Natural Hazards Risk Assessment Walk-through

April 17, 2025

Christine Shirley

What did we do in Phase 1?
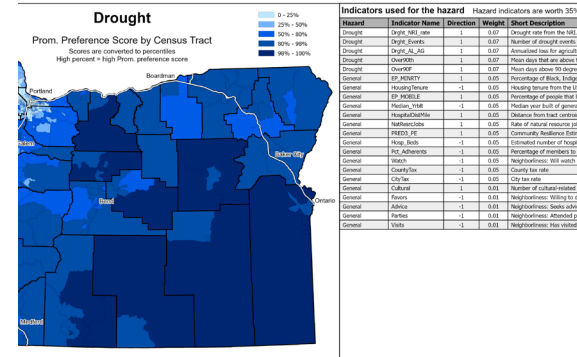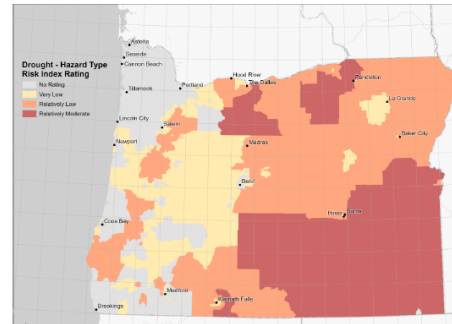
Focus on the Oregon Natural Hazards Mitigation Plan

- Identified most at-risk census tracts for 9 hazards.

- Displayed hazard and socio-economic drivers of risk for most at-risk census tracts.

- Identified state-owned facilities in those census tracts by hazard and for the 9 hazards combined.

- Counted critical facilities and lifelines in most at-risk census tracts.

Risk Assessment Assumptions

Hazard mitigation planning enhances community resilience —the ability to predict, respond, adapt, and recover from natural hazards.

Underserved and under-resourced communities suffer more, even if hazard events are less damaging than in better resourced communities.

Risk of harm is multi-faceted and includes not only damage to buildings, agricultural losses, death, and injuries but also potentially long-term disruption to lives, livelihoods, and financial stability.

Risk Assessment Goals

Enhance existing tools, such as the FEMA National Risk Index.

Employ a multi-criteria decision support method that reflects multiple types of vulnerability to natural hazard events and can reflect local conditions.

Maintain transparency with respect to model inputs.

Provides actionable information.

Indicators

88 indicators used in the model
Examples

Hazard Exposure

# of events

Expected annual loss rate (NRI)

% buildings

% critical facilities

 # historic structures

Road miles

% bridges

Socio-economic

% mobile homes

% BIPOC

% homeowners

Median year built

Distance to health care

% natural resource jobs

Community Resilience Estimate

Community cohesion

# of cultural institutions

% participation I religious organizations

City/county tax rates

Census tracts ranked from most to least vulnerable

All hazards with socio-economic factors:
Bright Yellow – top 10% of census tracts using OR model
Light yellow – next 10% top ranked census tracts
Red – very high rating from NRI
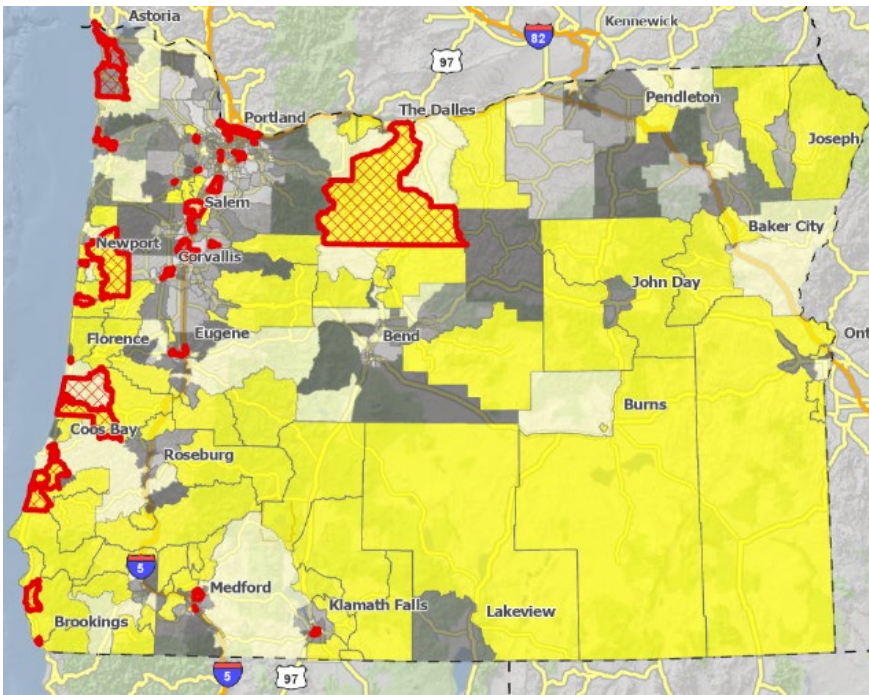
All hazards <u>without</u> socio-economic factors:
Bright Yellow – top 10% most vulnerable census tracts using OR model
Light yellow – next 10% most vulnerable census tracts
Red – very high rating from NRI
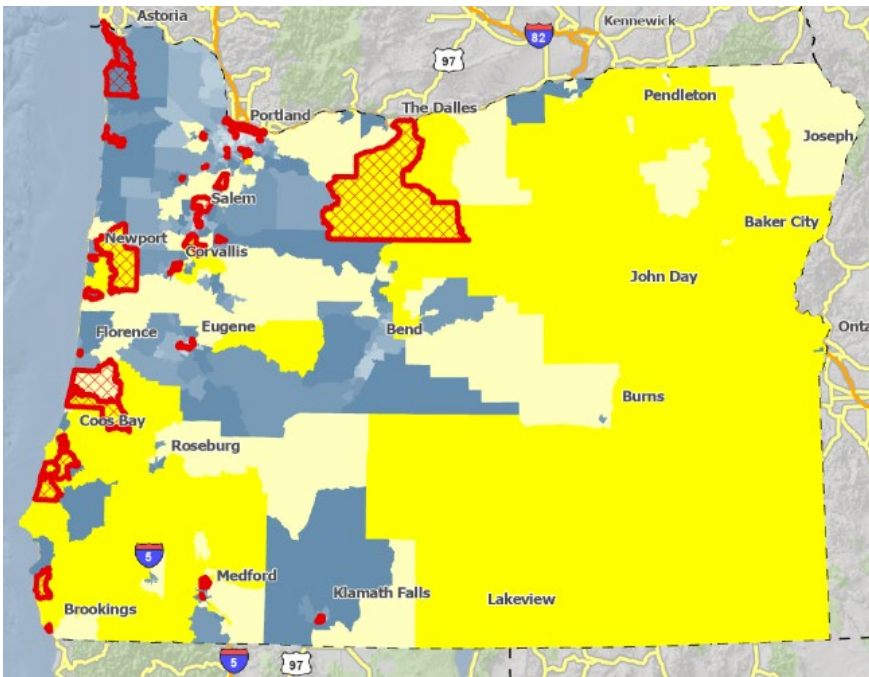
In both cases the NRI is picking up $ losses in developed areas when compared to OR model.

Selected top 10 most vulnerable census tracts to identify specific, actionable information

All Hazards Rank 7 41031960100 - Jefferson	Critical or Essential State-owned Facility?		
Building Name	No	Yes	**Grand Total**
Deer Ridge Correctional Facility		249,747,780	249,747,780
Juniper Butte Scale House	184,422		184,422
Stephenson Mountain M/W		54,188	54,188
Unidentified assets	95,586		95,586
Total	280,008	249,802,238	250,082,246

Specific , actionable information

Table 9.1.4-1: Counts of community lifelines in top ranked all-hazards mitigation areas

| All Hazard Rank | Census Tract | County | Food, Water, Shelter | | | Energy | Communications |
			Wastewater Treatment Plants	Stormwater Control Measures	Stormwater Outfalls	Power Plants	Public Safety Answering Points
1	41025960200	Harney	0	4	0	1	0
2	41015950100	Curry	1	0	0	0	0
3	41015950201	Curry	0	0	0	0	1
4	41029002800	Jackson	1	2	0	0	0
5	41019200000	Douglas	2	2	0	1	0
6	41065970800	Wasco	2	8	0	1	0
7	41031960100	Jefferson	0	2	0	1	0
8	41023960100	Grant	1	0	0	1	0
9	41023960201	Grant	2	0	0	0	0
10	41045970900	Malheur	0	0	0	6	0

Flood

Census tracts displayed limited to those ranked in top 10

Top 10 Prom. Preference Score by Top Census Tract

Scores are converted to percentiles
High percent = high Prom. preference score

Very Low (0 - 25%)
Low (25% - 50%)
Moderate (50% - 80%)
High (80% - 98%)
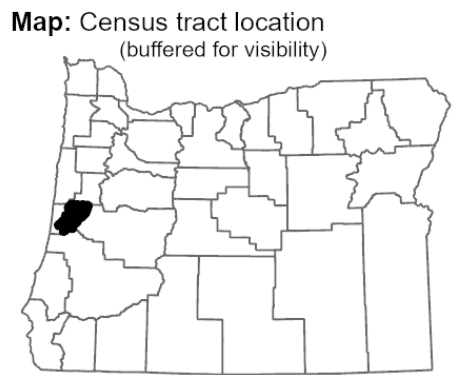Very High (98% - 100%)

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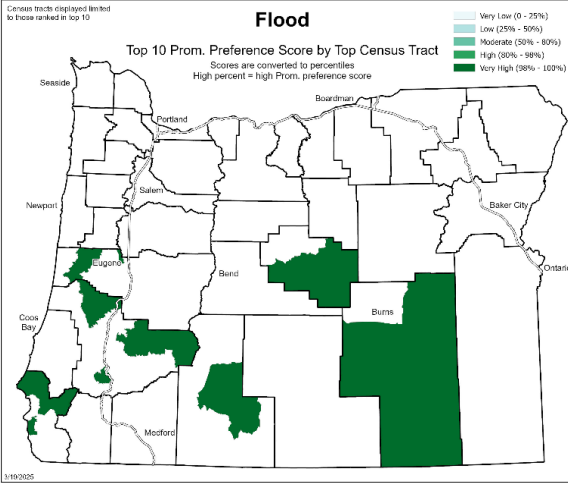
Indicators used for the hazard — Hazard indicators are worth 35% of the total weight.

Hazard	Indicator Name	Direction	Weight	Short Description
Flood	Bridge_Scour	1	0.032	Number of bridges that are at risk from scour during a 100-year flood.
Flood	CRS_Rate	1	0.032	Community Rating System (NFIP) score for communities.
Flood	FL_pct_bld	1	0.032	Percentage of SBFO buildings exposed to flooding.
Flood	FL_pct_CF	1	0.032	Percentage of critical facilities buildings exposed to flooding.
Flood	ImpervSurf_Pct	1	0.032	Percentage of impervious surface.
Flood	Hwy_FL_pct	1	0.032	Major roadways number of miles that are exposed to flood hazard.
Flood	Bridge_Scour_pct	1	0.032	Percentage of bridges that are scoured from a 100 year flood.
Flood	Hist_FL_ct	1	0.032	Percentage of historic buildings exposed to flooding.
Flood	FIRM_Diff	1	0.032	Number of years difference between median year built and FIRM date.
Flood	FL_Haz_Area	1	0.032	Area of tract in 100-year flood hazard.
Flood	RepeatLoss	1	0.032	Repetitive loss structures.
General	EP_MINRTY	1	0.046	Percentage of Black, Indigenous, and People of Color (2020 Census).
General	HousingTenure	-1	0.046	Housing tenure from the US Census.
General	EP_MOBILE	1	0.046	Percentage of people that live in mobile homes.
General	Median_Yrblt	-1	0.046	Median year built of general building stock based on HAZUS default.
General	HospitalDistMile	1	0.046	Distance from tract centroid to nearest hospital.
General	NatResrcJobs	1	0.046	Rate of natural resource jobs.
General	PRED3_PE	1	0.046	Community Resilience Estimate.
General	Hosp_Beds	-1	0.046	Estimated number of hospital beds based on square footage.
General	Pct_Adherents	-1	0.046	Percentage of members to a religious group.
General	Mitigation	-1	0.046	Number of migration projects (grouped by zip code and evenly distributed to overlaying tracts).
General	Watch	-1	0.046	Neighborliness: Will watch neighbor's house.
General	CountyTax	-1	0.046	County tax rate.
General	CityTax	-1	0.046	City tax rate.
General	Cultural	1	0.009	Number of cultural-related buildings.
General	Favors	-1	0.009	Neighborliness: Willing to do favors for neighbor.
General	Advice	-1	0.009	Neighborliness: Seeks advice from neighbor.
General	Parties	-1	0.009	Neighborliness: Attended parties that occur in neighborhood.
General	Visits	-1	0.009	Neighborliness: Has visited neighbor's house.

Flood - Rank 1

Census Tract: 41039000500, Lane County

Plot: Z-Scores by indicator

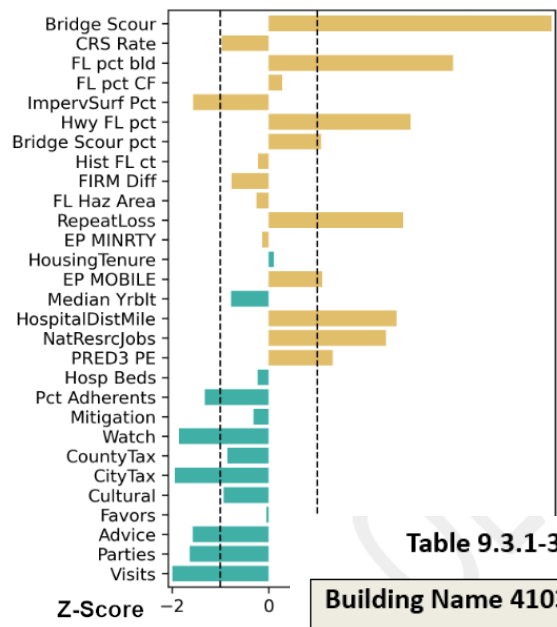Blue-green = Contributes to resiliency
Gold = Contributes to vulnerability

Map: Census tract location
(buffered for visibility)

3/19/2025

For each of the 9 hazards evaluated we show the location of the top 10 most vulnerable census tracts, the indicator scores, and a list of critical facilities located in the hazard zone.

We also list state-owned buildings where we have information.

Table 9.3.1-3: Critical facilities identified in 1% annual chance flood zone

Building Name 41039000500	Value ($)	Flood Losses ($)
Mapleton Fire Department	143,695	15,530
Mapleton School	70,416	6,843
Swisshome Deadwood RFPD Station 2	82,008	

No state-owned buildings located in 1% annual chance flood zone.

Access to underlying data

Indicator field names

Risk ranking by hazard

Flood - Rank 2
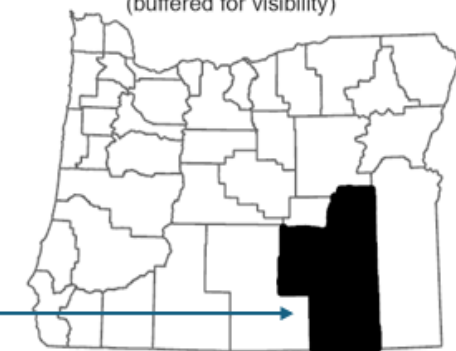
Census Tract: 41025960200, Harney County

Plot: Z-Scores by indicator

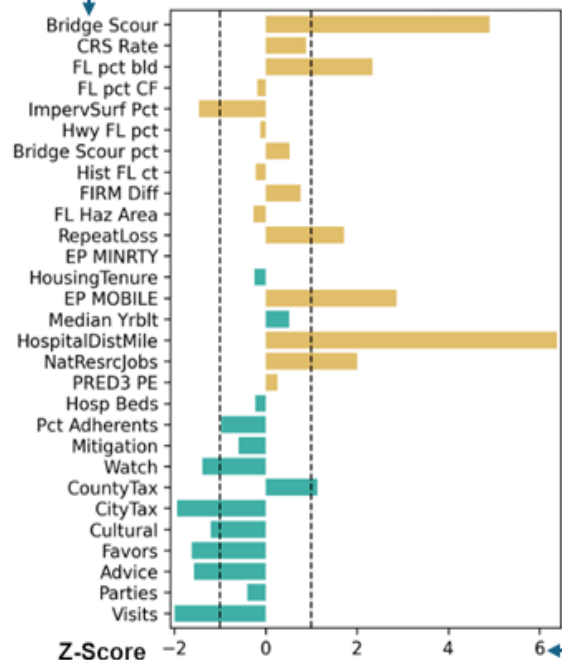Blue-green = Contributes to resiliency
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Map: Census tract location
(buffered for visibility)

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Census tract location

Gold bars point left = less vulnerable

Gold bars point right = more vulnerable
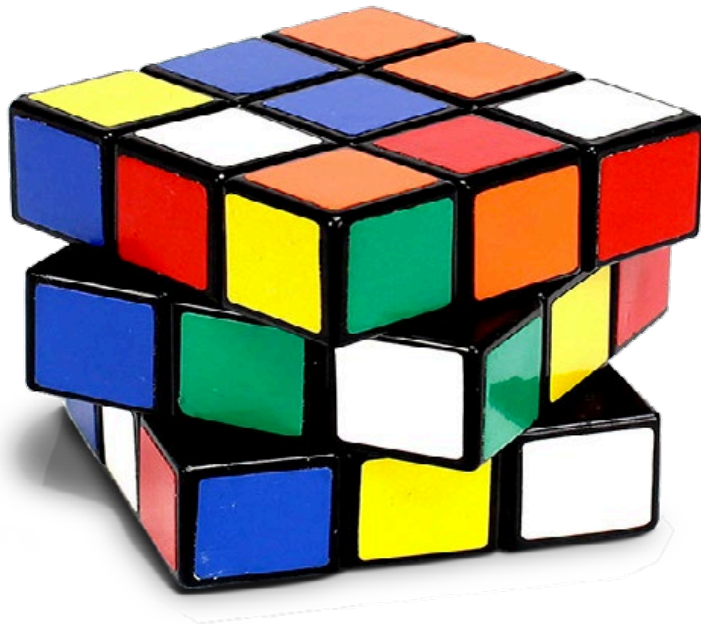
Blue-green bars point left = more vulnerable

Blue-green bars point right = less vulnerable

Z-scores by indicator: z-scores tell us how many standard deviations away from the mean a value is. Values over 1 or below -1 are unusual and may be drivers of vulnerability.

Risk Assessment Next Steps

Phase 2

1. Refine risk assessment model

2. Design and publish an online tool that allows public access to data underlying risk assessment and provides analytic tools

Risk Assessment Workgroup Upcoming meeting:

1:30-3pm, Tuesday April 29, 2025

Look for the invitation!

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DLCD

Department of
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Thank you