

# **Bridges & Emergency Management**

## **Successes, Challenges, and Needs**

Evan Grimm, State Bridge & Structures Engineer  
Kayla Grayson, Northwest Region Emergency Manager  
Island County Council of Governments Meeting  
June 25, 2025

# Introduction

- Bridge Condition
- Seismic Retrofit
- Seismic Lifeline
- Emergency Response
- Damage Assessments

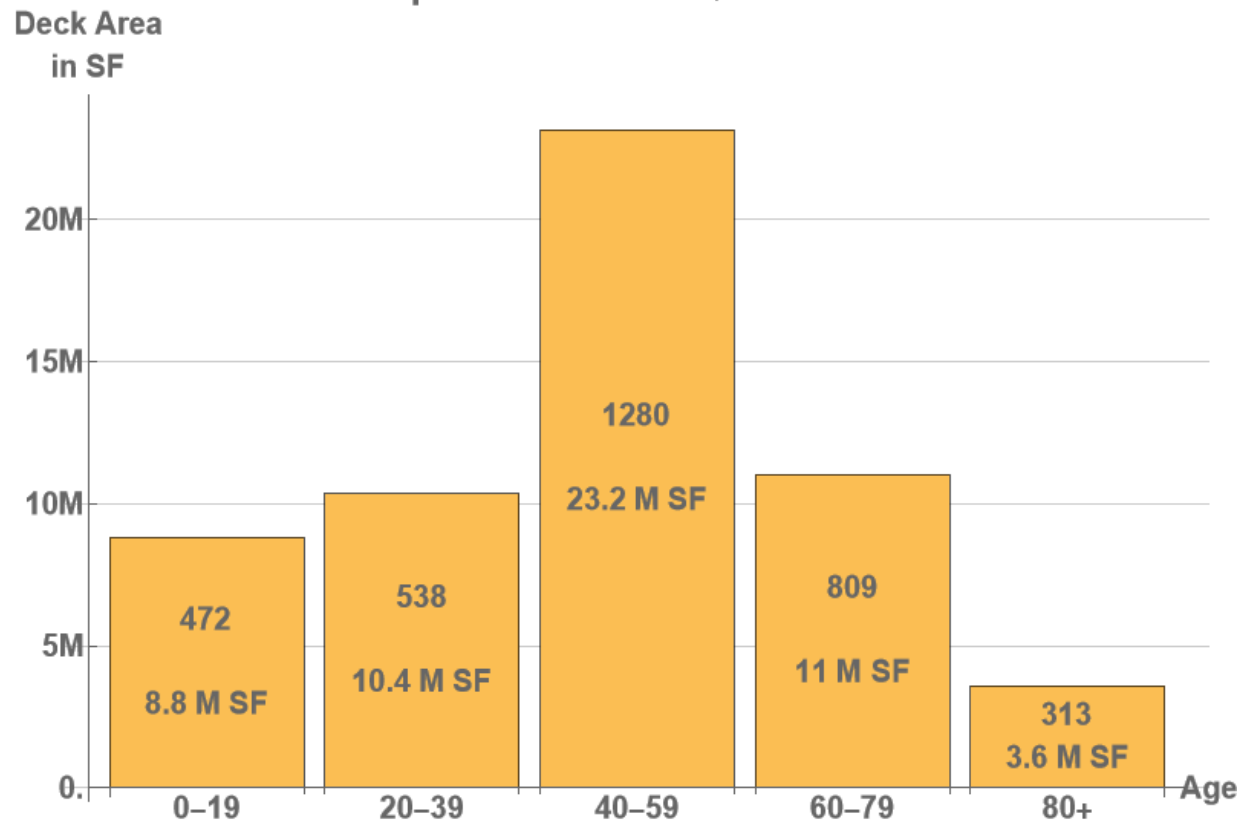


# WSDOT Bridge Inventory



# WSDOT's Aging Bridge Inventory

Replacement value \$131 Billion



Total 3,412 bridges

Average age: 51 years

Oldest: 1915

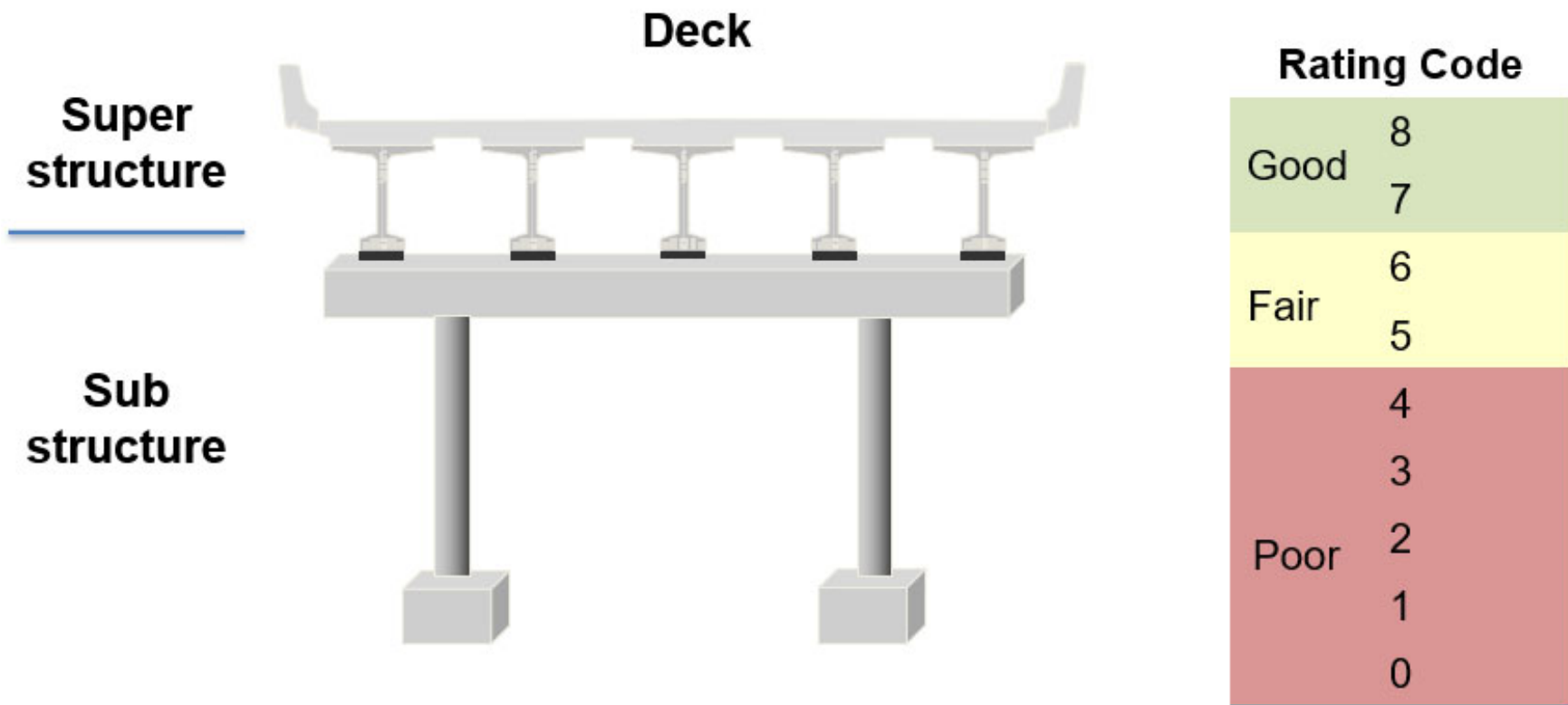
80+ yrs. old

313 bridges (\$8.3 B)

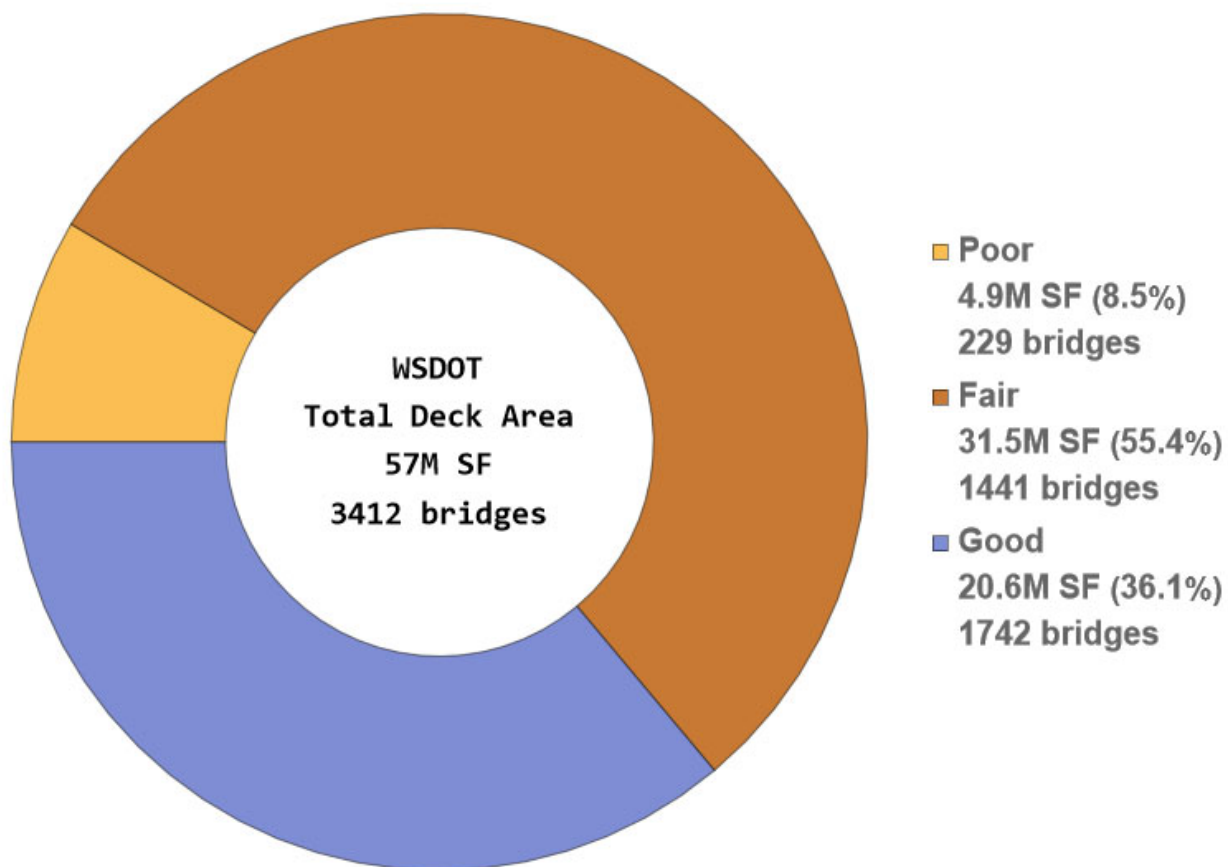
Data from June 2024



# How We Measure Bridge Condition

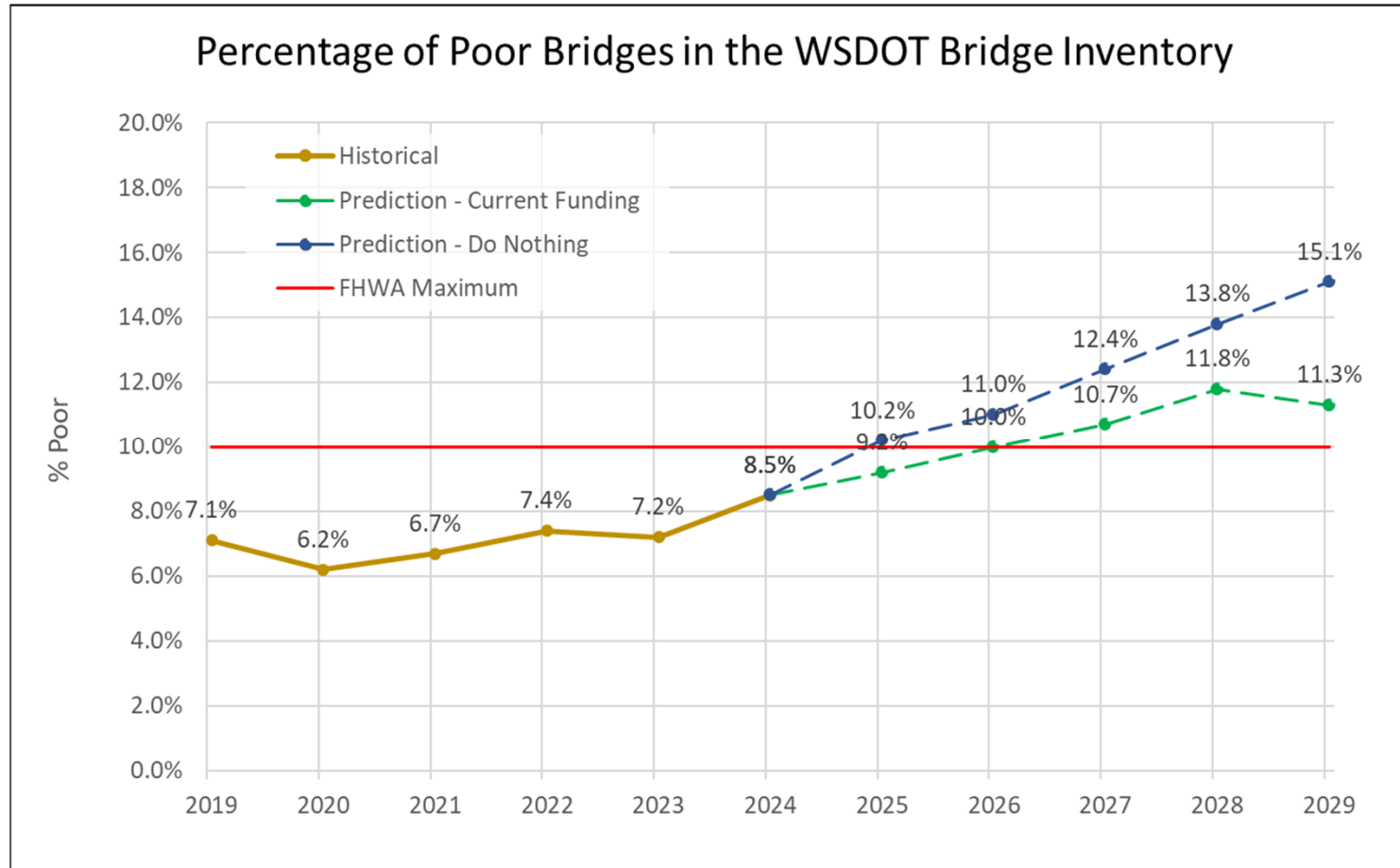


# Statewide WSDOT Bridge Condition

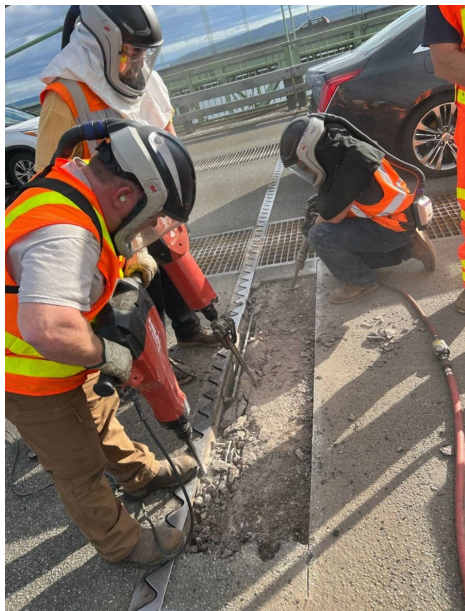


Data from June 2024

# Condition Trends and Projections



# Condition Examples



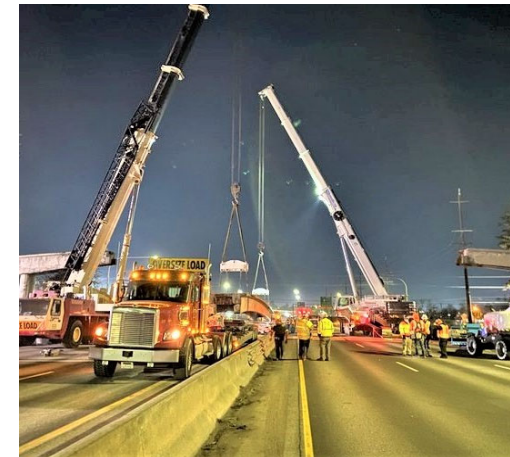
1950 Tacoma Narrows  
Bridge Deck / Joints



SR 165 Fairfax  
Bridge Closure



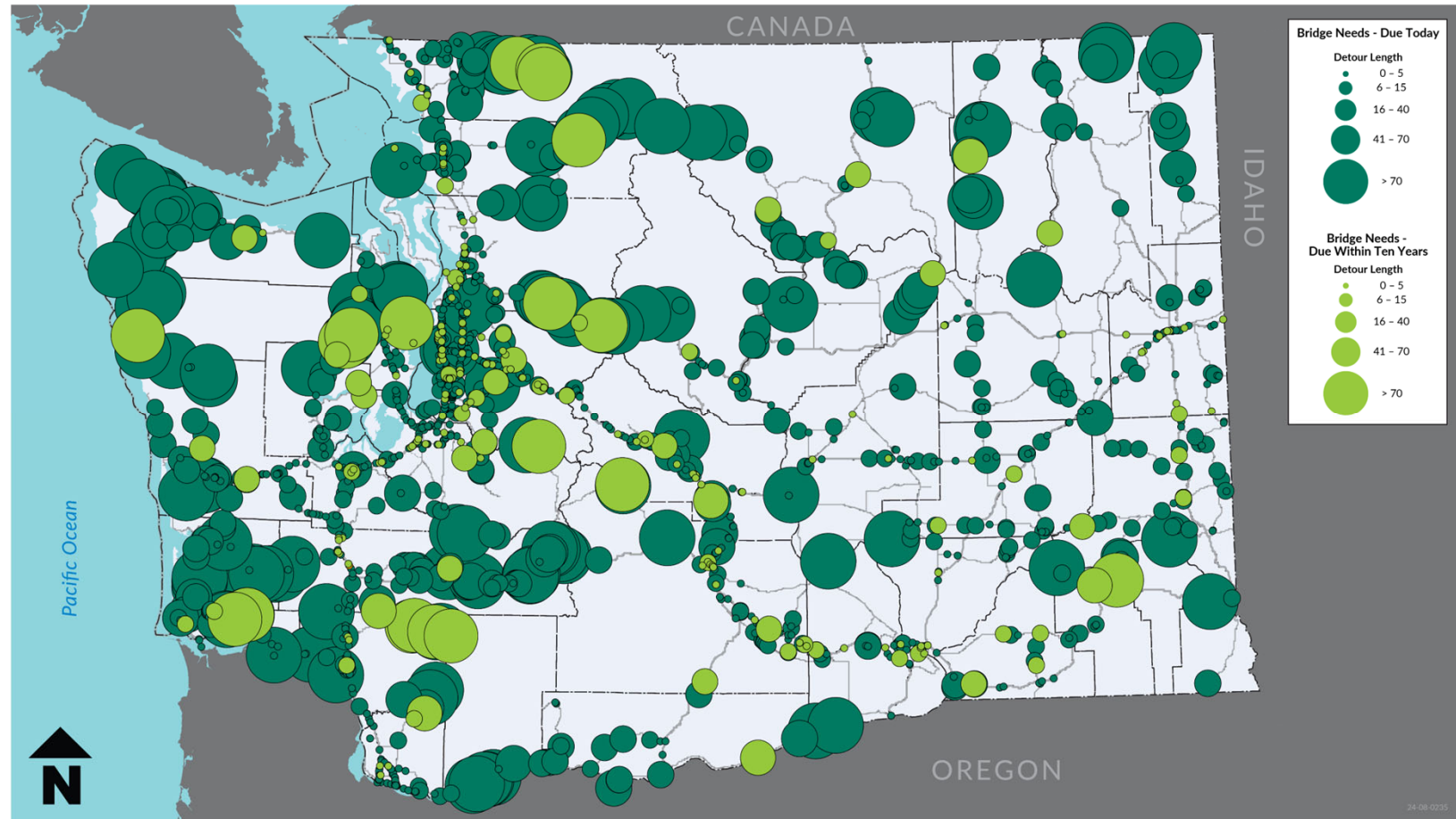
I-5 Ship Canal Bridge  
Deck Rehab



Spokane Ped Bridge  
over I-90 – Closure



# State Highway Bridge Preservation Needs



# Deception & Canoe Pass Bridges

## Condition

- Year Built 1935
- Steel Deck Truss, Concrete Approach Spans
- Fair, Poor
- Needs: Deck drain repairs, steel cracking, section loss
- Recent Project: 2020-21 Painting & Repairs
- Regular Washing





# Upcoming Study



Current Rail



Example:  
Aurora Ave, Seattle

# Preservation Needs – Condition vs Risk

## Condition

Operations

Probability = 1



## Risk

Vessel Collision,

Seismic

Probability < 1





# WSDOT Seismic Retrofit Program

Spent to date	>\$100M
Bridges Identified	918
Bridges Completely Retrofitted	330
Bridges Still Needing Complete Retrofit	588
Have Been Partially Retrofitted	117



# Deception & Canoe Pass Seismic Analysis

- July 2019 Analysis
- Structural Vulnerabilities Identified
- Retrofit Recommendations and Cost Estimate
- Retrofit Not Programmed

## Deception Pass Canoe Pass Seismic Analysis Bridge Nos. 20/204 & 207



# Seismic Lifeline

- Developed to connect federal distribution points
- Does not include I-5 through Seattle
- Provided funding to reinforce along the lifeline
- Only reinforced from ground up – does not account for liquefaction

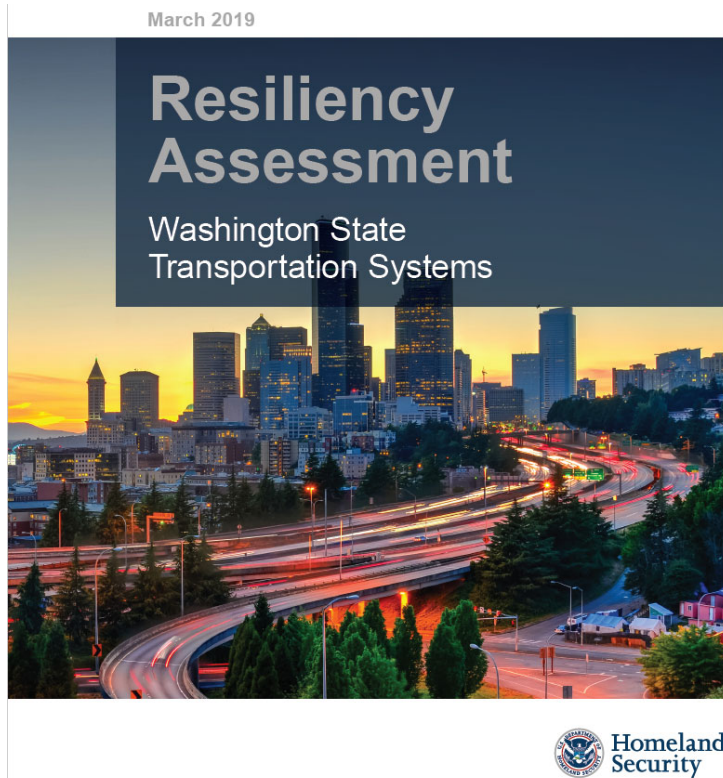
## Next Steps

- Expanding to locals – building the branches
- Unrealistic to expect full reinforcement statewide

## WSDOT Bridge Seismic Lifeline Routes



# RRAP General Information



- Regional Resiliency Assessment Program (RRAP)
- Undertaken by DHS with help from WA EMD and other partners
- Based on a M9.0 Cascadia Subduction Zone rupture
- Key outcome = identification of priority highway routes into Western Washington which can later support movement of resources into the areas of need.
  - Prioritized investment in highway routes to enhance seismic resilience prior to major earthquake to accelerate repair times.



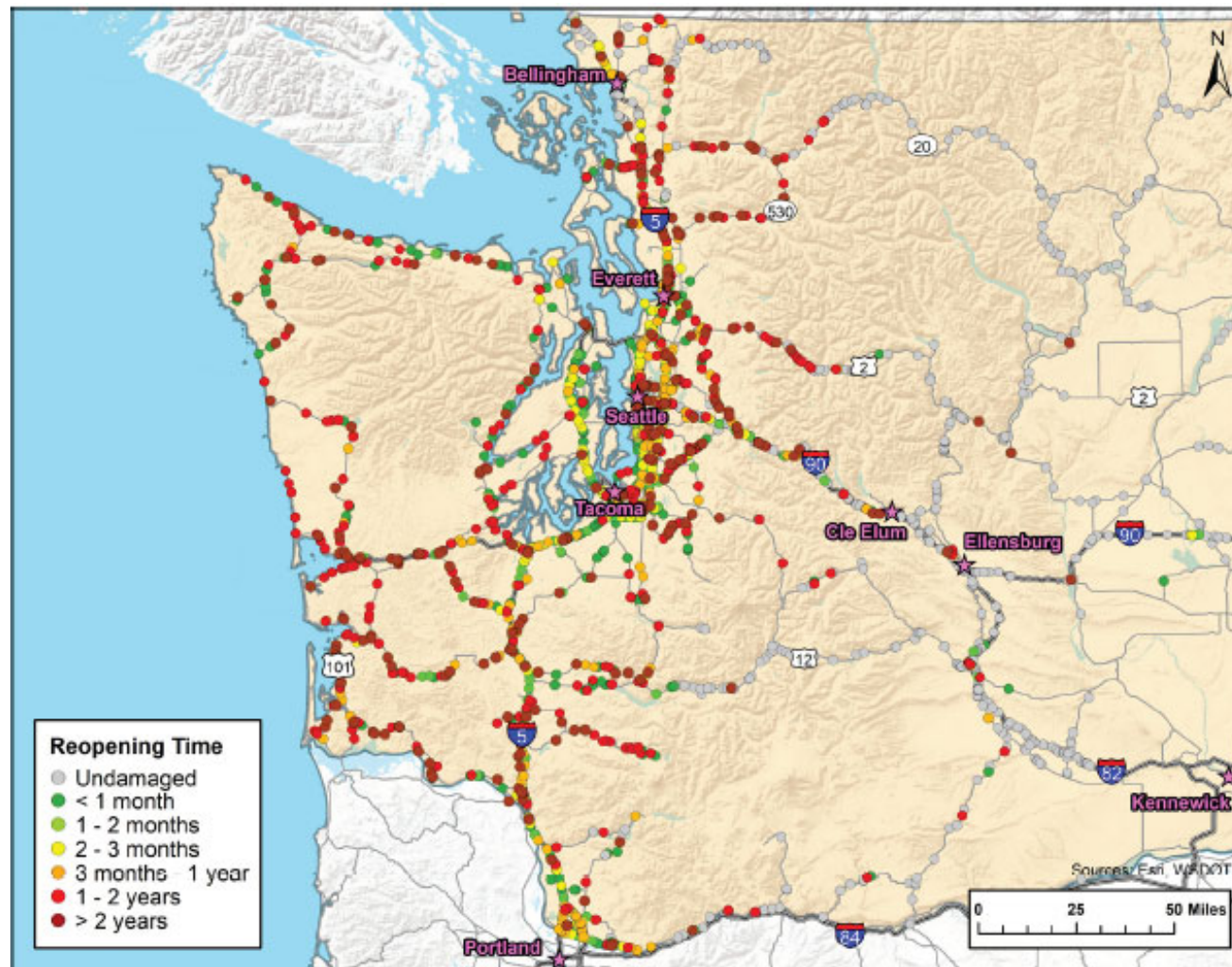


Figure 10: Bridge Seismic Screening Tool (BSST) Projected Reopening Times of Highway Bridges in Washington after the CSZ Scenario Earthquake

*Table 2: Summary of Bridge Seismic Screening Tool (BSST) Projected Reopening Times of Highway Bridges in Washington after the CSZ Scenario Earthquake*

Reopening Time	Number of Bridges
None	621
1–14 days	317
2–4 weeks	46
1–3 months	627
3–6 months	165
6–12 months	159
1–1.5 years	304
1.5–2 years	120
2–2.5 years	352
> 2.5 years	6

# Preliminary Damage Assessments

## The Basics:

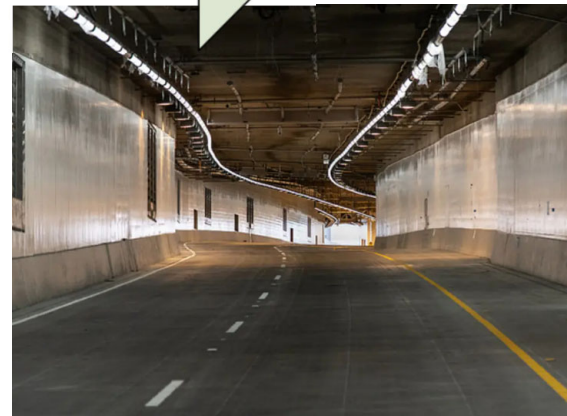
- System for conducting damage assessments
- 10-minute evaluation of bridges (NOT including specialty bridges)
- Includes roadway assessment
- Two-hour training annually
- Practice in Great ShakeOut
- Based on NCHRP guidelines



PDA Inspectors

Area Operations  
Center

Region EOC



# Preliminary Damage Assessments

Washington State Department of Transportation		Bridge & Roadway Preliminary Damage Report																		
1. Date	2. Time	Status of Bridge or Roadway:																		
		3. <input type="checkbox"/> Open	4. <input type="checkbox"/> Closed	5. <input type="checkbox"/> Restricted																
6. Region	7. County	8. Route	9. Milepost	10. Bridge Number (if applicable)																
11. Location		12. Inspector's Name																		
13. Remarks																				
<p align="center"><b>Emergency Bridge Inspection</b></p> <p>Check box that corresponds with any problems below: <b>Note:</b> Only check a box if you are going to close the bridge.</p> <p>If Bridge is <b>SAFE</b> to stay <b>OPEN</b>, apply <b>GREEN</b> tape with the date, time, and inspector's initials to right hand side of the bridge on the approaching corner. If Bridge is <b>UNSAFE</b> and needs to be <b>CLOSED</b>, apply <b>RED</b> tape with date, time, and inspector's initials to right hand side of the bridge on the approaching corner. Post signs to close bridge when able.</p> <p>Items:</p> <table border="1"> <tr> <td>14. <input type="checkbox"/> Bridge Approaches</td> <td>21. <input type="checkbox"/> Hinge or Expansion Joints</td> <td rowspan="6"> <b>Check for:</b>            General alignment of roadways and rails, and damaged utilities            Raised or lowered approaches            Cracks or buckling in the deck or roadway            Raised or protruding joints or utility covers            Cracking, crushing, spalling, or misalignment in columns, bent caps, abutments, beams, girders or wing walls            Settlement around abutments, columns or walls            Missing bolts or rivets and/or fractured, broken, missing, or damaged anchorage connections.            Dislocation or movement of bearings            Changes in water flow or debris accumulations            Loss of soils around footings, walls and roadway embankments due to erosion or scour         </td> </tr> <tr> <td>15. <input type="checkbox"/> Wing Walls</td> <td>22. <input type="checkbox"/> Railings, Parapet and Curb</td> </tr> <tr> <td>16. <input type="checkbox"/> Bridge Abutments</td> <td>23. <input type="checkbox"/> Utilities and Surrounding Areas</td> </tr> <tr> <td>17. <input type="checkbox"/> Bent Caps, and Columns</td> <td>24. <input type="checkbox"/> Seismic Restraint Devices</td> </tr> <tr> <td>18. <input type="checkbox"/> Bearings</td> <td>25. <input type="checkbox"/> Debris Accumulation in Channel</td> </tr> <tr> <td>19. <input type="checkbox"/> Beams or Girders</td> <td>26. <input type="checkbox"/> Undermined Footings</td> </tr> <tr> <td>20. <input type="checkbox"/> Deck (Top and Underside)</td> <td></td> <td></td> </tr> </table>					14. <input type="checkbox"/> Bridge Approaches	21. <input type="checkbox"/> Hinge or Expansion Joints	<b>Check for:</b> General alignment of roadways and rails, and damaged utilities Raised or lowered approaches Cracks or buckling in the deck or roadway Raised or protruding joints or utility covers Cracking, crushing, spalling, or misalignment in columns, bent caps, abutments, beams, girders or wing walls Settlement around abutments, columns or walls Missing bolts or rivets and/or fractured, broken, missing, or damaged anchorage connections. Dislocation or movement of bearings Changes in water flow or debris accumulations Loss of soils around footings, walls and roadway embankments due to erosion or scour	15. <input type="checkbox"/> Wing Walls	22. <input type="checkbox"/> Railings, Parapet and Curb	16. <input type="checkbox"/> Bridge Abutments	23. <input type="checkbox"/> Utilities and Surrounding Areas	17. <input type="checkbox"/> Bent Caps, and Columns	24. <input type="checkbox"/> Seismic Restraint Devices	18. <input type="checkbox"/> Bearings	25. <input type="checkbox"/> Debris Accumulation in Channel	19. <input type="checkbox"/> Beams or Girders	26. <input type="checkbox"/> Undermined Footings	20. <input type="checkbox"/> Deck (Top and Underside)		
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<b>Roadway Inspection</b>		<b>Geotechnical Inspection</b>																		
27. <input type="checkbox"/> Cracking		34. <input type="checkbox"/> Shoulder settlement																		
28. <input type="checkbox"/> Buckling		35. <input type="checkbox"/> Sags in roadway safety features (guardrail)																		
29. <input type="checkbox"/> Heaving or rolling		36. <input type="checkbox"/> Movement above or below tilted trees																		
30. <input type="checkbox"/> Pavement separation		37. <input type="checkbox"/> Debris on roadway																		
31. <input type="checkbox"/> Change in configuration - striping or lane shift		38. <input type="checkbox"/> Sloughing slopes																		
32. <input type="checkbox"/> Change in roadway surface		39. <input type="checkbox"/> Unstable rock blocks above roadway																		
33. <input type="checkbox"/> Signs, VMS and sign bridges		40. <input type="checkbox"/> Sinkhole																		

## Who we train:

- As many WSDOT personnel as we can!

## How we train:

- Online via Teams

## Where we want to go:

- More training
- Expand to locals
- Developing a Seismic Interoperability Plan

## Form link:

DOT Form 580-020 Bridge & Roadway Preliminary Damage Report



# Emergency Repairs

**Washington State Department of Transportation**

**Declaration of Emergency**

For the purpose of documenting the use of alternative bidding procedures under RCW 47.28.170 and estimating the costs of using State Forces for emergency work under RCW 47.28.030.

1. Date of Emergency: **January 17, 2021** 2. SR: **SR 109**

3. Preliminary Estimate: ☐ Up to \$100,000\* ☒ Over \$100,000\*\* ☐ Over \$700,000\*\*\*

4. County: **Grays Harbor County**

5. MP Location/Limits: **MP 3.3**

6. Work Order No. (if known): **DM-C272**

7. Cause and Description:

On January 17, 2021, a large slide deposited debris and rock across SR 109 at MP 3.3 that blocked the highway and continued into the bay. Weather and rain have inundated the region; however the cause of the slide has not been determined.

WSDOT Maintenance crews did an emergency road closure and detoured the traveling public with an alternate route around the slide. The detour route is 12 miles in length.

The size of the slide and debris field is 325 feet in length, 80-90 feet in depth, and 80 feet wide. There is a head scarp 240 feet in length on the backside of the slide. The slope has 30+ large-diameter trees with leans toward the roadway.

8. ☐ Maintenance Superintendent/Project Engineer  
☒ Director, Regional Administrator or Designee

9. Signature: **John Wynands** Digitally signed by **John Wynands**  
Date: 2021.01.19 14:53:08 PST

10. Date: **2021.01.19**

\* Projects for up to \$100,000 or less can be authorized by the Maintenance Superintendent, or Project Engineer.  
\*\* Projects over \$100,000 require authorization by the Regional Administrator.  
\*\*\* Projects over \$700,000 require review by the Secretary of Transportation or designee.

**Washington State Department of Transportation**

Work Order Number: **DM-C255** Supplement No. **MP** From **11.4** To **11.6** Sub Program **M2**

SR: **706**

Work Order Title: **Slide/Slope Repair**

Work Description: **Subgrade Repair, Pavement repair, ditch restoration, etc.**

Group	01 Work Done By Contractor	02 Work Under Agreement
Previous Authorization Totals		
Temporary / Emergency Repair		
Incidental Repair		
Permanent Restoration		
Eligible Work Items		
This Request Amount		
New Authorization Totals		
Work Done Agreement		
Payment Agreement Number		
Additional Project Information		
Notes to Accounting		

Send to: **WSDOT HQ Asset Agmt**  
**WSDOT CRQA Project Financial Specialist**

DOT Form 128-123  
Revised 12/07

**Transportation + Infrastructure**

**FHWA announces \$1 emergency relief for bridge repairs**



# Questions?

For additional information, please contact:

WSDOT Bridges – Evan Grimm, [Evan.Grimm@wsdot.wa.gov](mailto:Evan.Grimm@wsdot.wa.gov)

Emergency Management – Kayla Grayson, [Kayla.Grayson@wsdot.wa.gov](mailto:Kayla.Grayson@wsdot.wa.gov)