Prioritizing Climate Change Resilient Transportation Investments

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Oregon Department of Transportation

Challenges

FEWER RESOURCES

Increasing need
Decreasing funding

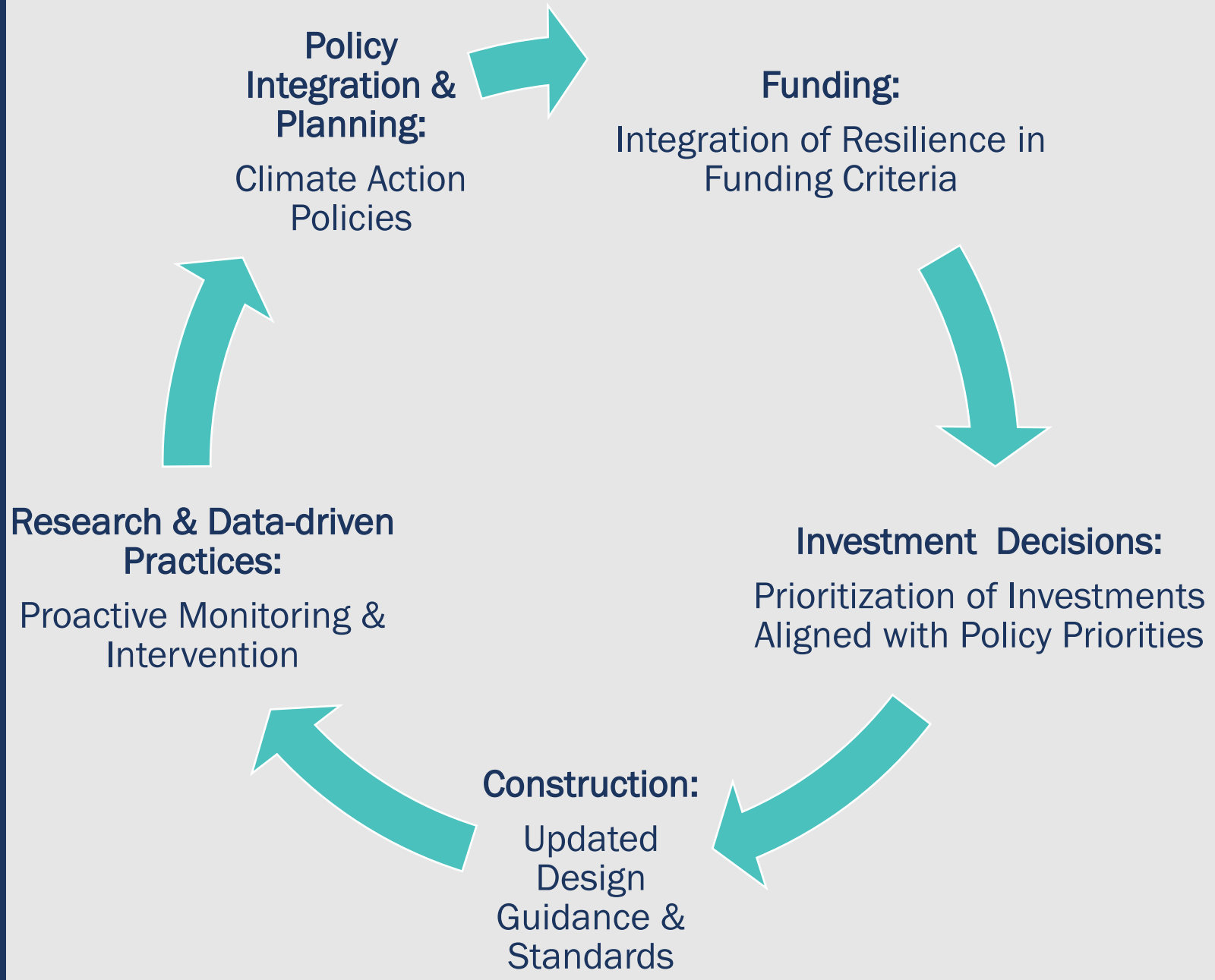
HIGHER COSTS

Increasing intensity & frequency of extreme weather & hazard impacts

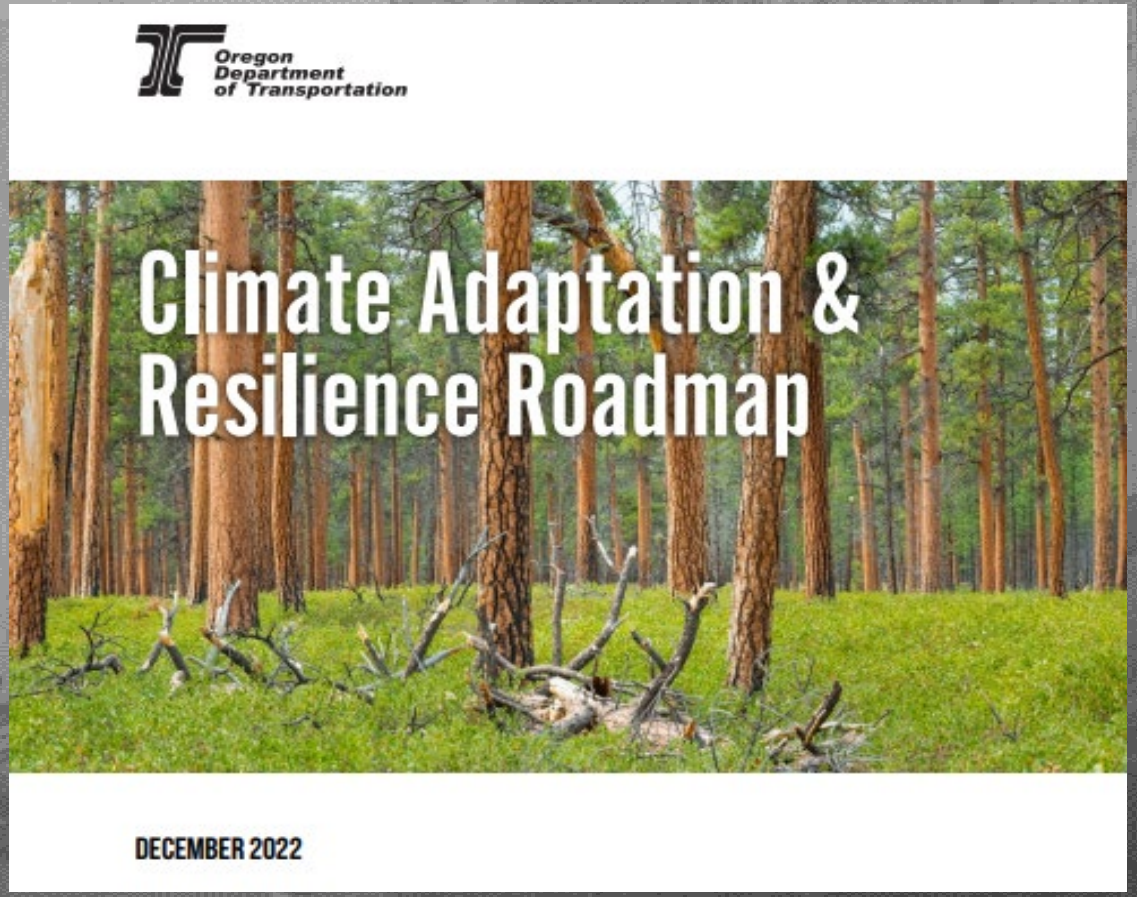
Climate Adaptation & Resilience Roadmap

- Assesses historic and future climate risks, economic impacts and social equity impacts
- Notes Increased Oregon Risk for:
  - Wildfires and very hot days
  - Flooding
  - Landslides
  - Coastal erosion
- Creates a risk map and investment priority routes
- Establishes policies, practices and research
- Satisfies FHWA requirement for PROTECT Resilience Improvement Plan

How are we operationalizing climate resilience considerations?

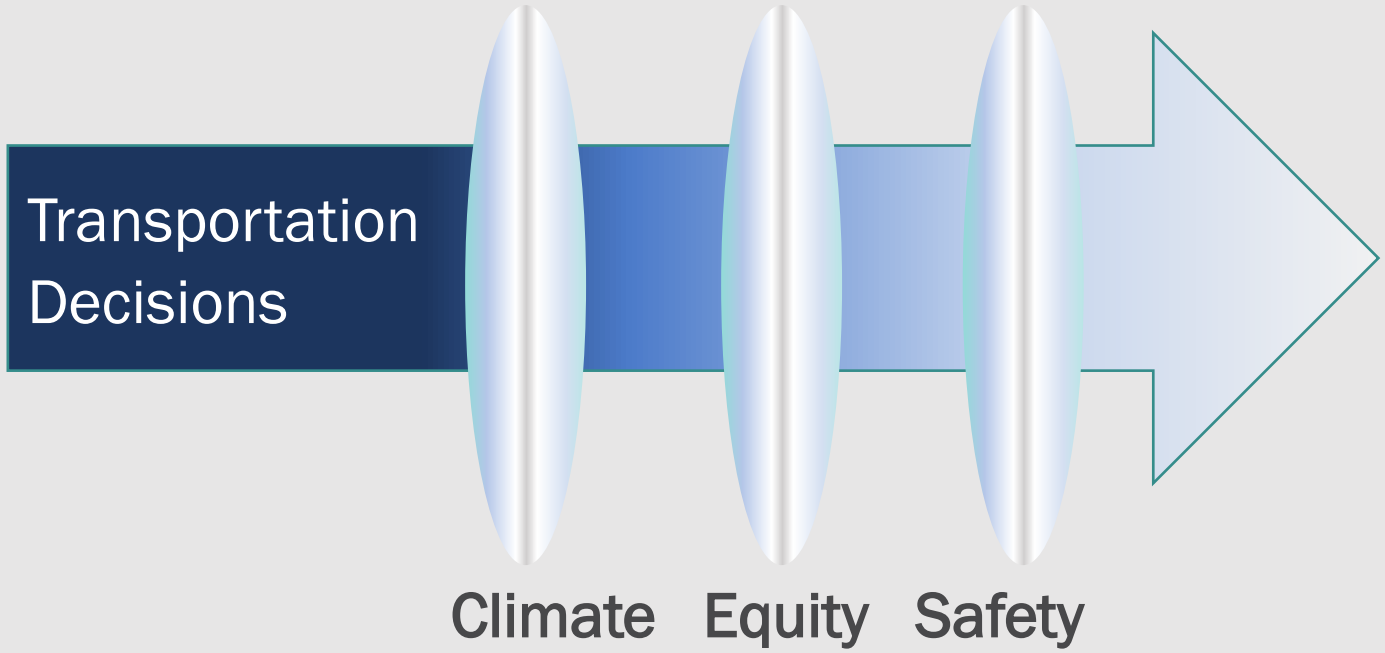


Institutionalizing Resilience as an Agency Priority



Oregon Transportation Plan Vision

"Oregon's transportation system supports all Oregonians by connecting people and goods to places in the most climate-friendly, equitable, and safe way."



Connection to Policy

- OTP (Climate, Equity, Safety):
  - **Strategy** SP.2.1.3: Implement a **funding allocation framework and project prioritization process** that evaluates the impact of investments on climate, equity, and safety and results in total spending that helps meet OTP performance targets.
  - **Objective** SP.6: **Increase the resiliency of the transportation system** to better withstand and recover from the anticipated impacts of climate change, extreme weather, seismic and other natural disasters, and adapt to changing needs.

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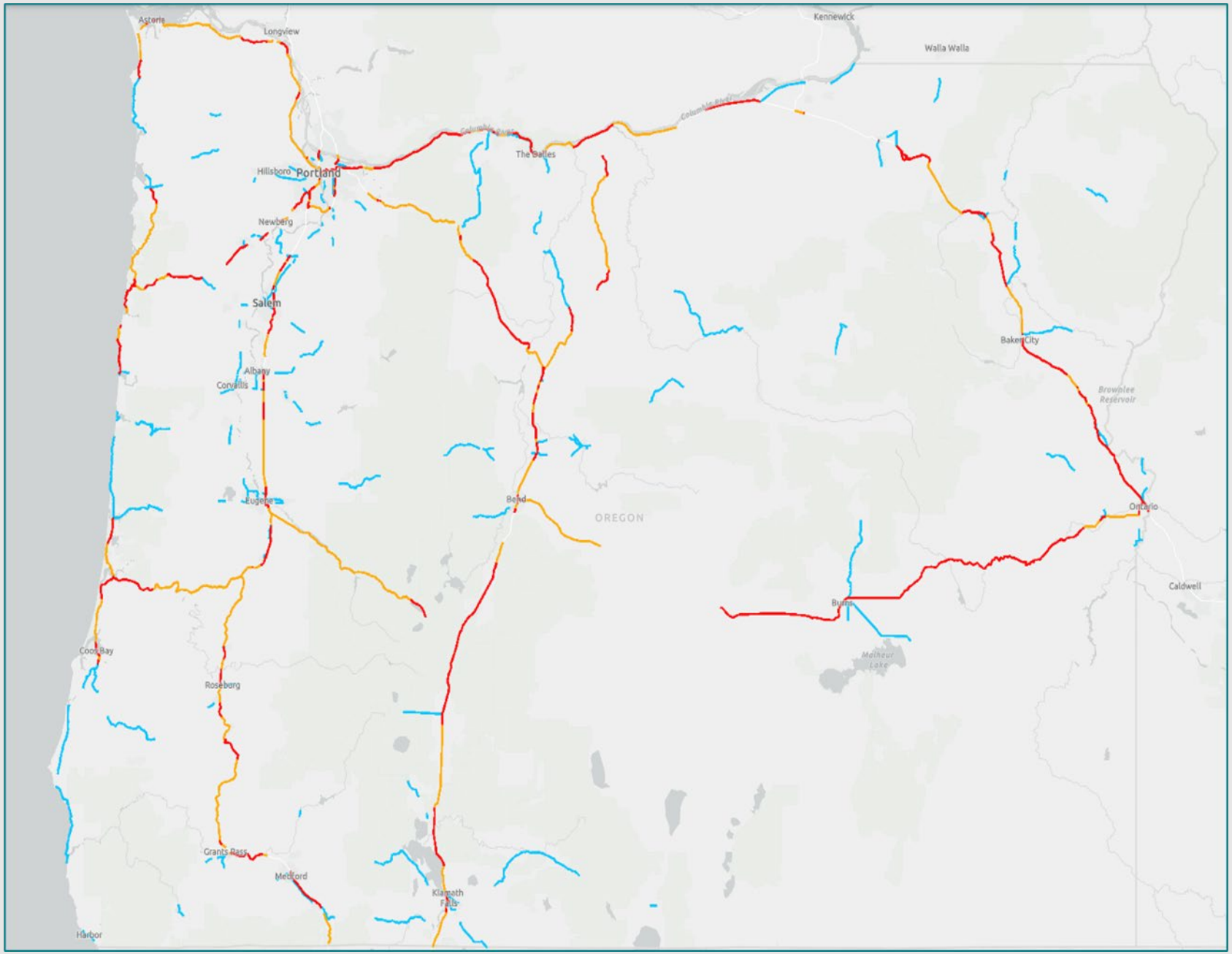
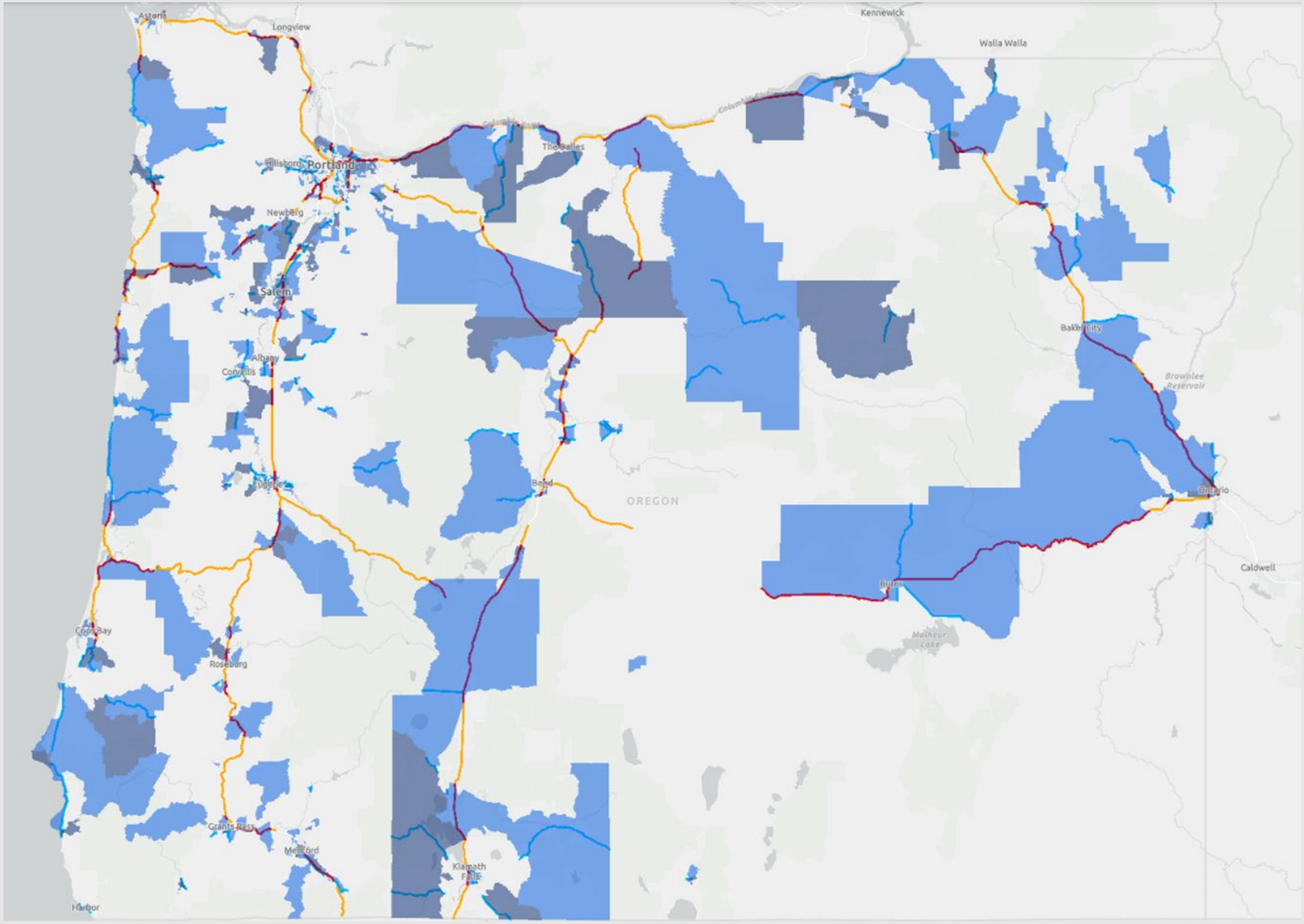
Data Solutions

Climate Hazard Risk Maps



Resilience Corridors



Catalog Layer Legend

Resilience Corridors

- Tier 1
- Tier 2
- Tier 3

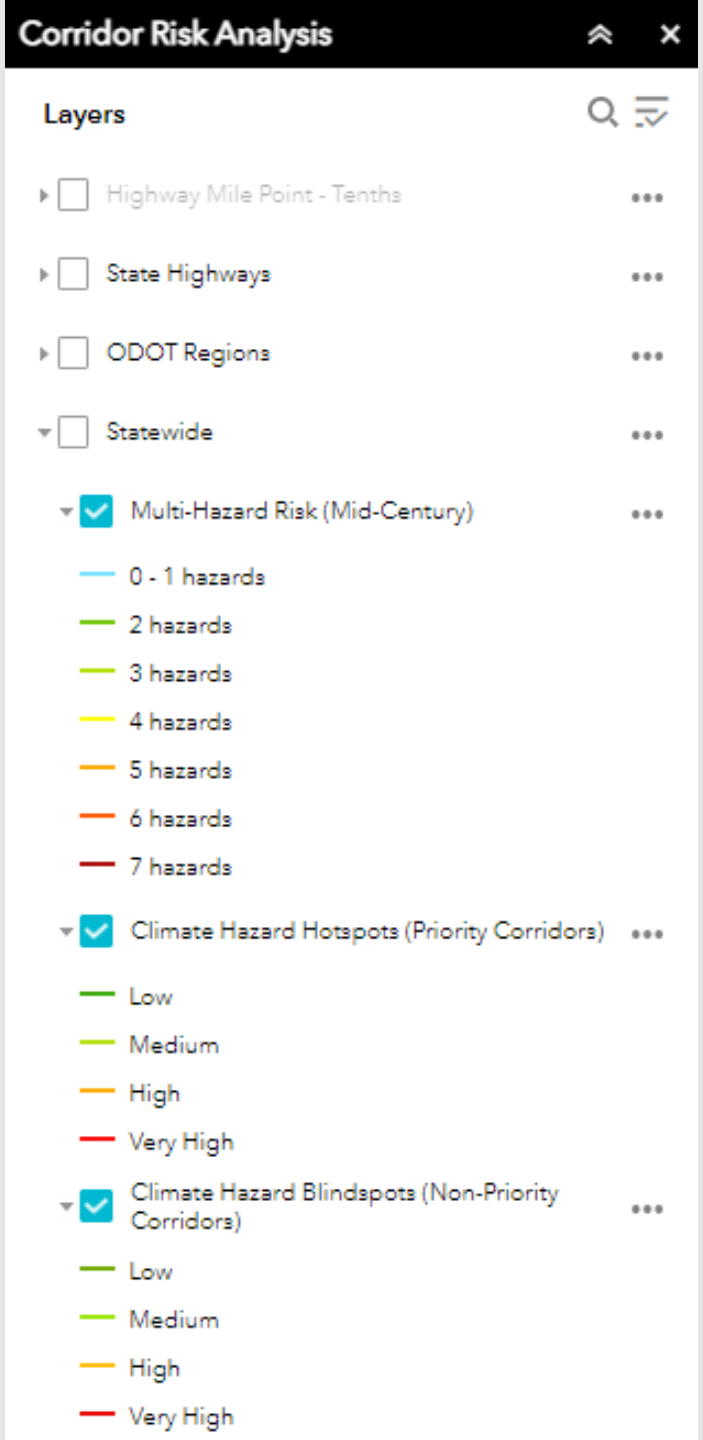
Map Data Overview

Historical event data
-floods
-fires
-winter events
-landslides

Infrastructure condition ratings, traffic flow data, ODOT statewide social equity data, and more…

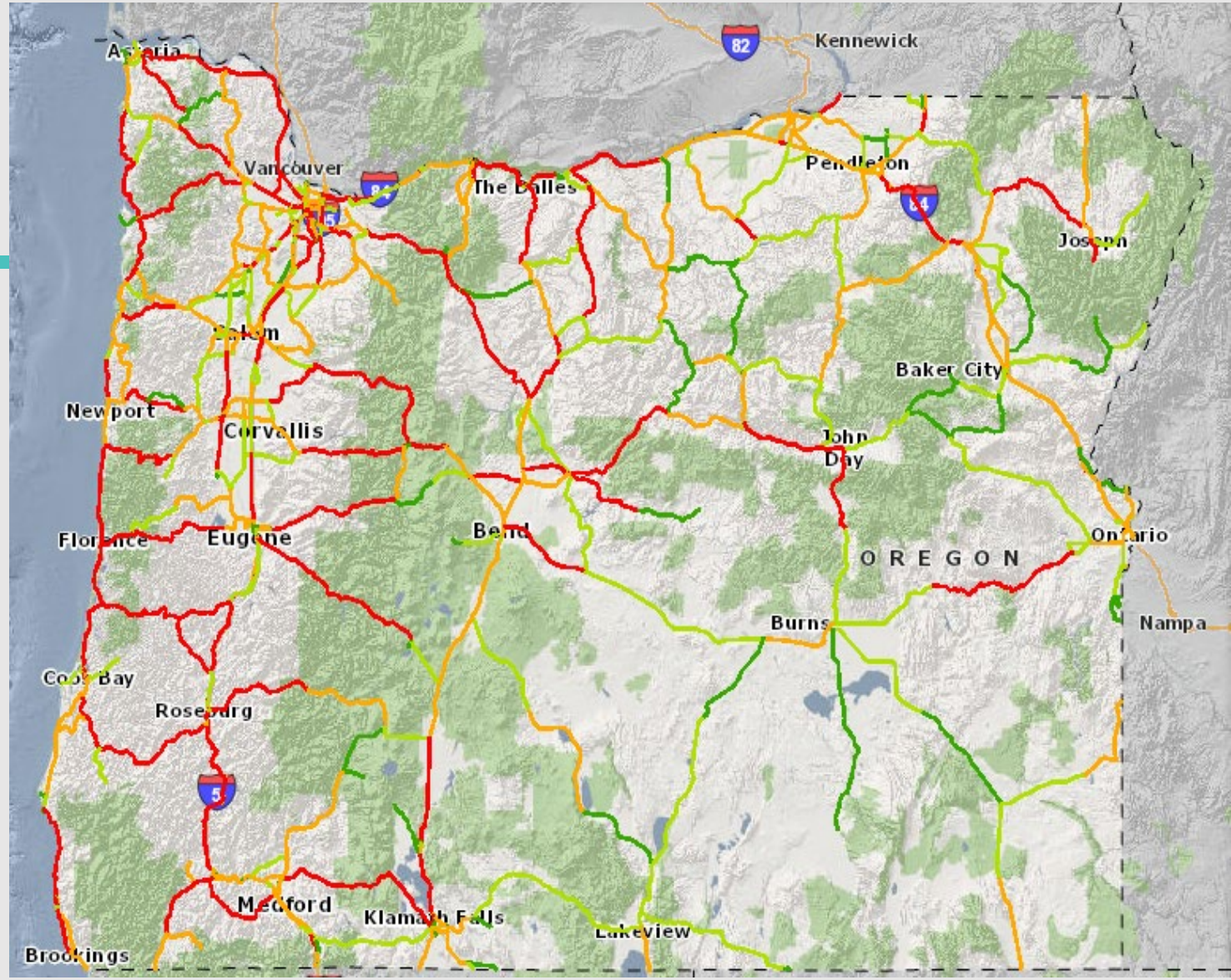
Historical climate data for nine hazards (30-year averages)

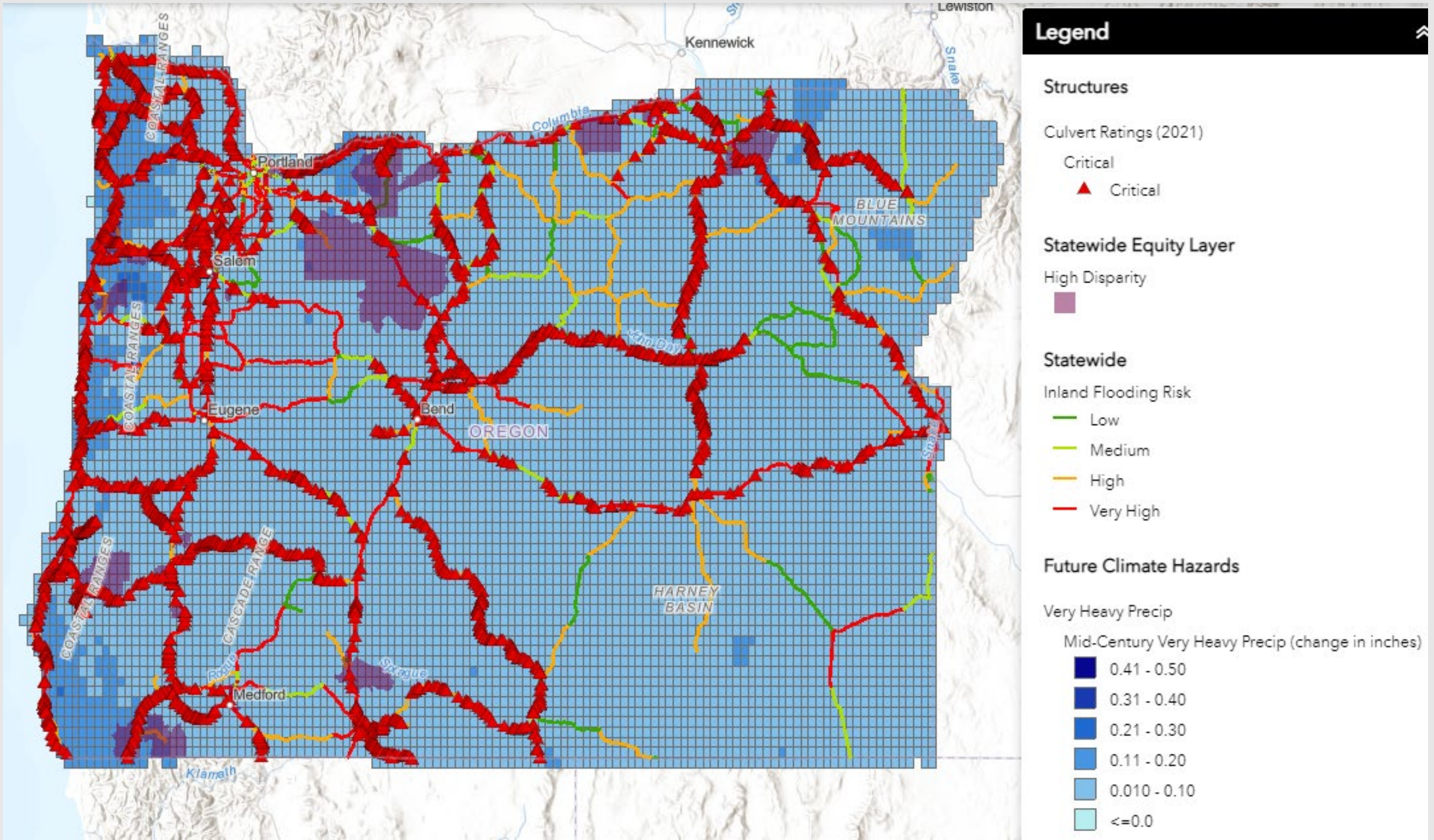
Future climate data for nine hazards (mid- and late-century projections)



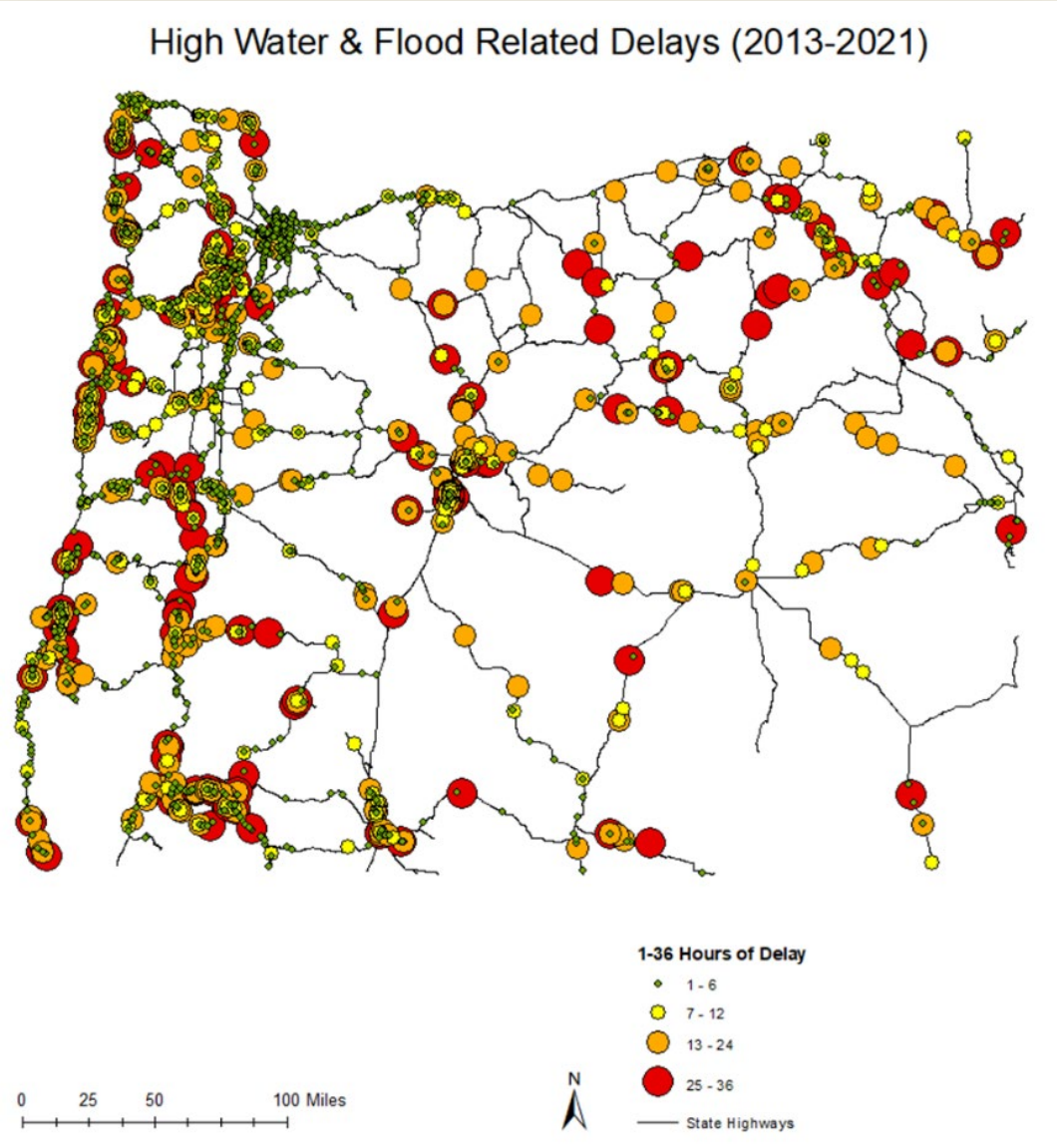
Risk Map Applications

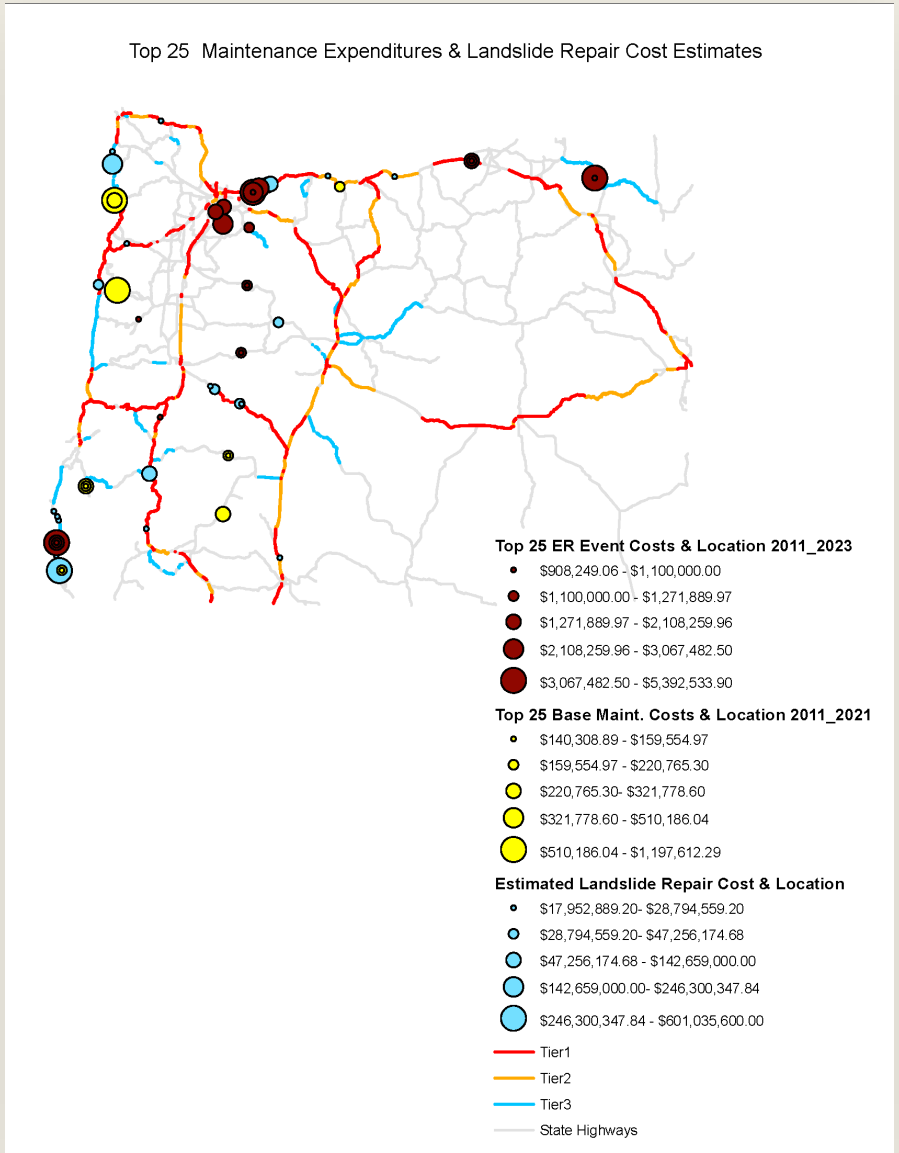
- Identify high risk corridors, prioritize projects
- Communicate eligibility for resilience-focused funding opportunities
- Display challenges, connections at a regional scale
- Collaborate with partners




Legend
Structures
Culvert Ratings (2021)
Critical
Critical
Statewide Equity Layer
High Disparity
Statewide
Inland Flooding Risk
Low
Medium
High
Very High
Future Climate Hazards
Very Heavy Precip
Mid-Century Very Heavy Precip (change in inches)
0.41 - 0.50
0.31 - 0.40
0.21 - 0.30
0.11 - 0.20
0.010 - 0.10
<=0.0
Kennewick
Lewiston
Portland
Salem
Eugene
Bend
Medford
OREGON
COASTAL RANGES
CASCADE RANGE
BLUE MOUNTAINS
HARNEY BASIN
Columbia
Snake
John Day
Klamath

Better Understanding Cost and Disruption Patterns





Climate Resilience Integration at the Program and Project-level

Baselining Resilience Investments

Identifying Potential Opportunities to Enhance Resilience

Prioritizing New Investments

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Targeting Funding for Resilience

EXISTING HIGHWAY & MAINTENANCE	PROTECT FORMULA	PROTECT DISCRETIONARY
Integrating climate considerations	Resilience Improvement Plan Projects & Planning Efforts	Competitive Grant Opportunities

How we get there…

Statewide Transportation Improvement Program (STIP) Integration

Examine proposed project types & locations

Identify climate hazard risk mitigation opportunities

Evaluate selected projects based on funding of applicable attributes

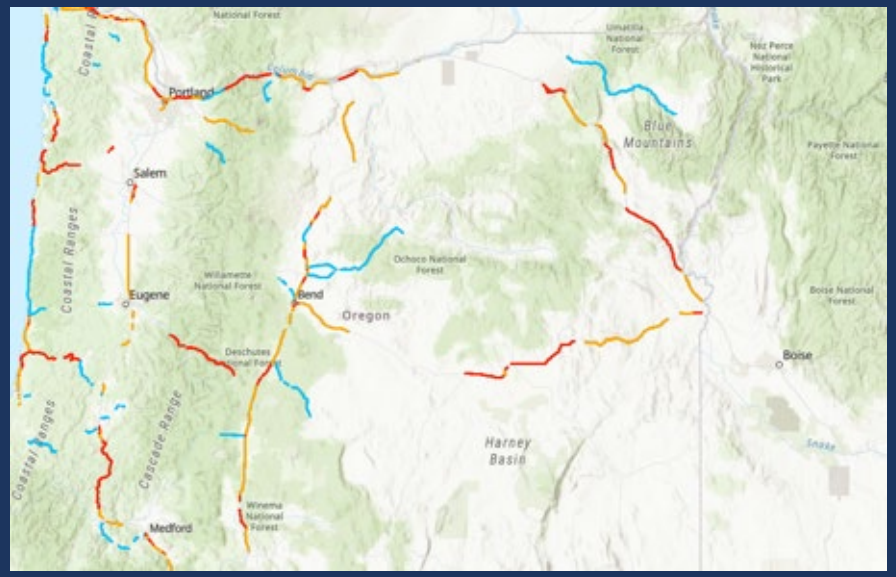
PROTECT Formula Program

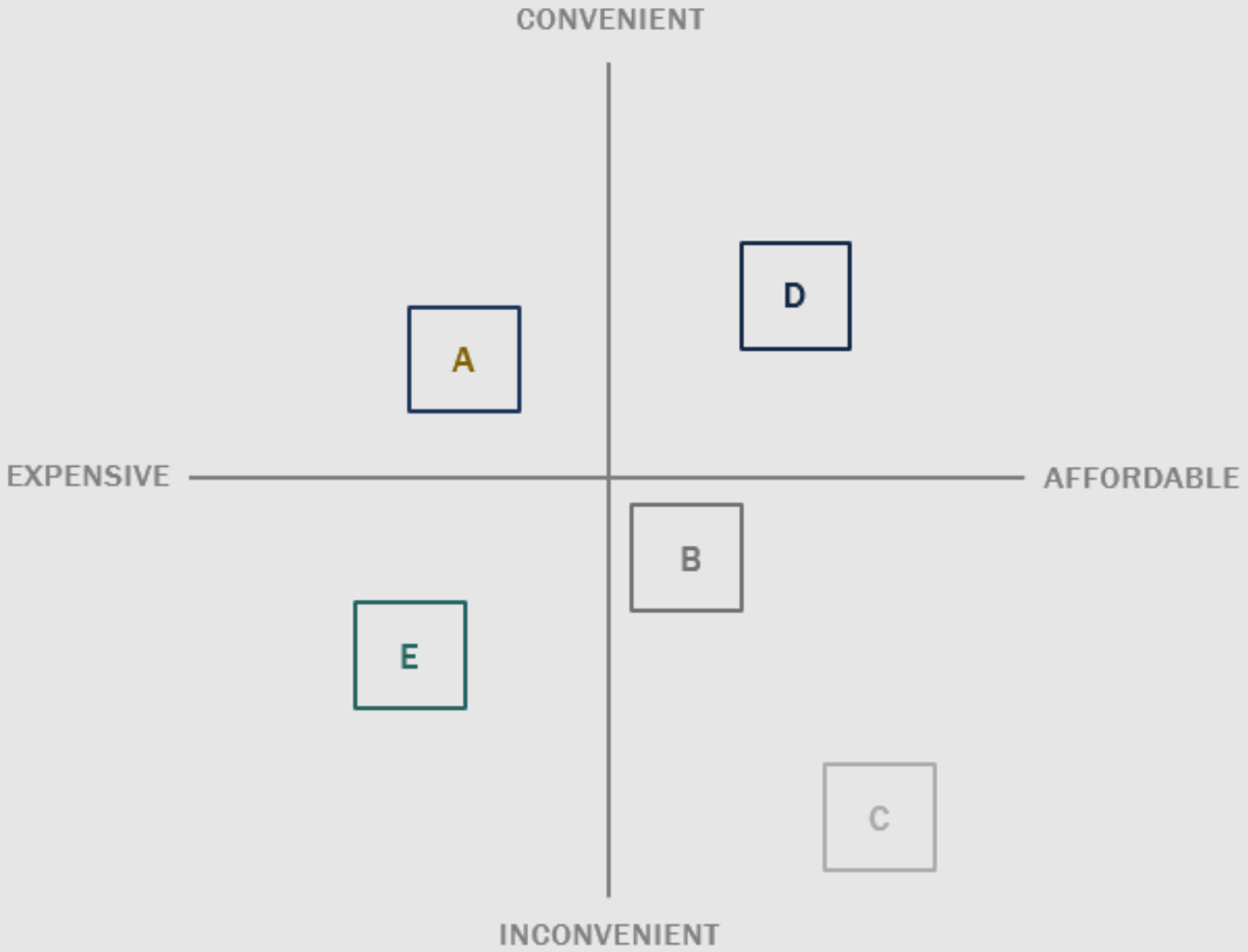
- Adds resiliency consideration to project scope and selection
- Used to fund Planning, Design, and Construction projects
- Considers:
  - Future climate hazards impacts and risk reduction
  - Lowering maintenance and operations costs over time
- Target prioritize Resilience Improvement Plan projects on Resilience Corridors

PROTECT Formula Planning Funds

Corridor Needs Analysis

Investment Strategy





Example Beverly Beach Project

Diversity of social and environmental challenges could model resilience planning approaches elsewhere

2023 Planning Grant Submission

Tribal Engagement

May 2023 workshop

July 2023 follow up

August 2023 pilot ideas in motion

Resilient Design

2021 NCHRP coastal bridge retrofit study

2022 Climate Office receives support for nature based coastal erosion mitigation pilot work

US 101 Coastal Erosion Risk Prioritization

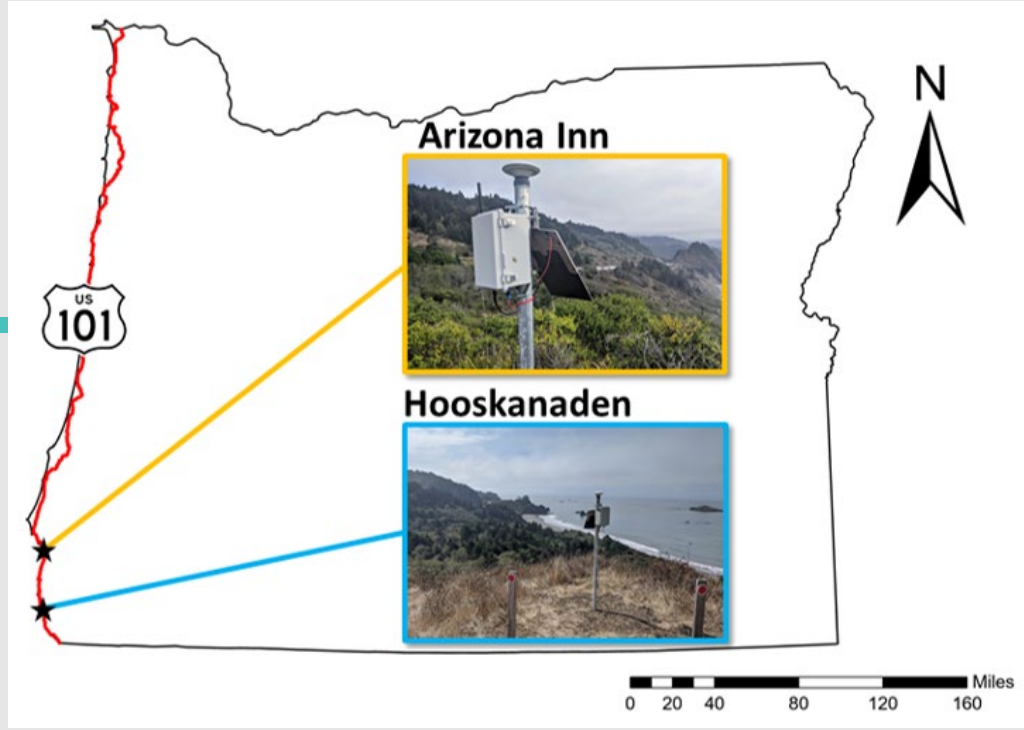
- Prioritize erosion hazards and hot spots
- Assess maintenance costs and economic costs of long-term closures
- Identify mitigation options and repair costs at highest risk sites
- Inform future projects and regulatory approvals for shoreline protection or other adaptation

Post Wildfire Debris Flow Monitoring and Mitigation

- Research to develop an Oregon-specific debris flow risk assessment and monitoring tool.
- Deploy debris flow monitoring sensors (warning system) capable of measuring flow rates, depth and volumes to be installed upstream of channels that cross ODOT roadways.
- Results to provide a framework for forecasting future wildfire scenarios and debris flow risks.

Advancing Research w/ Pilot Projects: Real-time Landslide Monitoring

- Using a rapidly deployable system to leverage real-time data & monitor slide movements
- Enables high temporal resolution for landslide velocities with increased spatial resolution
- High-resolution lidar and photogrammetric techniques (derived from ODOT Research Project SPR807) supplement change detection to better quantify the movement in both horizontal and vertical directions.



Questions?