

Climate Change, Hydrology, and Access in the North Cascadia Ecosystem

WSDOT Climate Change Risk Assessment

November 30 – December 1, 2011

Woodland Park Zoo Education Center

Seattle, WA



Mark Maurer, LA, P.E., Assistant State Hydraulics Engineer
Washington State Department of Transportation

Climate Impact Areas of Concern

Western WA

- Sea level rise
 - Salt water intrusion
 - Landslides
 - Habitat loss
- Erosion, scour
- River aggradation
- Flooding
- Extreme heat
- Drought

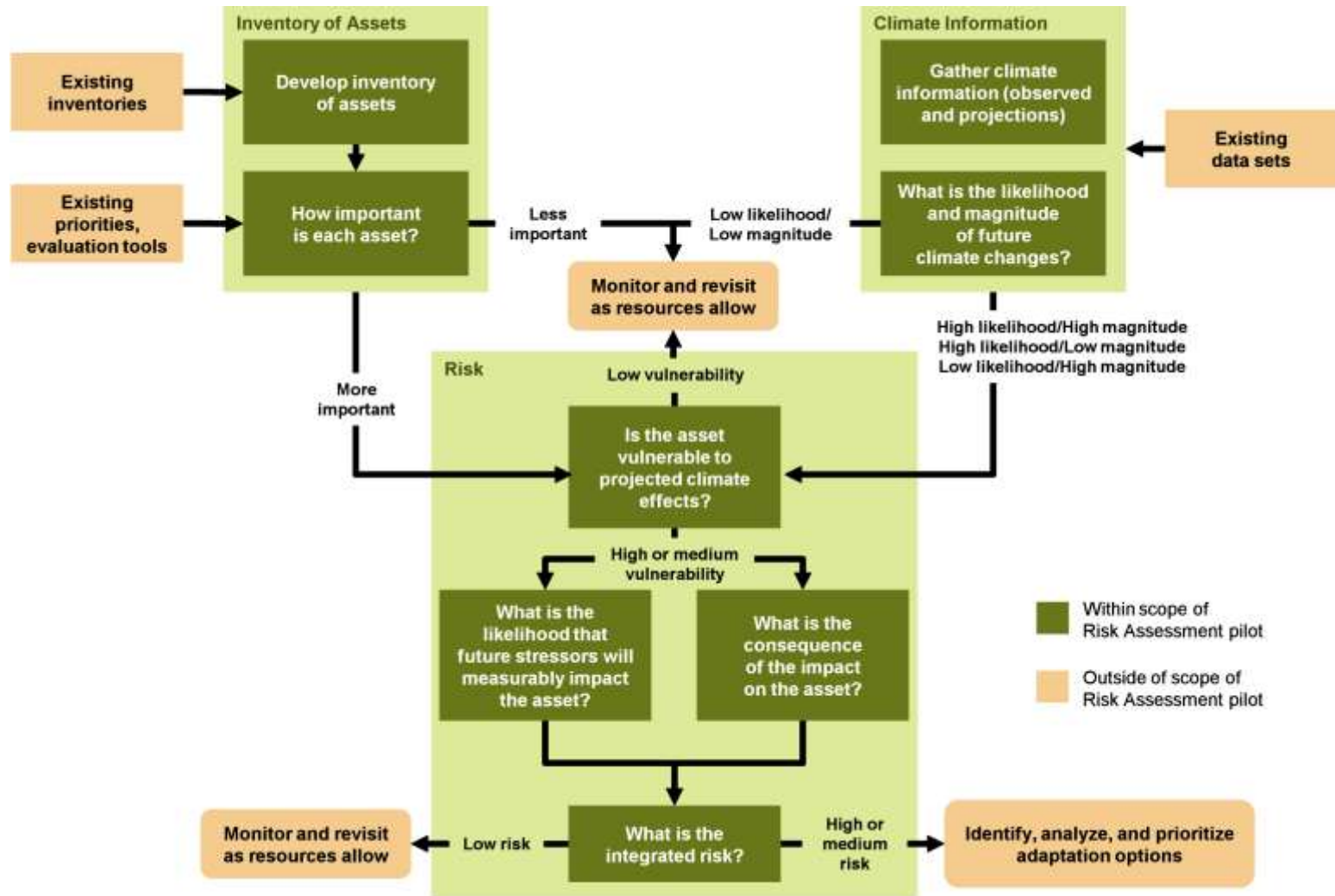
Eastern WA

- Heat and Drought
 - Toxic temps for fish
 - Habitat migration
- Rain dominant rivers
 - Water timing
 - Scour
 - Flooding
- Invasive Species

FHWA / WSDOT climate change vulnerability & risk assessment

- WSDOT Goals:
 - Informed decision-making
 - Assess our risks
 - Assist in prioritizing needs – feeds into planning and project development
 - Resilient and sustainable transportation system regardless of the future we face
 - Test FHWA methodology
- Boundaries:
 - State-owned infrastructure
 - Report due to FHWA November 30, 2011

FHWA Risk Assessment Model






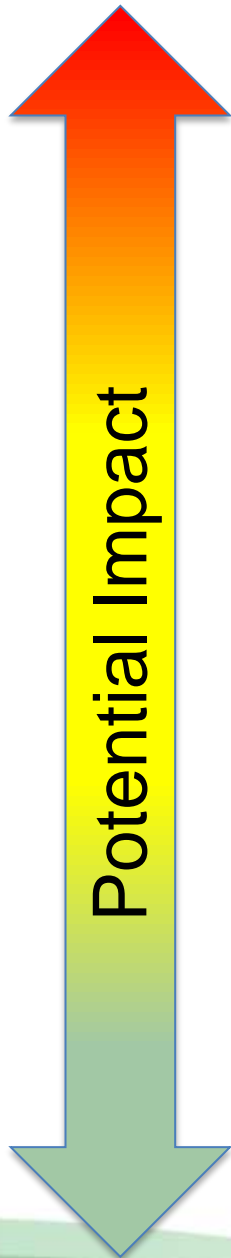
We use our experience to gauge future impacts



Scour and damage to structures - Just off US 12 Davis Creek

Criticality Assessment:

Very low to low				Moderate		Critical to Very Critical			
1	2	3	4	5	6	7	8	9	10
Criticality of asset									
<p>Notice that along with the qualitative terms there is an associated scale of 1 to 10, this is to serve as a facilitation tool for some people who may find it useful to think in terms of a numerical scale – although the scoring by each individual is of course subjective. The scale is a generic scale of criticality where “1” is very low (least critical) and “10” is very critical.</p>									
									
<p>Typically involves: non-NHS low AADT alternate routes available</p>				<p>Typically involves: some NHS non-NHS low to medium AADT serves as an alternative for other state routes</p>		<p>Typically involves: Interstate Lifeline some NHS sole access no alternate routes</p>			



Complete Catastrophic Failure

Results in total loss or ruin of asset. Asset *may* be available for *limited* use after at least 60 days and would require major repair or rebuild over extended period of time. "Complete and/or catastrophic failure" typically involves:

- Immediate road closure;
- Disruptions to travel;
- Vehicles forced to re-route to other roads;
- Reduced commerce in affected areas;
- Reduces or eliminates access to some destinations;
- May sever some utilities located within right-of-way;
- May damage drainage conveyance systems.



Temporary Operational Failure

Results in minor damage and/or disruption to asset. Asset would be available with either full or limited use within 60 days and may have immediate limited use still available. "Temporary Operational Failure" typically involves:

- Temporary road closure, hours to weeks;
- Reduced access to destinations served by the asset;
- Stranded vehicles;
- Possible temporary utility failures.



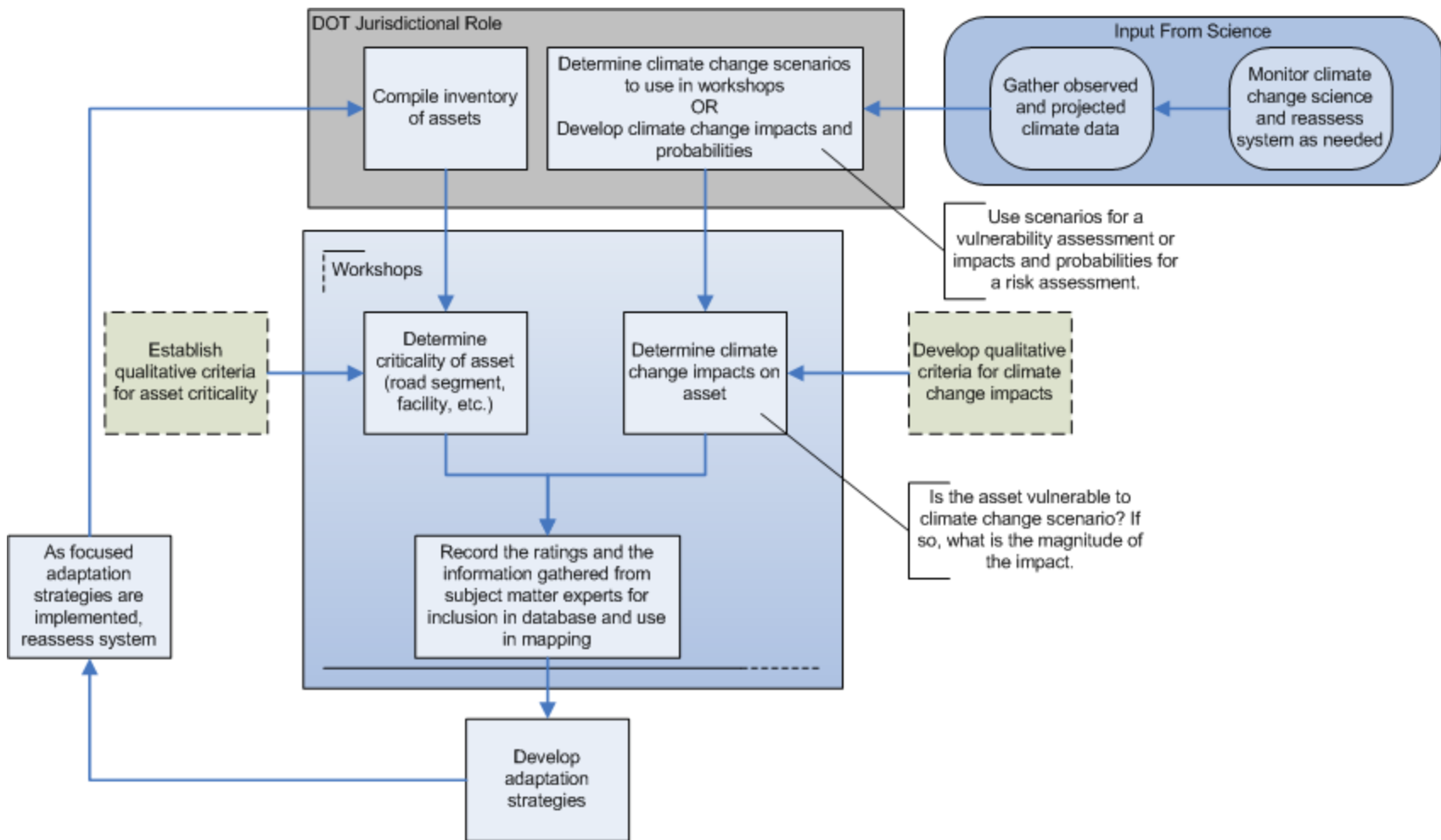
Reduced capacity

Results in little or negligible impact to asset. Asset would be available with full use within 10 days and has immediate limited use still available. "Reduced capacity" typically involves:

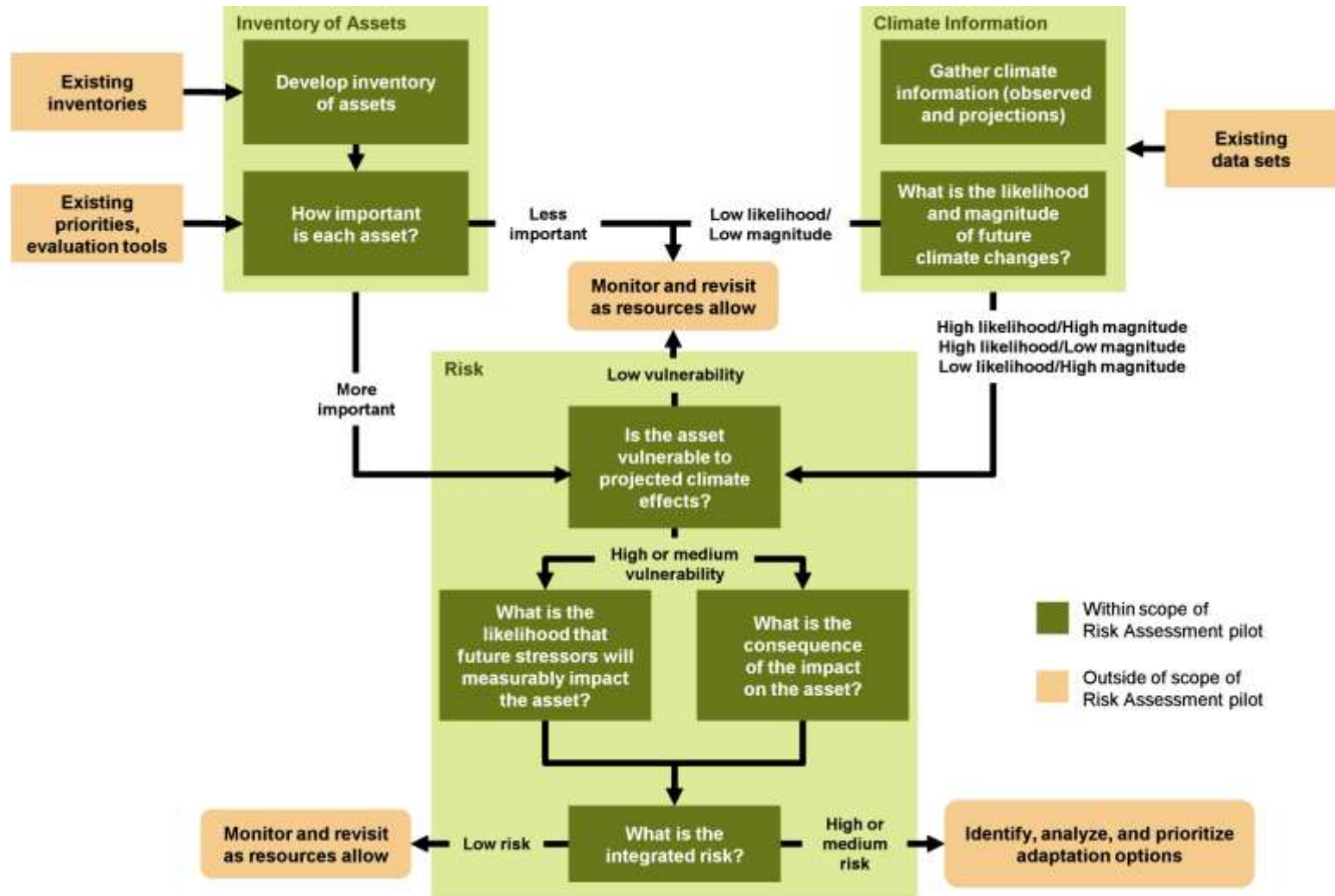
- Less convenient travel;
- Occasional/ brief lane closures, but roads remain open;
- A few vehicles may move to alternate routes;

Figure 2.1 Photo Depictions of Qualitatively Assessed Climate Change Consequences

Recommendations for the FHWA Model



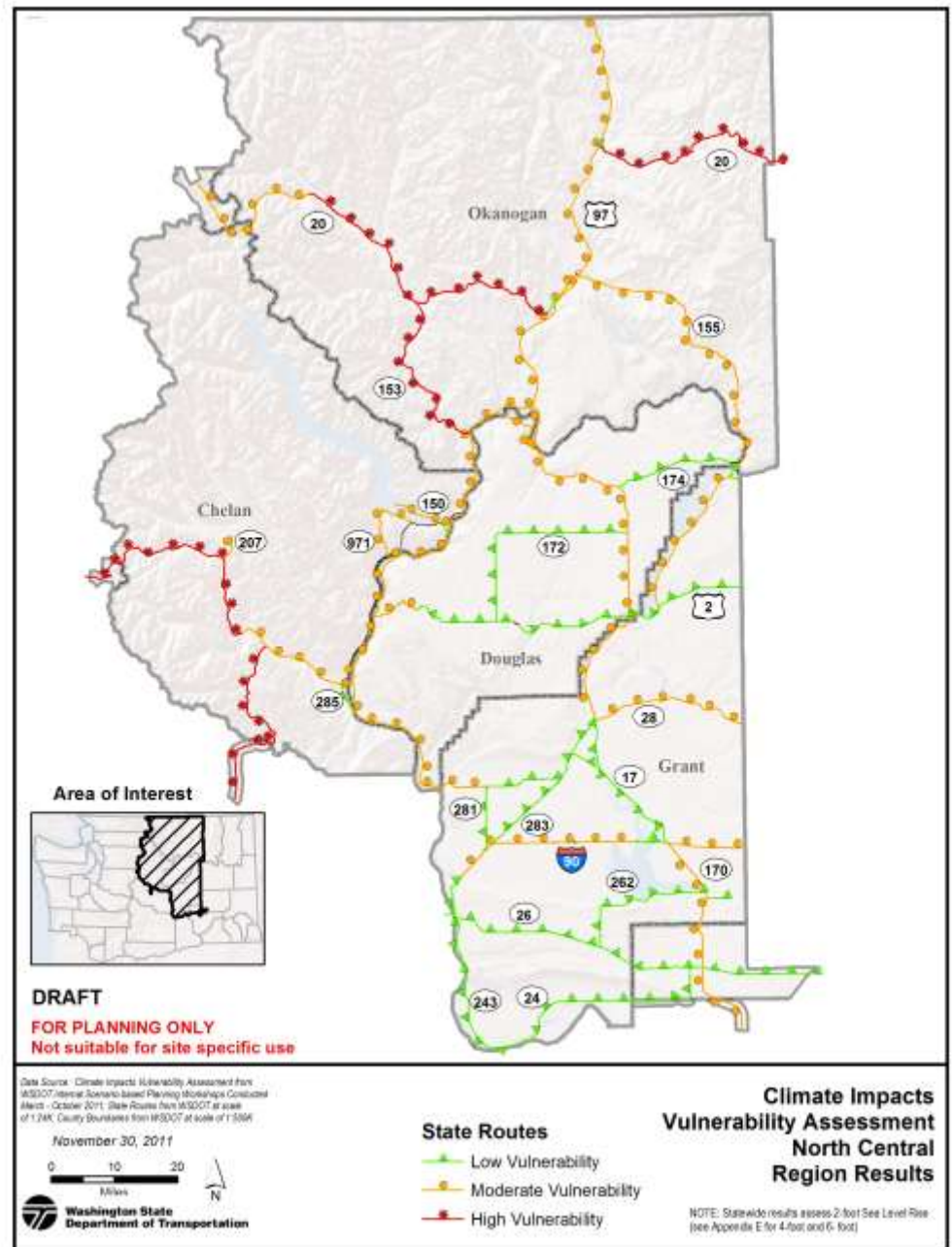
FHWA Risk Assessment Model



Sneak Preview of the Results!

Green shows the resilient assets.

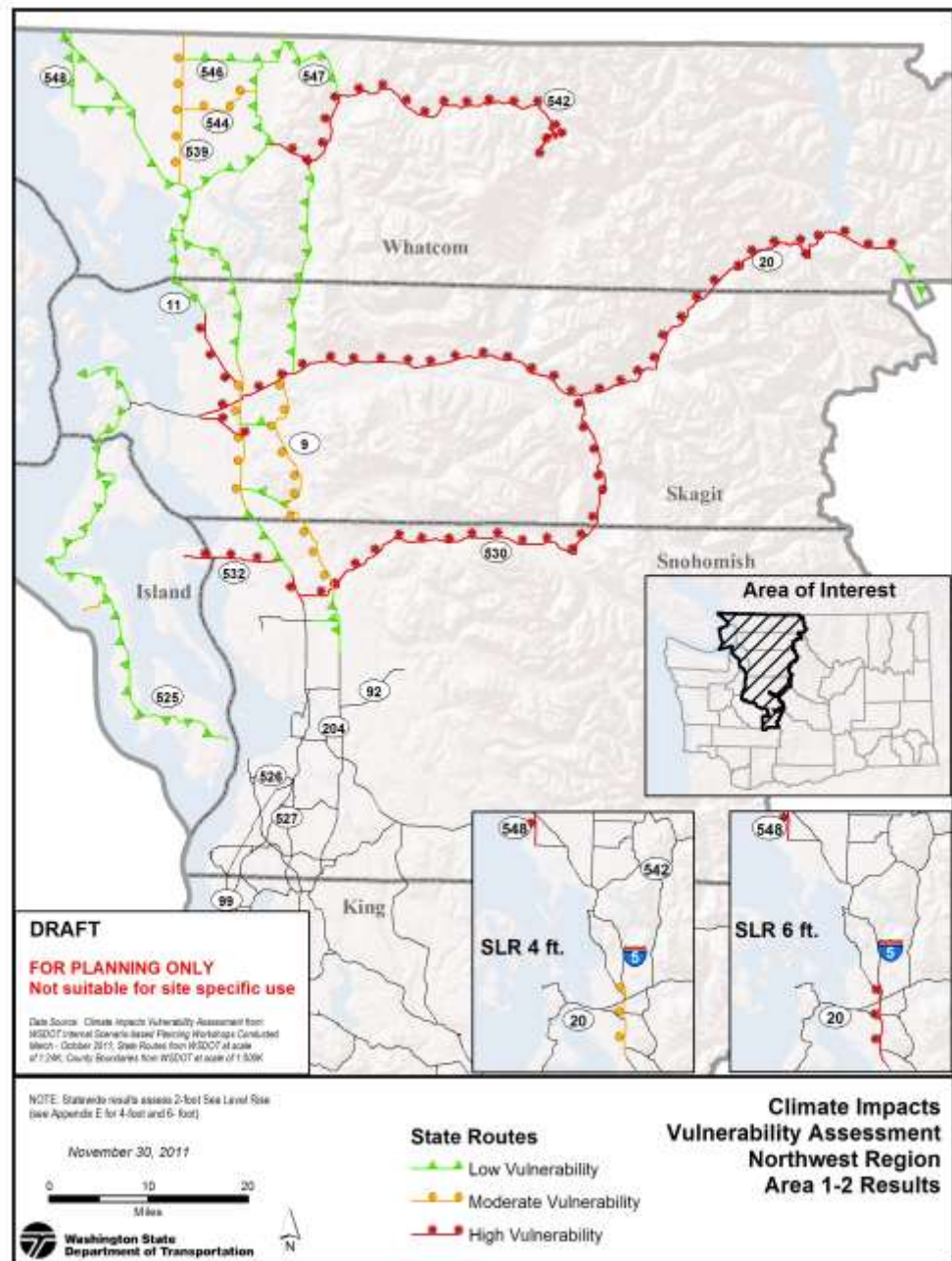
Red and gold are areas where extreme weather changes may cause problems.



Sneak Preview of the Results!

Green shows the resilient assets.

Red and gold are areas where extreme weather changes may cause problems.



Questions?