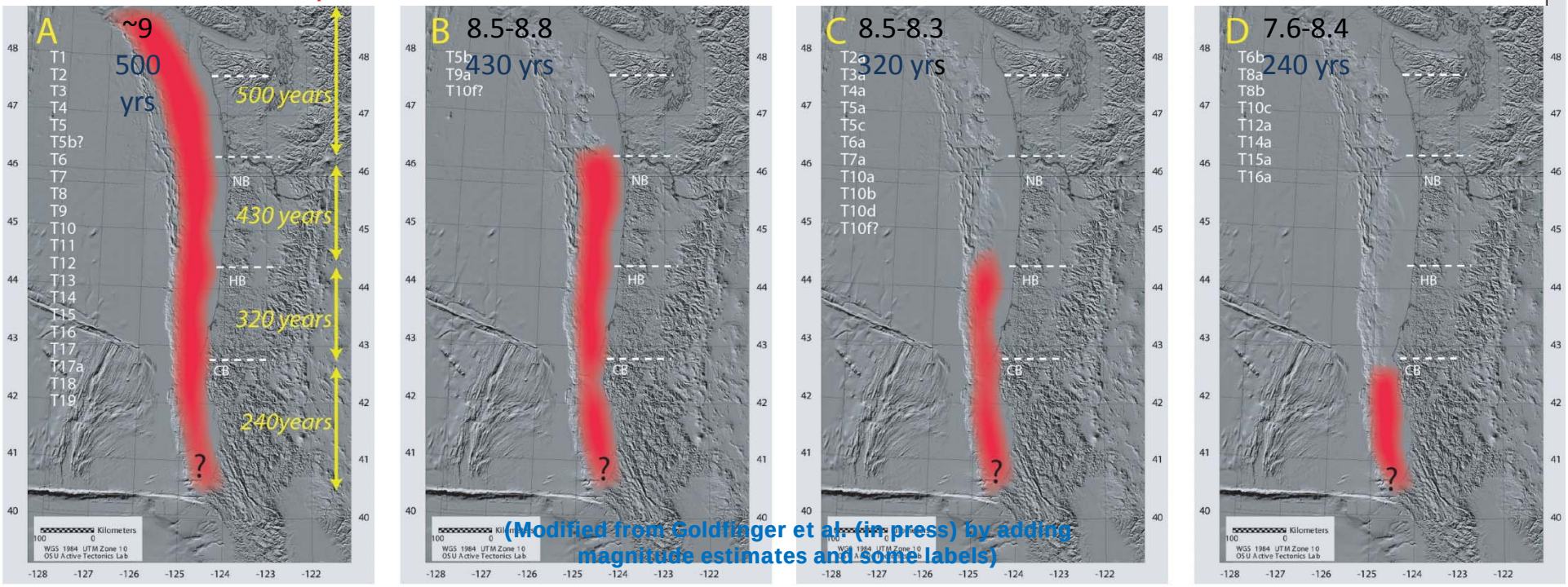
To Keep Commerce Flowing, We Need Infrastructure

Cascadia Subduction Earthquake



Cascadia Subduction Zone Earthquakes



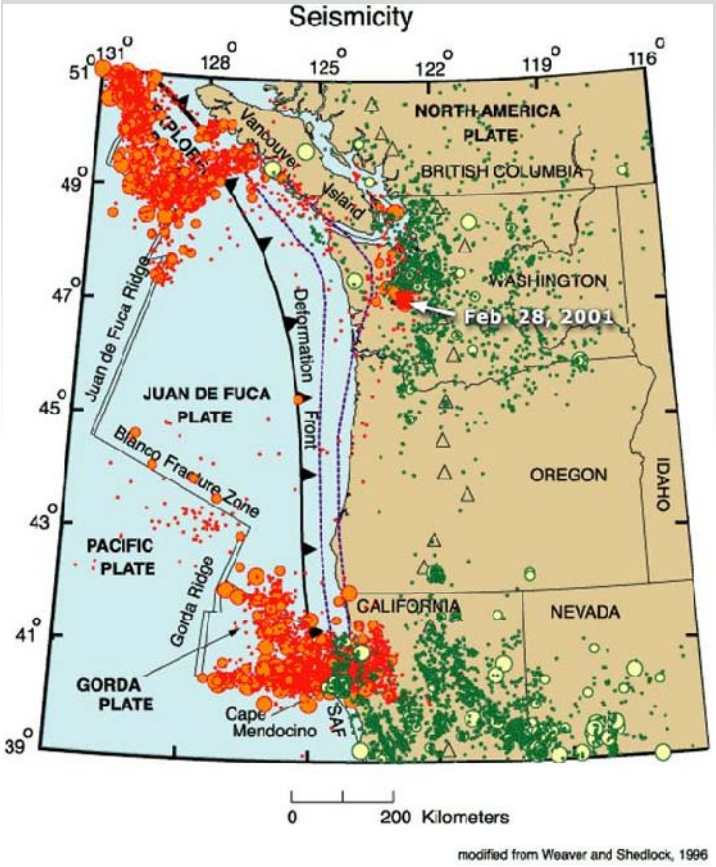


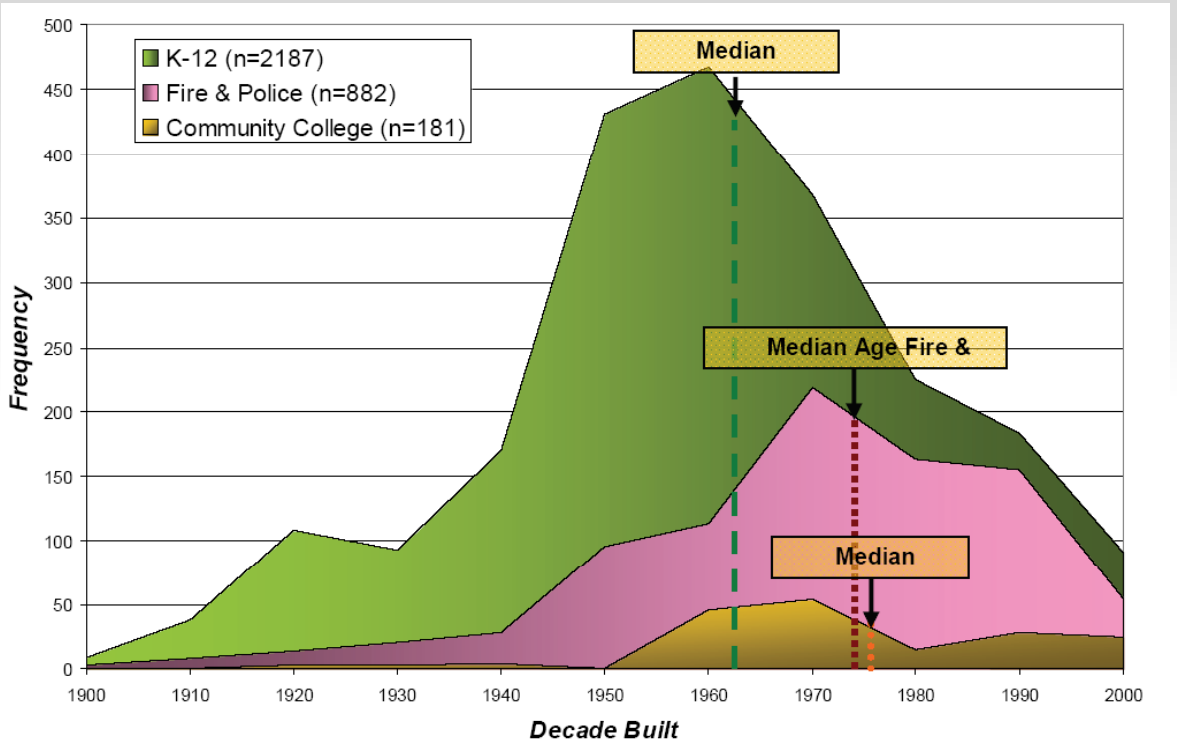
(Modified from Goldfinger et al. (in press) by adding magnitude estimates and some labels)

Cascadia Earthquake Hazards and Risk

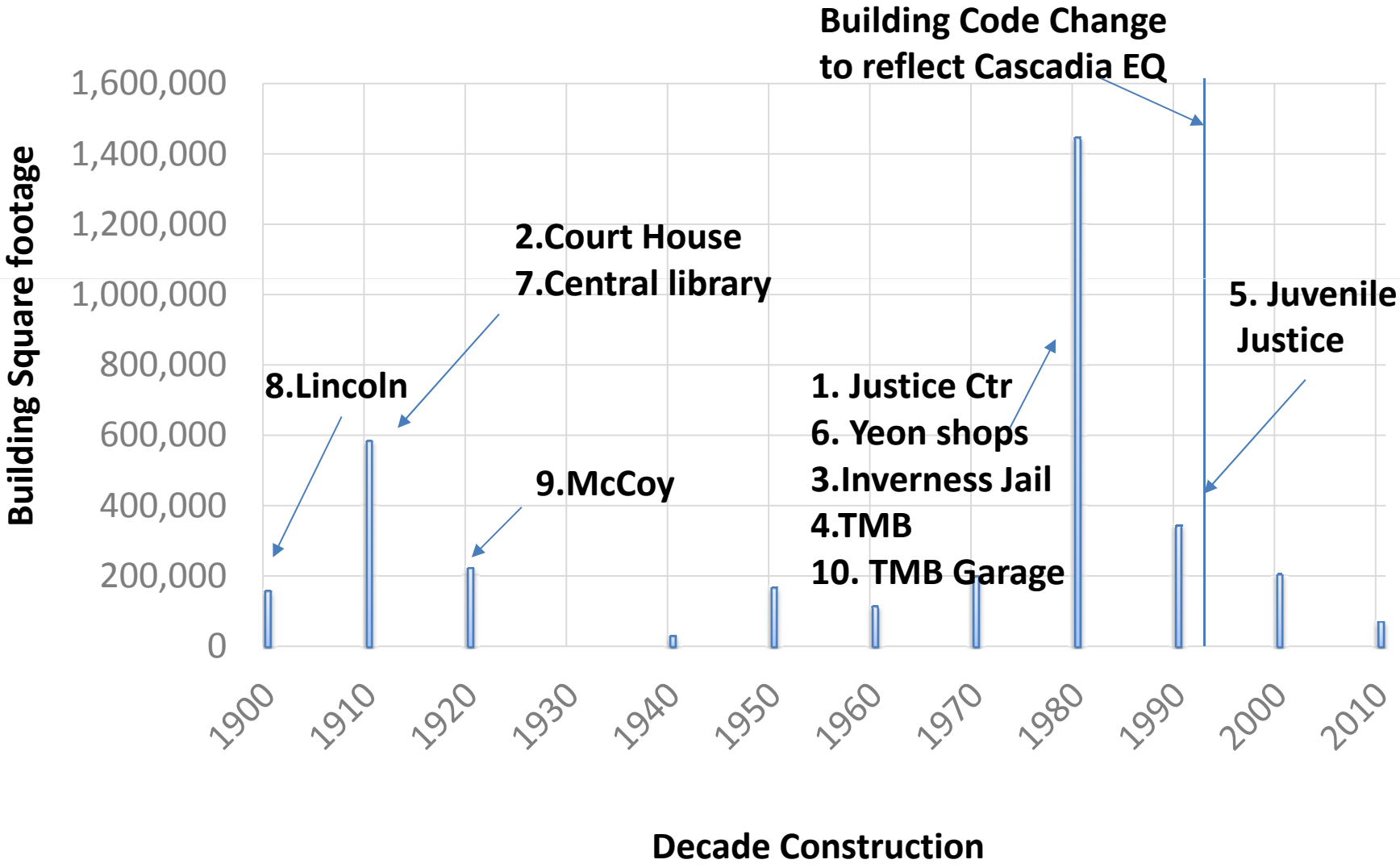
Cascadia Subduction Earthquake

- Strong Ground Shaking (M9 w/ 2 - 4 min shaking)





Multnomah County Facilities



March 25,1993 Scotts Mills Spring Break Earthquake

The Seattle Times
Winner of Nine Pulitzer Prizes

Search

Home | News | Business & Tech | Sports | Entertainment | Living | Homes | Travel | Opinio

Thursday, March 25, 1993 - Page updated at 12:00 AM

E-mail article Print

Quake Cracks Oregon Capitol -- Temblor Registers 5.4, Causes Minor Injuries

AP: Times Staff

PORTLAND - An earthquake centered in the Cascade foothills east of Silverton rattled northwest Oregon and parts of Western Washington early today, cracking the rotunda of the Oregon Capitol in Salem and causing minor injuries.

The quake, focused about 12 miles deep and about 30 miles southeast of Portland, registered 5.4 on the Richter scale of ground motion at 5:34 a.m. and lasted about 45 seconds.

"It felt like I was on a boat going down rapids. It woke me right up," said Bill Holder, a cook at Rod's Lafayette Restaurant in Lafayette, near the epicenter.

The original wing of the state Capitol in Salem was closed after serious cracks were found in the rotunda, House Speaker Larry Campbell said. A newer wing remained open. Engineers were considering removing the gold-plated pioneer statue on top of the Capitol.

Two people came to the emergency room at Salem Hospital with minor cuts from falling glass.

In Molalla, 27 miles southeast of Portland, two walls at the high school partially collapsed. Bricks and a chimney fell from the school, which was built in 1925.

Brick planters and windows also were broken at some homes and businesses in the town of 3,800, and goods were knocked off grocery store shelves.

FAILURE

Sometimes you can see it coming around the bend

Lifeline Interdependencies

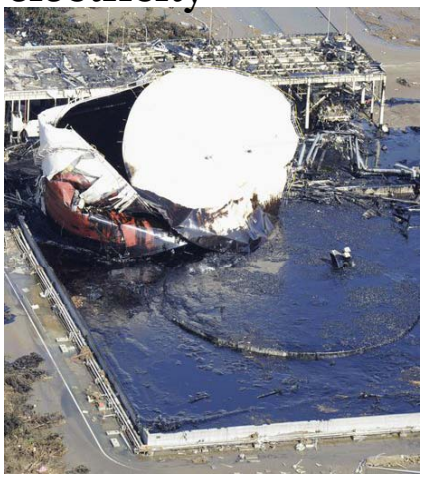
Interdependencies will make disaster recovery much more difficult. The earthquake will damage all systems at the same time.

To restore electric service, you need to reopen roads

To restore water service, you need electricity

To restore fuel supplies you need electricity

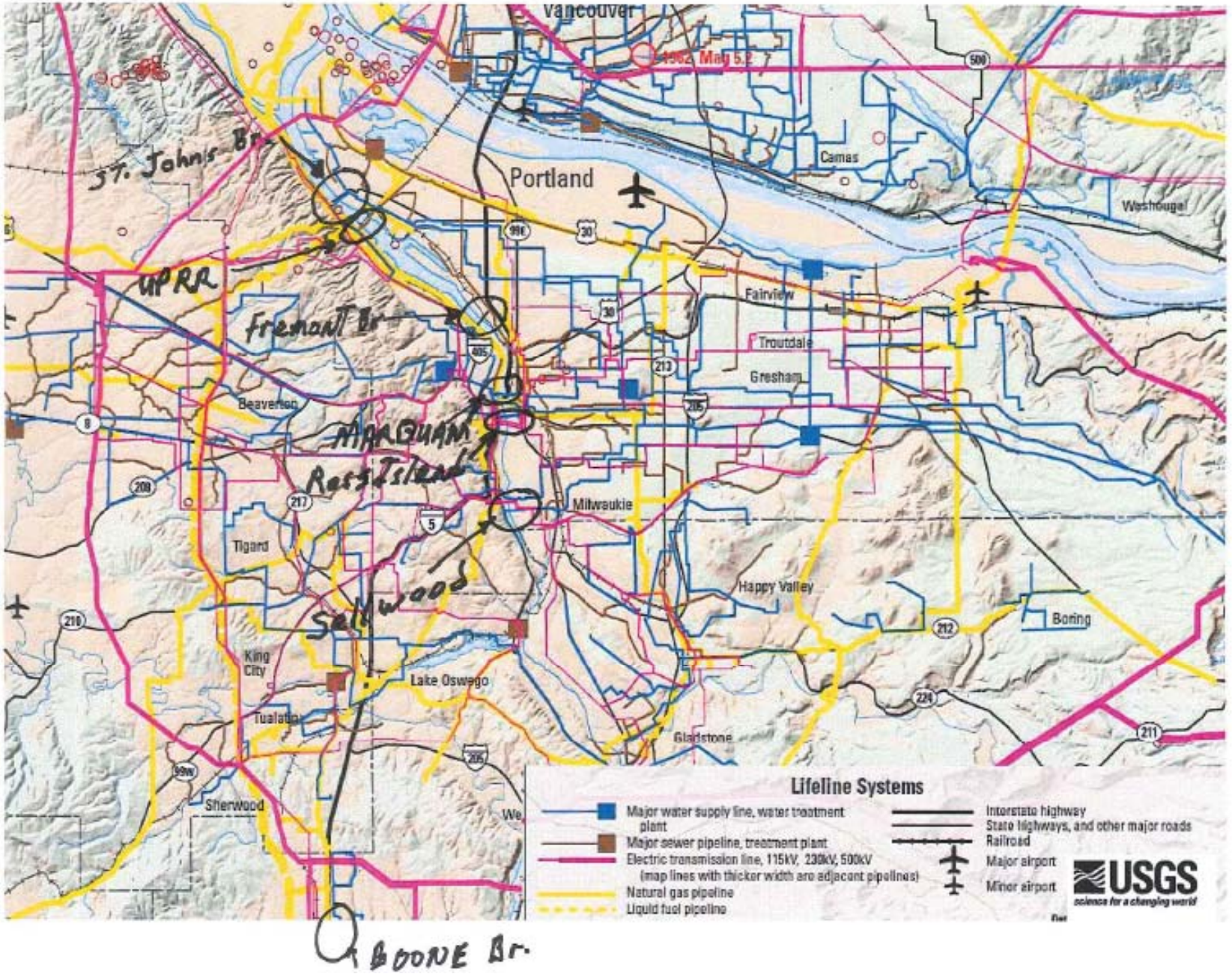
To reopen roads, you need to restore fuel supplies



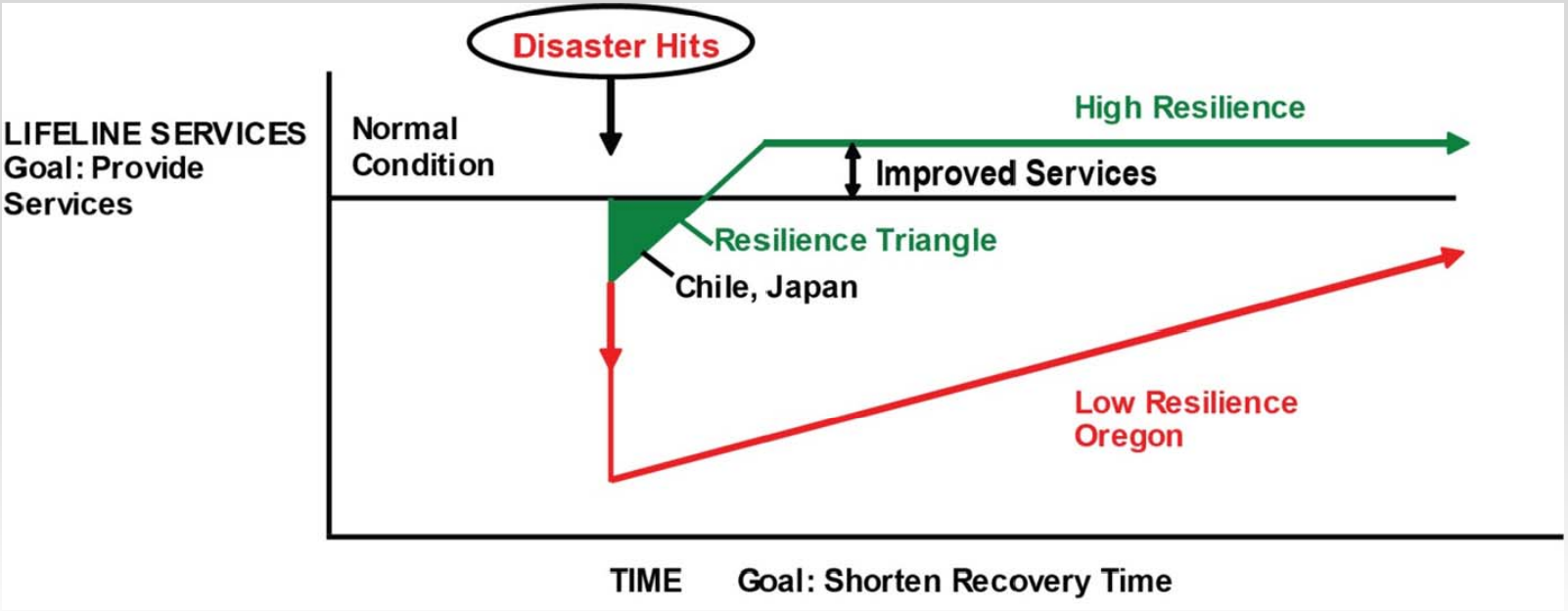
Aftermath of an earthquake in Japan, 2004
Photograph by Kimimasa Mayama/Reuters

NATIONAL GEOGRAPHIC

Lifeline Co-location



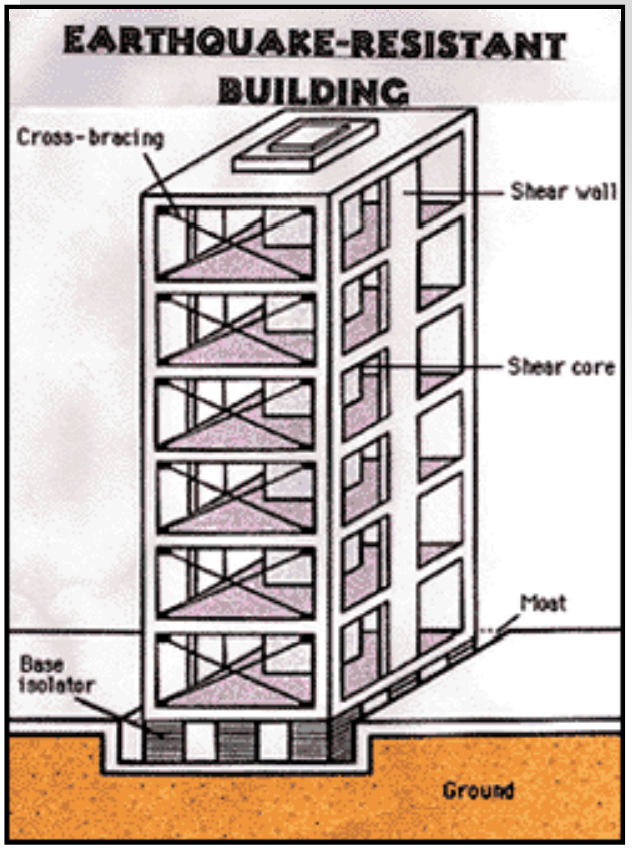
Shift From Life-Safety to Resilience



(Yumei Wang)

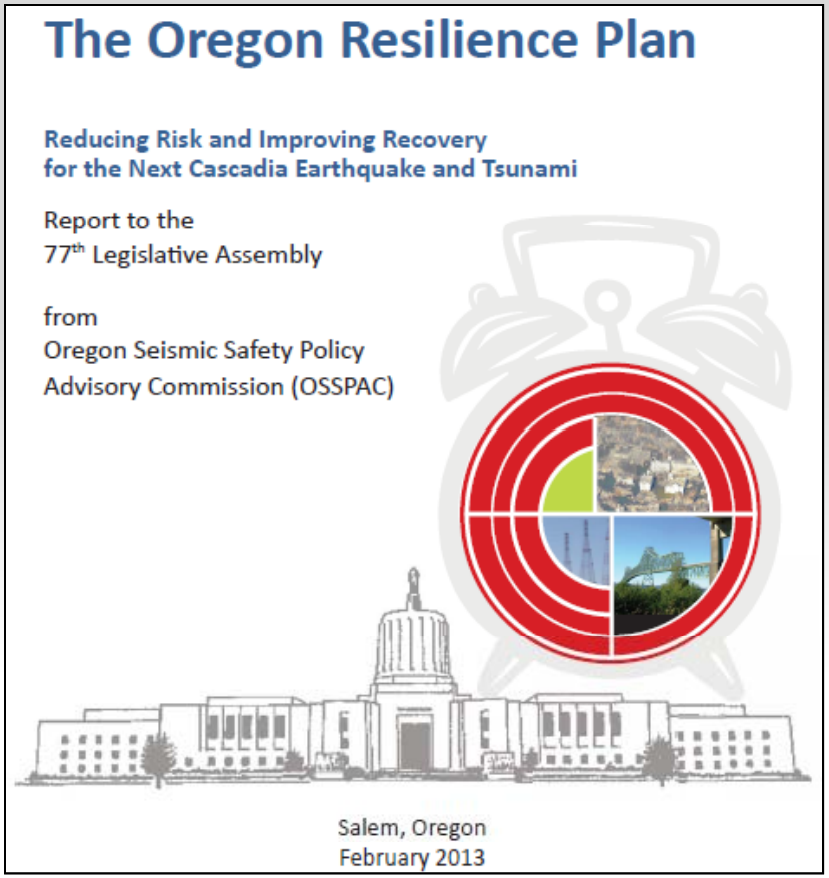
- **Resilience:** Save lives, Reduce Losses, Speed Recovery, & Rebuild Better
- Direct Economic Loss vs Indirect Economic Loss
- Sustainability without **Resilience** is NOT sustainable!
- Resilience enhances sustainability

Relationship Between Sustainability and Disaster Resilience



Source: Public Entity Research workgroup

The Oregon Resilience Plan

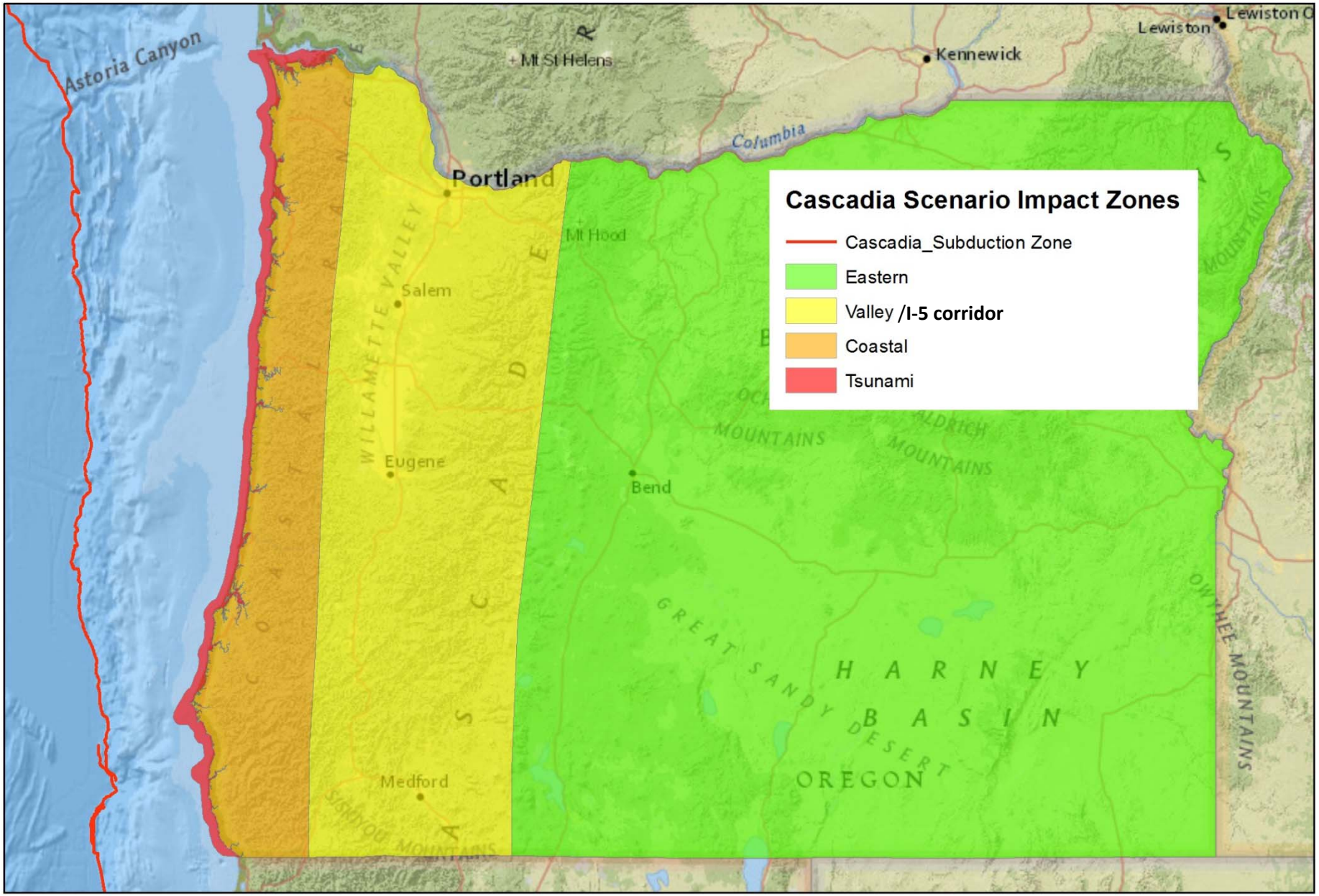


50-year Comprehensive Plan

- ❑ **Cascadia Earthquake Scenario**
- ❑ **Business/Workforce Continuity**
- ❑ **Coastal Communities**
- ❑ **Critical & Essential Buildings**
- ❑ **Transportation**
- ❑ **Energy**
- ❑ **Information and Communication**
- ❑ **Water & Wastewater**

- ❑ Save Lives, protect our economy, and preserve our communities;
- ❑ 169 Expert Volunteers;
- ❑ $ Millions in donation of professional services over a year

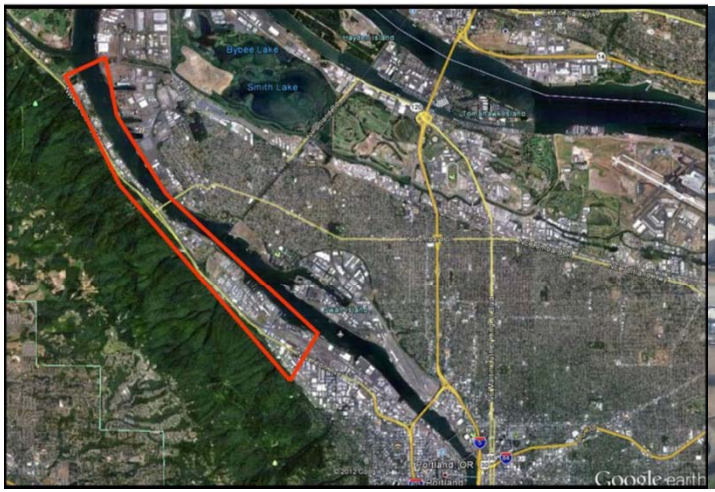
Four Zones


Cascadia Scenario Impact Zones
Cascadia_Subduction Zone
Eastern
Valley /I-5 corridor
Coastal
Tsunami
Astoria Canyon
Mt St Helens
Kennewick
Lewiston
Columbia
Portland
Mt Hood
Salem
Eugene
Bend
Medford
WILLAMETTE VALLEY
CASCADE
COASTAL RANGE
MOUNTAINS
GREAT SANDY DESERT
HARNEY BASIN
OREGON
OWYHEE MOUNTAINS

Key Findings

- Oregon is far from resilient to the impact of a great Cascadia earthquake today
  - Casualties (a few thousand to more than 10,000)
  - Economic Loss (at least 20% state GDP)
  - More than one million truck loads of debris

- Liquid Fuel vulnerability



Key Findings

- Business can only tolerate two to four weeks of disruption of essential services
- Significant resilience gap

Toppled Radio Towers in Loma Prieta, 1989

Northridge, 1994

Current Resilience Gap

- Business can only tolerate two to four weeks of disruption of essential services

Critical Service	Zone	Estimated Time to Restore Service
Electricity	Valley	1 to 3 months
Electricity	Coast	3 to 6 months
Police and fire stations	Valley	2 to 4 months
Drinking water and sewer	Valley	1 month to 1 year
Drinking water and sewer	Coast	1 to 3 years
Top-priority highways (partial restoration)	Valley	6 to 12 months
Healthcare facilities	Valley	18 months
Healthcare facilities	Coast	3 years

Expected Building Performance

- Falls short in almost every category
- Business can tolerate 2 to 4 week recovery

Critical Building Category	Zone	Estimated Average Recovery Time
Healthcare Facilities	Valley	18 months
Police and Fire Stations	Valley	2 to 4 months
Emergency Operations Centers	Valley	4 months
Schools	Val	
Housing	Val	
Emergency Shelter	Val	
Retail and Banking	Val	

** Underestimates recovery for older constr

METRO Bridges Preliminary Assessment

Potential Collapse

Extensive Damage

Moderate Damage

Columbia River Ports

Pacific Coast
COLLABORATIVE

Leadership now
for a sustainable tomorrow

Vision 2030

Positioning Pacific North America for Sustainable Prosperity

Released for comment and discussion by the Premier of British Columbia and the Governors of California, Oregon and Washington on the occasion of the first Leaders' Forum of the Pacific Coast Collaborative in Vancouver, B.C. on February 12, 2010.

Nature of the Northwest?

A Secure Regional Economy

Protecting the lives and livelihoods of the citizens of our region remains a top priority for Pacific North America. Natural disasters, ranging from earthquakes and tsunamis to severe storms, flooding and forest fires, do not respect state or national borders. Coordinated emergency preparedness and response systems serve to secure the region's economy and keep our citizens safe.

WCX

CALIFORNIA | OREGON | WASHINGTON | BRITISH COLUMBIA

West Coast Infrastructure Exchange

HOME ABOUT NEWS CALENDAR CASE STUDIES CONTACT

Overview

California, Oregon, Washington, and British Columbia have combined to form the West Coast Infrastructure Exchange (WCX).

WCX Framework Agreement

CH2M HILL Report | summary

The partnership is being launched to create

Participants *and* Partners

The WCX operates under a framework agreement adopted by partners in British Columbia, California, Oregon, and Washington.

News

Tuesday September 10, 2013

West Coast Infrastructure Exchange Releases Draft Project Standards for Comment WCX

Tuesday August 13, 2013

Viewpoints – Chris Taylor: Bay Bridge doesn't have to mark end of big California public works

Can we achieve resilience for M9?

- YES

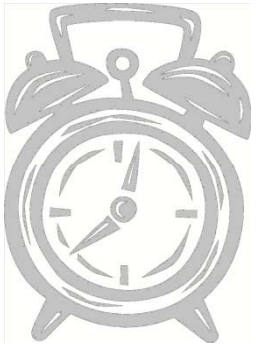
- Chile (2010 M8.8 Maule Earthquake)
  - 90% communication services within two weeks
  - 95% power supply within two weeks
  - Re-start commercial flights in ten days

- Japan (2011 M9.0 Tohoku Earthquake)
  - 90% power supply in ten days
  - 90% telephone lines in two weeks

Overarching Recommendations

- Establish a State Resilience Office to provide leadership, resources, advocacy, and expertise in implementing statewide resilience plans

- Undertake comprehensive seismic assessments of the key structures and systems that underpin Oregon's economy;

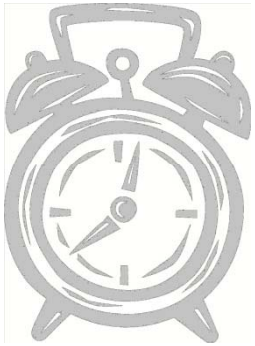


Overarching Recommendations

- Launch a sustained program of capital improvement in Oregon's public structures;

- Craft a package of incentives to engage Oregon's private sector to advance seismic resilience;

- Update Oregon's public policies



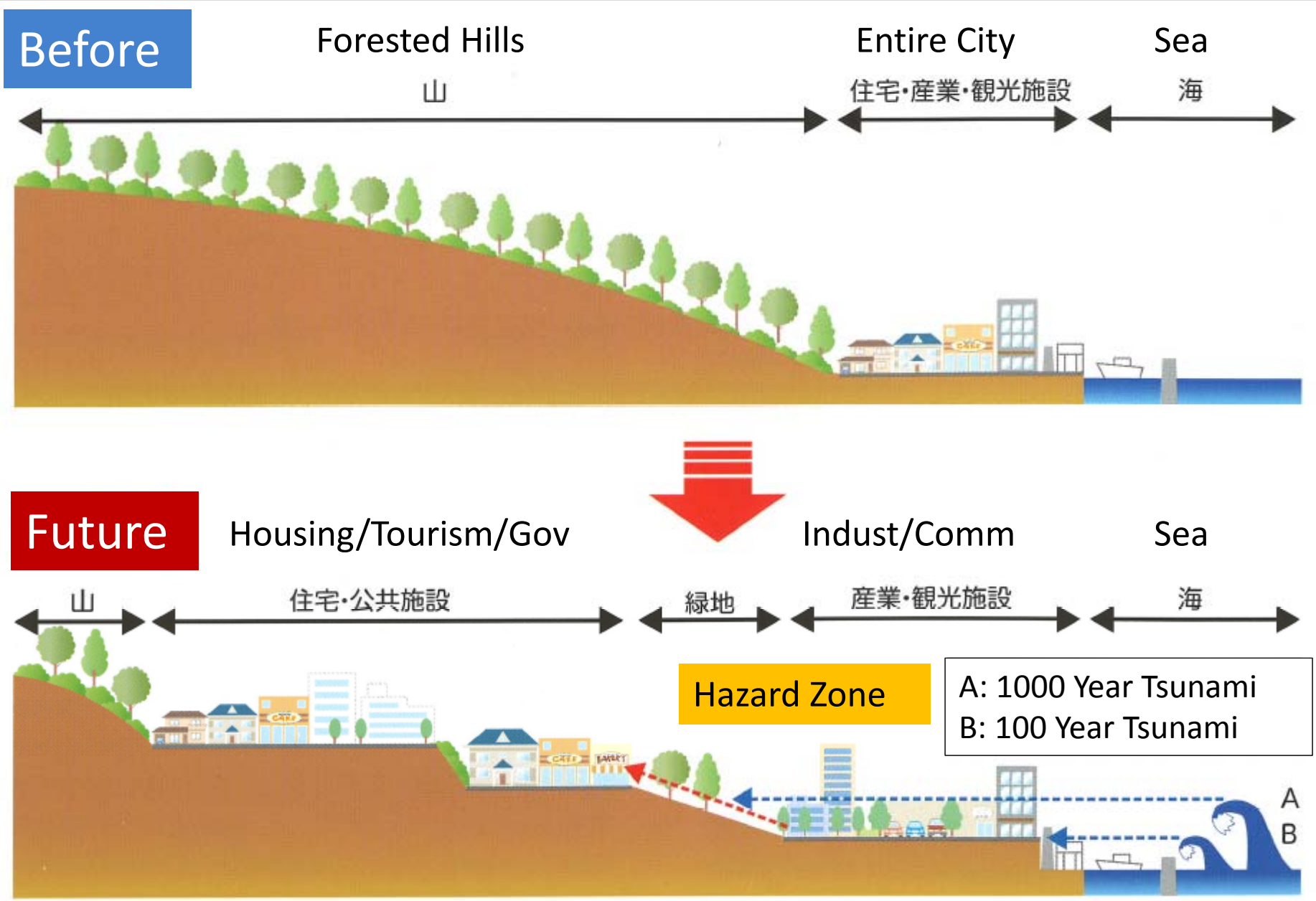
Recovery Planning = Vision

Minamisanriku

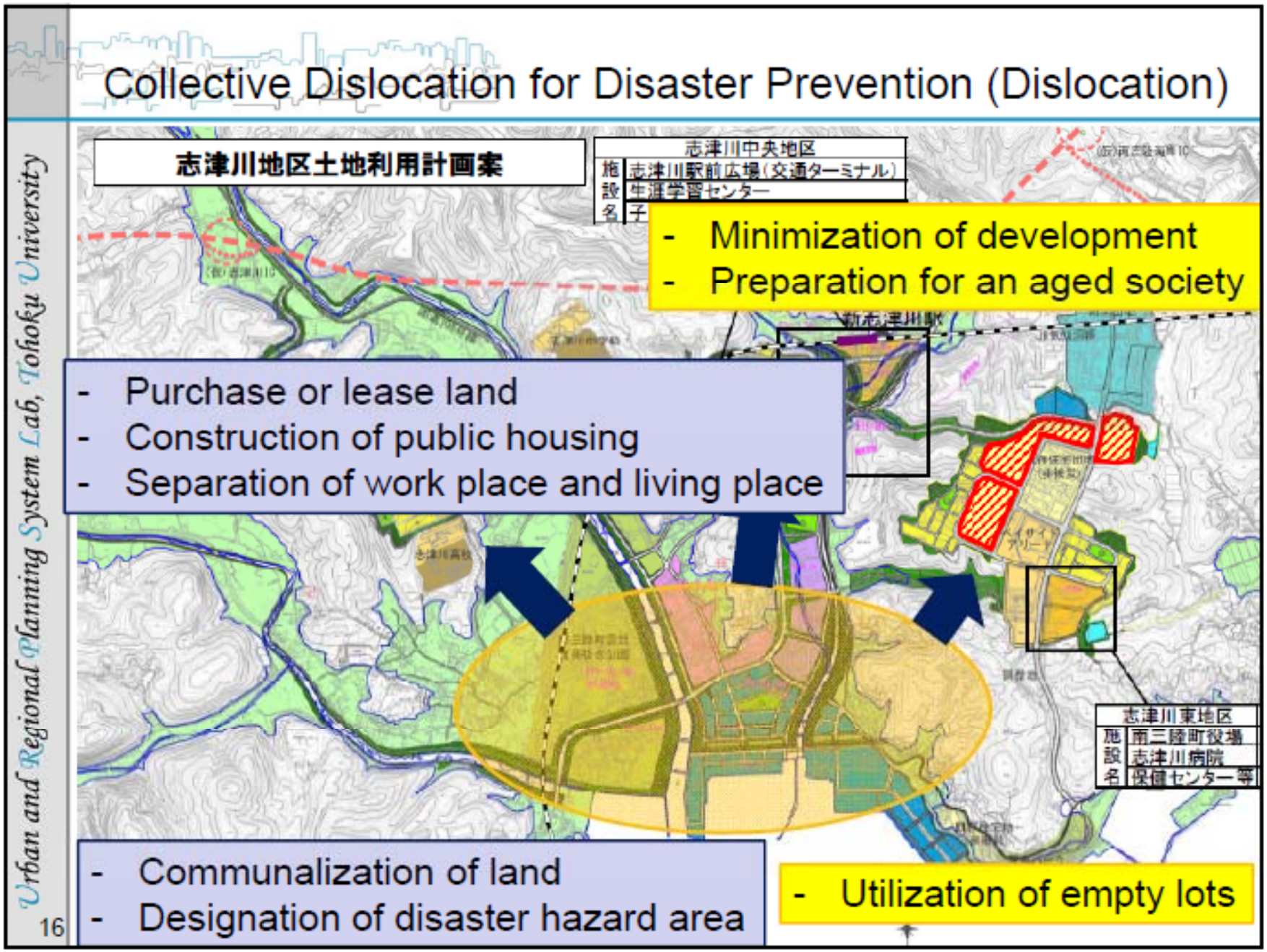
Capacity for Response and Recovery?

Minamisanriku – Relocation to Higher Ground

Two Levels of Tsunami Protection: 100 yr (seawalls) and 1000 yr (elevation)



Collective Dislocation for Disaster Prevention (Dislocation)

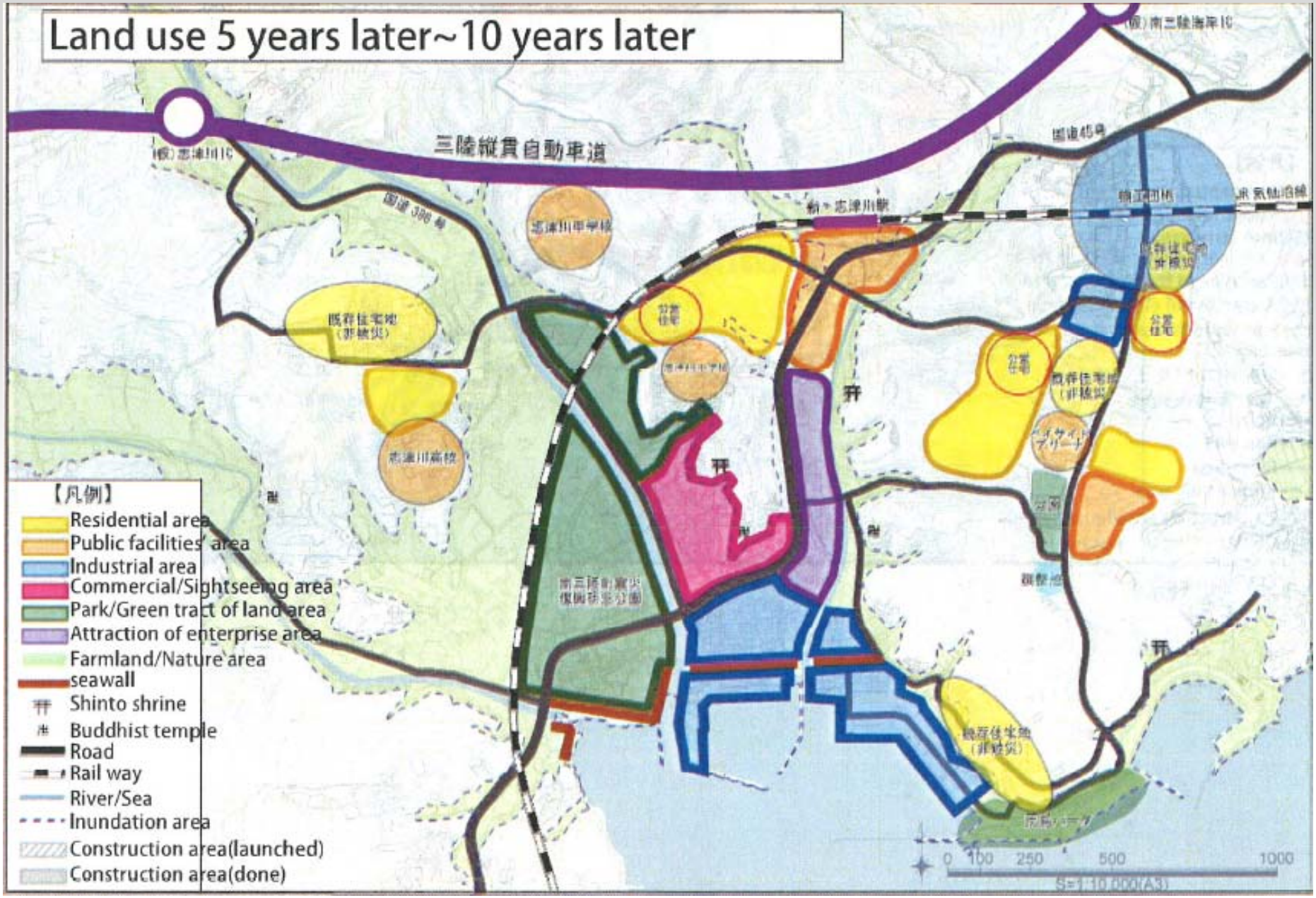


Urban and Regional Planning System Lab, Tohoku University

16

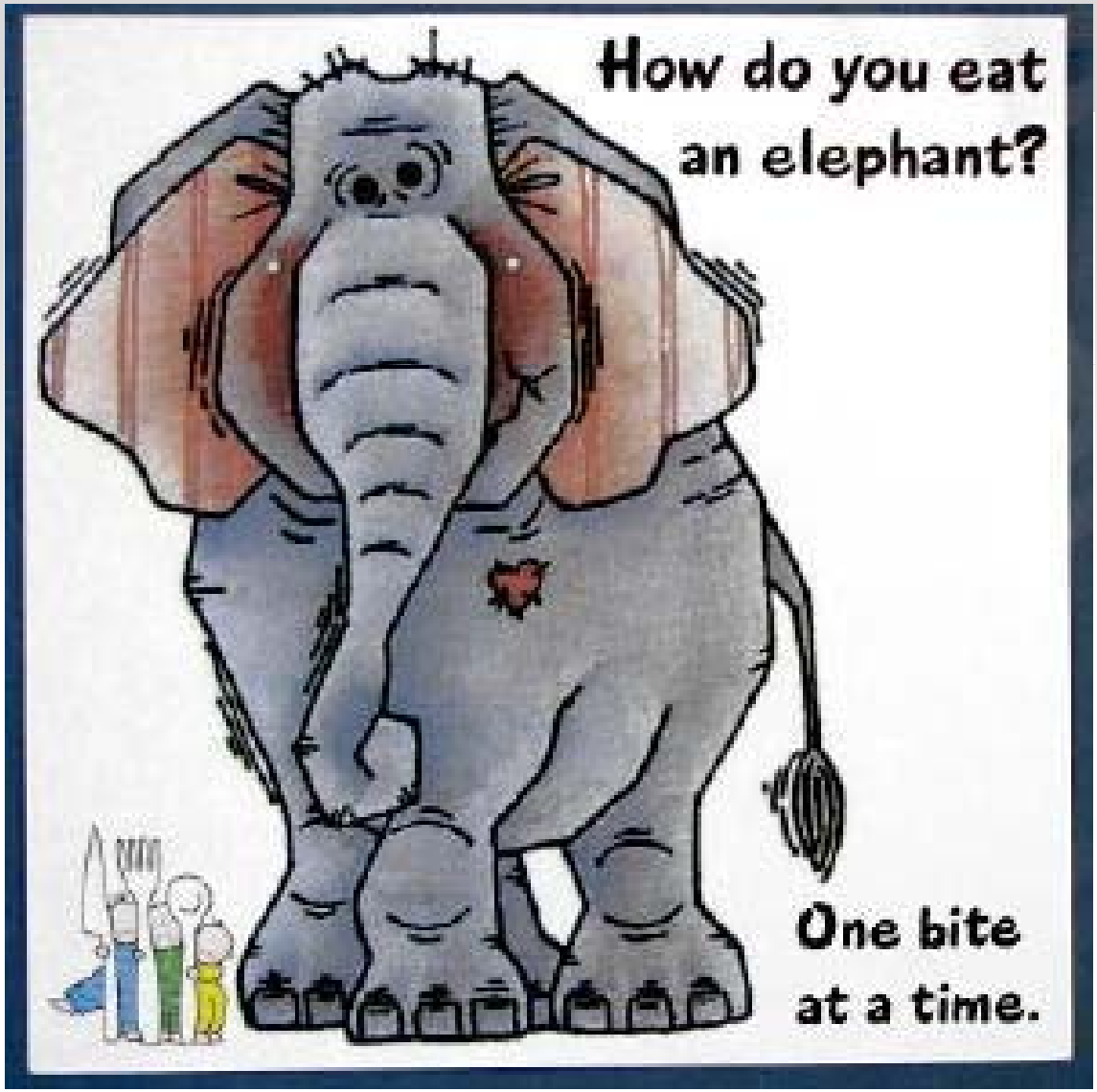
Source: Dr. Michio Ubaure, Tohoku Univesity 姥浦 道生

Minamisanriku – Recovery Plan



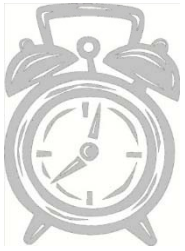
Minamisanriku Recovery Vision

How to Implement it?



Recommendations for Multnomah County

- Conduct comprehensive assessment of your bridges and buildings (as part of statewide assessment);
- Perform gap analysis of your facilities based on (1) your role and responsibility for post-event response and recovery and (2) your obligation to your staff and your customers (vulnerable population);
- Pinpoint sources of the gap: internal versus external factors;
- Develop strategies to close the resilience gap through
  - Phased/prioritized approaches to retrofit/redesign your critical asset;
  - Enhance design/maintenance standards based on criticality;
  - Work with state agencies, regional and local governments, your service contractors, and providers of critical utilities (such as fuel, power, telecommunication, and water/wastewater)



B-Engrossed

Senate Bill 33

Ordered by the House June 17
Including House Amendments dated May 31 and June 17

SUMMARY

The following summary is not prepared by the sponsors of the measure and is not a part of the body thereof subject to consideration by the Legislative Assembly. It is an editor's brief statement of the essential features of the measure.

Modifies list of state agencies required to designate liaison for emergency preparedness and response. Requires that liaison be individual with authority during emergency to allocate agency resources and assets.

Establishes task force to facilitate implementation of Oregon Resilience Plan.

Declares emergency, effective on passage.

(3) The task force shall facilitate a comprehensive and robust plan to implement the strategic vision and roadmap of the Oregon Resilience Plan for responding to the consequences of naturally occurring seismic events associated with geologic shift along the Cascadia subduction zone by making recommendations about:

(a) Education and training of community leaders in emergency management and resilience practices, including:

(b) Coordination of investments in equipment, facilities and systems critical for enhanced resilience and survivability in the near, intermediate and far terms, including:

NEWS 16 SOURCE
KMTR EUGENE

NEWS | WEATHER | SPORTS | KMTR TV

'Compared to the level of earthquake preparedness even in California and Washington, it's clear that Oregon is bringing up the rear'

By David Stauth, OSU News & Research Communication
Published: Oct 30, 2013 at 10:56 AM PDT

Liquefaction in the recent subduction zone earthquake in Japan caused entire buildings to sink several feet lower than they had been previously. (Photo by Scott Ashford, courtesy of Oregon State University)

"When I studied areas that had been hard-hit by earthquakes in Chile, New Zealand and Japan, it became apparent that money spent to prepare for and minimize damage from the earthquake was hugely cost-effective," Ashford said.

One utility company in New Zealand said they saved about $10 for every $1 they had spent in retrofitting and rebuilding their infrastructure."

Prof. Scott Ashford, OSU

Looking Ahead

- **Propose to work with Oregon's Legislative Assembly to keep the 50-year goal in view**
- **Community-level Planning**
- **Joint regional planning with Washington State**
- **Civic infrastructure**
- **Human Resilience**

Thank You

if you have any questions, please contact us:

Kent Yu
kentyu@seftconsulting.com
(503)702-2065
&
Jay Wilson
jaywilson@clackamas.us
503-723-4848