

Geoscience and Seismic Resilience in Oregon

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Additional material from Yumei Wang, Jay Wilson, others



Oregon's Problem

- 7-15% chance of M_w 9 CSZ quake in next 50 years
 - > 30% chance of M_w 7.5-8.5 SCSZ quake
- 3-5 minutes of shaking
 - Amplification
- Many structures not built to recent/current code
 - Codes don't go beyond life safety
- Extensive liquefaction possible
- Extensive impact on W coast, Pacific



Oregon Resilience Plan (ORP)

The Oregon Resilience Plan

Reducing Risk and Improving Recovery
for the Next Cascadia Earthquake and Tsunami

Report to the
77th Legislative Assembly

from
Oregon Seismic Safety Policy
Advisory Commission (OSSPAC)



Salem, Oregon
February 2013

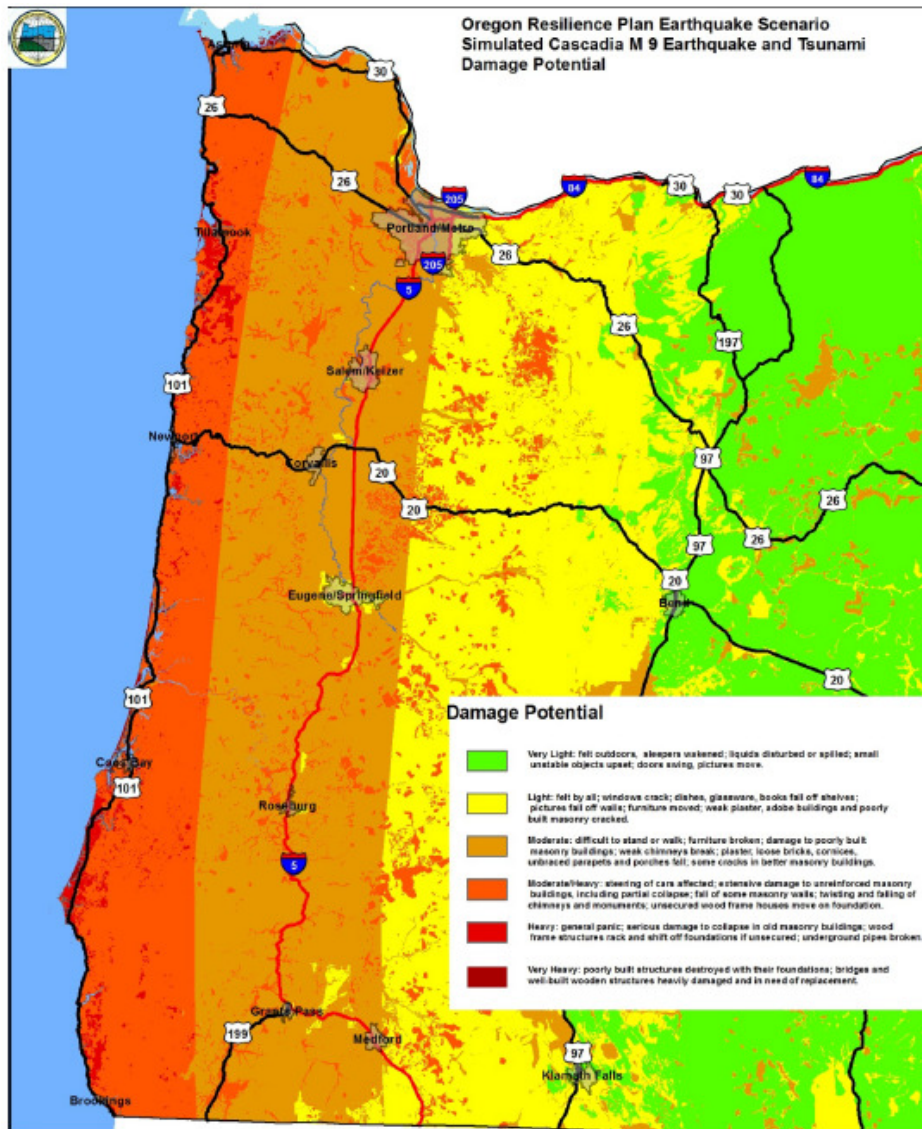
50-year Comprehensive Plan

- ☐ Save Lives
- ☐ Protect our Economy
- ☐ Preserve our Communities

- ☐ 169 volunteers
- ☐ \$0 Funding
- ☐ One-year Schedule

<http://www.oregon.gov/omd/oem/pages/osspace/osspace.aspx>

➤ Strong Shaking and Tsunami



Liquefaction



Wikimedia Commons: Martin Luff

➤ Chile, 2/27/10: weak soils (Y. Wang)



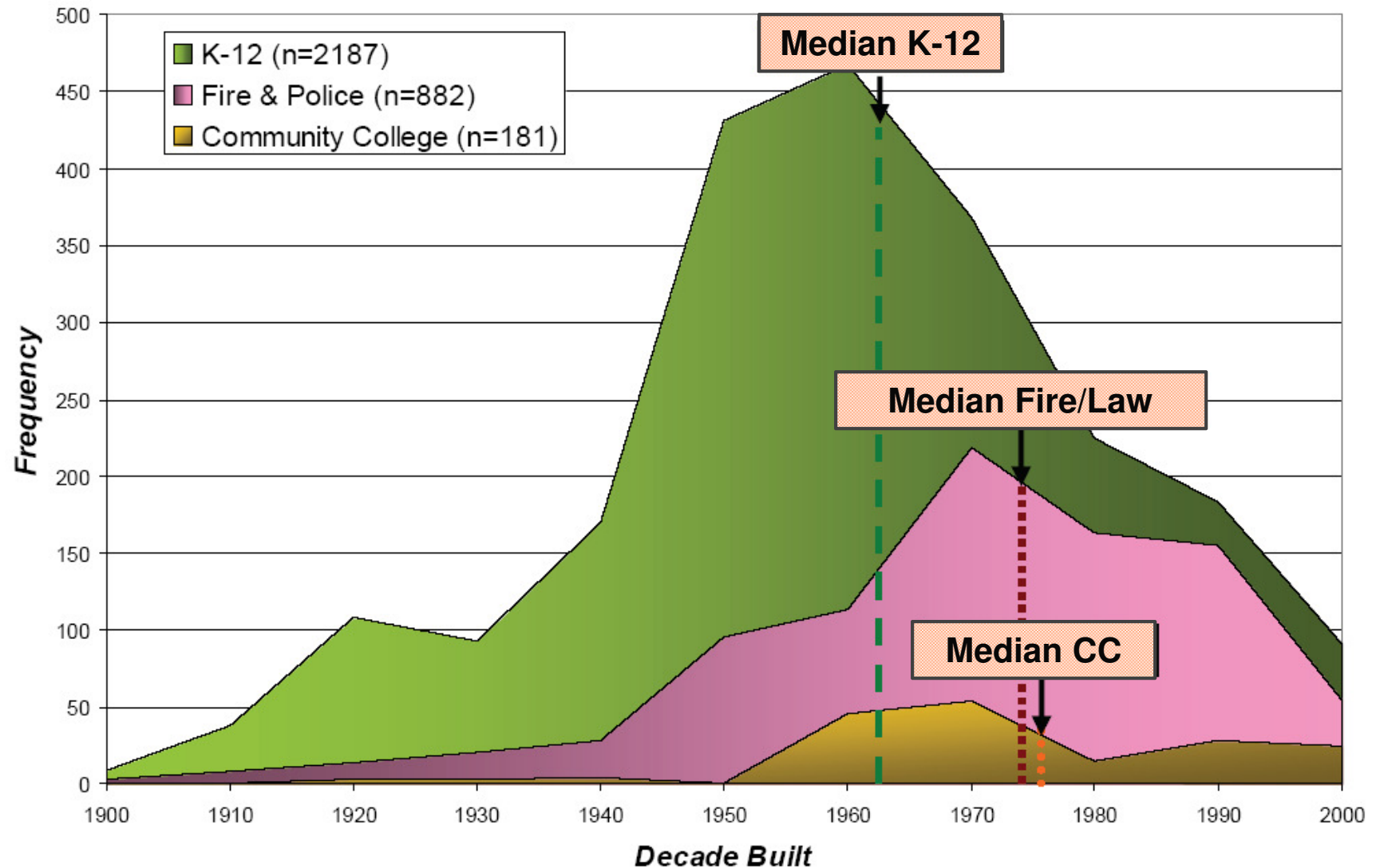


What else?

- Interdependencies: **Lifelines**
 - Utilities
 - Transportation
 - Fuel
- Difficult to grasp low-frequency, high-impact events
 - Inadequate seismic knowledge + inadequate codes
 - Many “best practices” untested
 - Exercise challenges



Oregon Education & Emergency Facilities

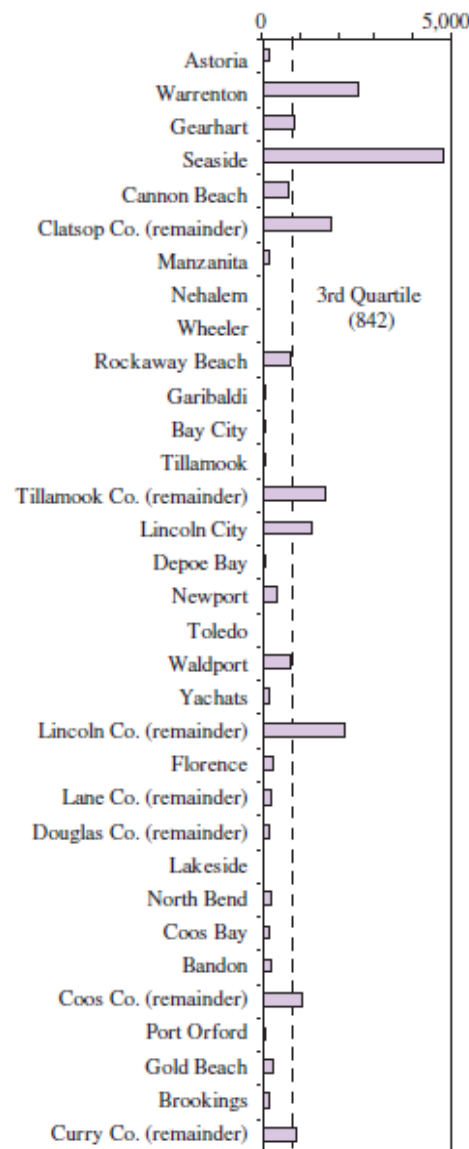




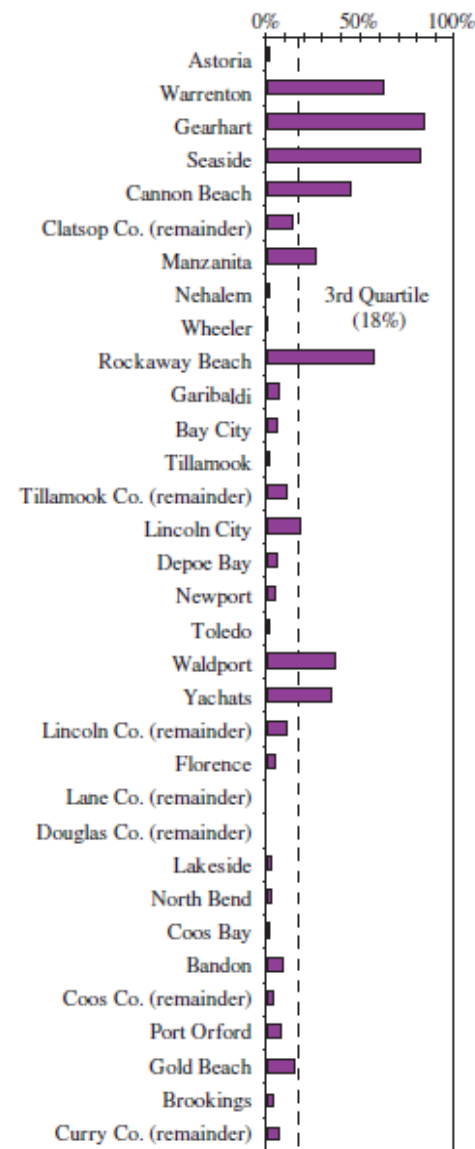
Oregon Tsunami Exposure (N. Wood, USGS)



A Number of Residents in Tsunami-Inundation Zone



B Percentage of Residents in Tsunami-Inundation Zone





Science-based policy

- **ORS 455.446**
 - **Tsunami inundation-zone restrictions**
 - **“Based on scientific evidence that may include geologic field data and tsunami modeling”**



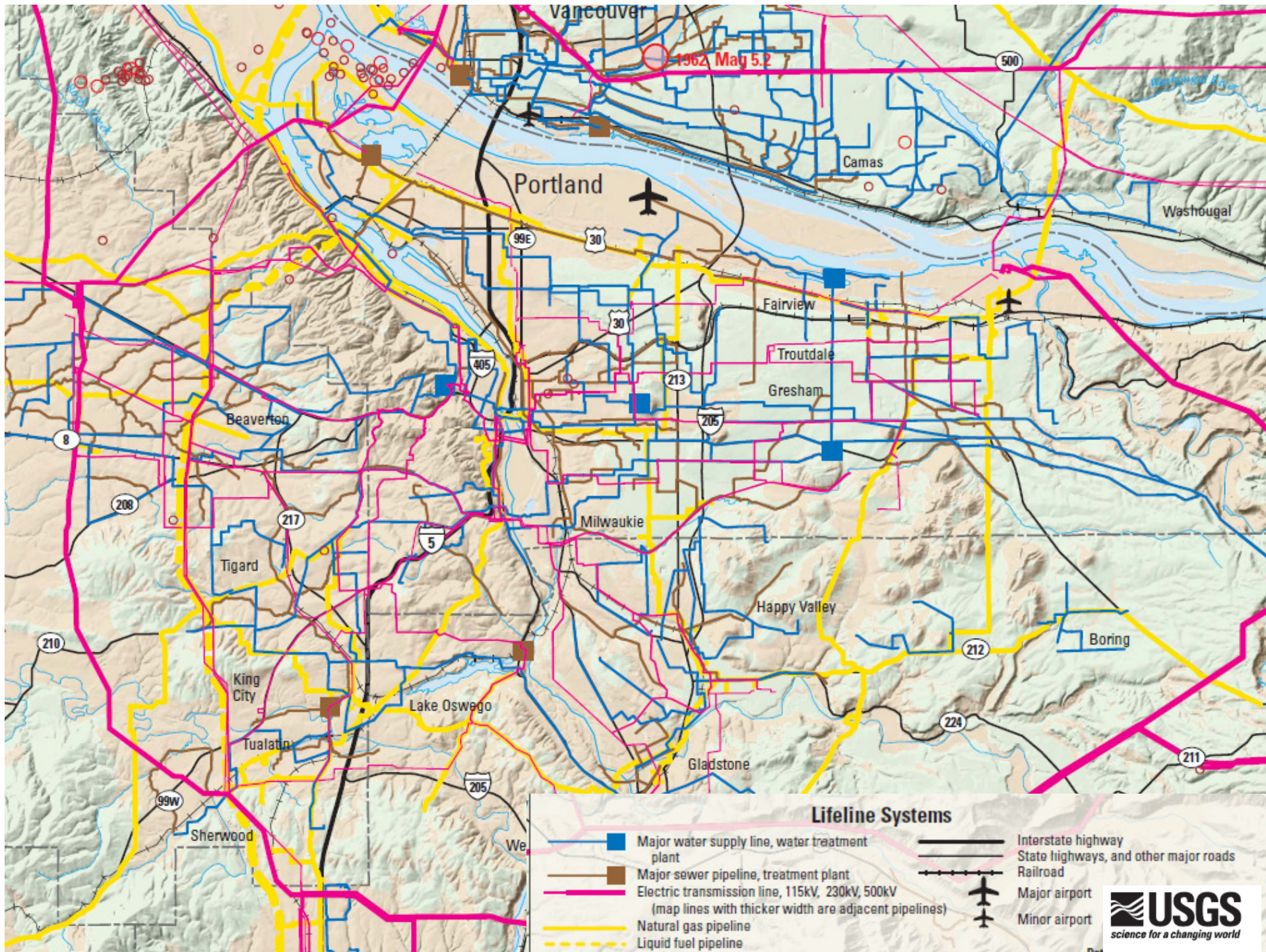
Key ORP Findings

“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.”

Key ORP Findings

- OR far from resilient to impact of great Cascadia earthquake today
 - Casualties (1,000-10,000)
 - Economic loss (close to 20% of state GDP)
 - More than one million truckloads of debris
- Liquid fuel vulnerability







OR Resilience Task Force

77th OREGON LEGISLATIVE ASSEMBLY--2013 Regular Session

Enrolled

Senate Bill 33

Printed pursuant to Senate Interim Rule 213.28 by order of the President of the Senate in conformance with pre-session filing rules, indicating neither advocacy nor opposition on the part of the President (at the request of Governor John A. Kitzhaber, M.D., for Oregon Military Department)

“The task force shall facilitate a *comprehensive and robust plan to implement the strategic vision and roadmap of the ORP* for responding to the consequences of naturally occurring seismic events associated with geologic shift along the CSZ by making recommendations about...”

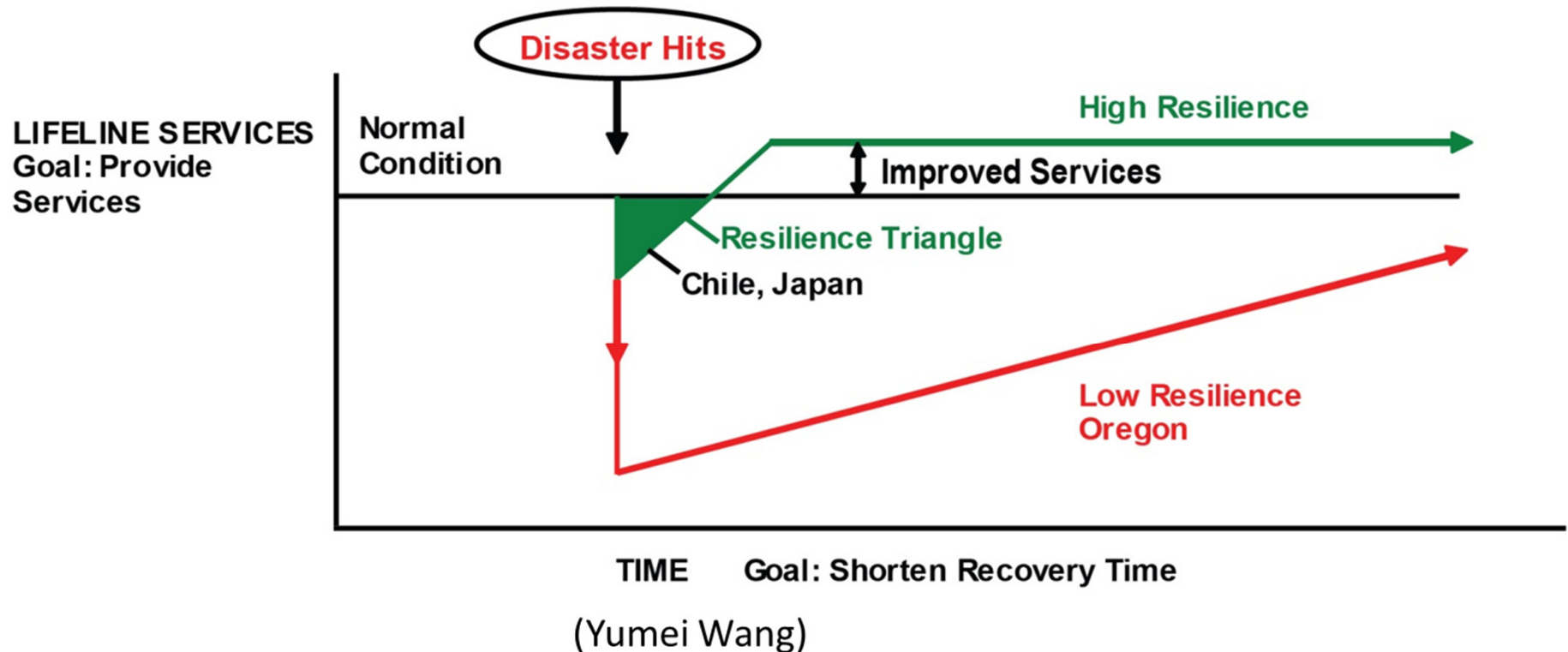
www.oregon.gov/OMD/OEM/Pages/Resilience-Taskforce.aspx

What Does Resilience Mean?





Our Definition of Resilience



- Resilience: Save lives, Reduce Losses, Speed Recovery, Rebuild Better
- Sustainability requires resilience!



ORTF Recommendations

■ Oversight

- Specified Resilience Policy Advisor
- Appointed by, reporting to governor

■ Land use

- Adopt stricter inundation zones
- Help coastal communities adapt
- Pre-designate “safe” urban reserves

■ Buildings

- Expand program for schools, critical facilities



ORTF Recommendations

■ Infrastructure/Lifelines

- Complete designated backbone routes
- Multi-modal inventory/assessment
- Utilities conduct seismic assessment
 - Allow cost recovery for mitigation
- Diversify fuel storage/distribution
- Water providers, fire depts. coordinate

■ Research and Education

- Adopt curriculum in schools
- Support in-state research



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