



# Seismic Readiness of Oregon's Highways

Ways and Means Subcommittee on Transportation and Economic Development

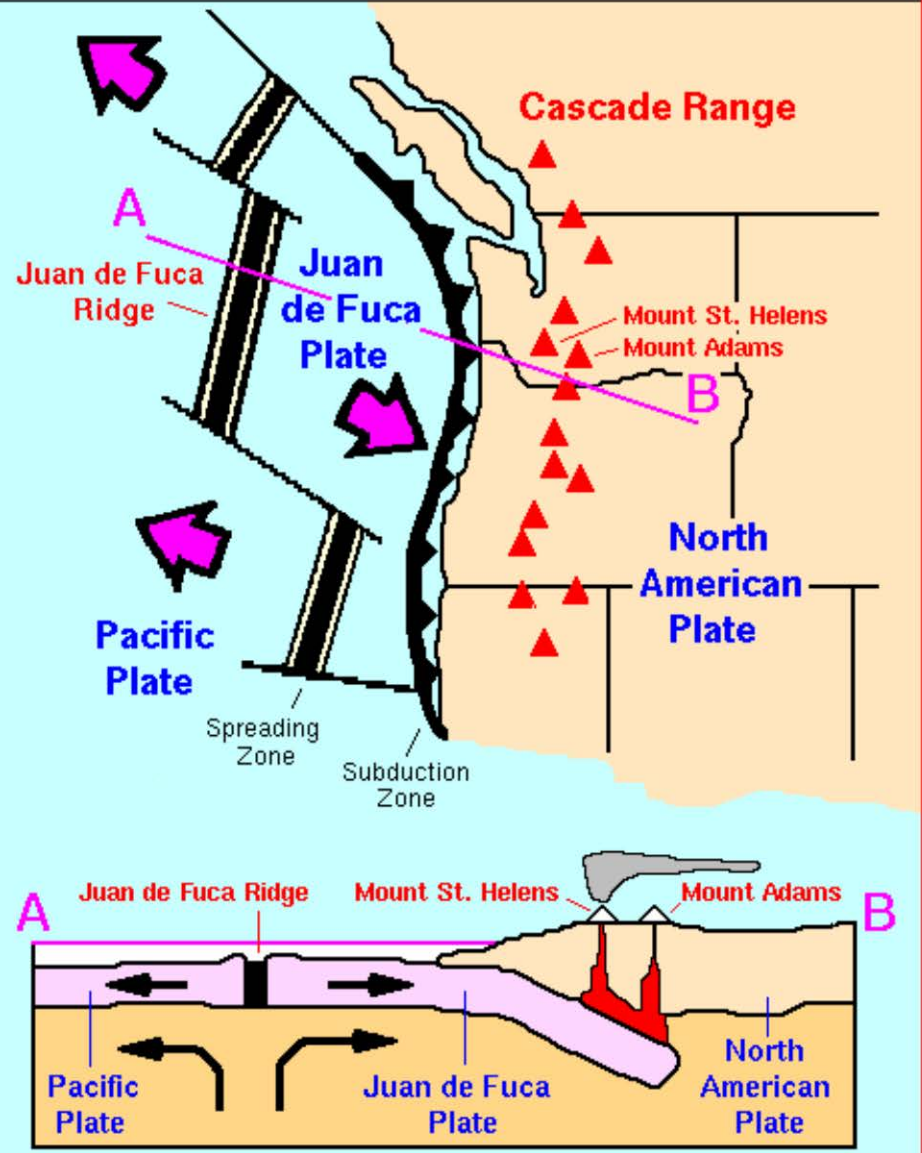
Paul Mather, ODOT Highway Division Administrator


March 2, 2017



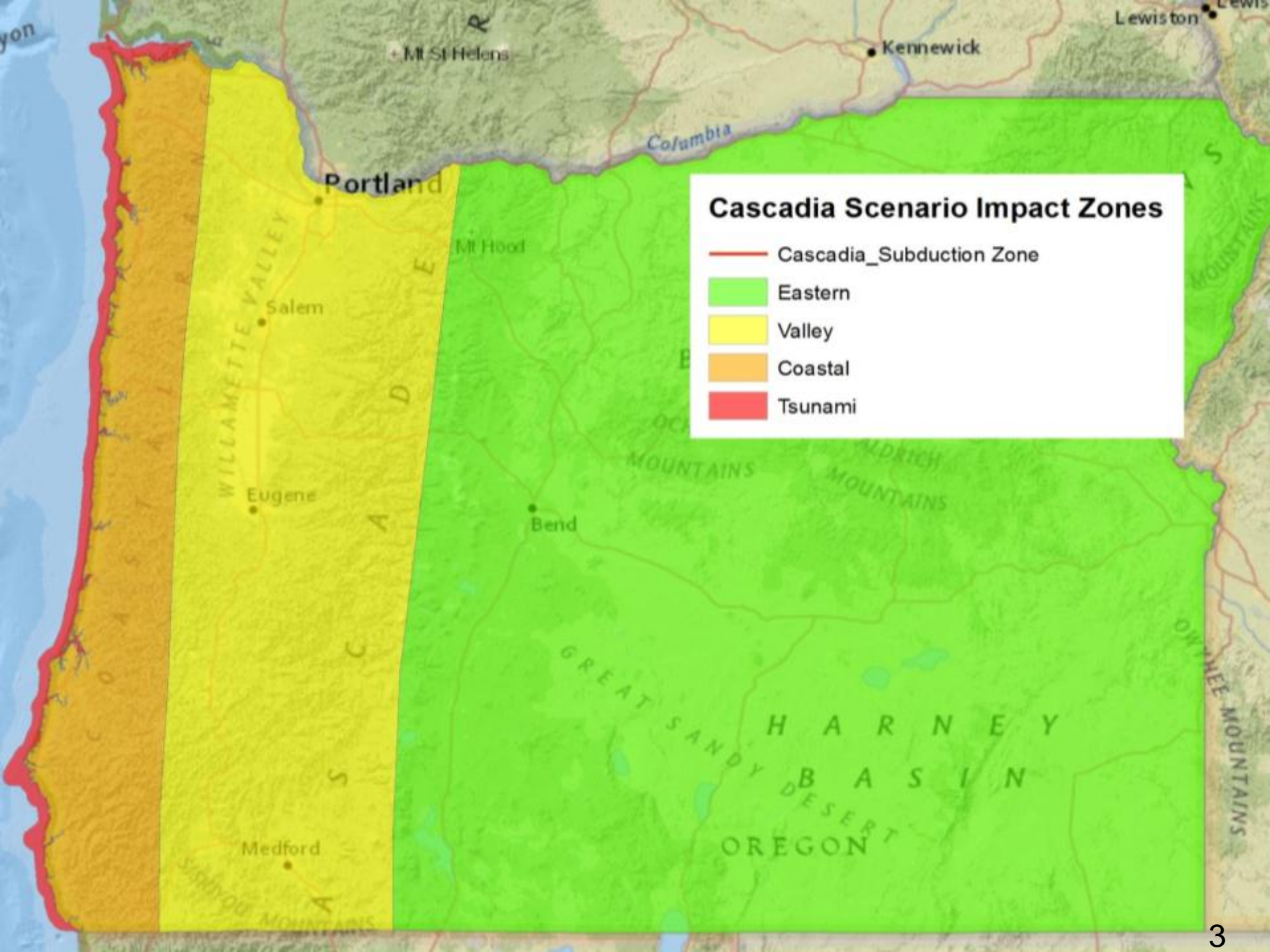
# The Cascadia Subduction Zone

## Plate Tectonics – Cascade Range



 Topinka, USGSICVD, 1999, Modified from: Tilling, 1985, Volcanoes: USGS General Interest Publication



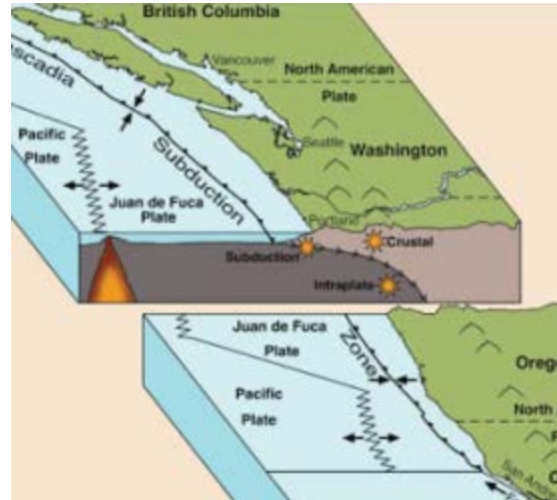


### Cascadia Scenario Impact Zones

- Cascadia\_Subduction Zone
- Eastern
- Valley
- Coastal
- Tsunami

# The Oregon Resilience Plan

Required by the legislature, supported by Governor

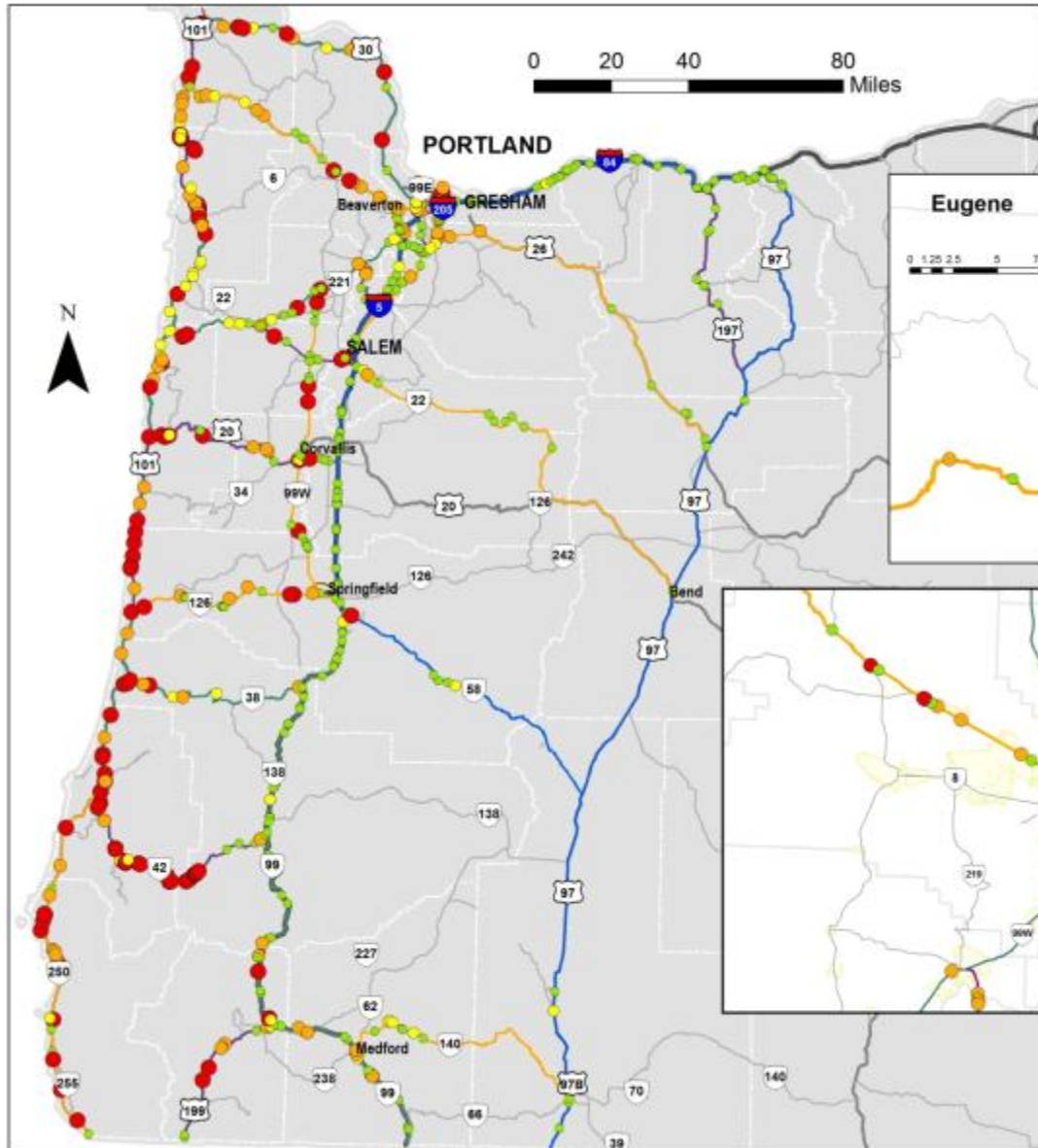


Comprehensive plan, developing a strategic approach

Transportation is critical



# Seismic Plus Program Bridges by Expected Damage State



- Bridge Damage State**
- DS5 - Collapse
  - DS4 - Extensive
  - DS3 - Moderate
  - DS2 - Minor
- Program Phases**
- Phase 1
  - Phase 2
  - Phase 3
  - Phase 4
- Phase 5:  
Replacements Only**
- Interstate Route
  - U. S. Route
  - Oregon Route
  - County
  - City Limits



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August 2014



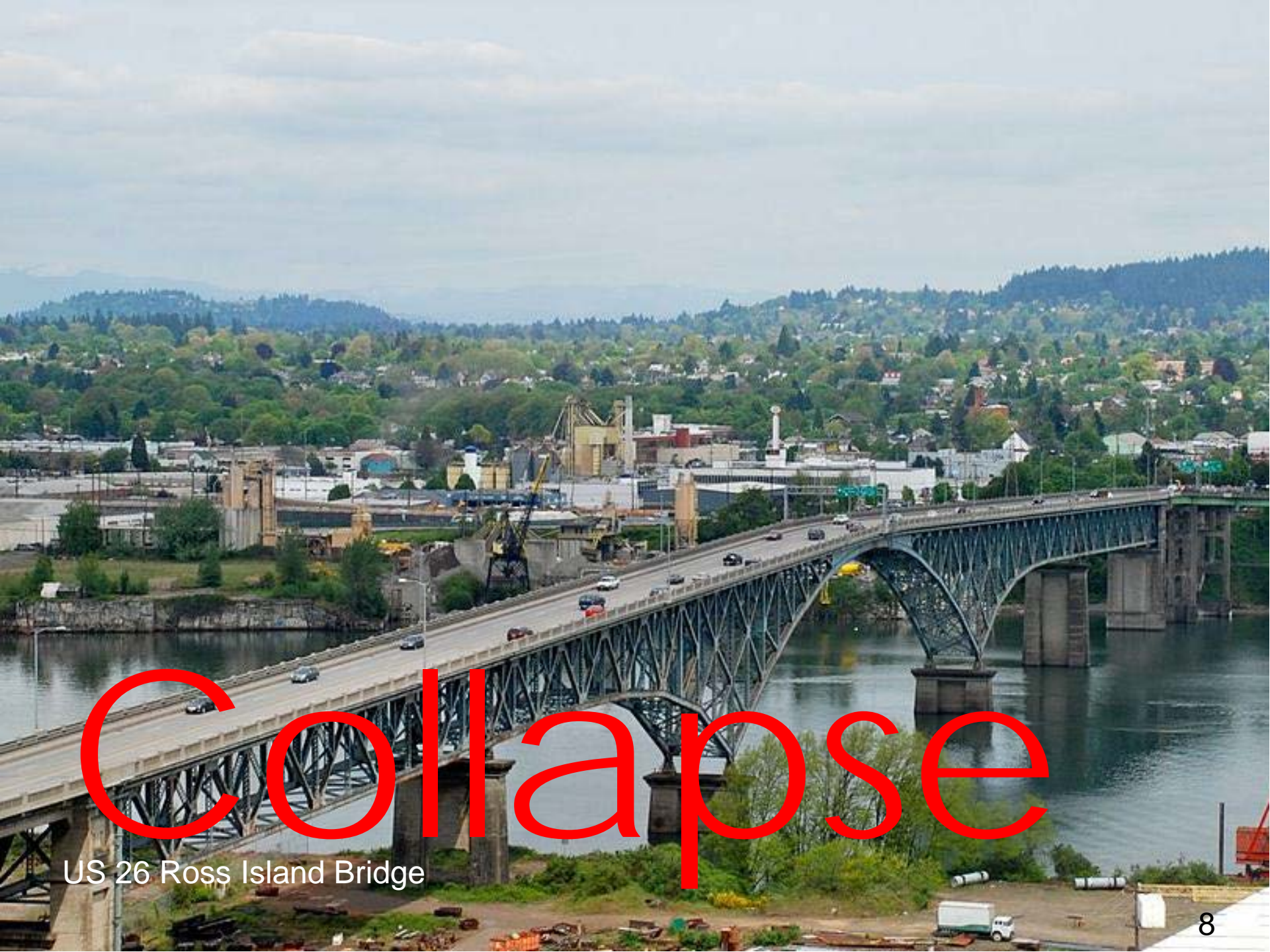
# Moderate

I-5 Marquam Bridge



# Moderate

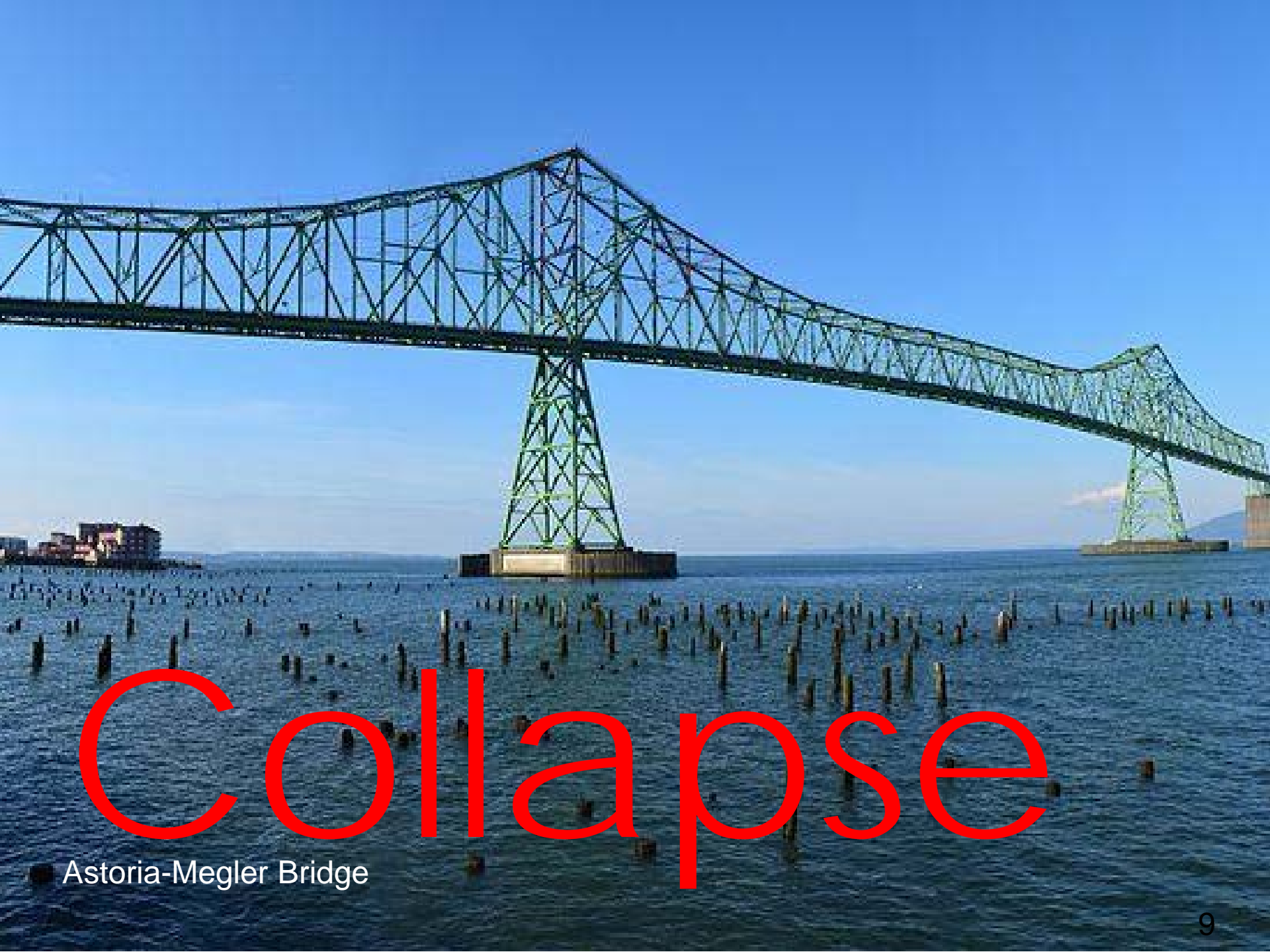
I-405 Fremont Bridge



# Collapse

US 26 Ross Island Bridge





# Collapse

Astoria-Megler Bridge



# Collapse

I-5 Interstate Bridge



# Slight to Moderate

I-205 Glenn Jackson Bridge

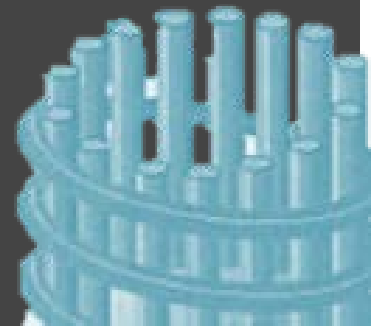
# The solution

## RETROFIT

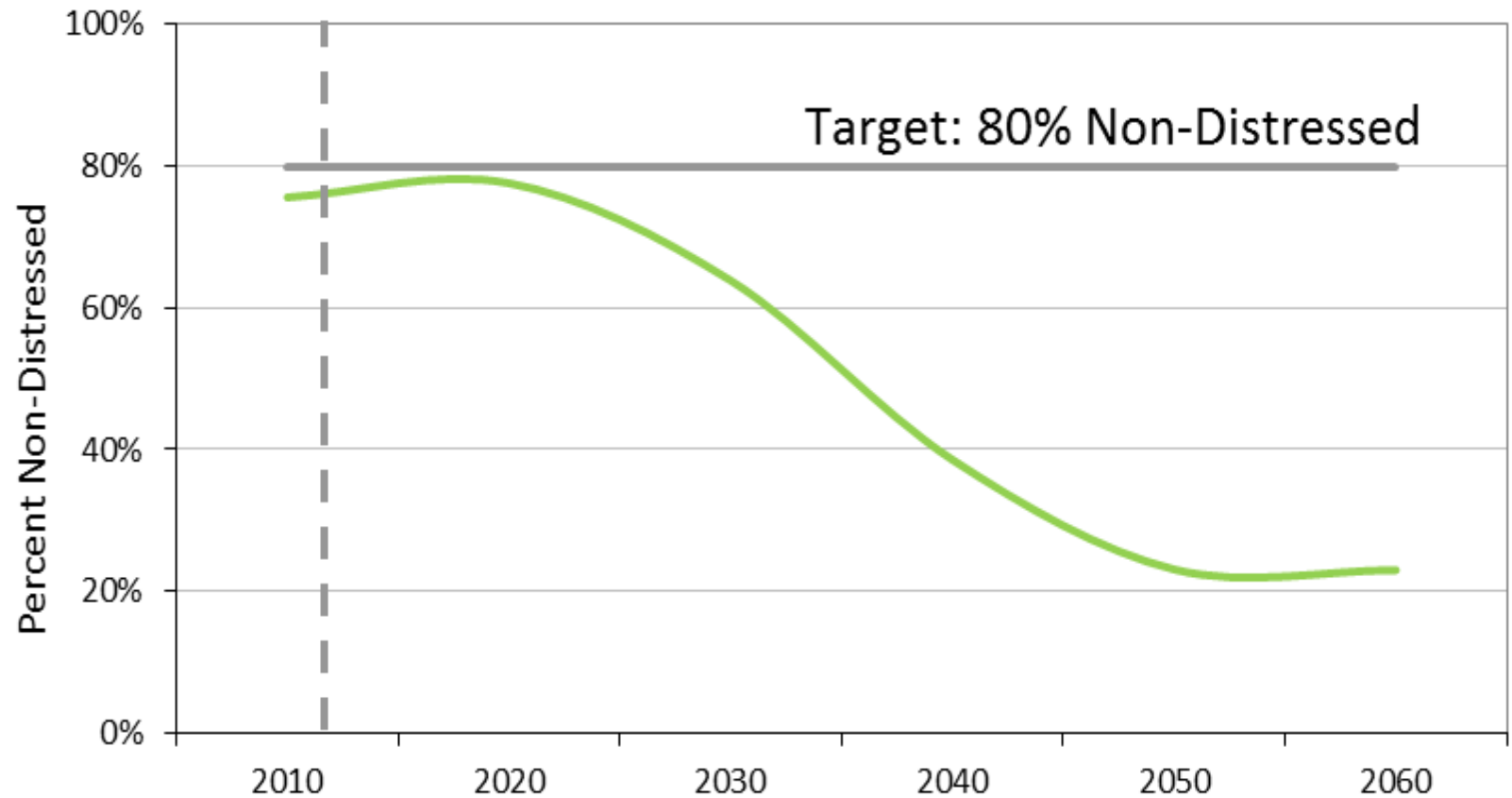
For **life safety** to prevent collapse



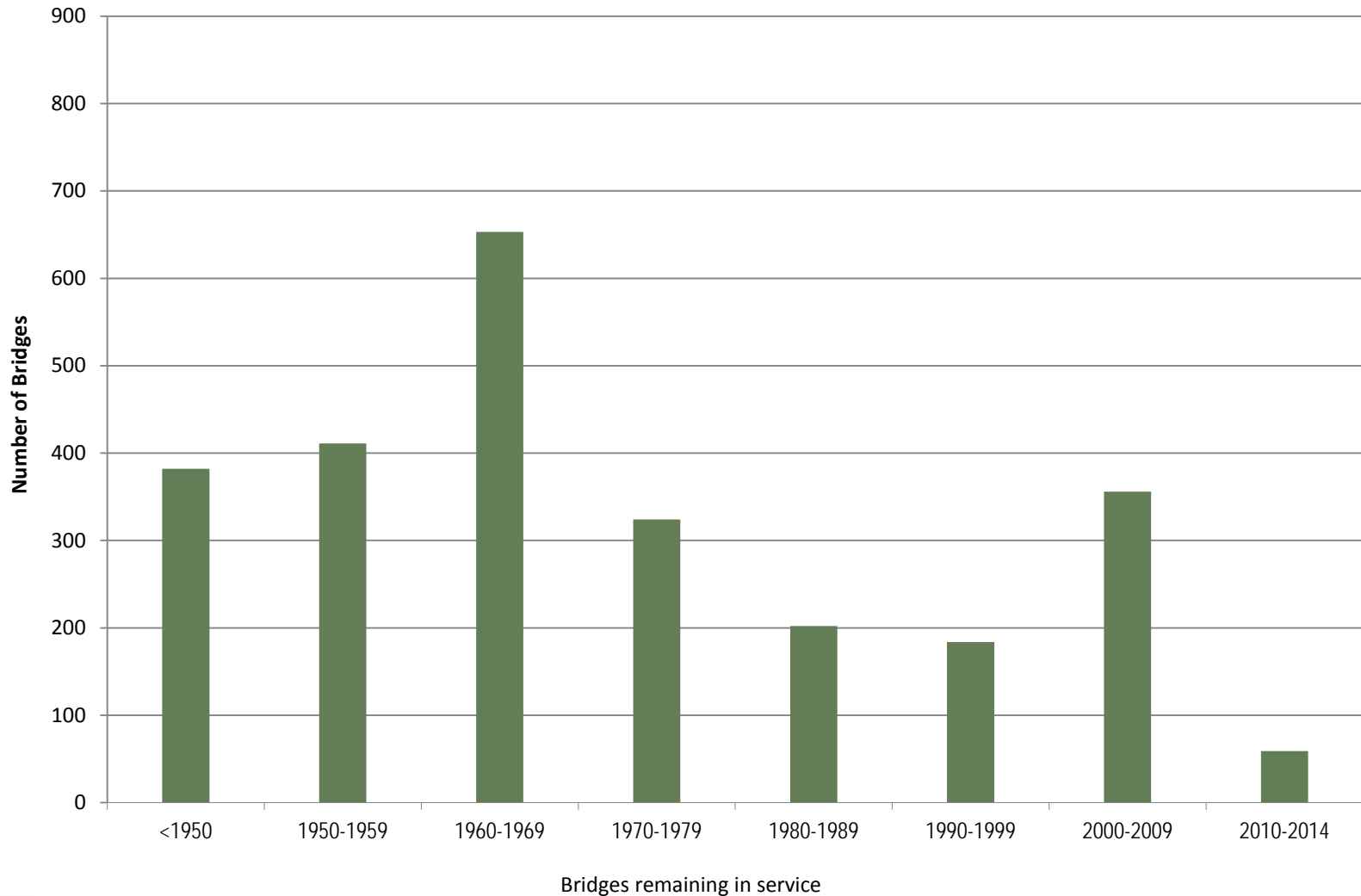
For **serviceability** to keep the bridge functional



# Bridge Conditions Decline



# Most bridges beyond design life

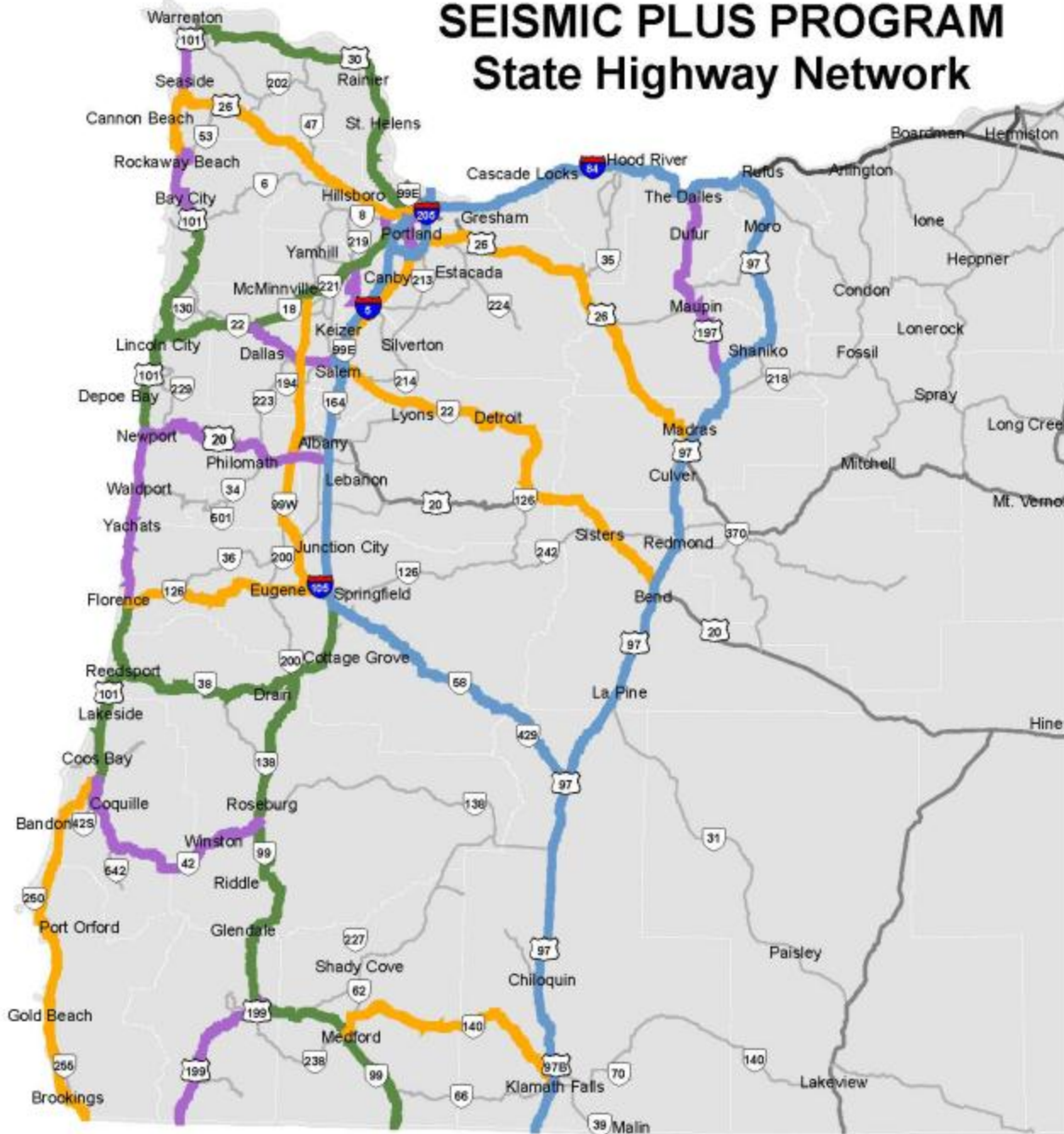


# Route selection

<b>Survivability</b>	<ul style="list-style-type: none"><li>• Emergency responders</li><li>• Critical care facilities</li></ul>
<b>Life Support</b>	<ul style="list-style-type: none"><li>• Critical care facilities</li><li>• Life support resources</li><li>• Evacuation routes</li></ul>
<b>Economic Recovery</b>	<ul style="list-style-type: none"><li>• Critical freight corridors</li><li>• Mobility into and out of the region</li><li>• Routes between large metro areas</li></ul>



# SEISMIC PLUS PROGRAM State Highway Network



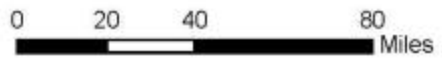
## LEGEND

- Program Phase 1
- Program Phase 2
- Program Phase 3
- Program Phase 4

Phase 5 (replacements) not shown for clarity

- Interstate
- U.S. Routes
- Oregon Routes
- County
- City Limits

1 in = 39 miles



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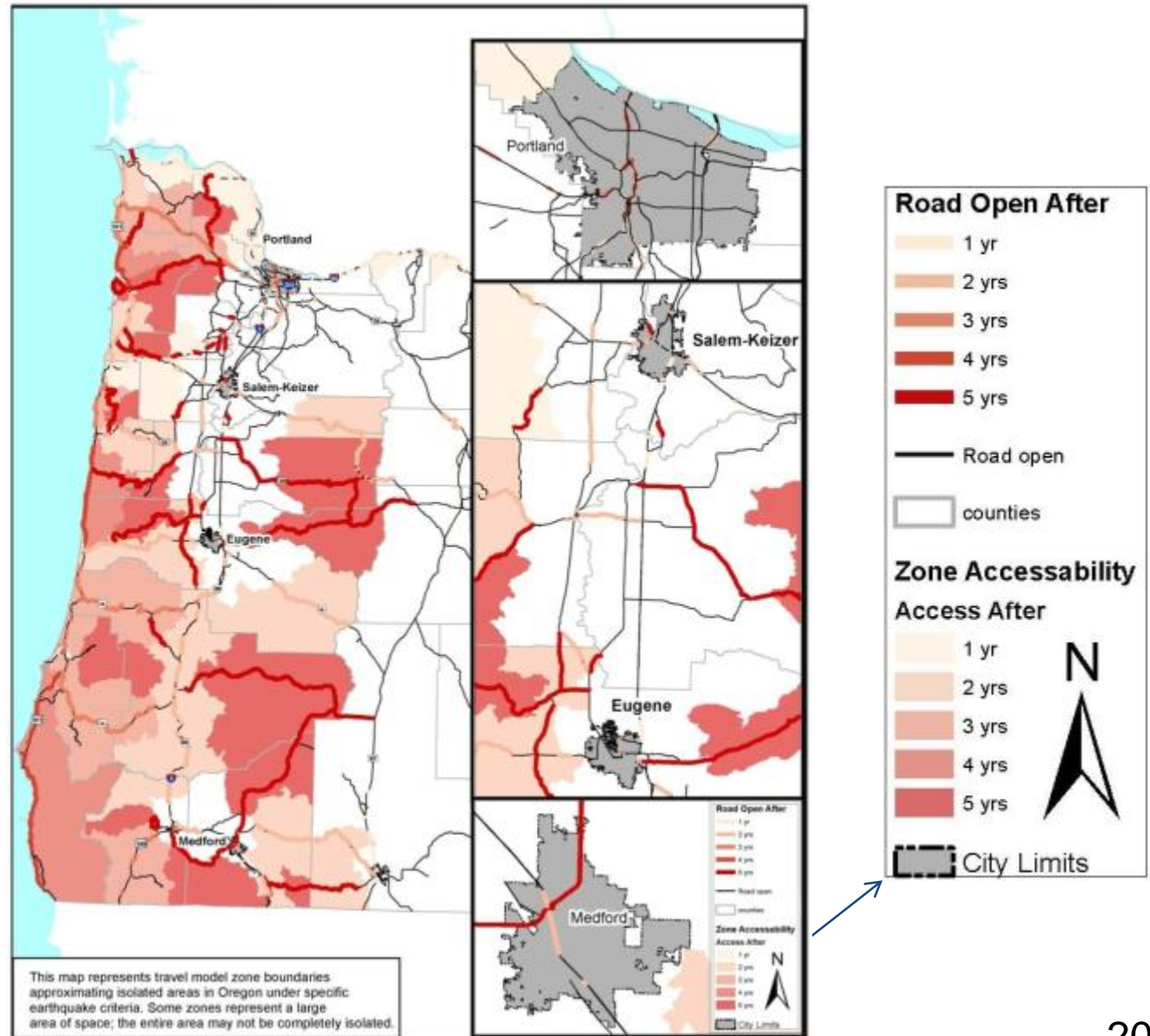
# Total Seismic PLUS Program Cost

Program Phases	Total Bridge Cost	Landslides/Rockfalls Cost	Total Seismic PLUS Program Costs
1	\$738 Million	\$197 Million	<b>\$935 Million</b>
2	\$632 Million	\$272 Million	<b>\$904 Million</b>
3	\$612 Million	\$483 Million	<b>\$1,095 Million</b>
4	\$640 Million	\$126 Million	<b>\$766 Million</b>
5	\$1,432 Million	\$0	<b>\$1,432 Million</b>
<b>Total</b>	<b>\$4.1 Billion</b>	<b>\$1.0 Billion</b>	<b>\$5.1 Billion</b>



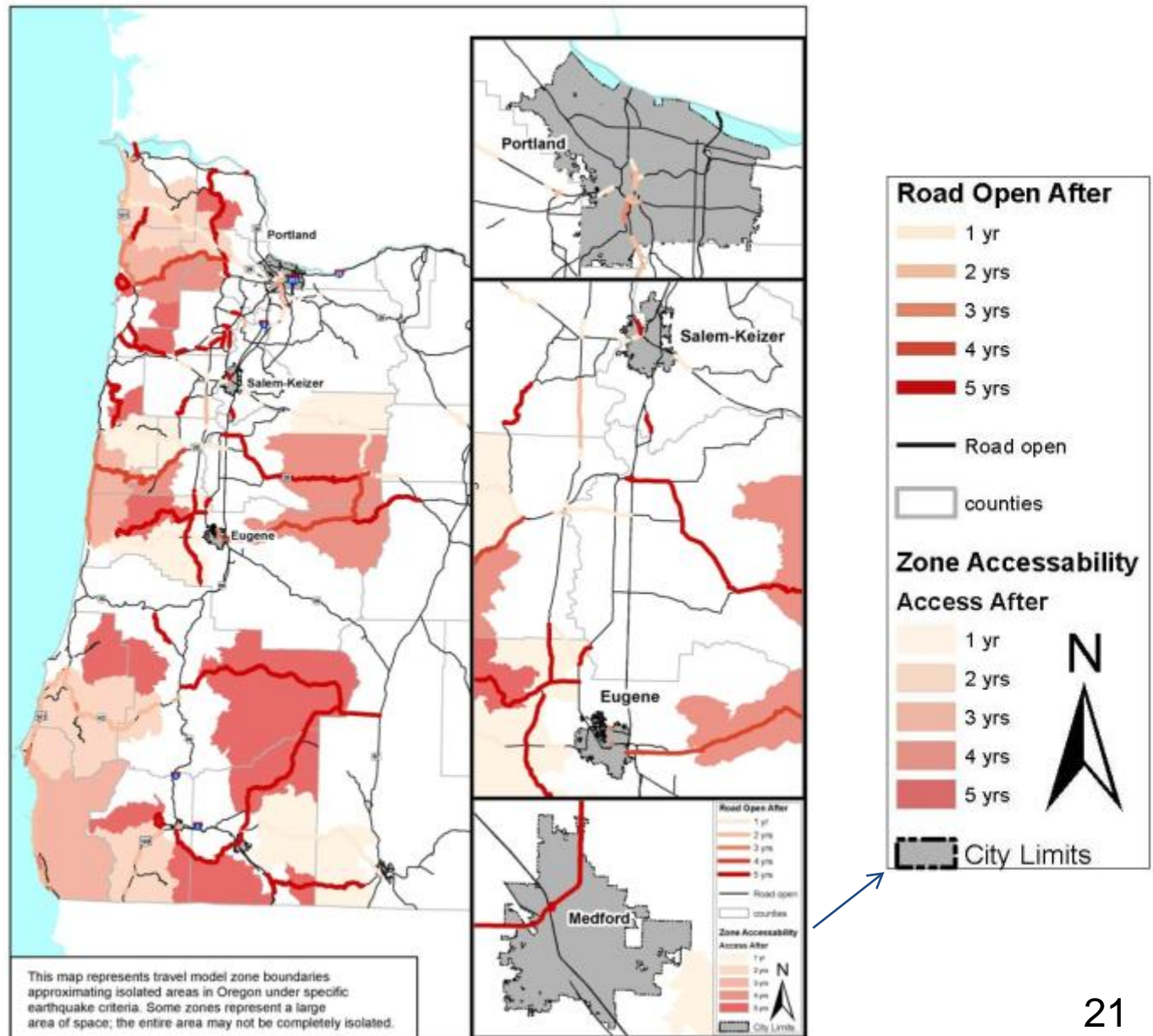
# Major Seismic Event: Isolated Areas

Total economic loss: **\$350 B**



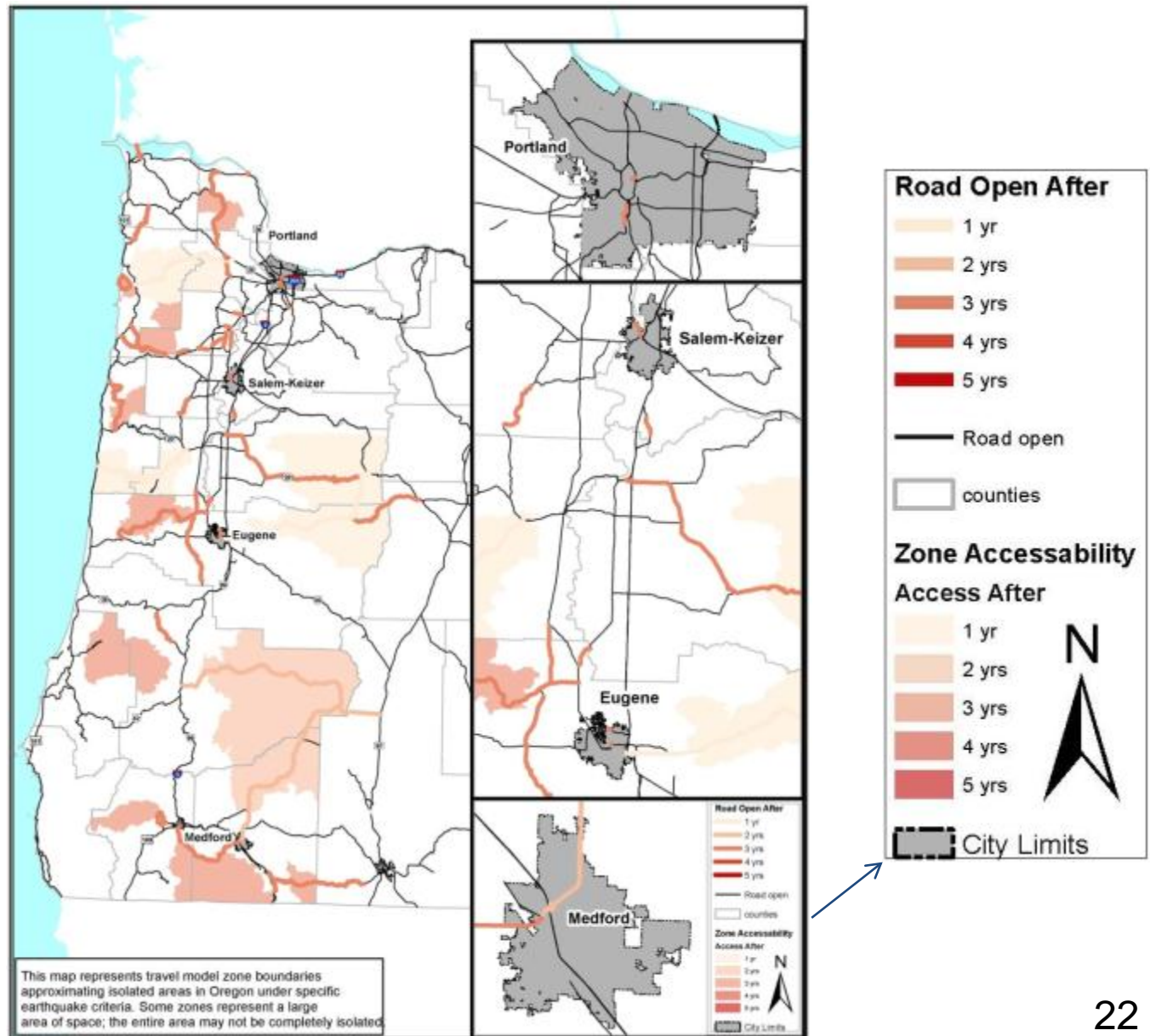
# Isolated Zones: Phase 1 & 2 Scenario

Reduce economic loss by:  
**\$35 B**



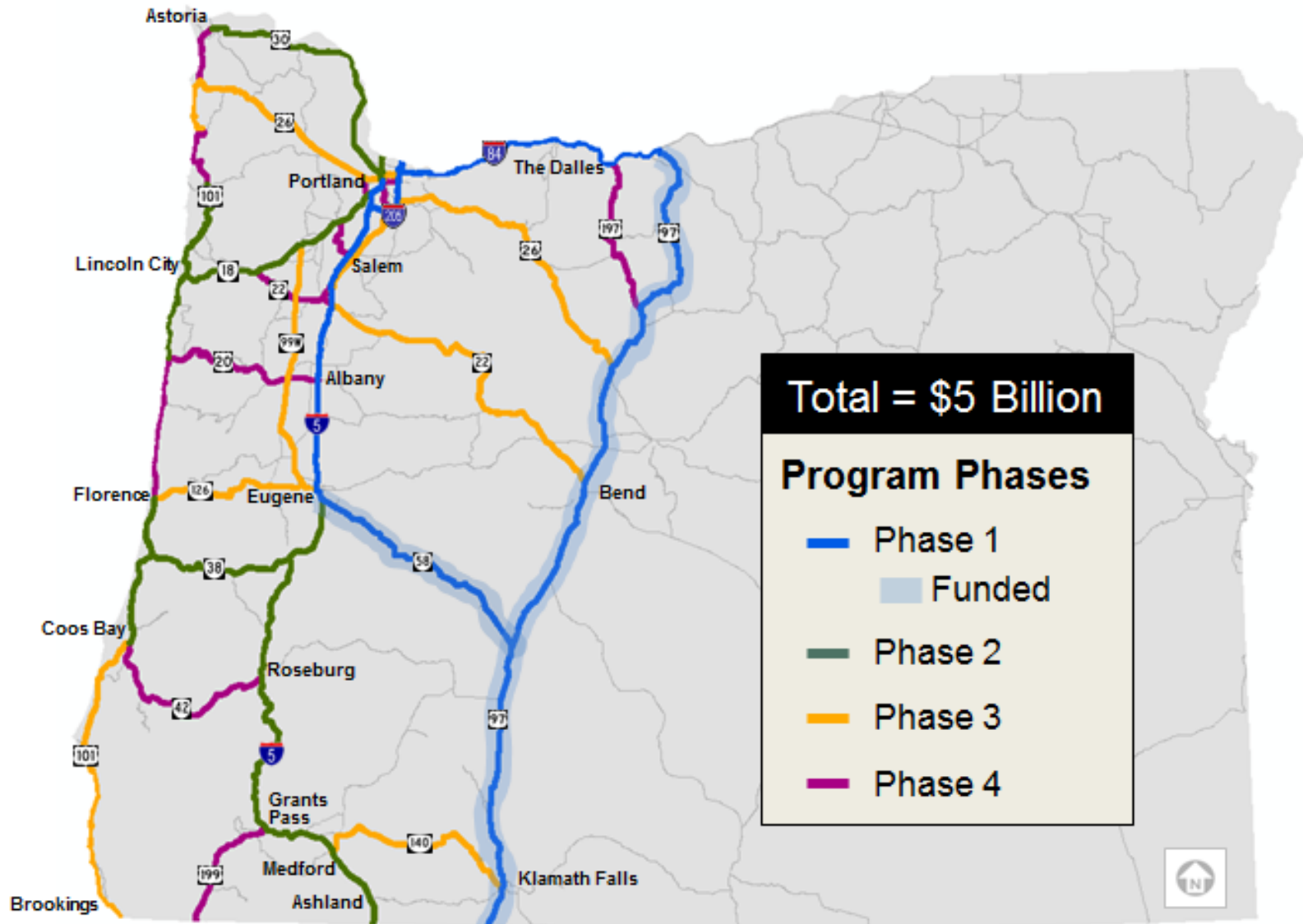
# Isolated Zones: Full Seismic Program

Reduce economic loss by:  
**\$84 B**



# Seismic **Plus** Program

2016:OTC Approves \$35M



# Seismic Resiliency Triage Strategy

ODOT's Short-Term Approach

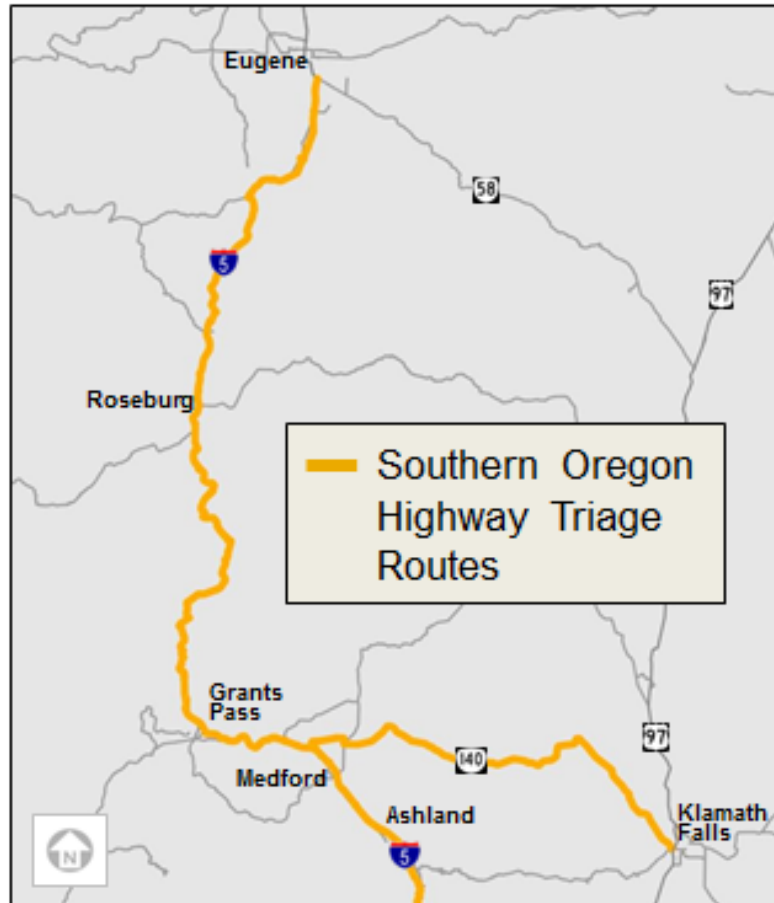
Southern  
Oregon  
Highway  
Triage

Coastal  
Forward  
Supplies

Local  
ODOT  
Triage

# Southern Oregon Highway Triage

Interstate 5 and OR 140



- I-5 and OR 140  
*(key lifeline routes)*
- 17 Bridges and  
7 Unstable Slopes
- \$35 Million

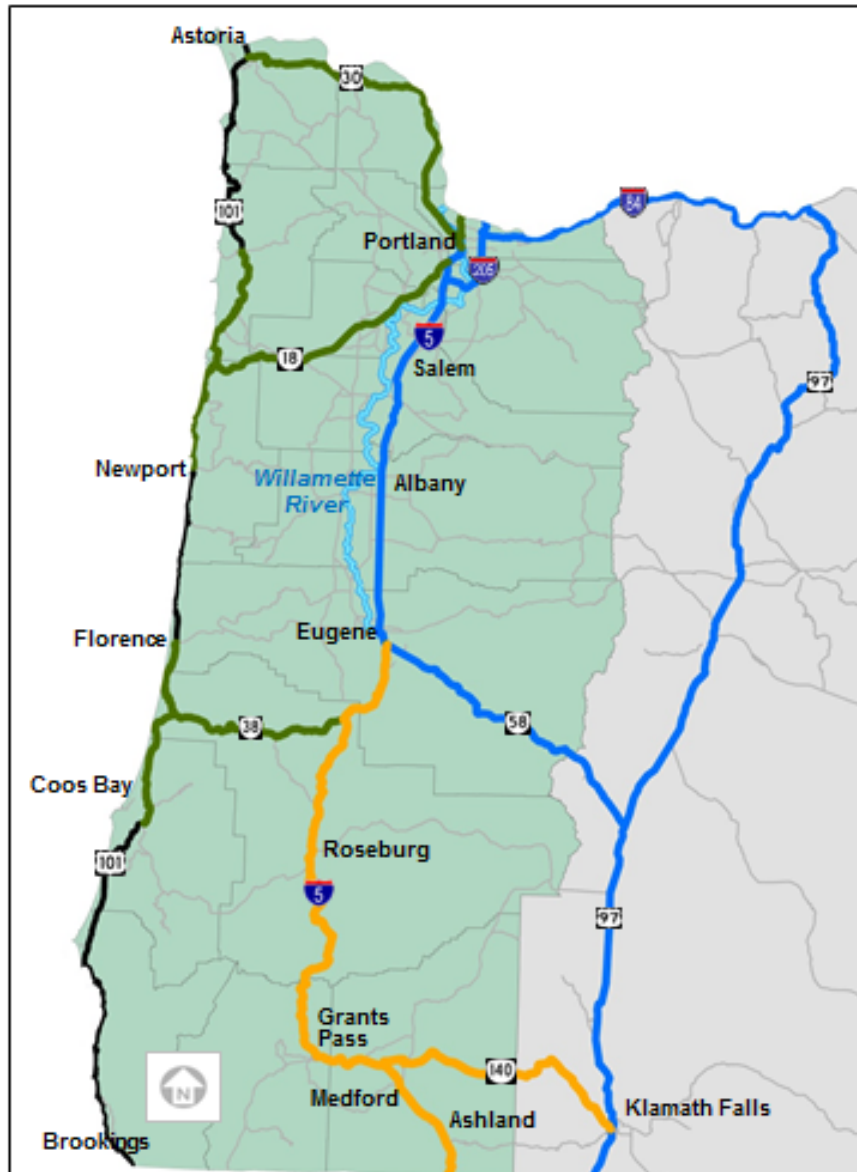
# Coastal Seismic Response Kits

Supporting Communities (Post Seismic Event)





# Local ODOT Triage



- Integrate local and statewide plans
- Secure strategic ODOT bridges
- Focus on major river crossings



# Overall Seismic Resiliency Triage Strategy






**\$200 M over 20 years**

**Rogue Valley Seismic Triage**  
(bridges and unstable slopes on I-5 and OR 140)





**Coastal Forward Supplies & Seismic Response Kits**

-  Astoria
-  Newport
-  Coos Bay

**Local ODOT Triage**  
(address strategic ODOT and local bridges/major river crossings)



**Seismic Options Report**  
(not part of \$200 M total above)

-  Phase 1 – Partially Funded
-  Phase 2



Brookings

# Bridge Conditions

# OREGON STATE HIGHWAY SYSTEM - BRIDGE CONDITION

Includes Bridges on lifeline routes not needing specific seismic work (highlighted)

