Chapter 9 Appendices

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9.1 Risk Assessment Appendix

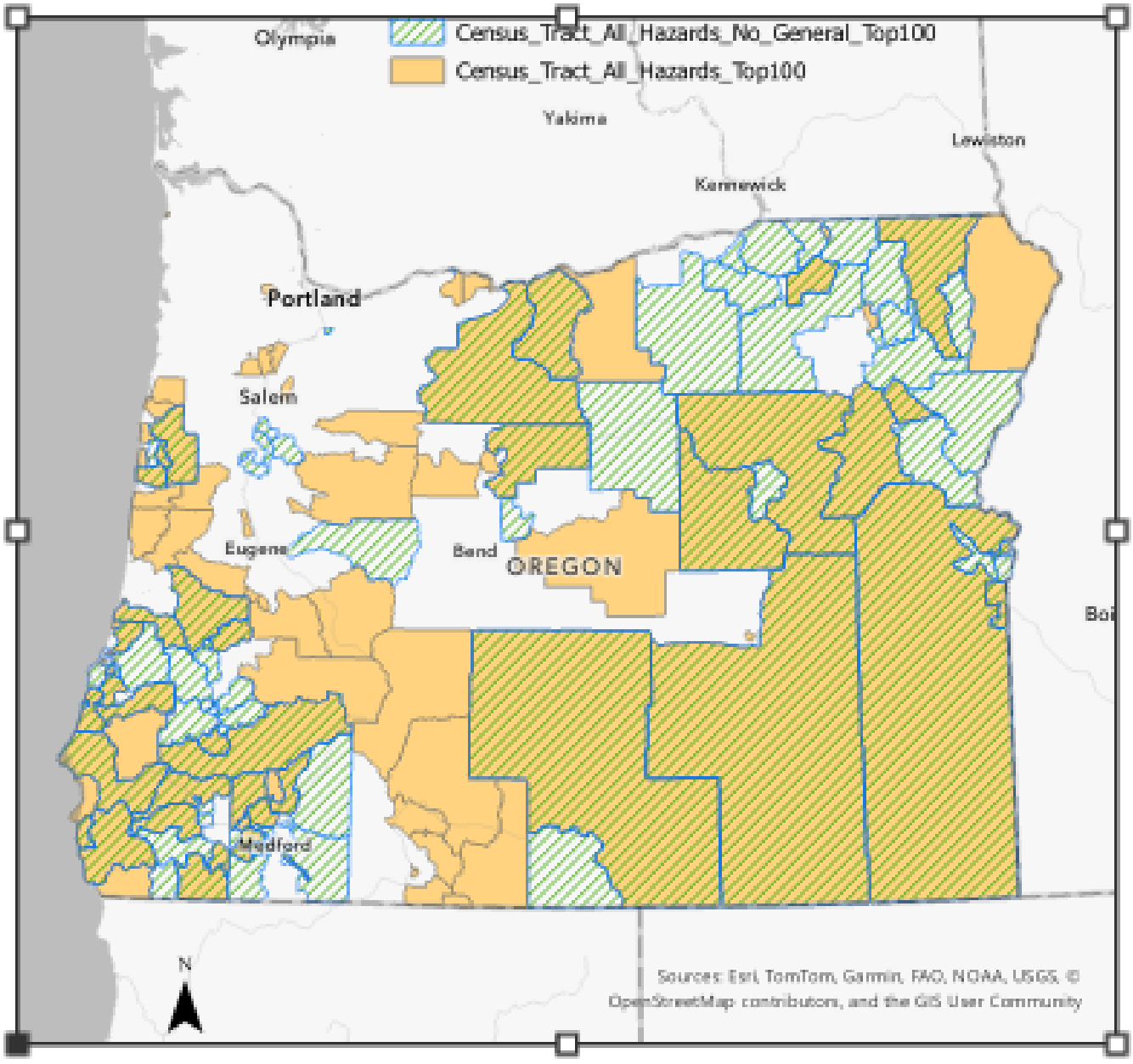
9.1.1 All Hazards

Many cities and census tracts in the state are exposed to multiple hazards. This section shows places exposed to multiple hazards by combining results from individual hazards analyses. Some of these multiple

hazards may occur at the same time or following an initial event. While the state does recognize that harms from multiple hazards can occur and can have synergistic effects, the authors of this assessment were not able to evaluate cascading effects of multiple hazards at this time.

Figure 9.1.1-1 shows modeling results when all evaluated hazards are combined. The polygons represent census tracts that ranked in the top 100 when all evaluated hazards are considered together. The pink census tracts are those that ranked in the top 100 when all indicators are considered. The cross-hatched census tracts are those where only the hazard-specific indicators are considered.

Figure 9.1.1-1: Top 100 Census Tracts, All-hazards with Social Factors and without Social Factors.



Note: Areas that are solid orange in color reflect top 100 all-hazards ranking with socio-economic considerations included. When the solid orange color is overlaid with hatching, the census tract is in the top 100 both with and without socio-economic factors considered. Hatching alone indicates an area in the top 100 with no socio-economic factors included.

Table 9.1.1-1: Top 10 All-hazards Census Tract Rank with Social Factors (Orange polygons from figure above)

All Hazards Rank	Census Tract	County
1	41025960200	Harney
2	41015950100	Curry
3	41015950201	Curry
4	41029002800	Jackson
5	41019200000	Douglas
6	41065970800	Wasco
7	41031960100	Jefferson
8	41023960100	Grant
9	41023960201	Grant
10	41045970900	Malheur

Modeling as of 3/19/2025

Table 9.1.1-2: Top 10 All-hazards Census Tract Rank with No Social Factors (hazards only) (cross hatched polygons from figure above)

All Hazards Rank	Census Tract	County
1	41011000701	Coos
2	41045970600	Malheur
3	41011001002	Coos
4	41033361601	Josephine
5	41045970900	Malheur
6	41011001102	Coos
7	41019190000	Douglas
8	41065970800	Wasco

All Hazards Rank	Census Tract	County
9	41059950400	Umatilla
10	41023960202	Grant

Model results as of 3/19/2025

9.1.2 State-owned or Leased Buildings

Analysis of state-owned or leased facilities expands on what was accomplished for the 2020 plan. According to the Oregon Department of Administrative Services (DAS), the State of Oregon owns or leases buildings having a total value of nearly $7.3 billion in 2019. Because of this investment it is important the State assess the vulnerability of these structures to Oregon's natural hazards. Data to support this analysis were available for the following hazards: coastal erosion, earthquake, flood, landslide, tsunami, volcano, and wildfire. The Oregon Department of Geology and Mineral Industries (DOGAMI) assembled the best-available statewide natural hazard data and assessed which state-owned/leased buildings are exposed to each hazard. DOGAMI also assessed the vulnerability of local critical facilities to natural hazards throughout the state.

The data for this analysis was furnished by DAS. As a part of the quality control review, DOGAMI removed nearly 400 building points from the original 2019 DAS dataset to build the dataset used in the vulnerability assessment. Many of the buildings were removed based on attributes in the GIS data that indicated that the points represented non-structures (e.g., property grounds). The final data set contained 5,350 state facilities.

Notably, the DAS building data does not identify "critical/essential" facilities. Within the state facilities dataset DOGAMI created a subcategory of critical facilities. DOGAMI and the Department of Land Conservation and Development (DLCD) defined critical facilities as buildings that function as airports, communications, emergency operations, fire stations, hospitals or health clinics, military facilities, police stations, schools, detention centers, or miscellaneous facilities (e.g., ODOT Maintenance Facility) that would be needed during or immediately after a natural disaster. DOGAMI identified 1,674 state critical facilities. Figure xx shows the distribution and dollar value (potential loss) of these 5,350 state-owned/leased facilities within Oregon NHMP Natural Hazard Regions.

DLCD extended analysis conducted for the 2020 plan by overlaying buildings that DOGAMI identified as being located in hazard zones onto the "all-hazards" census tract layer to assign one PROMETHEE ranking score to each exposed building. In most cases a building was not directly exposed to every hazard. Nonetheless, the ranking alerts hazard mitigation planners to buildings that that for a variety of reasons may pose challenges during and after an event. Critical facilities located in high-risk census tracts should be managed to maintain a high degree of functionality.

Table 9.1.2-1: State-owned building names and values by all-hazards rank with social factors evaluated – Top 10 all-hazards census tracts only

All Hazards Rank 1 40125960200 - Harney	Critical or Essential State-owned Facility?

Building Name	No	Yes	Grand Total
Alkali Lake MS Deicer Building		$640,565	$640,565
Barn - Pete French Round Barn	$509,322		$509,322
Buchanan Springs RA Shelter	$106,513		$106,513
Hotel (Concession)	$865,639		$865,639
Sagehen SRA Restroom Building	$1,322,406		$1,322,406
Site Systems - King Mountain M/W Grounds		$152,512	$152,512
Site Systems - Steens Radio Operating Exp Grounds		$107,781	$107,781
Stinking Water Scoop Shed	$82,741		$82,741
Stinking Water Mountain Sand Shed	$431,817		$431,817
Total	$3,318,438	$900,858	$4,219,296

All Hazards Rank 2 41015950100 - Curry	Critical or Essential State-owned Facility?		
Building Name	**No**	**Yes**	**Grand Total**
Barracks (01) Historic	$370,004		$370,004
Campground Maintenance Shop - Garage/Storage	$281,007		$281,007
Cape Blanco State Airport (5S6)	$60,668		$60,668
Edson Butte M/W Building		$147,355	$147,355
Elk River Hatchery Storage Building	$424,676		$424,676
Garage (03) Historic	$281,356		$281,356
House - Hughes House SA (Historic)	$462,666		$462,666
Life Boat Display Building	$323,969		$323,969
Maintenance Shop - Historic	$226,922		$226,922
Plumbed Type 6-4 RS - Sites 1-27	$489,339		$489,339
Plumbed Type 9-9 RS - A-Loop	$392,923		$392,923
Plumbed Type 9-9 RS - Sites 28-95	$651,255		$651,255
Port Orford Fuel Station		$243,383	$243,383

Port Orford Hazardous Materials Building		$458,532	$458,532
Port Orford Maintenance Station Building		$325,501	$325,501
Port Orford MS Herb		$122,628	$122,628
Port Orford MS Storage Building	$450,953		$450,953
Port Orford Pole Building		$211,401	$211,401
Residence	$672,866		$672,866
Residence (02) Historic	$290,531		$290,531
Shop 2 Bay Storage	$420,940		$420,940
Total	$5,800,075	$1,508,800	$7,308,875
All Hazards Rank 3 41015950201 - Curry	**Critical or Essential State-owned Facility?**		
Building Name	**No**	**Yes**	**Grand Total**
Curry County Circuit Court	$60,668		$60,668
Gas and Oil House (#15) Gold Beach	$2,907,498		$2,907,498
Hunter Creek Maintenance Station Building	$840,392		$840,392
Hunter Creek MS Pole Building	$931,662		$931,662
Total	$4,740,220		$4,740,220
All Hazards Rank 4 41029002800 - Jackson	**Critical or Essential State-owned Facility?**		
Building Name	**No**	**Yes**	**Grand Total**
Vault Double – Boat Ramp/Swimming/DU	$93,457		$93,457
Total	$93,457		$93,457
All Hazards Rank 5 41019200000 - Douglas	**Critical or Essential State-owned Facility?**		
Building Name	**No**	**Yes**	**Grand Total**
Canyonville MS Enclosed Storage		$280,158	$280,158
Canyonville Maintenance Station Building		$976,004	$976,004

Canyonville MS Open Storage		$232,529	$232,529
Lookout Silver Butte	$291,239		$291,239
Total	$291,239	$1,488,691	$1,779,930
All Hazards Rank 6 41065970800 - Wasco	**Critical or Essential State-owned Facility?**		
Building Name	**No**	**Yes**	**Grand Total**
Cow Creek Rest Area Buildings	2,360,151		2,360,151
Foreman Point M/W Buildings		749,128	749,128
Hulse Ranch M/W Buildings		1,046,295	1,046,295
Oak Springs Hatchery		9,205,512	9,205,512
The Dalles Maintenance Station		9,749,208	9,749,208
White River Wildlife Area	4,324,432		4,324,432
Unidentified Assets	4,611,843		4,611,843
Total	11,296,426	21,477,699	32,774,125
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
All Hazards Rank 8 41023960100 – Grant	**Critical or Essential State-owned Facility?**		
Building Name	**No**	**Yes**	**Grand Total**
Austin Maintenance Station		4,407,243	4,407,243

Bone Point M/W & Radio Operations		66,220	66,220
Carter Rest Area	99,936		99,936
Long Creek Maintenance Station		1,478,031	1,478,031
Lookout Ritter Mountain		148,072	148,072
Smith Pit Stockpile Site	20,480		20,480
Tamarack m/W & Radio Operations		89,232	89,232
Unidentified Assets	1,978,013		1,978,013
Total	2,098,429	6,188,798	8,287,227
All Hazards Rank 9 41023960201 - Grant	**Critical or Essential State-owned Facility?**		
Building Name	**No**	**Yes**	**Grand Total**
Aldrich Mountain Generator Buildings		156,600	156,600
Phillip W. Schneider office/residence/barn	81,920		81,920
Unidentified assets	1,686,029		1,686,029
Total	1,767,949	156.600	1,924,549
All Hazards Rank 10 41045970900 - Malheur	**Critical or Essential State-owned Facility?**		
Building Name	**No**	**Yes**	**Grand Total**
Black Butte Radio Operations		96,210	96,210
Cottonwood Mountain M/W buildings		67,369	67,369
Coyne Point Radio Buildings		82,356	82,356
Farewell Bend POE Grounds	2,101,187		2,101,187
Mahogony Mountain M/W buildings		48,577	48,577
McDermitt State Airport	20,675		20,675
Ontario Maintenance Station		18,655,543	18,655,543
Pharmacy Hill Operating Grounds	47,671		47,671

Rome State Airport	20,675		20,675
Site Systems -- Basque	20,675		20,675
Snake River Correctional Institution		504,885,082	504,885,082
Succor Creek Operating Exp Grounds	65,328		65,328
Unidentified assets	1,032,477		1,032,477
Total	3,308,688	523,907,850	527,216,538
Grand Total			838,426,463

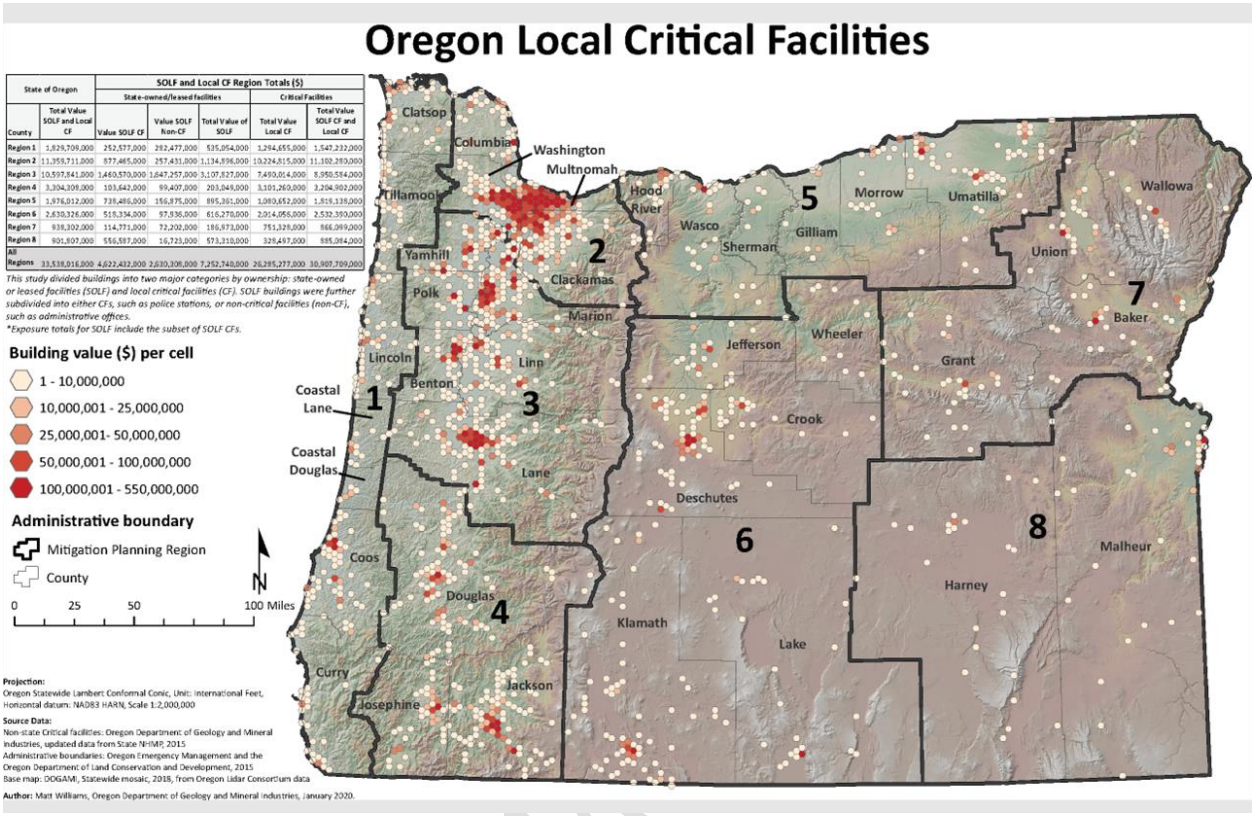
9.1.3 Critical Facilities

Local critical facilities are a building, or a group of buildings, that either are publicly or privately owned airports, communications, emergency operations, fire stations, hospitals or clinics, military facilities, police stations, schools, detention centers, or miscellaneous facilities, as defined by DOGAMI and DLCD. The dataset that DOGAMI developed and used in the 2020 vulnerability assessment had 8,757 buildings with a total value of $26 billion. Local critical facilities are shown in Figure 9.1.3-2. DLCD assigned a PROMETHEE census tract rank to this list of buildings to arrive at a list of buildings in priority all-hazards mitigation areas or the 2025 plan.

Figure 9.1.3-1: Statewide distribution of state-owned and leased facilities and state-critical facilities

Source: DOGAMI

Figure 9.1.3-2: Statewide distribution of local critical facilities



Source: DOGAMI

9.1.4 Lifelines

9.1.4.1 Road Network Lifelines

An overview of seismic lifeline vulnerabilities is provided in the Oregon Department of Transportation's (ODOT's) 2012 Oregon Seismic Lifeline Report (OSLR) findings, including identification of system vulnerabilities, loss estimates and recommended next steps. OSLR findings have been incorporated into a public facing GIS environment, last updated in 2023 (https://ftp.gis.oregon.gov/framework/transportation/seismic_lifelines.zip). This data is meant to represent a, "secure lifeline network of streets, highways and bridges to facilitate emergency services response and to support rapid economic recovery after a seismic disaster."

9.1.4.2 ODOT Climate Adaptation and Resilience Roadmap

The Climate Adaptation and Resilience Roadmap is a broad document that provides policy guidance and actionable strategies to help ODOT institutionalize adaptation and resilience. It outlines a path forward for

integrating climate change considerations into ways the agency plans for, invests in, builds, manages, maintains, and supports the multi-modal transportation system. The roadmap incorporates results from ODOT's statewide climate hazards risk analysis, drawing from corridor-scale risk maps of the state highway system. This information can now be used to inform project planning and prioritization by locating transportation corridors at high risk to climate hazards. The roadmap is also Oregon's FHWA-approved statewide Resilience Improvement Plan (RIP) for PROTECT. Click here or more information about ODOT's PROTECT Program. (copied from ODOT website, accessed 02/04/2025)

Lifelines also include facilities that must remain operational during a natural hazard event. Based on FEMA's definition, they fall into seven categories: safety and security, food water and shelter, health and medical, energy (power and fuel), communications, transportation, hazardous materials. Some lifelines have already been identified as critical facilities as well. Additional lifelines that have not been previously identified by DLCD are listed in Table 9.1.4-1 and Table 9.1.4-2. DLCD identified these from data sources identified on the RAPT website, State of Oregon databases, and Oregon Department of Transportation (ODOT) TransGIS to compile a list of these facilities. Data on wastewater treatment plants, power plants, and principal ports are Homeland Infrastructure Foundation Level Data found on the RAPT website. Primary public safety answering points and hazardous materials storage sites are from the State of Oregon GEOHub Database, the state's authoritative geospatial repository. Data on stormwater control measures, stormwater outfalls, transit stops, amtrak stops, and POINT Bus Stops (statewide long distance bus lines) are from the Oregon Department of Transportation TransGIS.

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

			Food, Water, Shelter			Energy	Communications
All Hazard Rank	Census Tract	County	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

Table 9.1.4-2: Counts of community lifelines in top ranked all-hazards mitigation areas continued

			Transportation				Hazardous Materials
All Hazard Rank	Census Tract	County	Transit Stops	Amtrak Stops	POINT Bus Stops	Principal Ports	Hazardous Material Storage
1	41025960200	Harney	3	0	3	0	37
2	41015950100	Curry	1	0	0	0	34
3	41015950201	Curry	1	0	0	0	25
4	41029002800	Jackson	0	0	0	0	12
5	41019200000	Douglas	33	0	0	0	37
6	41065970800	Wasco	0	0	0	0	70
7	41031960100	Jefferson	2	0	0	0	32
8	41023960100	Grant	24	0	0	0	24
9	41023960201	Grant	9	0	0	0	9
10	41045970900	Malheur	2	0	2	0	52

9.2 Assessment Methods

DOGAMI used two primary methods for assessing vulnerability to hazards: Hazus damage estimates for earthquakes and exposure analysis for floods, coastal erosion, volcanic hazards, tsunamis, wildfires, and landslides. This is a simple method to determine which facilities lie within a natural hazard area and which do not. It is an alternative for natural hazards for which Hazus damage functions or high-quality, statewide hazard mapping is not available, and therefore, loss estimation is not possible or recommended.

9.2.1 Hazard Data Limitations

Building-specific information can make an enormous difference when evaluating the actual damaging effects of natural hazards. For example, a modern seismically reinforced building may receive far less or no earthquake damage compared to older un-reinforced buildings next door. The analysis performed by DOGAMI and DLCD does not attempt to account for building- or site-specific characteristics.

9.2.2 Interpreting the Results of Hazard Specific Modeling

The following sections show modeling results for six natural hazards: riverine flooding, coastal hazards, tsunami, drought, extreme heat, landslide, volcano, wildfire, and earthquake. Each hazard section begins with a short description of the event scenario used in the model. A map showing the top-10 ranked census tract is followed by a table naming the census tracts, its modeling rank, and statistics from the National Risk Index. Adjacent to the map is a list of the indicators used to model the event. The indicators category "General" was used as a set for each hazard. The remaining indicators vary by hazard type. Following the maps showing the top-10 census tracts are a set of maps showing the location of an individual census tract along with a bar chart showing a z-score for each indicator.

The z-score measures how many standard deviations the observed value is away from the mean value. Z-scores greater than 1 or less than 1 show where the observed value for the subject census tract is more than one standard deviation from the mean value of all census tracts used in the analysis. In other words, it is unusual and a likely driver of risk or resilience in the census tract.

Care must be taken when deciding whether an unusual z-score contributes to risk or resilience. The table associated with the hazard-specific top-10 census tracts shows a column labeled "Direction". If the direction is positive, the indicator contributes to vulnerability. If it is negative it contributes to resilience.

The tables listing state-owned buildings and critical facilities reflect only those buildings and facilities in the census tract that are in the hazard zone. Building values are provided by DAS and reflect 2019 values. If a loss is recorded it is because that building has suffered a loss from the natural hazard event in the past.

9.2.3 Indicator Key

The gold corresponds to indicators modeled in a positive direction (1)
The blue-green corresponds to indicators modeled in a negative direction (-1)

Table 9.2.3-1: Multi-Criteria Analyses Indicator Key

	Gold: bars point to the left on z-score graphs = less vulnerable
	Gold: bars point to the right on z-score graphs = more vulnerable
	Blue-green: bars point to the left on z-score graphs = more vulnerable
	Blue-green bars point to the right on z-score graphs = less vulnerable

Indicator Name	Description	Data Source	Justification
GENERAL (Socio-economic Indicators used for all evaluated hazards)			
EP_MOBILE	Percentage of residential building stock that are mobile homes	2020 Census; **ACS Table(s)**: B25024, B25032	Mobile homes are more likely than site-built homes to be damaged by natural hazard events. Manufactured home parks are often located in hazard zones

Indicator Name	Description	Data Source	Justification
EP_MINRTY	Percentage of non-white population		The State of Oregon and the Department of Land Conservation and Development have a "lead with race" policy. The CRE (a social vulnerability indicator) does not include race.
Housing Tenure	Percent of owned homes		Tenure definition from US Census: A unit is owner occupied if the owner or co-owner lives in the unit, even if it is mortgaged or not fully paid for. Owners have more control over mitigation projects and opportunities.
Median_Yrblt	Median year built of general building stock based on HAZUS default data.	Hazus (org. 2020 Census)	Older homes likely are built with less stringent buildings codes. Maintenance status may make them more prone to damage due to natural hazard events.
HospitalDistMile	Distance from tract centroid to nearest hospital.	DOGAMI generated	Distance to the nearest hospital indicates degree of access to medical services in the face of and after a natural hazard event.

Indicator Name	Description	Data Source	Justification
NatResrcJobs	Percentage of natural resource jobs.	2020 Census	People employed in natural resource jobs may work outdoors and also may face reductions in work hours or access to raw materials during and after a natural hazards event. Short term employment gains may be experienced from rebuilding, but these are short-lived.
PRED3_PE	Percentage of individuals with three plus components of social vulnerability from the Community Resilience Estimate (CRE)	2023 CRE Estimate	Metric for how socially vulnerable people are to the impacts of disasters.
Hosp_Beds	Estimated number of hospital beds based on square footage of hospital building (1500ft^2 per bed)	DOGAMI generated	Indicates the ability of local medical system to address emergencies during and after an event.
Pct_Adherents	Percentage of members to a religious group	2020 US Religion Census	Indicates community cohesion or access to local assistance.
Mitigation	Number of migitation projects (grouped by zip code and evenly distributed to overlaying tracts)	FEMA: Hazard Mitigation Assistance Projects - v4 | FEMA.gov	Measures degree of mitigation attention that has been paid to the area.
Cultural	Number of cultural-related institutions	Oregon Cultural Trust	Indicates community cohesion by

Indicator Name	Description	Data Source	Justification
			participation in cultural activities
Favors	Average rating from survey of neighborliness: Willing to do favors for neighbor	OHA	Indicates propensity to assist neighbors during and after an event.
Advice	Average rating from survey of neighborliness: Seeks advice from neighbor	OHA	Indicates propensity to assist neighbors during and after an event.
Parties	Average rating from survey of neighborliness: Attended parties that occur in neighborhood	OHA	Indicates propensity to assist neighbors during and after an event.
Visits	Average rating from survey of neighborliness: Has visited neighbor's house	OHA	Indicates propensity to assist neighbors during and after an event.
Watch	Average rating from survey of neighborliness: Will watch neighbor's house	OHA	Indicates propensity to assist neighbors during and after an event.
CountyTax	County tax rate	Oregon Dept. of Revenue	Indicates capacity of local government to plan, respond to, and mitigate.
CityTax	City tax rate	Oregon Dept. of Revenue	Indicates capacity of local government to plan, respond to, and mitigate.

Hazard Specific Indicators

Indicator Name	Description	Data Source	Justification
COASTAL HAZARDS			
CFL_pct_CF	Percentage of critical facilities (2020 State NHMP data) buildings exposed to coastal flooding based on NFIP flood zones.	DOGAMI generated	Indicates the degree of disruption to critical facilities during a flood event and its aftermath.
Hist_count	Number of historic buildings.	OR agency for Historic bld source?)	Indicates cultural significance in the area
Port	Presence of marine port infrastructure	DOGAMI generated	Damage to ports disrupts commerce, jobs, and local economy. May be costly to repair
Bridge_Scour_pct	Percentage of bridges that are scoured from a 100 year flood.	ODOT	A high proportion of damaged bridges in an area indicates reduced ability to find detours.
CRS_Rate	Community Rating System (NFIP program for reduced insurance premiums) score for communities within census tracts (1 – 10 scores with 1 being the best score).	FEMA	Communities that participate in the Community Rating System tend to be better prepared for flood events and to adopt policies to avoid building in flood hazard zones.
ImpervSurf_Pct	Percentage of impervious surface.	Justice40	Areas with a high percentage of impervious surface tend to have flood and drainage problems,

Indicator Name	Description	Data Source	Justification
			leading to the potential for damage.
FIRM_Diff	Number of years difference between median year built and first Flood Insurance Rate Map date.	FEMA/2020 Census	Older flood maps tend to misrepresent areas subject to flood; newer maps are more reliable indicators of flood hazard.
FL_Haz_Area	Area of tract in 100-year flood hazard.	FEMA	Census tracts with large flood hazard zones are more likely to suffer harm.
RepeatLoss	Number of Repetitive loss structures	FEMA	Indicates historic repetitive losses and opportunity for mitigation.
DROUGHT			
Drght_NRI_rate	Expected annual loss (EAL) rate for drought from the FEMA NATIONAL RISK INDEX.	National Risk Index	EAL rates are designed to reflect the average expected annual percentage loss for the building value, population, and agriculture value within a community
Drght_Events	Number of drought events from the FEMA NATIONAL RISK INDEX.	National Risk Index	
Drght_AL_AG	Expected annual loss (EAL) rate for agriculture from FEMA NATIONAL RISK INDEX.	National Risk Index	EAL rates are designed to reflect the average expected annual percentage loss for the building value, population, and agriculture value within a community

Indicator Name	Description	Data Source	Justification
Over90th	Mean number of days that are above the historic 90th percentile temp	OCCRI	
Over90F	Mean number of days above 90 degrees Fahrenheit	OCCRI	
Over90th	Mean number of days that are above the historic 90th percentile temp	OCCRI	
Over90F	Mean number of days above 90 degrees Fahrenheit	OCCRI	
EARTHQUAKE			
LQ_pct_bld	Percentage of STATEWIDE BUILDING FOOOTPRINTS FOR OREGON buildings exposed to Moderate to Very High liquefaction zones based on data compiled in the Oregon Seismic Hazard Dataset (OSHD).	DOGAMI generated	Indicates the degree of disruption within the census tract because of liquefaction and its aftermath.
LQ_pct_CF	Percentage of critical facilities (2020 State NHMP data) buildings exposed to Moderate to Very High liquefaction zones based on data compiled in the Oregon Seismic	DOGAMI generated	Indicates the degree of disruption to critical facilities as a result liquefaction.

Indicator Name	Description	Data Source	Justification
	Hazard Dataset (OSHD).		
EQCSZ_pct_CF	Percentage of critical facilities (2020 State NHMP data) buildings that are red or yellow-tagged buildings based on CSZ Deterministic Hazus scenario analysis.	DOGAMI generated	Indicates the degree of disruption to critical facilities because of earthquake.
EQ25_pct_CF	Percentage of critical facilities (2020 State NHMP data) buildings that are red or yellow-tagged buildings based on 2500 Probabilistic Hazus scenario analysis.	DOGAMI generated	Indicates the degree of disruption to critical facilities because of earthquake.
Hist_count	Number of historic buildings.	OR agency for Historic bld source?)	Indicates cultural significance in the area
Hwy_LQ_pct	Miles of major roadway exposed to Moderate to Very High liquefaction zones based on data compiled in the Oregon Seismic Hazard Dataset (OSHD).are	ODOT/DOGAMI generated	Damaged roads disrupt transportation and access to services.
Erqk_NRI_rate	Expected annual loss (EAL) rate for earthquake from FEMA NATIONAL RISK INDEX.	National Risk Index	FEMA designed EAL rates to reflect the average expected annual percentage loss for the building value, population, and agriculture value within a community.

Indicator Name	Description	Data Source	Justification
LQ_Haz_Area	Area of tract in high or very high liquefaction hazard.	DOGAMI generated	Indicates a potential disruption.
Bridges_LIQ	Number of bridges that are within high or very high liquefaction hazard.	ODOT/DOGAMI generated	Bridges provide critical transportation links and can take time to repair leading to disruptions.
PGA_2500	Average shaking in tract from 2500-year probabilistic earthquake.	DOGAMI generated	
EXTREME HEAT			
Heat_Events	Number of heat events.	National Risk Index	
Heat_ALAG	Expected annual loss (EAL) rates to agriculture from heat.	National Risk Index	FEMA designed EAL rates to reflect the average expected annual percentage loss for the building value, population, and agriculture value within a community
Heat_ALPOP	Expected annual loss rate to population from heat.	National Risk Index	FEMA designed EAL rates to reflect the average expected annual percentage loss for the building value, population, and agriculture value within a community
OutdoorJobs	Percentage of jobs that occur outside.	ACS 2021	People who work outdoors are exposed to natural hazards and their consequences.

Indicator Name	Description	Data Source	Justification
TreeCan_avg	Tree canopy density	USDAg	Indicates potential for shade or cooling.
FLOOD			
Bridge_Scour	Number of bridges that are at risk from scour during a 100-year flood.	Oregon Dept. of Transportation	Bridges provide key transportation links that can be difficult to go around if damaged during a flood. Often require extended repair times.
CRS_Rate	Community Rating System (NFIP program for reduced insurance premiums) score for communities within census tracts (1 – 10 scores with 1 being the best score).	FEMA	Communities that participate in the Community Rating System tend to be better prepared for flood events and to adopt policies to avoid building in flood hazard zones.
FL_pct_bld	Percentage of Statewide Building Footprint for Oregon buildings exposed to flooding based on NFIP flood zones.	DOGAMI generated	Indicates the degree of disruption within the census tract because of flood and its aftermath.
FL_pct_CF	Percentage of critical facilities (2020 State NHMP data) buildings exposed to flooding based on NFIP flood zones.	DOGAMI generated	Indicates the degree of disruption to critical facilities during a flood event and its aftermath.
ImpervSurf_Pct	Percentage of impervious surface.	Justice40	Areas with a high percentage of impervious surface tend to have flood and drainage problems,

Indicator Name	Description	Data Source	Justification
			leading to the potential for damage.
Hwy_FL_pct	Miles of major roadways miles based on ODOT data that are exposed to flood hazard from NFIP data.	ODOT/DOGAMI generated	Flooded roads disrupt transportation and access to services.
Bridge_Scour_pct	Percentage of bridges that are scoured from a 100 year flood.	ODOT	A high proportion of damaged bridges in an area indicates reduced ability to find detours.
FIRM_Diff	Number of years difference between median year built and first Flood Insurance Rate Map date.	FEMA/2020 Census	Older flood maps tend to misrepresent areas subject to flood; newer maps are more reliable indicators of flood hazard.
FL_Haz_Area	Area of tract in 100-year flood hazard.	FEMA	Census tracts with large flood hazard zones are more likely to suffer harm.
RepeatLoss	Number of Repetitive loss structures	FEMA	Indicates historic repetitive losses and opportunity for mitigation.
Hist_count	Number of historic buildings.	OR agency for Historic bld source?)	Indicates cultural significance in the area
CFL_pct_bld	Percentage of STATEWIDE BUILDING FOOOTPRINTS FOR OREGON buildings exposed to coastal flooding based on NFIP flood zones.	DOGAMI generated	Indicates the degree of disruption within the census tract because of flood and its aftermath.

Indicator Name	Description	Data Source	Justification
Hwy_FL_pct	Miles of major roadways that are exposed to flood hazard from NFIP data based on ODOT data.	ODOT/DOGAMI generated	Flooded roads disrupt transportation and access to services.
LANDSLIDE			
LSS_pct_bld	Percentage of STATEWIDE BUILDING FOOOTPRINTS FOR OREGON buildings exposed to existing landslide deposit SLIDO.	DOGAMI generated	Indicates the degree of disruption within the census tract as a result of landslide.
LSS_pct_CF	Percentage of critical facilities (2020 State NHMP data) buildings exposed to existing landslide deposit SLIDO.	DOGAMI generated	Indicates the degree of disruption to critical facilities during a landslide event and its aftermath.
Hwy_LSS_pct	Miles of major roadways based on ODOT data that are exposed to existing landslide deposits based on SLIDO.	ODOT/DOGAMI generated	Damaged roads disrupt transportation and access to services.
Hist_count	Number of historic buildings.	OR agency for Historic bld source?)	Indicates cultural significance in the area
LSS_Haz_Area	Area of tract in high or very high landslide hazard.	DOGAMI generated	Indicates the degree of potential disruption and harm to people or property.
TSUNAMI			
TSU_pct_bld	Percentage of STATEWIDE BUILDING FOOOTPRINTS FOR OREGON buildings	DOGAMI generated	Indicates the degree of disruption within

Indicator Name	Description	Data Source	Justification
	exposed to any sized (Sm-XXL) CSZ tsunami.		the census tract as a result of fsunami.
TSU_pct_CF	Percentage of critical facilities (2020 State NHMP data) buildings exposed to any sized (Sm-XXL) CSZ tsunami.	DOGAMI generated	Indicates the degree of disruption to critical facilities because of tsunami.
Port	Presence of marine port infrastructure	DOGAMI generated	Damage to ports disrupts commerce, jobs, and local economy. May be costly to repair
Bridges_TSU	Number of bridges that are within a tsunami inundation zone.	ODOT/DOGAMI generated	Bridges provide critical transportation links, particularly on the coast where detour routes are few and far between.
Hist_count	Number of historic buildings.	OR agency for Historic bld source?)	Indicates cultural significance in the area
VOLCANO			
LAH_pct_bld	Percentage of STATEWIDE BUILDING FOOOTPRINTS FOR OREGON buildings exposed to volcanic lahar hazard of any size based on USGS and DOGAMI lahar zones for Cascade volcanoes.	DOGAMI generated	Indicates the degree of disruption within the census tract, including harm to people and property.
LAH_pct_CF	Percentage of critical facilities (2020 State NHMP data) buildings exposed to volcanic lahar hazard of any	DOGAMI generated	Indicates the degree of disruption to critical facilities during a volcanic event and its aftermath.

Indicator Name	Description	Data Source	Justification
	size based on USGS and DOGAMI lahar zones for Cascade volcanoes.		
Hist_count	Number of historic buildings.	OR agency for Historic bld source?)	Indicates cultural significance in the area
WILDFIRE			
WF_pct_bld	Percentage of STATEWIDE BUILDING FOOOTPRINTS FOR OREGON buildings exposed to Medium and High Burn Probability based on PNW Quantitative database.	Oregon Dept. of Forestry/DOGAMI	Indicates the degree of disruption within the census tract, including harm to people and property.
WF_pct_CF	Percentage of critical facilities (2020 State NHMP data) buildings exposed to Medium and High Burn Probability based on PNW Quantitative database .	Oregon Dept. of Forestry/DOGAMI	Indicates the degree of disruption to critical facilities during a flood event and its aftermath.
BurnProb	Burn probability from the QPNW		
Hwy_WF_pct	Percentage of highway miles within High Burn Probability Zones		
Hist_count	Number of historic buildings.	OR agency for Historic bld source?)	Indicates cultural significance in the area
Over 90th	Mean number of days that are above the	OCCRI	

Indicator Name	Description	Data Source	Justification
	historic 90th percentile temp		
Over90F	Mean number of days above 90 degrees Fahrenheit	OCCRI	

9.2.4 Hazard Scenarios

Table 9.2.4-1: Hazard scenario data sources

Hazard	Data Name	Data Source
Earthquake	Liquefaction	Oregon Seismic Hazard Database (OSHD) – DOGAMI (Madin and others, 2021)
	CSZ Hazus Analysis (Coseismic landslide and liquefaction, and NEHRP)	OSHD – DOGAMI (Madin and others, 2021)
	2475-year Hazus Analysis (4 ground motions)	OSHD – DOGAMI (Madin and others, 2021)
Flood & Coastal Flooding	Flood Hazard Area	FEMA – National Flood Hazard Program
Channel Migration	Channel migration zones	DOGAMI (multiple pubs)
Tsunami	Tsunami inundation zones	DOGAMI (multiple pubs)
Landslide	Statewide Landslide susceptibility	DOGAMI (multiple pubs)
Wildfire	Burn probability	Oregon Dept. of Forestry (McEvoy and others, 2023)
	Wildfire annualized loss	National Risk Index
Volcano	Lahar inundation zones	USGS (Mt. Jefferson, Sisters, Crater Lake)
	Lahar inundation zones	Mt. Hood – DOGAMI (Burns and others, 2011)
Drought	Drought annualized loss	National Risk Index

Heat	Heat annualized loss	National Risk Index
	Tree canopy	USDA, US Forest Service

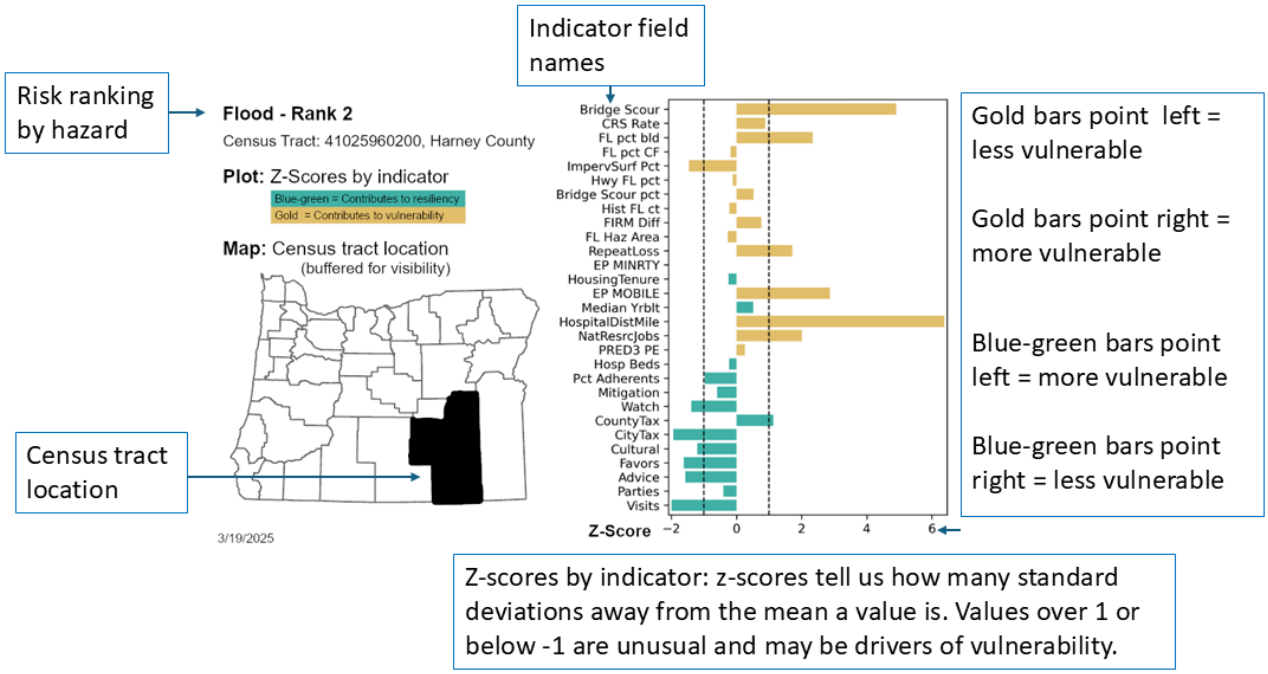
DRAFT prepared by: Matt Williams DOGAMI 12/3/2024

9.2.5 How to Interpret Risk Assessment Results Graphs

The following graphs show z-scores for the top 10 most vulnerable census tracts by hazard. A z-score measures how far away a value is from the mean or average of all values considered. In our case, the dataset includes all 993 Oregon inhabited census tracts, except for the coastal hazards which include 77 census tracts. So, for hazards except for coastal hazards, the z-score represents how far away the indicator value is away from the average of all Oregon census tracts. The z-scores for coastal hazards represents how far the indicator value is away from the average of all coastal census tracts. A z-score of 1 tells us that the indicator value is one standard deviation above the average, while a z-score of –1 tells us that the indicator value is one standard deviation below the average. Z-scores above or below 1 tell us that the indicator value is unusually high or low. These unusual values can be interpreted as drivers of risk or resilience.

Most of the indicators used in this model point towards vulnerability or increased risk. These are labeled on the map that introduces each hazard as “Direction.” A Direction of 1 tells us that the indicator contributes to vulnerability or risk. A Direction of –1 tells us that the indicator contributes to resilience. (Future versions of these graphs will color code which indicators point to more or less risk.). Figure 9.2.5-1 provides a visual explanation of the top 10 hazard graphs.

Figure 9.2.5-1: Visual explanation of how to interpret hazard graphs



9.3 Top 10 Census Tracts by Hazard

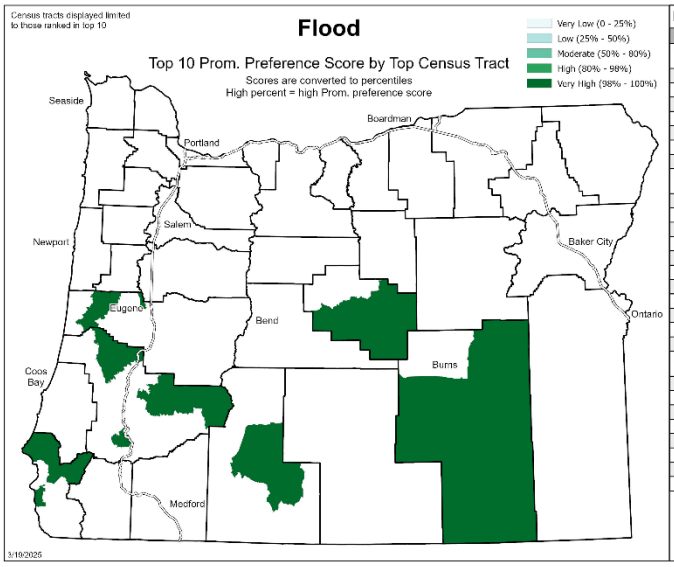
9.3.1 Riverine Flood

9.3.1.1 Hazard Scenario

Exposure was based on 1% annual chance floods as depicted on Federal Emergency Management Agency Flood Insurance Rate Maps. GIS layers were obtained from digital flood insurance rate maps, where possible. The Oregon Department of Geology and Mineral Industries digitized flood zones boundaries in areas where FEMA has not provided digitized information. (Citation to data references) Refer to previous hazard description.

9.3.1.2 Top Ranked Riverine Flood Risk Areas

Figure 9.3.1-1: Top 10 flood hazard census tracts



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 migitation 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

Table 9.3.1-1: Oregon Natural Hazard Risk Assessment Rank Compared to the National Risk Index

Census Tract Number	County in which census tract is located	Oregon Risk Assessment Rank – Riverine Flood	National Risk Index Classification*	People Exposed to 1% annual chance flood**
41039000500	Lane	1	Relatively moderate	667
41025960200	Harney	2	Relatively low	159

Census Tract Number	County in which census tract is located	Oregon Risk Assessment Rank – Riverine Flood	National Risk Index Classification*	People Exposed to 1% annual chance flood**
41035970201	Klamath	3	Relatively high	178
41015950201	Curry	4	Relatively high	186
41039000404	Lane	5	Relatively high	2387
41015950100	Curry	6	Relatively High	90
41019030000	Douglas	7	Relatively high	821
41019100000	Douglas	8	Relatively high	156
41013950402	Crook	9	Relatively Low	53
41019200000	Douglas	10	Relatively High	235

*Compared to census tracts nationwide

** From NRI, accessed on 2/5/2025, 03/25/2025

Table 9.3.1-2: Top 10 Census Tract Demographics

Census Tract	Flood Risk Rank	2020 Population[1]	2023 Population[2]	% Change in Population	2016 SVI[3]	2022 SVI[4]	Change in SVI
41039000500	1	2244	2148	-4%	0.53	0.56	0.02
41025960200	2	2165	2261	4%	0.50	0.71	0.21
41035970201	3	2012	1450	-28%	#N/A	0.41	#N/A
41015950201	4	3513	3730	6%	#N/A	0.80	#N/A
41039000404	5	4010	4409	10%	0.83	0.74	-0.08
41015950100	6	3296	3226	-2%	0.66	0.56	-0.10
41019030000	7	4047	4107	1%	0.39	0.35	-0.04
41019100000	8	3103	3283	6%	0.56	0.56	0.00
41013950402	9	2397	2739	14%	#N/A	0.51	#N/A
41019200000	10	4902	4912	0%	0.87	0.91	0.04

[1] 2020 Decennial Census Census Tract Level Population Data HC2020.P1 - 2020 data was used rather than 2018 due to changes in census tract boundaries in 2020

[2] 2023 ACS 5-Year Estimates Census Tract Level Age and Sex Data S0101

[3] 2016 US CDC Social Vulnerability Index - "#N/A" cells represent census tracts that did not exist before changes to census tract boundaries in 2020

[4] 2022 US CDC Social Vulnerability Index

Flood Risk Rank 1 – Lane County, Mapleton vicinity 41039000500

This rural census tract includes the unincorporated community of Mapleton. The NRI reports a moderate risk of flooding, with a score of 89. Approximately 30% of the census tract population is exposed to flood risk (667 people). The Oregon risk assessment shows a much higher than statewide average repetitive losses due to flood. A higher than stateside average percent of buildings in the census tract are exposed to flood risk. The risk assessment also shows a higher than stateside average highway miles, bridge scour potential. Hospital distance is further than statewide average. The census tract has a higher-than-average CRE score (PRED3_PE) and lower social cohesion scores (Watch, Favors, Advice, Parties, Visits) indicating relatively high social vulnerability. Care must be taken when interpreting whether an unusual z-score contributes to risk or resilience.

Figure 9.3.1-2: First ranked census tract for flood hazard

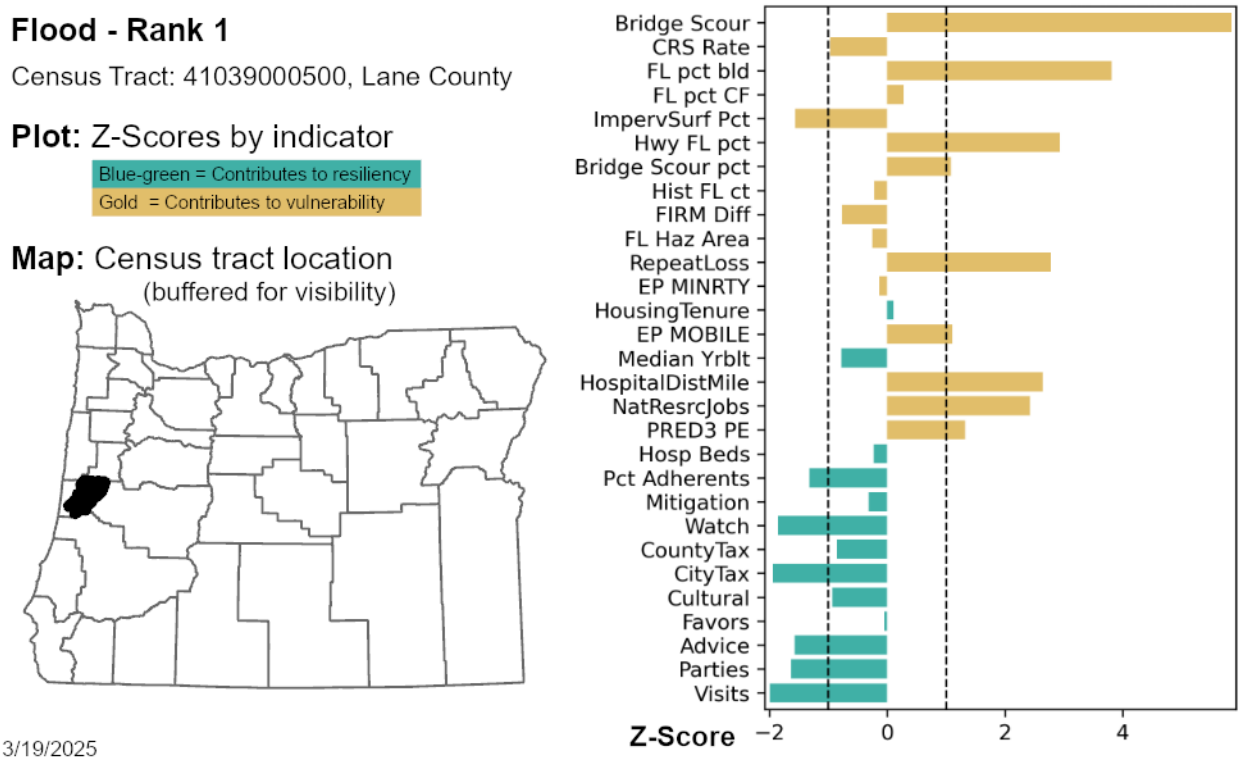


Table 9.3.1-3: Critical facilities identified in 1% annual chance flood zone

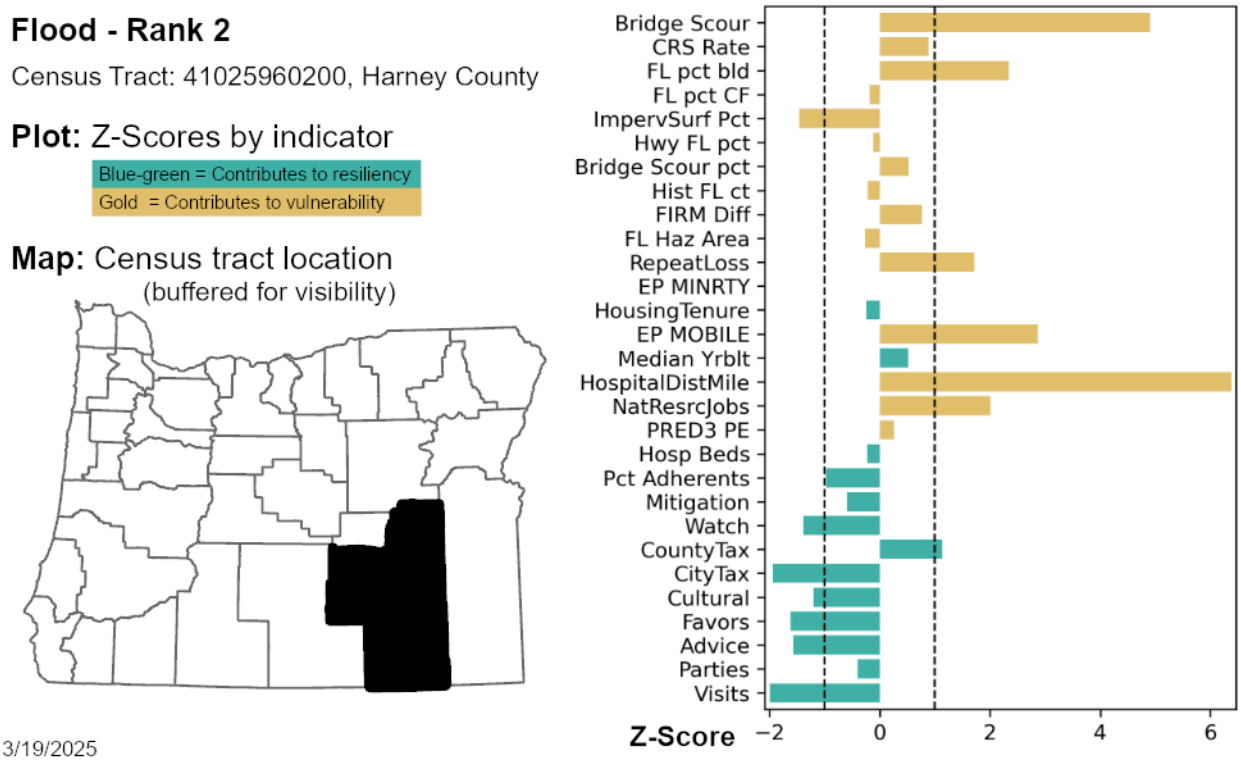
Building Name 41039000500	Value ($)	Flood Losses ($)
Mapleton Fire Department	143,695	15,530
Mapleton School	70,416	6,843
Swisshome Deadwood RFPD Station 2	82,008	

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

Flood Rank 2 – Harney County, unincorporated area south of the City of Burns 41025960200

This large census tract is in Harney County, south of the City of Burns. It rural and flat. The NRI reports a relatively low risk due to riverine flooding, with a score of 57.3. About 7 percent of the census tract population is exposed to flood hazards. The census tract has a higher than statewide average of proportion of building stock exposed to flood, and a higher than statewide average of repetitive losses. Hospitals are further away than for most census tracts. There are a higher proportion of natural resource jobs than the statewide average. County property tax rates are lower than statewide average. Social cohesion scores are also lower than statewide average.

Figure 9.3.1-3: Second ranked census tract for flood hazard

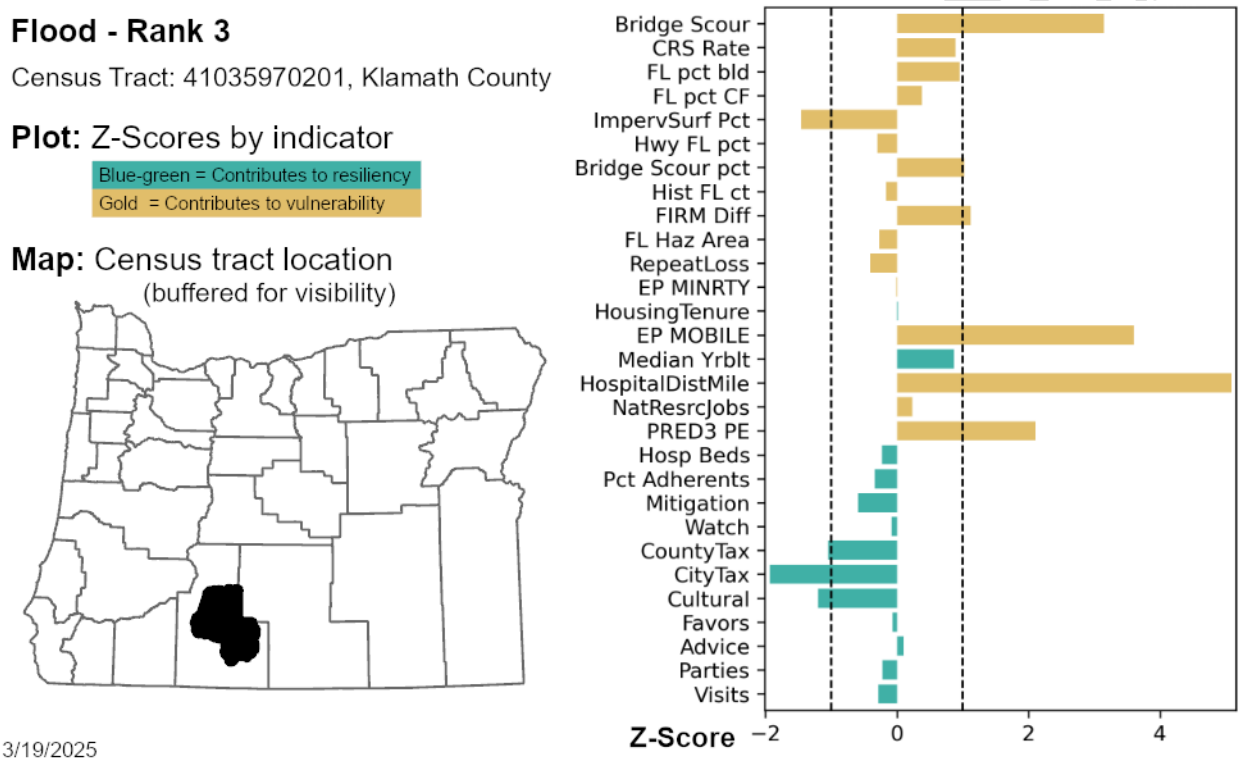


No state-owned buildings or critical facilities identified 1% annual chance flood zone. 41025960200

Flood Rank 3 – Klamath County unincorporated area east of Chiloquin 41035970201

This extremely rural census tract has a relatively high NRI riverine flood rating of 96.1, with approximately 9% of the census tract population exposed to a flood hazard. Flood risk is driven by a much higher than statewide average percent of bridges with scour potential, and a much higher than statewide average percent of mobile homes. The CRE score indicates a lack of community resilience. Census Bureau reports that over half the population is over the age of 65. Distances to a hospital are above statewide average.

Figure 9.3.1-4: Third ranked census tract for flood hazard



No state-owned buildings or critical facilities identified 1% annual chance flood zone. 41035970201

Flood Rank 4 – Curry County including the City of Gold Beach 41015950201

This census tract includes the City of Gold Beach. The NRI ranks this census tract as having a relatively high riverine flood risk, with a score of 98.5. About 5 percent of the census tract population is potentially directly exposed to riverine floods. The riverine flooding source is Hunter Creek. The census tract is characterized by above statewide average repetitive losses, mobile homes, and natural resource jobs. County property tax rates are significantly lower than the statewide average whereas city taxes are just slightly below. People associated with religious organizations is below the statewide average, but community cohesion is about average.

Figure 9.3.1-5: Fourth ranked census tract for flood hazard

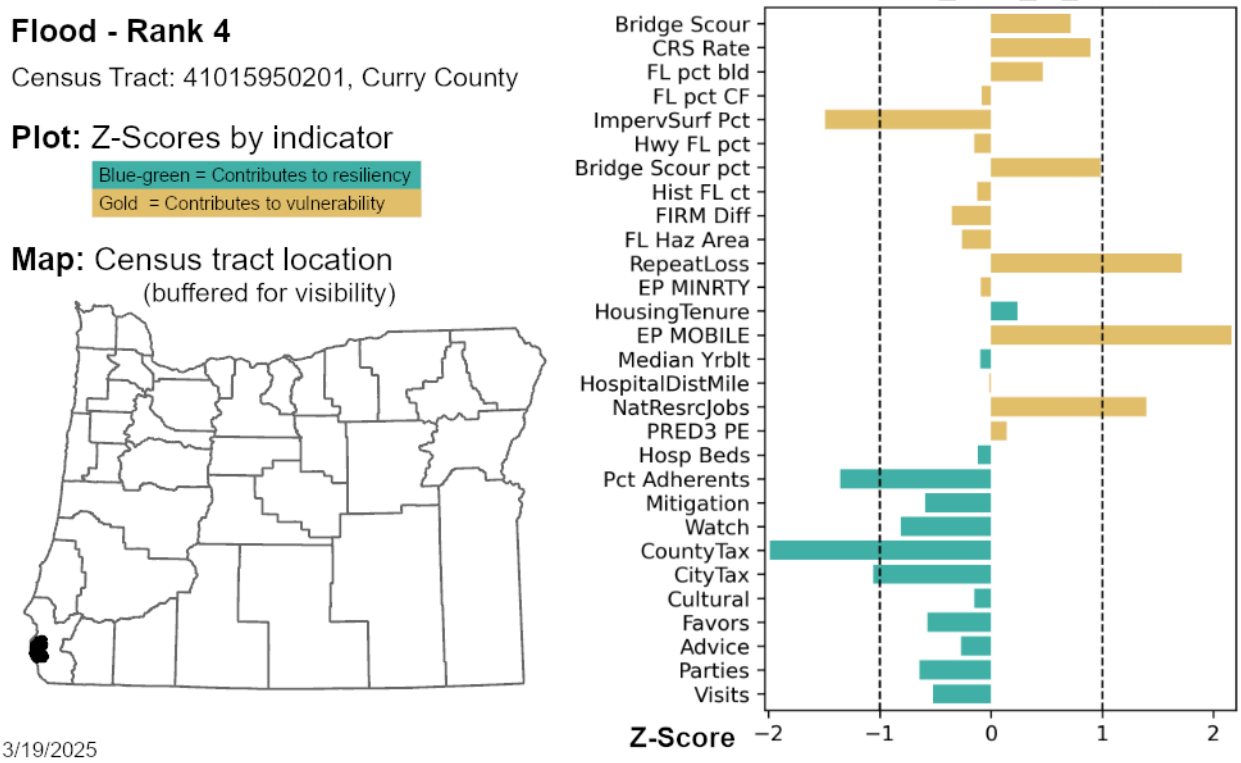


Table 9.3.1-4: Critical facilities identified in 1% annual chance flood zone

	Building Name 41015950201	Value ($)	Flood Losses ($)
CF	Gold Beach Muni	2,088,716	484,641
CF	Communications Structure	1,679,700	259,953

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

Flood Rank 5 – Lane County, Junction City to Harrisburg 41039000404

This census tract includes portions of Junction City and the City of Harrisburg, including part of the Junction City State Hospital campus. The census tract is characterized by a mix of urban development and agricultural land. The NRI reports a relatively high risk of flooding, with a score of 97. Almost 60 percent of the census tract population is exposed to flood risk according to the NRI (2387 people). The Oregon risk assessment confirms the extent of potential flooding with flood area, exposed buildings, exposed critical facilities, and exposed highway miles far exceeding statewide average. Bridge scour potential also exceeds statewide average. CRE is similar to statewide average whereas social cohesion indicator values are slightly below statewide average.

Figure 9.3.1-6: Fifth ranked census tract for flood hazard

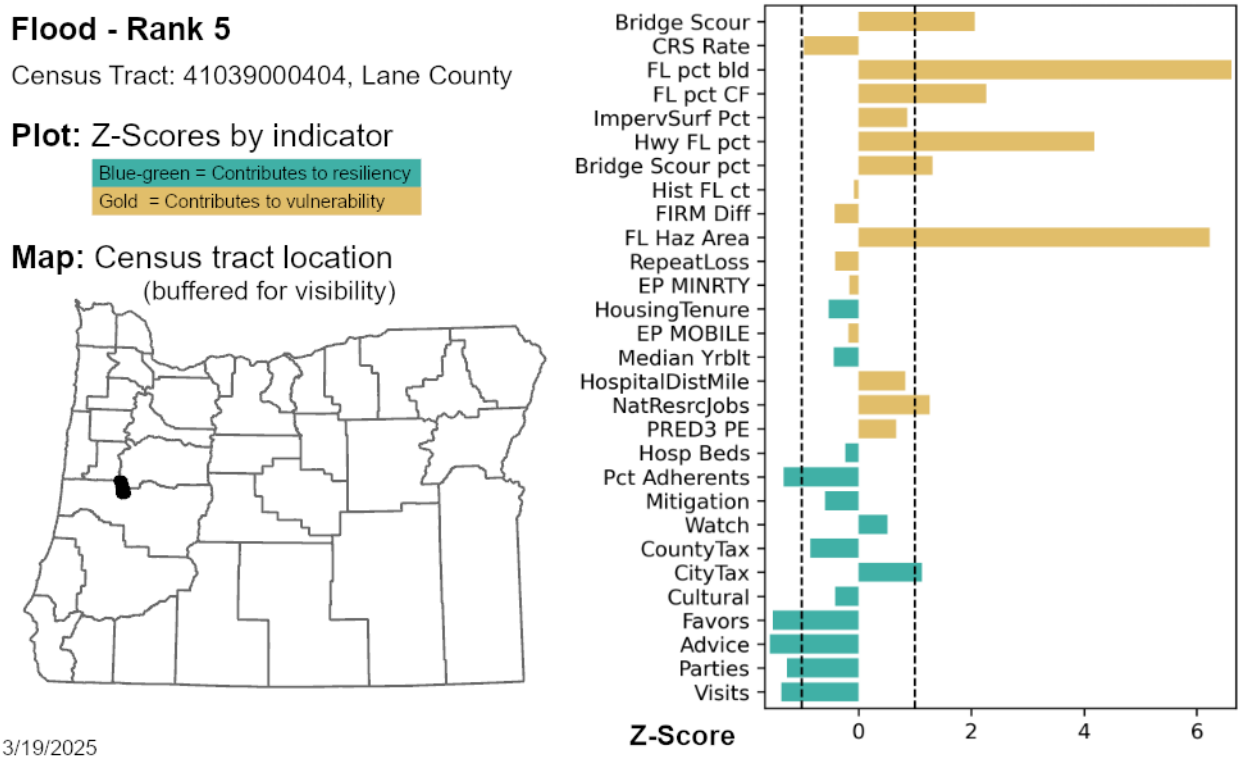


Table 9.3.1-5: State-owned buildings and critical facilities identified in 1% annual chance flood zone

	Building Name 41039000404	Value ($)
State-owned	State Hospital Junction City	117,098,414
State-owned	Marshall Island Boat Ramp, Park, Restrooms	69,239
Critical Facility	Nature Discovery School	1,430,250

	Building Name 41039000404	Value ($)
Critical Facility	Junction City Public Works	1,564,800
Critical Facility	Communications Structure	750,000
Critical Facility	Communications Structure	3,114,600

Flood Rank 6 – Curry County, including Port Orford 41015950100

This largely rural census tract includes the small city of Port Orford. The main drivers of vulnerability appear to be percent and miles of bridges exposed to scour. Social factors indicate potential social vulnerabilities and a lack of community cohesion. Taxes in the unincorporated portion of the tract are very low compared to other counties indicating a lack of government capacity to develop mitigation projects.

Figure 9.3.1-7: Sixth ranked census tract for flood hazard

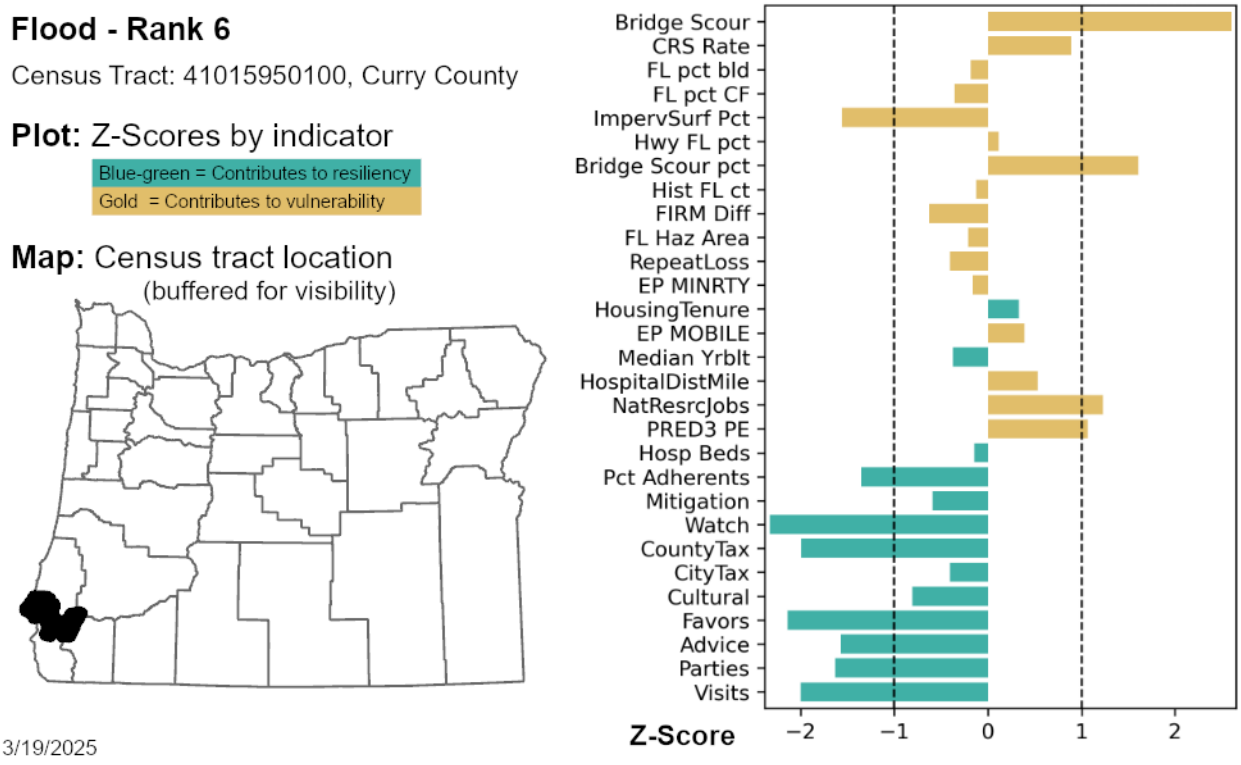


Table 9.3.1-6: State-owned buildings or critical facilities identified in 1% annual chance flood zone

	Building Name 41015950100	Value ($)
State-owned	None identified	
Critical facility	None identified	

Flood Rank 7 – Douglas County, Drain, Elkton, and coastal mountains west of Drain 41019030000

This census tract includes the small cities of Drain and Elkton and the rural area in between. The FEMA NRI ranks this census tract as at very high flood risk with a score of 98.6. The NRI estimates that approximately 20 % of the census tract population is exposed to a flood hazard (821 people). The Oregon risk assessment shows a larger than average percent of highway miles in the flood zone with very high percent of bridges in the census tract subject to scour. A higher than statewide average estimated percent of mobile homes and buildings located in the flood zone increases risk. Residents have a higher than statewide average distance to hospitals. Both city and county tax rates are lower than the statewide average.

Figure 9.3.1-8: Seventh ranked census tract for flood hazard

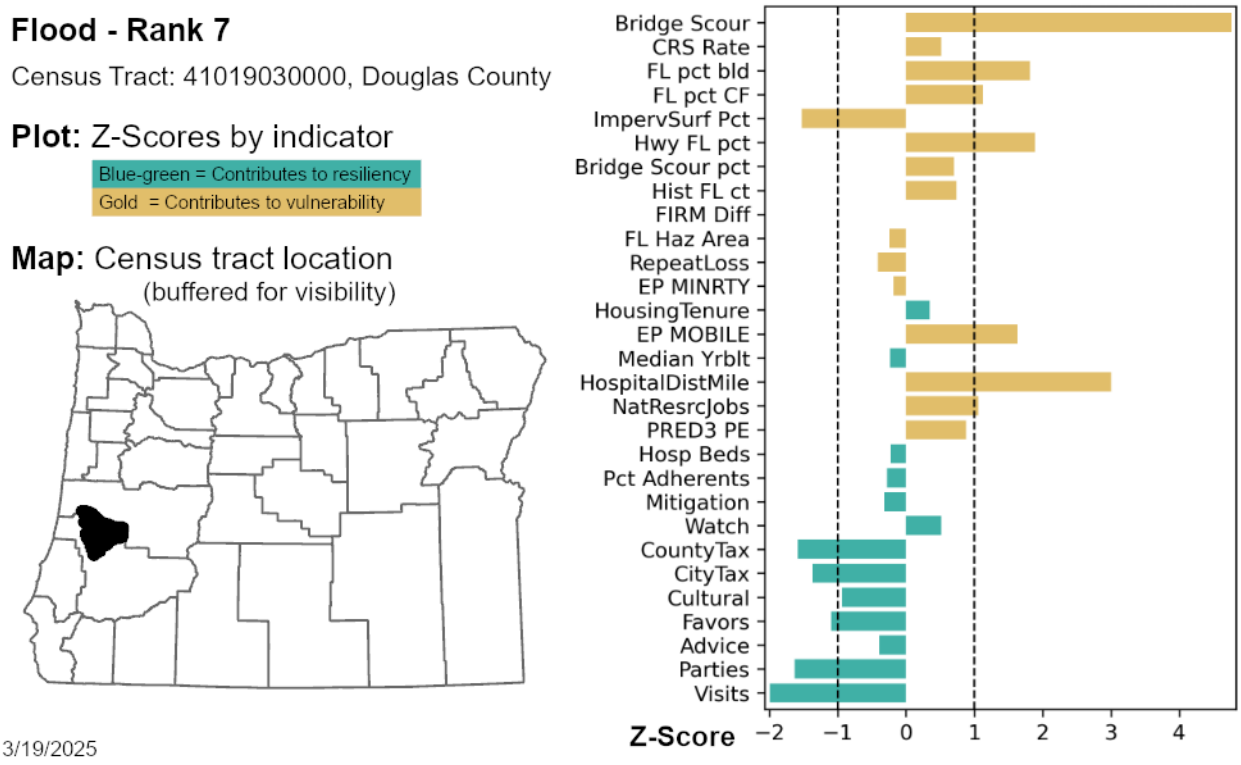


Table 9.3.1-7: State-owned buildings or critical facilities identified in 1% annual chance flood zone

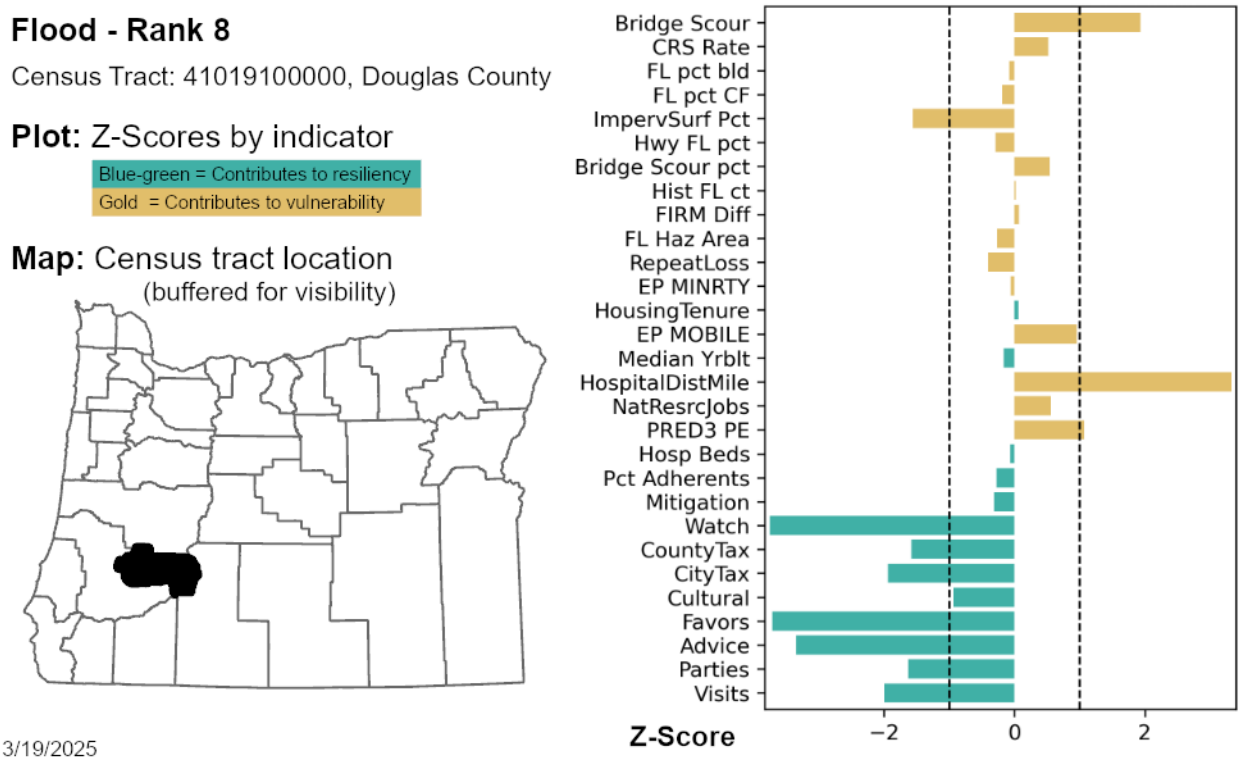
	Building Name 41019030000	Value ($)
State-owned	Unknown	95,675
State-owned	Unknown	136,002
Critical facility	Douglas County Sheriff's Office, Drain Substation	786,450
Critical facility	Drain STP	125,100

	Building Name 41019030000	Value ($)
Critical facility	Drain City Shop	1,342,950
Critical facility	Douglas County Public works	854,850
Critical facility	Douglas County Fire & EMS, annex	190,950
Critical facility	Douglas County Fire & EMS	1,102,200
Critical facility	Elkton High School	4,927,950

Flood Rank 8 – Douglas County, largely rural census tract along Umpqua River 41019100000

This largely rural census tract includes the small city of Glide and numerous recreational and camping sites along Highway 138. The highway follows close to the river. Hwy 138 links the City of Roseburg to Highway 97 to the east. The FEMA mapped floodplain is mostly centered on the City of Glide with the rural area floodplain left unmapped. The primary flood source is the Umpqua River. The NRI classifies the flood risk in the census tract as relatively high on a national scale, with a score of 93.3. Approximately 5 percent of the census tract population is expected to be affected (156 people). About half the population in this census tract lives in or very near the City of Glide. The Oregon risk assessment results are dominated by very low social cohesion scores, although these may be an artefact of about a third of the residents being over 65 years of age, and therefore not surveyed in the PRAMS protocol. City and county tax rates are lower that the statewide average.

Figure 9.3.1-9: Eighth ranked census tract for flood hazard

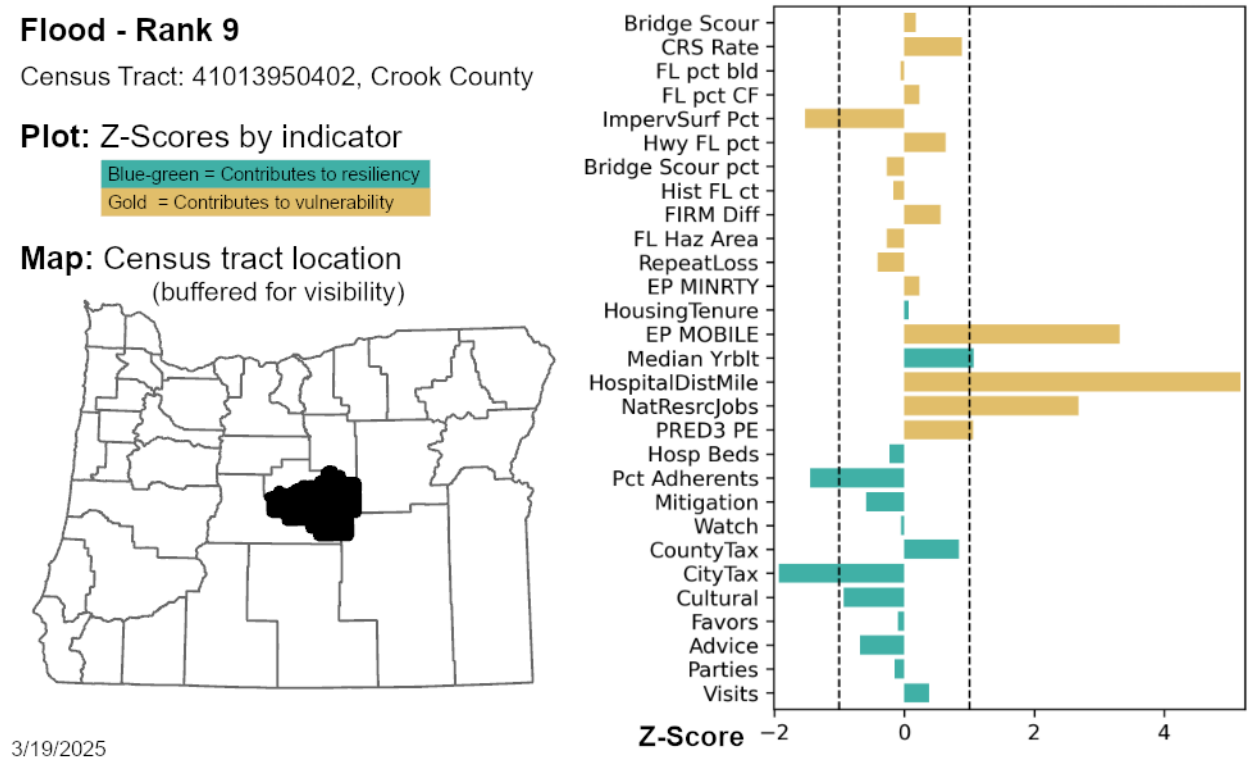


No state-owned buildings or critical facilities identified in 1% annual chance flood zone. 41019100000

Flood Rank 9 – Crook County, including the city of Prineville 41013950402

Vulnerabilities in this census tract center on a high rate of mobile homes, long distances to medical attention, and a high percentage of natural resource jobs. City tax rates are quite low compared to other cities in Oregon.

Figure 9.3.1-10: Ninth ranked census tract for flood hazard

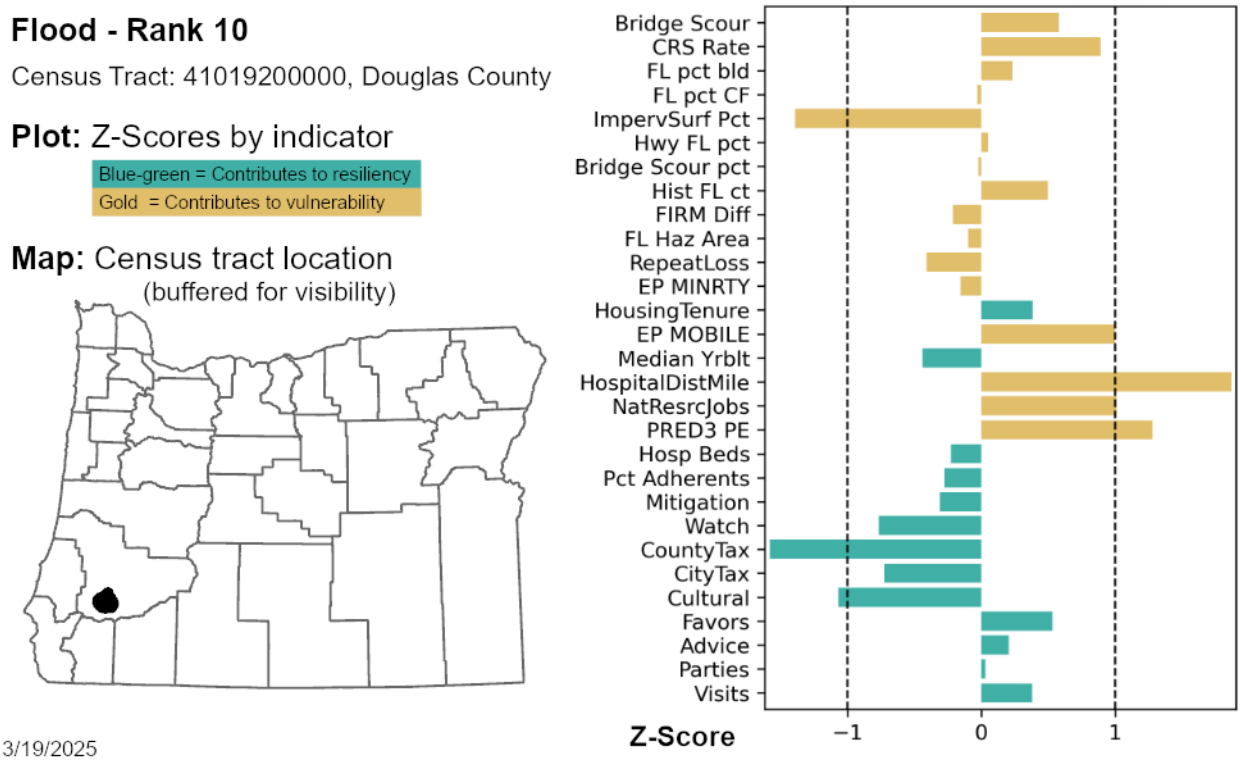


41013950402 SOB

Flood Rank 10 – Douglas County 41019200000

This is a mostly rural census tract that includes the small cities if Canyonville and Riddle. Vulnerabilities in this census tract arise from high social vulnerabilities and very low county tax rates. Distances to hospitals are long.

Figure 9.3.1-11: Tenth ranked census tract for flood hazard



No state-owned buildings or critical facilities identified in 1% annual chance flood zone.

9.3.2 Coastal Zone Hazards

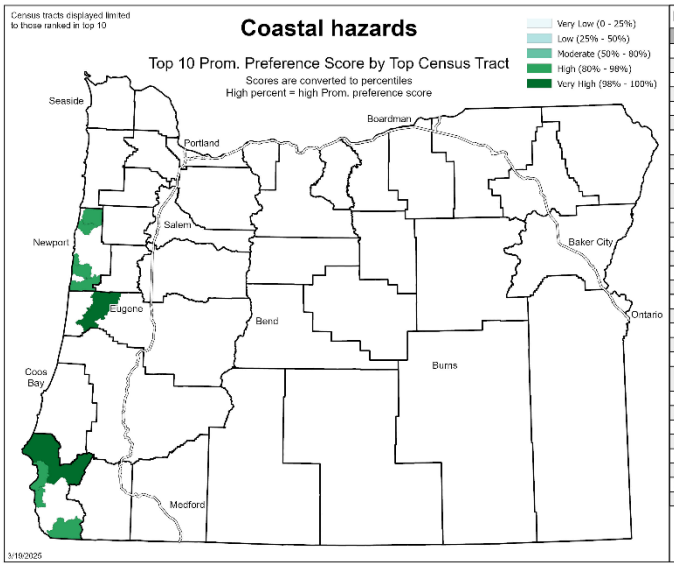
Coastal hazards include s coastal erosion zones and FEMA 1% annual chance flood zones for riverine and oceanfront velocity zones.

9.3.2.1 Hazard Scenario

Exposure was based on 1% annual chance floods as depicted on Federal Emergency Management Agency Flood Insurance Rate Maps. GIS layers were obtained from digital flood insurance rate maps. Coastal hazards also includes coastal erosion obtained from the Oregon Department of Geology and Mineral Industries.

9.3.2.2 Top Ranked Coastal Flood Risk Areas

Figure 9.3.2-1: Top Ranked Risk Areas in the Coastal Zone



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

Hazard	Indicator Name	Direction	Weight	Short Description
Coastal hazards	CFL_pct_bld	1	0.029	Percentage of SBFO buildings exposed to coastal flooding.
Coastal hazards	Hwy_FL_pct	1	0.029	Major roadways number of miles that are exposed to flood hazard.
Coastal hazards	CFL_pct_CF	1	0.029	Percentage of critical facilities exposed to coastal flooding.
Coastal hazards	Hist_CE_ct	1	0.029	Percentage of historic buildings exposed to coastal erosion.
Coastal hazards	SBFO_CE_pct	1	0.029	Percentage of SBFO buildings exposed to coastal erosion.
Coastal hazards	Port	1	0.029	Presence of marine port infrastructure
Coastal hazards	Bridge_Scour	1	0.029	Number of bridges that are at risk from scour during a 100-year flood.
Coastal hazards	CRS_Rate	1	0.029	Community Rating System (NFIP) score for communities.
Coastal hazards	ImpervSurf_Pct	1	0.029	Percentage of impervious surface.
Coastal hazards	FIRM_Diff	1	0.029	Number of years difference between median year built and FIRM date.
Coastal hazards	FL_Haz_Area	1	0.029	Area of tract in 100-year flood hazard.
Coastal hazards	RepeatLoss	1	0.029	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 migitation 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

Table 9.3.2-1: Oregon Natural Hazard Risk Assessment Rank Compared to the National Risk Index

Census Tract	County	Oregon Rank Coastal Hazards	National Risk Index Classification*	People Exposed Coastal Flooding **
41039000500	Lane	1	Relatively moderate	3
41015950100	Curry	2	Relatively low	111
41015950201	Curry	3	Relatively moderate	95

41015950202	Curry	4	Relatively moderate	49
41041951700	Lincoln	5	Relatively low	71
41041950601	Lincoln	6	Relatively high	338
41041950100	Lincoln	7	Relatively moderate	19
41041951200	Lincoln	8	Relatively moderate	47
41015950401	Curry	9	Relatively moderate	41
41041951500	Lincoln	10	Relatively moderate	128

*Compared to census tracts nationwide

**From the FEMA NRI

Table 9.3.2-2: Top 10 Census Tract Demographics

Census Tract	Coastal Flooding Risk Rank	2020 Population[1]	2023 Population[2]	% Change in Population	2016 SVI[3]	2022 SVI[4]	Change in SVI
41039000500	1	2244	2148	-4%	0.53	0.56	0.02
41015950100	2	3296	3226	-2%	0.66	0.56	-0.10
41015950201	3	3513	3730	6%	#N/A	0.80	#N/A
41015950202	4	1923	2074	8%	#N/A	0.34	#N/A
41041951700	5	2475	2163	-13%	0.67	0.77	0.11
41041950601	6	2662	2758	4%	0.35	0.28	-0.08
41041950100	7	3450	2639	-24%	0.55	0.66	0.11
41041951200	8	2166	2501	15%	0.24	0.46	0.22
41015950401	9	2925	2723	-7%	#N/A	0.53	#N/A
41041951500	10	2953	3040	3%	0.19	0.21	0.02

[1] 2020 Decennial Census Census Tract Level Population Data HC2020.P1 - 2020 data was used rather than 2018 due to changes in census tract boundaries in 2020

[2] 2023 ACS 5-Year Estimates Census Tract Level Age and Sex Data S0101

[3] 2016 US CDC Social Vulnerability Index - "#N/A" cells represent census tracts that did not exist before changes to census tract boundaries in 2020

[4] 2022 US CDC Social Vulnerability Index

Coastal Flood Rank 1, Lane County in the vicinity of Mapleton 41039000500

This rural census tract includes the unincorporated community of Mapleton. The NRI reports a relatively moderate risk of coastal and riverine flooding, with a score of 94.7 and 89 respectively. Approximately 30% of the census tract population is exposed to flood risk (669 people). The Oregon risk assessment shows a much higher than statewide average repetitive losses due to flood. A higher than stateside average percent of buildings in the census tract are exposed to flood risk. The risk assessment also shows a higher than stateside average highway miles, bridge scour potential. Hospital distance is further than statewide average. The census tract has a higher-than-average CRE score and lower social cohesion scores indicating social vulnerability.

Figure 9.3.2-2: First ranked census tract for coastal hazards

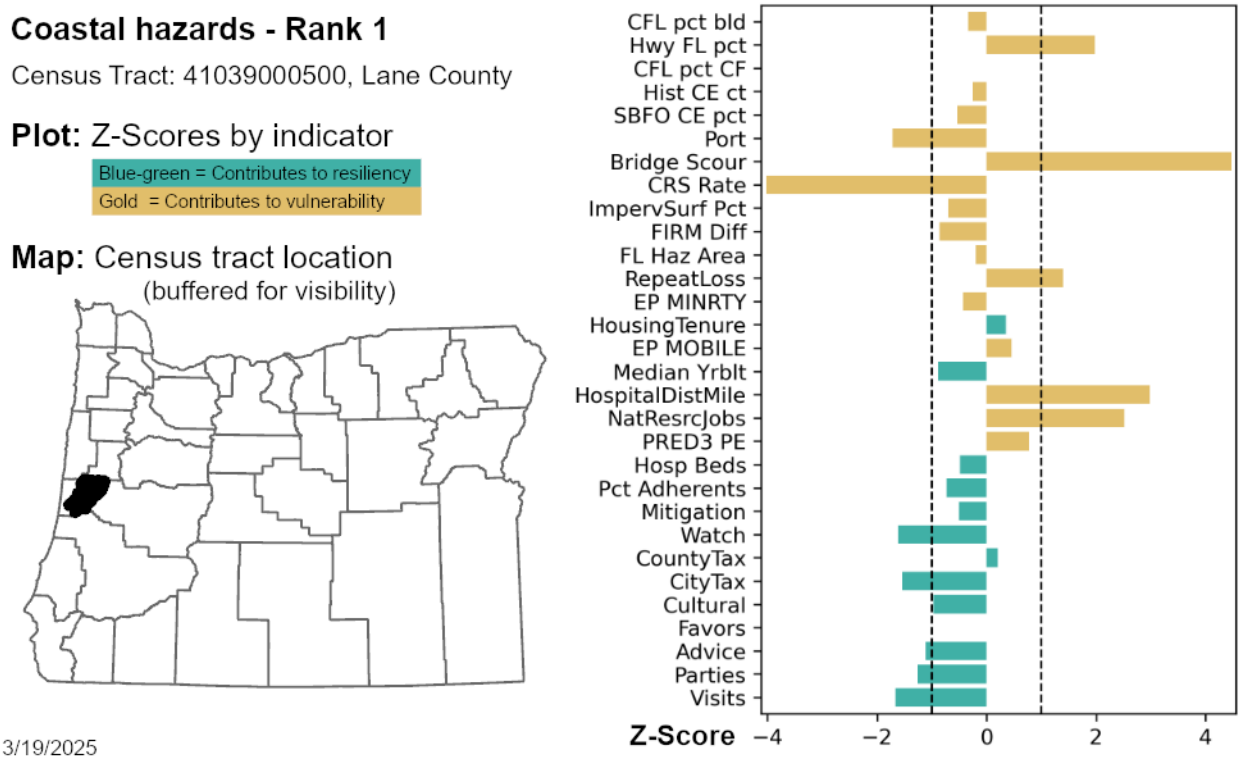


Table 9.3.2-3: State-owned Buildings or Critical Facilities identified in the coastal hazard zone

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

Coastal Flood Risk 2 – Curry County including Port Orford 41015950100

This rural census tract includes the City of Port Orford. The NRI classifies the census tract as low risk for coastal flood and high risk of riverine flood, with scores of 92.3 and 97.5 respectively. Three percent of the census tract population is exposed to these hazards. The Oregon risk assessment indicates that risk is driven by high bridge scour potential, high number of natural resources jobs, low county tax rates, and low social cohesion relative to other coastal census tracts.

Figure 9.3.2-3: Second ranked census tract for coastal hazards

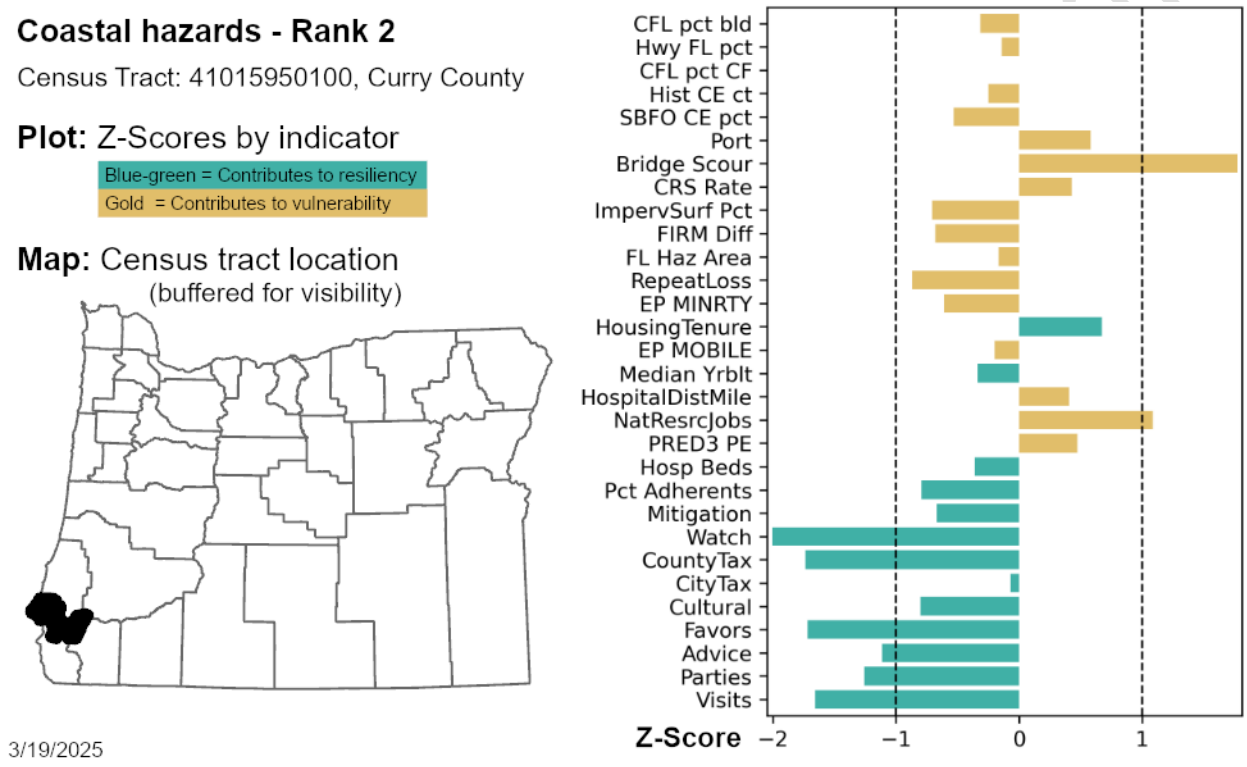


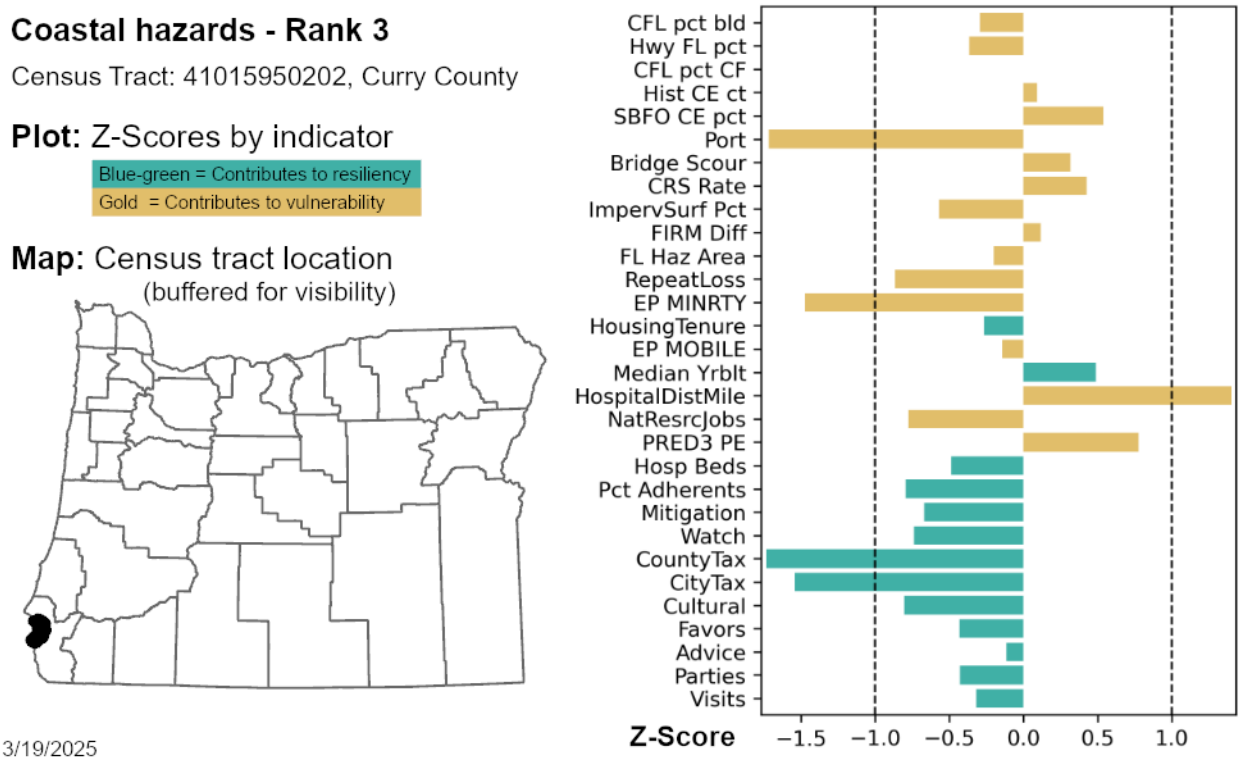
Table 9.3.2-4: State-owned Buildings or Critical Facilities identified in the coastal hazard zone

	Building Name 41015950100	Value ($)
SOB	Communications Structure	463,050
SOB	Cape Blanco Airport	60,668

Coastal Flood Rank 3 -- Curry County including the unincorporated communities of Nesika and Wedderburn, north of the City of Gold Beach 41015950202

This census tract is mostly rural but includes the unincorporated communities of Nesika and Wedderburn. The NRI rates the census tract as having a moderate risk of coastal flooding and a very high risk of riverine flooding, with scores of 94.1 and 99.1 respectively. Approximately 12 percent of the census tract population is exposed to flood risk (224 people). The Oregon risk assessment indicates that drivers of risk include long distance to a hospital and low county tax rates when compared to other coastal census tracts.

Figure 9.3.2-4: Third ranked census tract for coastal hazards



No state-owned buildings or critical facilities identified in the coastal hazard zone.

Coastal Flooding Rank 4 – Curry County, including Gold Beach 41015950201

This coastal census tract includes the City of Gold Beach. The NRI ranks this census tract as having moderate coastal flood risk and high riverine flood risk, with scores of 93.5 and 98.5 respectively. Eight percent of the census tract population is exposed to these hazards (281 people). The Oregon risk assessment indicates that a high number of mobile homes, high number of natural resource jobs, and low county tax rates drive risk when compared to other coastal census tracts.

Figure 9.3.2-5: Fourth ranked census tract for coastal hazards

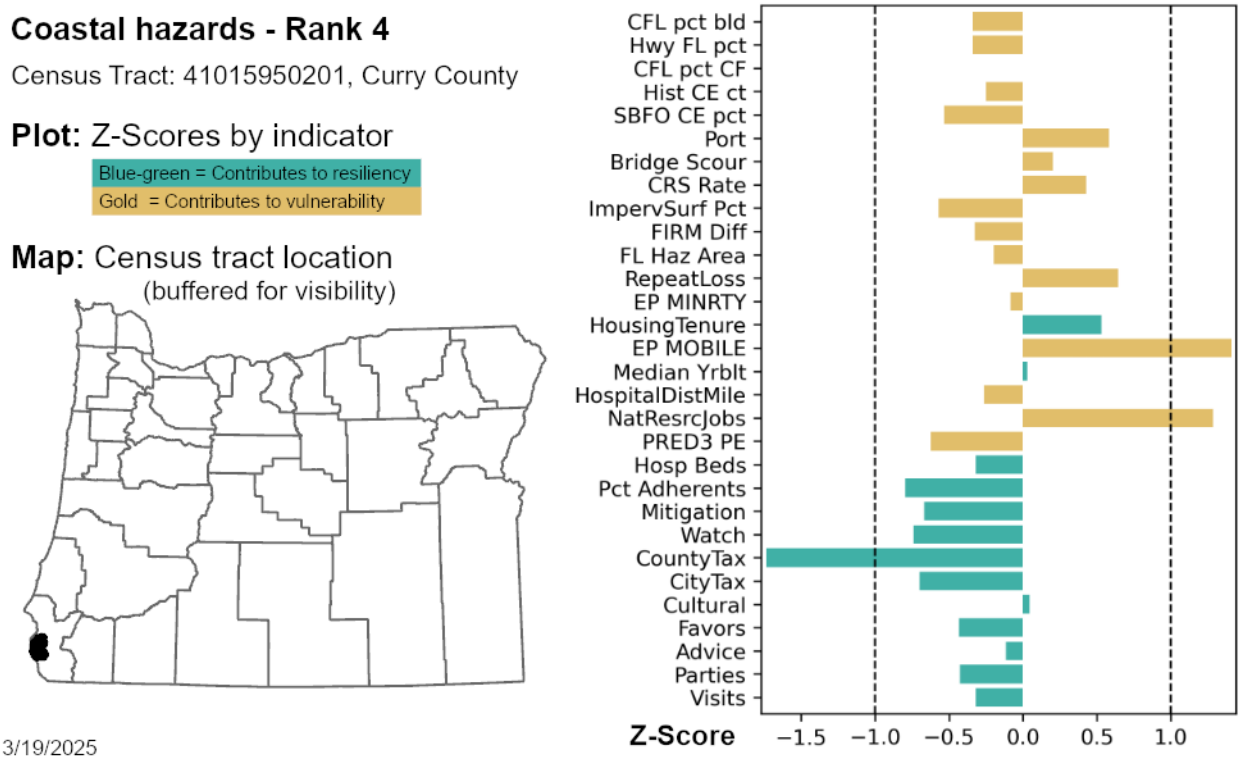


Table 9.3.2-5: Critical Facilities identified in the Coastal Hazard Zone

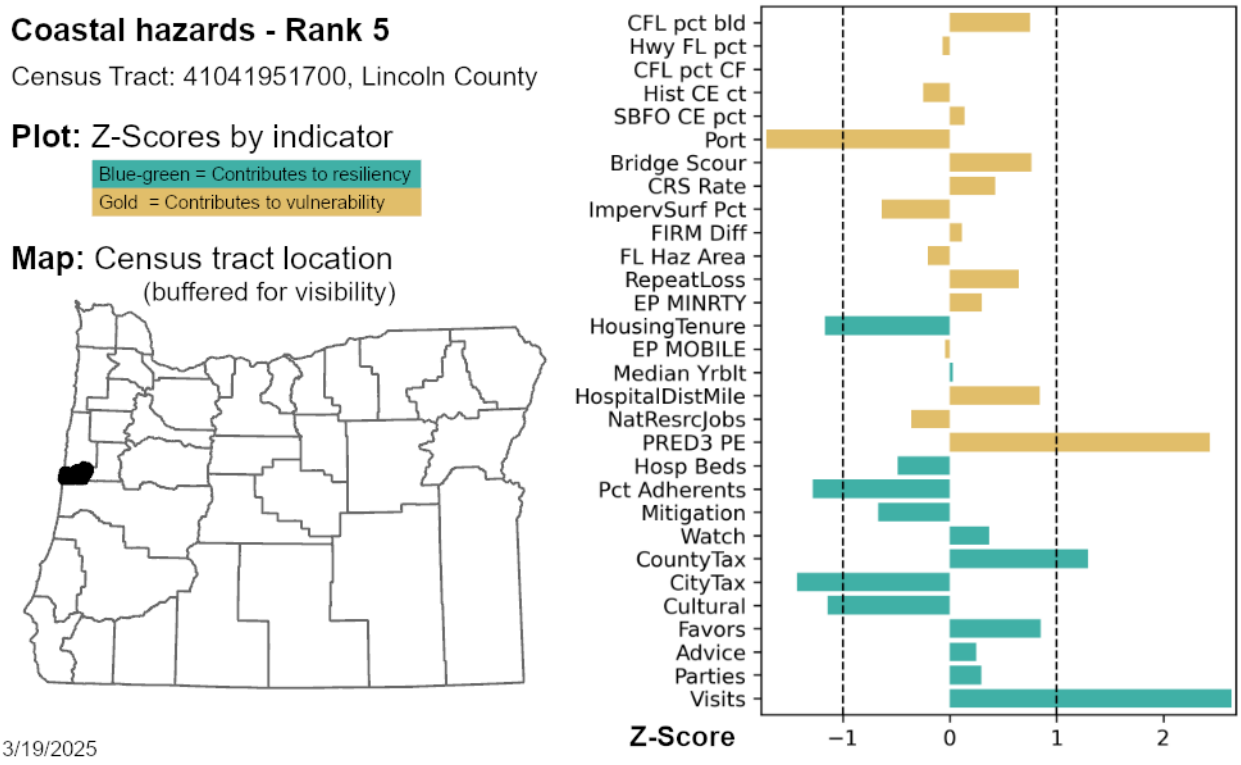
	Building Name 41015950201	Value	Flood Losses
Critical facility	Communications Structure	1,679,700	259,993
Critical facility	Gold Beach Muni	2,088,716	484641

No state-owned buildings identified in the coastal hazard zone.

Coastal Flooding Rank 5 – Lincoln County including the City of Yachats 41041951700

This mostly rural coastal census tract includes the City of Yachats. The NRI ranks the census tract low for coastal flooding and moderate for riverine flooding, with scores of 92.6 and 90.7 respectively. Approximately 9 percent of the census tract population is exposed to these flood hazards (222 people). The Oregon risk assessment finds that risk is dominated by low community resilience although social cohesion scores are near average for the coastal census tracts. City tax rates are also lower than for other coastal census tracts, but county tax rate is higher.

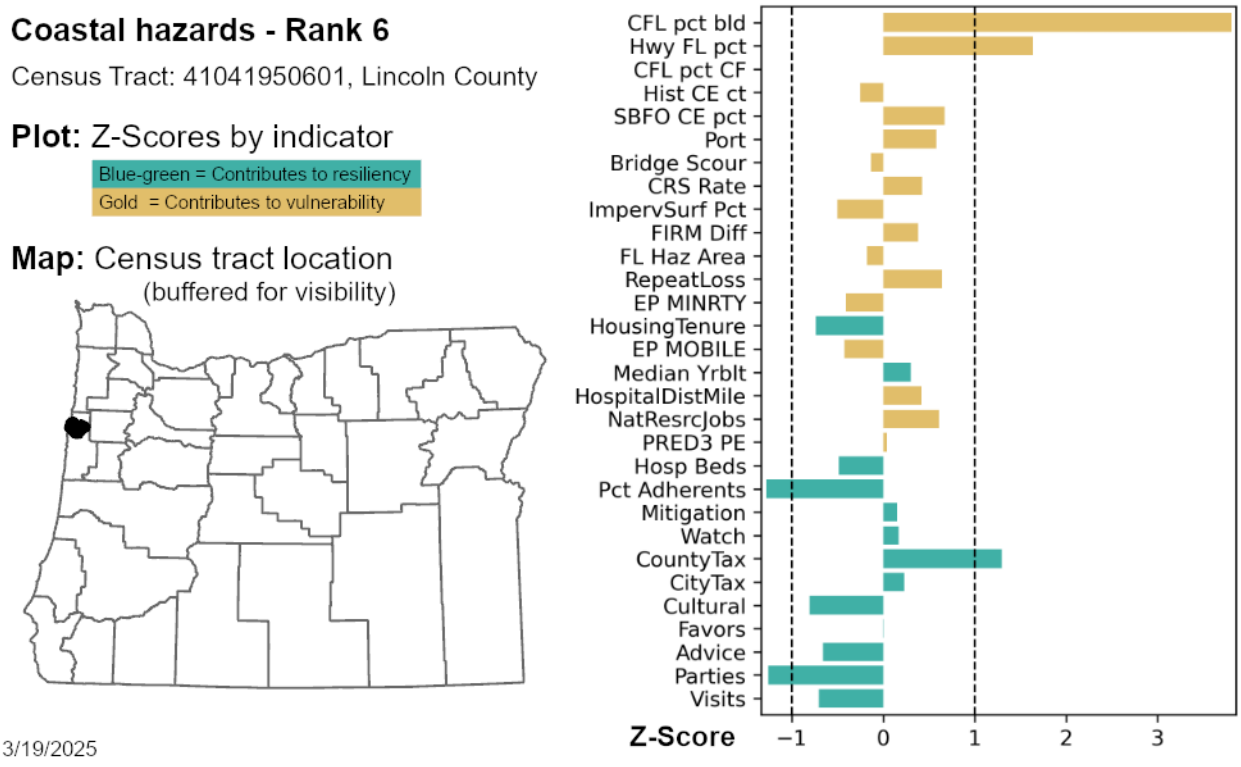
Figure 9.3.2-6: Fifth ranked census tract for coastal hazards



No state-owned Buildings or Critical Facilities identified in the coastal hazard zone. 41041951700

Coastal Flooding Rank 6 – Lincoln County in the vicinity of Otis and Rose Lodge 41041950601

Figure 9.3.2-7: Sixth ranked census tract for coastal hazards

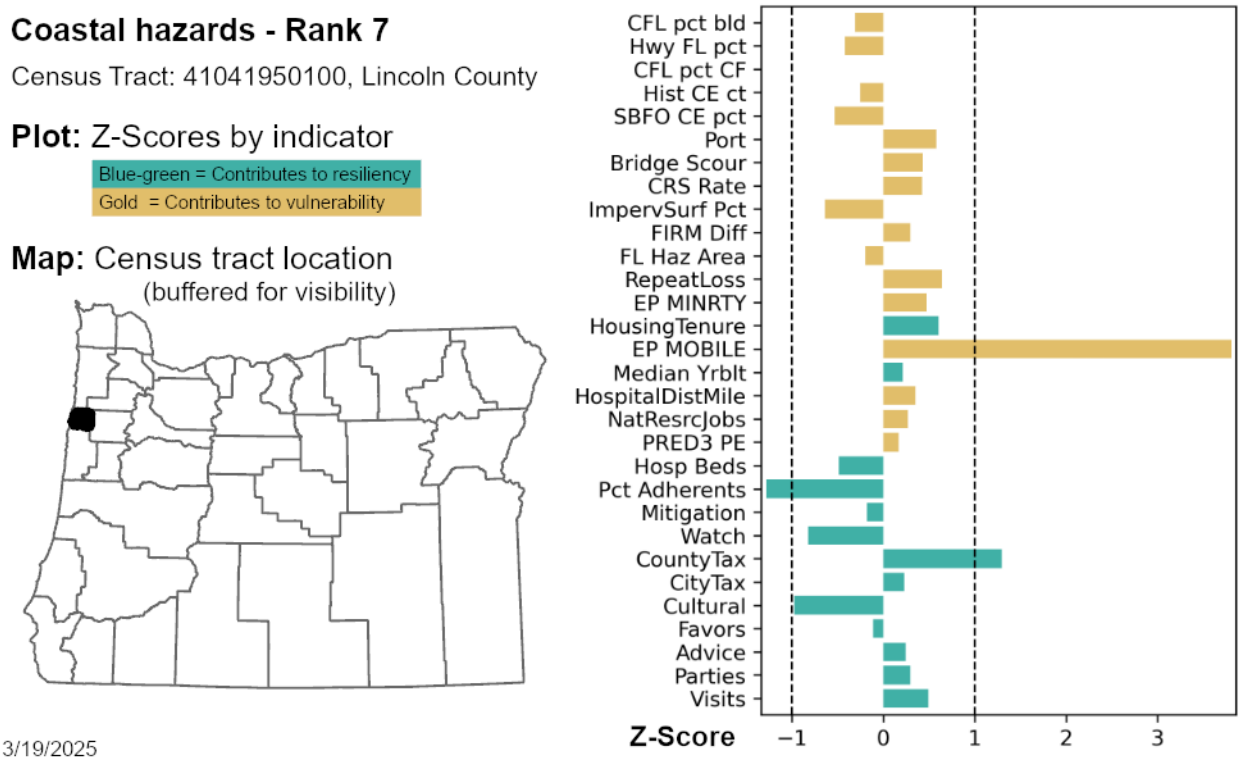


No state-owned buildings or critical facilities identified in coastal flood hazard zone. (Note: this may be an error since CFL_pct_bld shows a z-score above 1.)

Coastal Flooding Rank 7 – Lincoln County in the vicinity of Otis and Rose Lodge 41041950100

The NRI ranks this rural census tract as at moderate risk of coastal and riverine flooding, with scores of 95.6 and 88.8 respectively. Seven percent of the census tract population is exposed to these flood hazards (251 people). Risk is dominated by a much higher than average number of mobile homes when compared to other coastal census tracts.

Figure 9.3.2-8: Seventh ranked census tract for coastal hazards

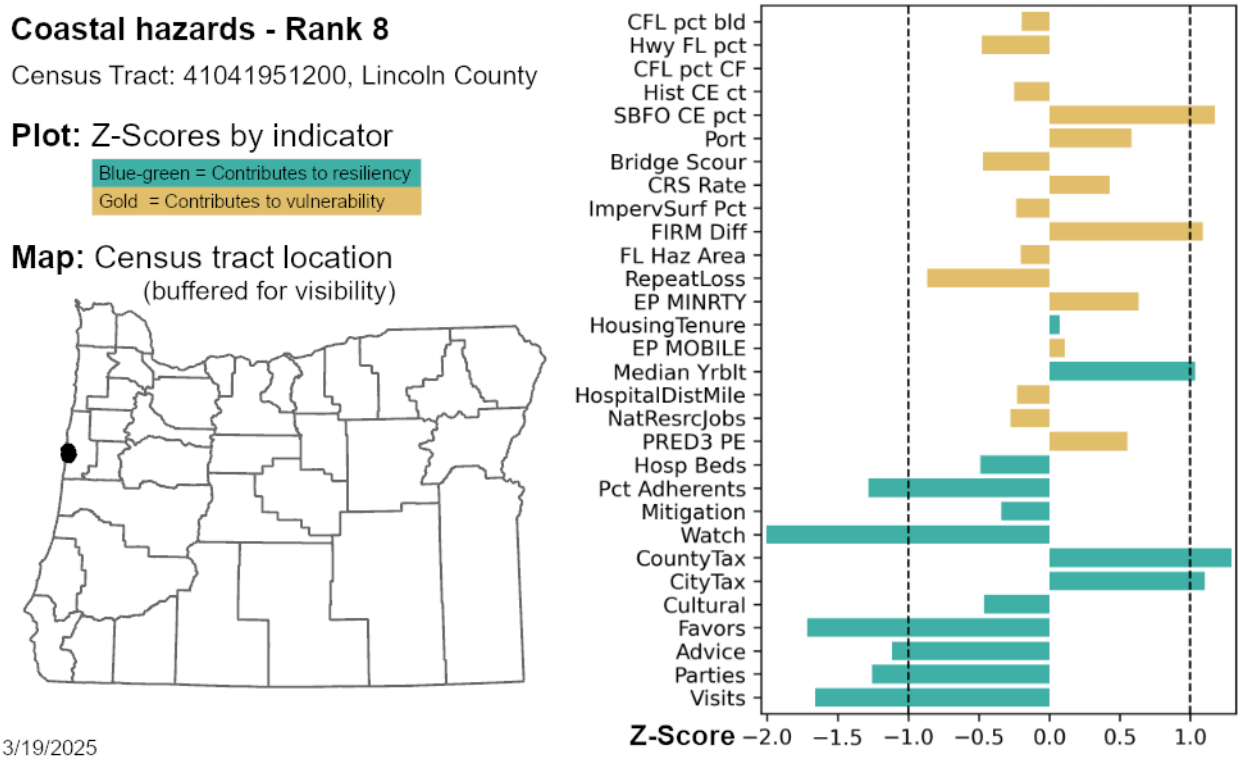


No state-owned buildings or critical facilities identified in coastal hazard zones.

Coastal Flooding Rank 8– Lincoln County 41041951200

Risk in this census tract is driven by a high percent of buildings located in coastal erosion zone.

Figure 9.3.2-9: Eighth ranked census tract for coastal hazards



No state-owned buildings or critical facilities identified in coastal hazard zones.

Coastal Hazards 9 – Curry County 41015950401

This census tracts abuts 41015950301 (Coastal Hazards rank 9). It is also rural and includes unincorporated communities near the Chetco River. According to the NRI it is at relatively moderate risk of coastal flooding and relatively high risk for riverine flooding. Together approximately 4 percent of census tract population is exposed to flood risks. Oregon risk assessment risk drivers includes percent of buildings and highway miles in the census tract that are located in the flood zones relative to other coastal census tracts.

Figure 9.3.2-10: Tenth ranked census tract for coastal hazards

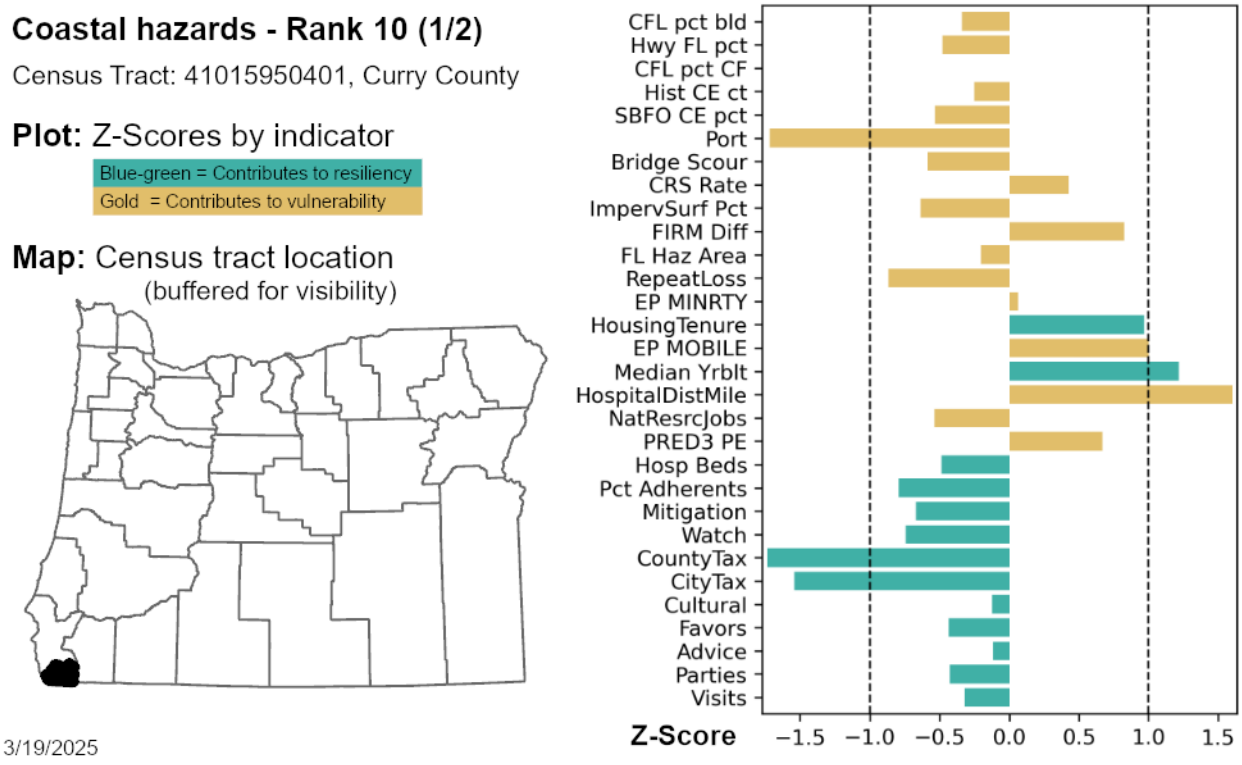
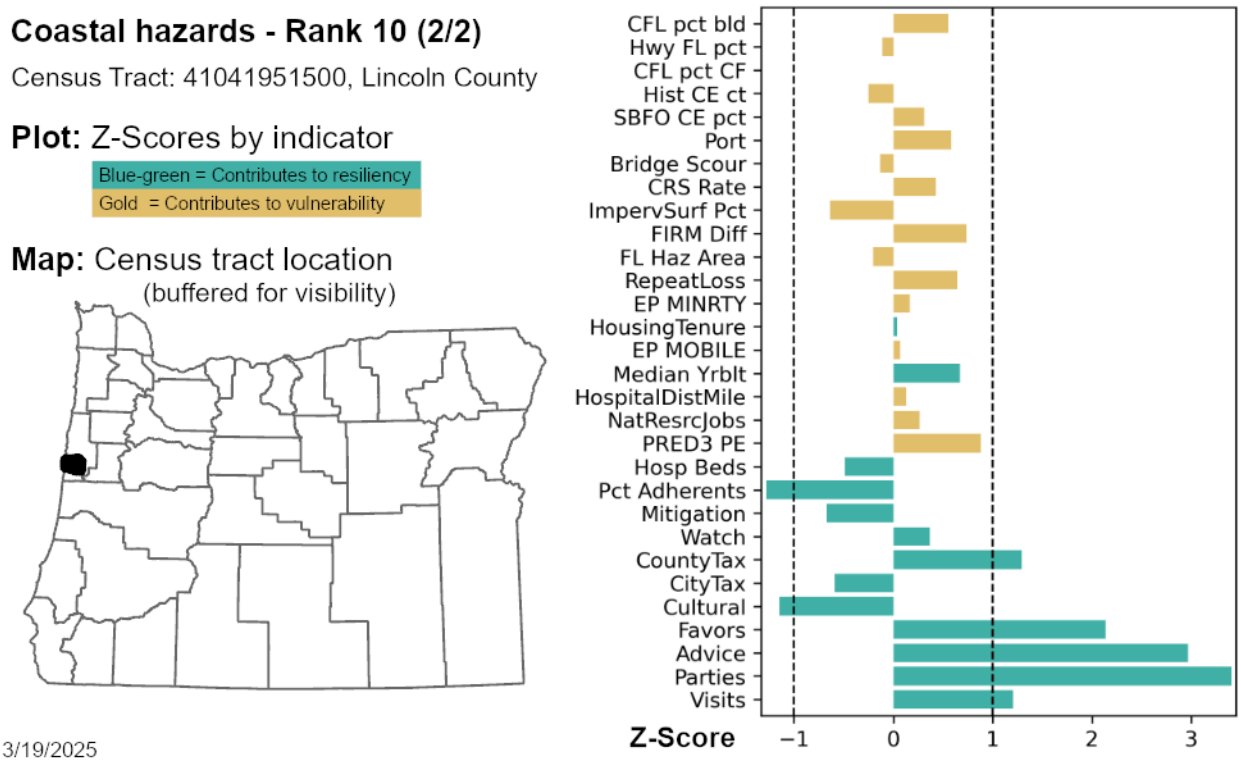


Table 9.3.2-6: State-owned Buildings or Critical Facilities identified in the coastal hazard zone

	Building Name 41015950401	Value ($)
State-owned	Crissey Field Welcome Center	3,959,447

Coastal Hazards 10 – Lincoln 41041951500

Figure 9.3.2-11: Tenth ranked census tract for coastal hazards



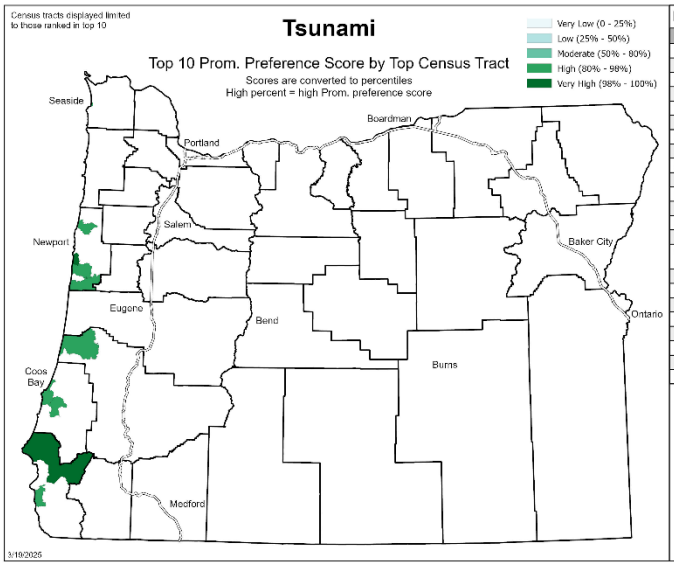
9.3.3 Tsunami

9.3.3.1 Hazard Scenario

Tsunami risks were evaluated based on exposure to any size (Sm-XXL) CSZ tsunami.

9.3.3.2 Top Ranked Tsunami Risk Areas

Figure 9.3.3-1: Top Ranked Risk Areas in the Tsunami Zone



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

Hazard	Indicator Name	Direction	Weight	Short Description
Tsunami	TSU_pct_bld	1	0.07	Percentage of SBFO buildings exposed to any sized CSZ tsunami.
Tsunami	TSU_pct_CF	1	0.07	Percentage of critical facilities exposed to any sized CSZ tsunami.
Tsunami	Port	1	0.07	Presence of marine port infrastructure
Tsunami	Bridges_TSU	1	0.07	Number of bridges that are within a tsunami inundation zone.
Tsunami	Hist_Tsu_ct	1	0.07	Percentage of historic buildings exposed to any sized CSZ tsunami.
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 migitation 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

Table 9.3.3-1: Oregon Natural Hazard Risk Assessment Rank Compared to the National Risk Index

Oregon Rank	Census Tract	County	National Risk Index Classification*	People Exposed to Tsunami**
1	41015950100	Curry	Relatively high	1402
2	41041951200	Lincoln	Relatively high	896
3	41041951700	Lincoln	Relatively high	2187
4	41041950601	Lincoln	Relatively moderate	1704
5	41015950201	Curry	Relatively high	2187
6	41007950900	Clatsop	Relatively high	4861
7	41011000502	Coos	Relatively moderate	1926

8	41019010000	Douglas	Relatively moderate	1538
9	41041951500	Lincoln	Relatively moderate	1203
10	41011000902	Coos	Relatively Low	185

*Compared to census tracts nationwide
** From the NRI accessed 03/26/2025

Table 9.3.3-2: Top 10 Census Tract Demographics

Census Tract	Tsunami Risk Rank	2020 Population[1]	2023 Population[2]	% Change in Population	2016 SVI[3]	2022 SVI[4]	Change in SVI
41015950100	1	3296	3226	-2%	0.66	0.56	-0.15
41041951200	2	2166	2501	15%	0.24	0.46	0.95
41041951700	3	2475	2163	-13%	0.67	0.77	0.16
41041950601	4	2662	2758	4%	0.35	0.28	-0.21
41015950201	5	3513	3730	6%	#N/A	0.80	#N/A
41007950900	6	4861	4793	-1%	0.89	0.86	-0.04
41011000502	7	2977	2494	-16%	0.66	0.56	-0.15
41019010000	8	2320	2434	5%	0.79	0.44	-0.44
41041951500	9	2953	3040	3%	0.19	0.21	0.13
41011000902	10	3684	3390	-8%	#N/A	0.81	#N/A

[1] 2020 Decennial Census Census Tract Level Population Data HC2020.P1 - 2020 data was used rather than 2018 due to changes in census tract boundaries in 2020

[2] 2023 ACS 5-Year Estimates Census Tract Level Age and Sex Data S0101

[3] 2016 US CDC Social Vulnerability Index - "#N/A" cells represent census tracts that did not exist before changes to census tract boundaries in 2020

[4] 2022 US CDC Social Vulnerability Index

Tsunami Rank 1 – Curry County including the City of Port Orford 41015950100

Tsunami risk in this census tract is dominated by a higher-than-average number of bridges within the tsunami inundation zone, a higher-than-average number of natural resource dependent jobs, lower than average county property tax rates, and lower than average social cohesion. The NRI estimates that 1402 or 42 percent of the census tract population is exposed to the tsunami inundation area. The NRI rates this census tract as relatively high for tsunami risk.

Figure 9.3.3-2: First ranked census tract for tsunami hazard

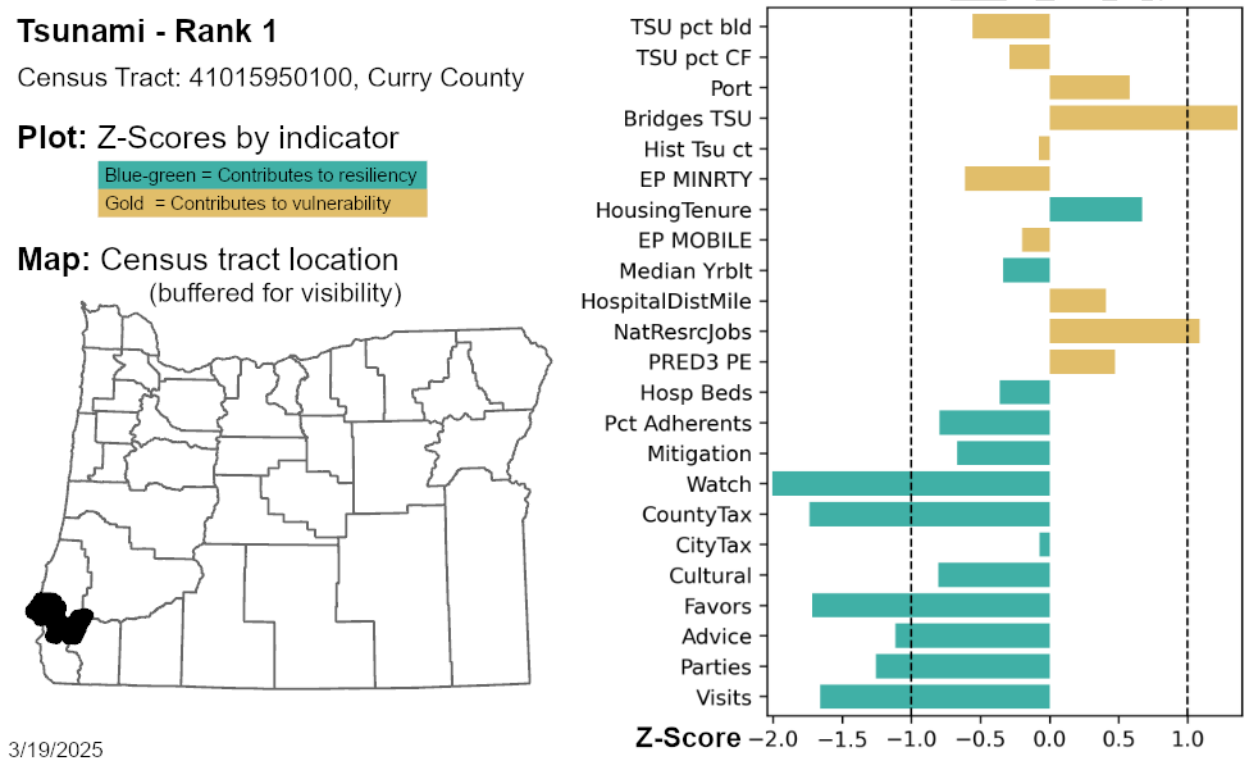


Table 9.3.3-3: Critical Facilities in Tsunami XXL Zone

	Building Name 41015950100	Value ($)	Losses ($)
Critical facility	Driftwood Elementary School	997771	
Critical facility	CURRY FAMILY MEDICAL	178464	
Critical facility	PORT ORFORD POLICE DEPARTMENT	173340	
Critical facility	Port Orford RFPD	273150	

No state-owned buildings located in tsunami zone.

Tsunami Rank 2 -- Lincoln County 41041951200

Tsunami risk in this census tract is driven by the high percentage of people exposed to the hazard. The NRI estimates that 896 people or 41 percent of the population are exposed. The Oregon risk assessment finds a higher-than-average number of historic buildings exposed to the hazard. The Yaquina Bay and Yaquina Head Lighthouses are located in the XXL tsunami zone. The area is characterized by lower-than-average social cohesion. The NRI rates this census tract as being at relatively high risk for harm caused by tsunami.

Figure 9.3.3-3: Second ranked census tract for tsunami hazard

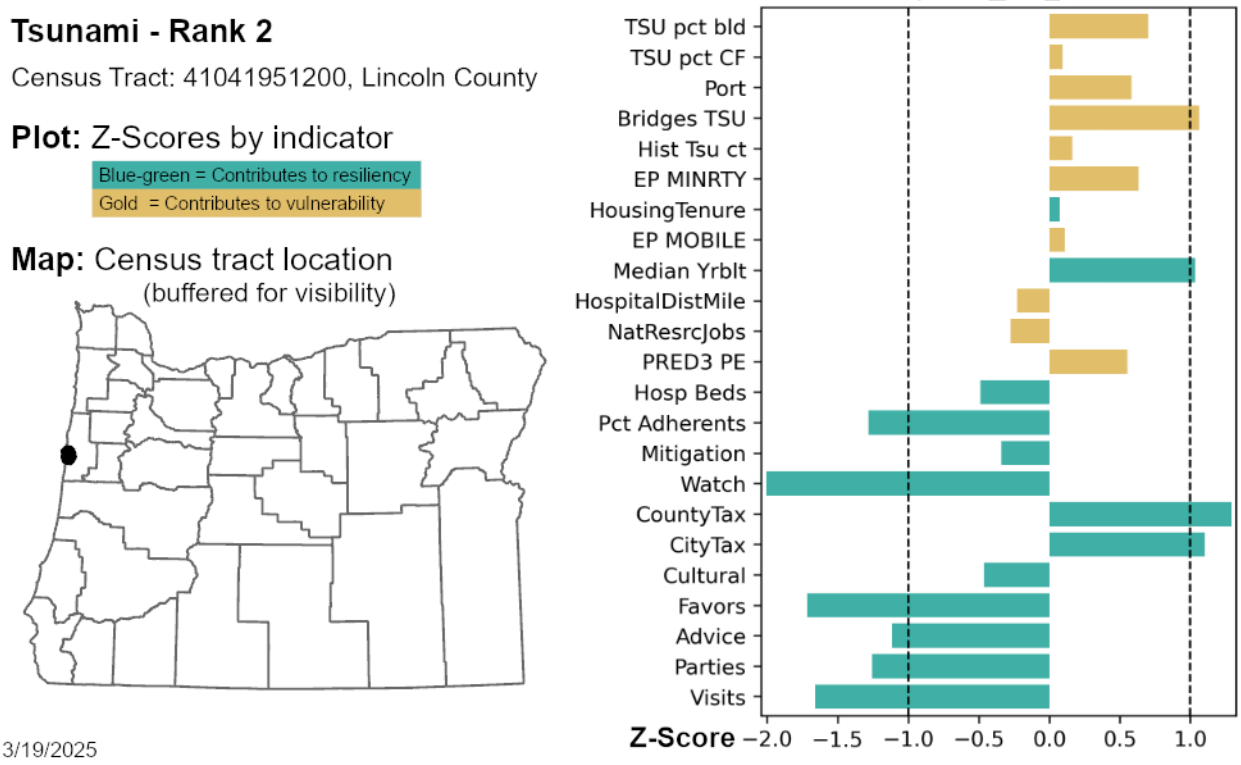


Table 9.3.3-4: State-owned Buildings or Critical Facilities in Tsunami XXL Zone

	Building Name 41041951200	Value ($)	Source
State-owned	Ona Beach	179311	
State-owned	Lost Creek State Park Day Use	101603	
State-owned	South Beach State Park	6528638	
State-owned	Yaquina Bay Lighthouse	unkbown	RAPT

	Building Name 41041951200	Value ($)	Source
State-owned	Marine Resources Program	3523355	
Critical facility	Communication Structure	1651200	
Critical facility	Communication Structure	103650	

Tsunami Rank 3 – Lincoln County in the vicinity of Yachats 41041951700

Figure 9.3.3-4: Third ranked census tract for tsunami hazard

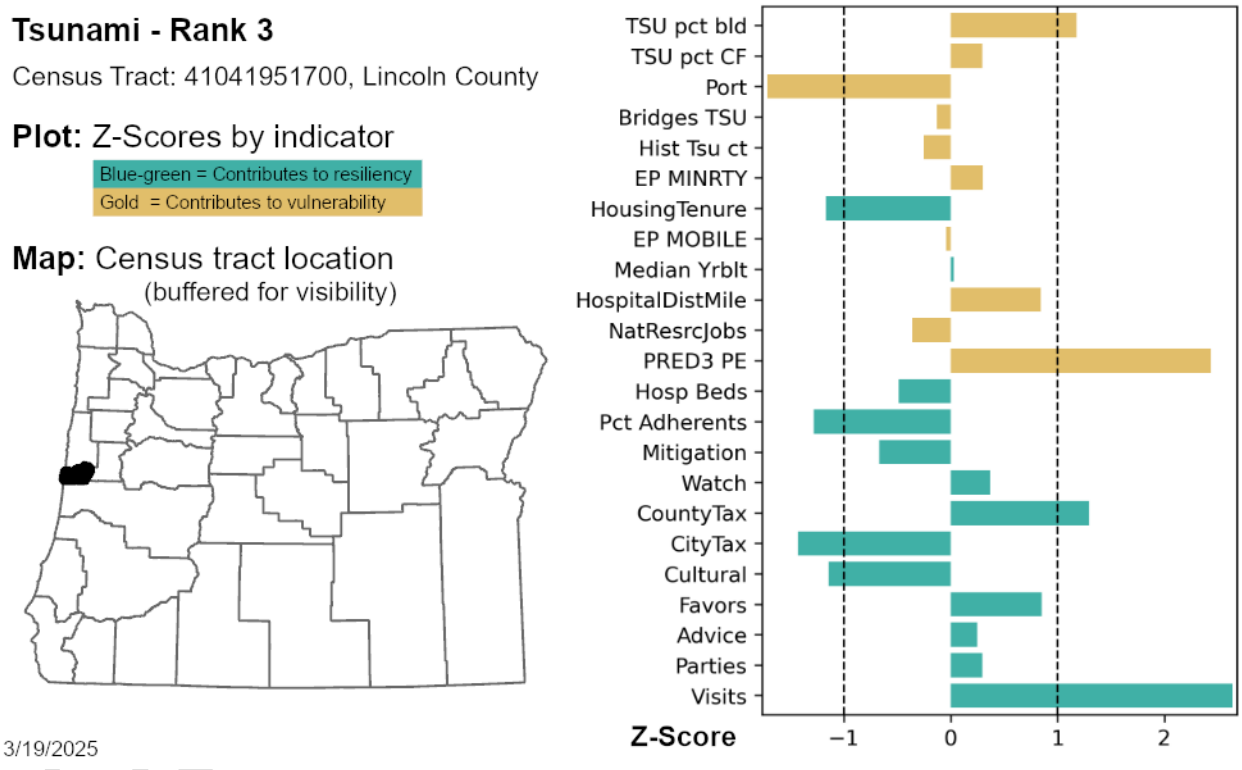


Table 9.3.3-5: Critical Facilities in Tsunami XXL Zone

	Building Name 41041951700	Value	Source
Critical facility	Yachats Rural Fire Protection District Station 8200		RAPT
Critical facility	Yachats Rural Fire Protection District, South Station		RAPT

Critical facility	Yachats STP (wastewater)		RAPT

No state-owned buildings locate in tsunami zone.

Tsunami Rank 4 – Lincoln County in the vicinity of Kernville 41041950601

This census tract includes significant development with the Oregon risk assessment showing a higher-than-average percentage of buildings, critical facilities, and historic sites when compared to other coastal census tracts. The NRI estimates 1704 people or 65 percent of the population of the census tract is exposed to the hazard. The NRI classifies the area as at relatively moderate risk of harm from tsunami.

Figure 9.3.3-5: Fourth ranked census tract for tsunami hazard

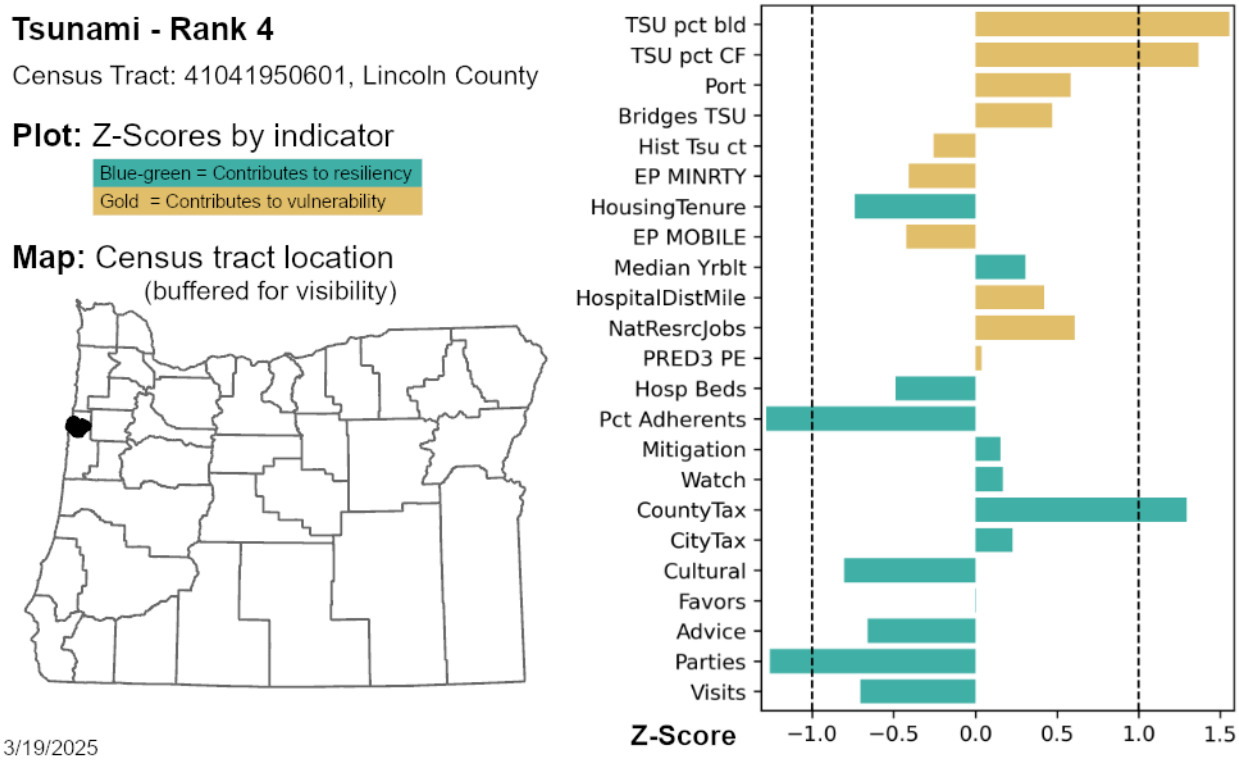


Table 9.3.3-6: State-owned Buildings or Critical Facilities in Tsunami XXL Zone

	Building Name 41041950601	Value ($)
State-owned	Gleneden Beach Recreation Area	358410
Critical facility	Communication Structure	16957
Critical facility	Communication Structure	16957
Critical facility	Depoe Bay Fire District - Station 2200	422087
Critical facility	North Lincoln Fire and Rescue - Kernville Station 1700	115940
Critical facility	SALISHAN STP	85650

	Building Name 41041950601	Value ($)
Critical facility	LINCOLN CITY, CITY OF	601350

Tsunami Rank 5 – Curry County including the City of Gold Beach 41041951700

Sixty-two percent of people living in this census tract are directly exposed to tsunami risk, 2187 people. The area is characterized in the Oregon risk assessment as having a higher-than-average percent when compared to other coastal census tracts of critical facilities, people living in mobile home, and people dependent on natural resource jobs exposed to the hazard. County property taxes are lower than average. The NRI rates this census tract as at relatively high risk of tsunami damage.

Figure 9.3.3-6: Fifth ranked census tract for tsunami hazard

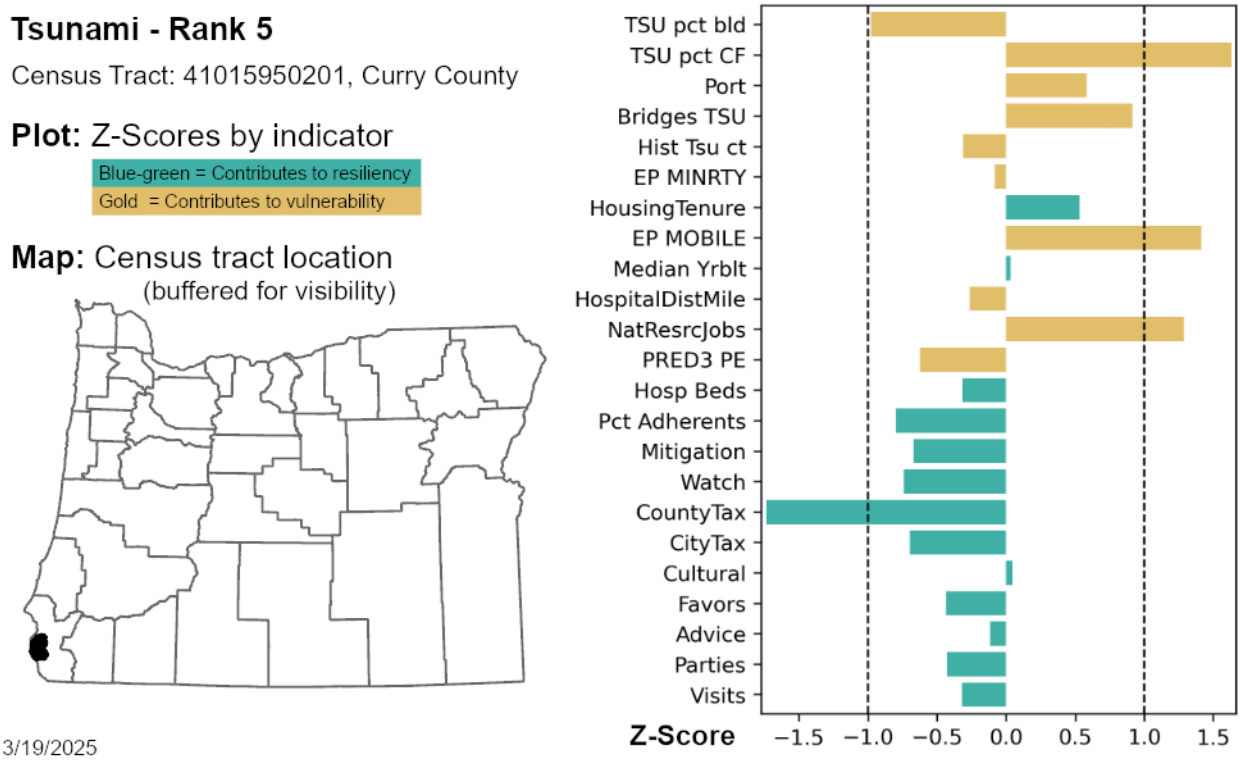


Table 9.3.3-7: State-owned Buildings or Critical Facilities in Tsunami XXL Zone

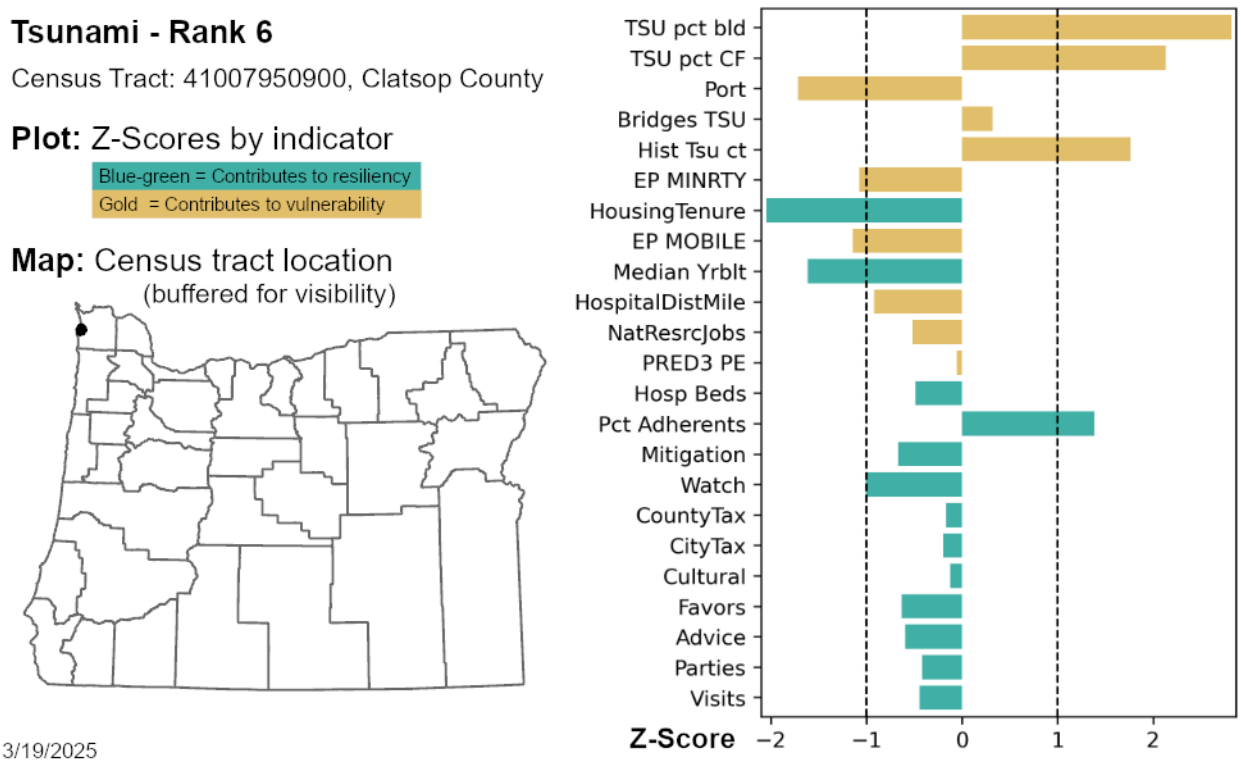
	Building Name 41041951700	Value ($)	Source
State-owned	Hunter Creek Maintenance Station Grounds	249130	DOGAMI/DAS
State-owned	Hunter Creek Maintenance Station Grounds	840392	DOGAMI/DAS
State-owned	Hunter Creek Maintenance Station Grounds	682532	DOGAMI/DAS
State-owned	Unknown	929953	DOGAMI/DAS
State-owned	OR State Police Gold Beach Work Site		RAPT

	Building Name 41041951700	Value ($)	Source
State-owned	Curry County Circuit Court	60668	DOGAMI/DAS
Critical facility	Riley Creek Elementary School	3245302	DOGAMI
Critical facility	Riley Creek Elementary School	96624	DOGAMI
Critical facility	Riley Creek Elementary School	364100	DOGAMI
Critical facility	Gold Beach High School	2985321	DOGAMI
Critical facility	Gold Beach High School	219421	DOGAMI
Critical facility	Gold Beach High School	173833	DOGAMI
Critical facility	Gold Beach High School	501716	DOGAMI
Critical facility	Gold Beach High School	97350	DOGAMI
Critical facility	Gold Beach Public Works, multiple buildings	495860	DOGAMI
Critical facility	Communication Structure	1679700	DOGAMI
Critical facility	Communication Structure	496850	DOGAMI
Critical facility	Communication Structure	730650	DOGAMI
Critical facility	Curry General Hospital - Gold Beach	555600	DOGAMI
Critical facility	NORTH BEND MEDICAL CENTER-GOLD BEACH	950400	DOGAMI
Critical facility	North Bend Medical Center duplicate?	950400	DOGAMI
Critical facility	Curry General Hospital	189300	DOGAMI
Critical facility	CURRY COUNTY SHERIFFS OFFICE and JAIL	2731050	DOGAMI
Critical facility	GOLD BEACH POLICE DEPARTMENT	516229	DOGAMI
Critical facility	ROGUE RIVER-SISKIYOU NATIONAL FOREST LAW ENFORCEMENT - GOLD BEACH RANGER DISTRICT	425100	DOGAMI
Critical facility	Gold Beach Fire Department	536643	DOGAMI
Critical facility	Pistol River RFPD	1960	DOGAMI
Critical facility	Pistol River RFPD	4259	DOGAMI
Critical facility	Gold Beach Muni	2088716	DOGAMI
Critical facility	Curry Emergency Operations Center	2731050	DOGAMI

Tsunami Rank 6 – Clatsop County, including the City of Seaside 4107950900

Risk in this census tract is driven by the high percentage of buildings and critical facilities located in the tsunami zone.

Figure 9.3.3-7: Sixth ranked census tract for tsunami hazard



Need to identify critical facilities.

Tsunami Rank 7 – Coos County including Sunset Bay and Shore Acres State Parks 4101100502

This census tract is characterized in the Oregon risk assessment as having a higher than average percent of buildings, critical facilities, historic buildings, and people living in mobile homes when compared to other coastal census tracts. Approximately 1926 people are directly exposed to the hazard, or 44 percent of the census tract population. The NRI rates the areas as having a relatively moderate risk due to tsunami.

Figure 9.3.3-8: Seventh ranked census tract for tsunami hazard

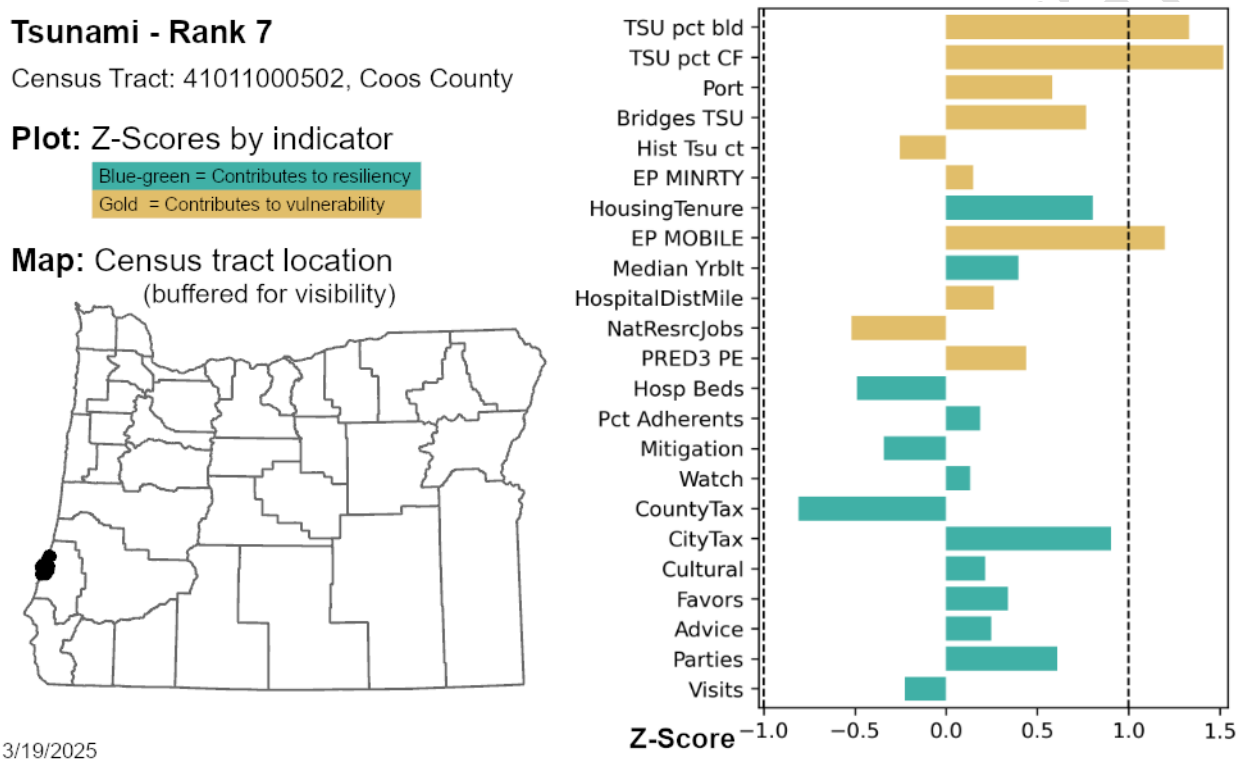


Table 9.3.3-8: State-owned Buildings or Critical Facilities in Tsunami XXL Zone

	Building Name 4101100502	Value ($)	Source
State-owned	Seven Devils Recreation Site	335287	
State-owned	Sunset Bay Campground	2421487	
State-owned	Unknown structures near Cape Argo	970505	
State-owned	Charleston District Office Building	44635	
Critical facility	Communication Structure	81150	
Critical facility	US Coast Guard - Station Coos Bay	2042006	

Critical facility	US Coast Guard - Navigation Team Coos Bay	1047136	
Critical facility	Charleston RFPD - Station 3	993482	DOGAMI
Critical facility	Charleston RFPC – Station 1		RAPT

Tsunami Rank 8 – Douglas County including the City of Reedsport 41019010000

The NRI rates this census tract, which includes the City of Reedsport, as relatively moderate risk of harm due to tsunami. Sixty-six percent, or 1538 people are directly exposed to the hazard according to the NRI. A higher than average when compared to other coastal census tracts of buildings, critical facilities, and bridges is reported by the Oregon risk assessment. Distance to hospital facilities is longer. Than average. County property tax rates are also relatively lower than in other census tracts. The US Census Bureau finds the tract to have high social vulnerability as compared to other coastal census tracts.

Figure 9.3.3-9: Eighth ranked census tract for tsunami hazard

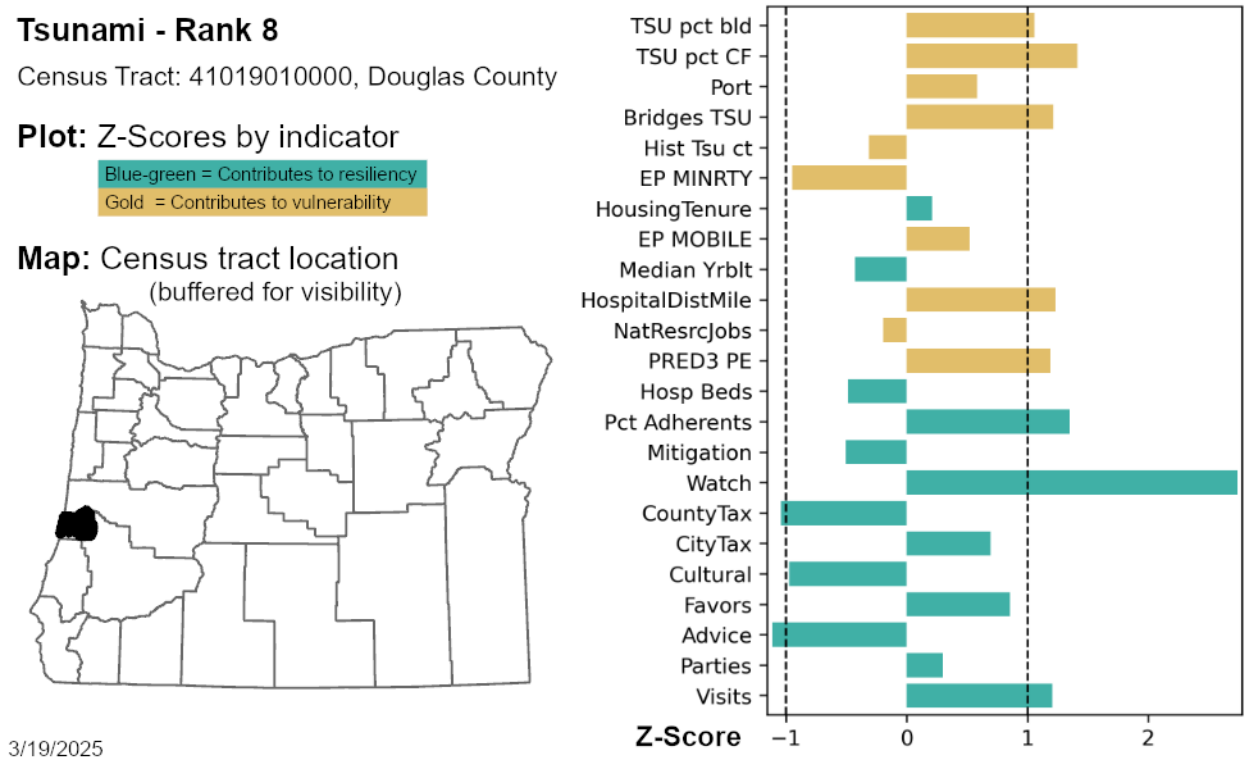


Table 9.3.3-9: State-owned Buildings or Critical Facilities in Tsunami XXL Zone

	Building Name 41019010000	Value ($)	Source
State-owned	Reedsport Maintenance Station Grounds	2262958	
Critical facility	Public Works - City Shop	88470	
Critical facility	Public Works - City Shop	34037	
Critical facility	Public Works - City Shop	8729	

	Building Name 41019010000	Value ($)	Source
Critical facility	Reedsport Public Works	97438	
Critical facility	Reedsport Public Works	68708	
Critical facility	Reedsport Public Works	31809	
Critical facility	Reedsport Public Works	12724	
Critical facility	Communication Structure	150900	
Critical facility	REEDSPORT POLICE DEPARTMENT	553960	
Critical facility	DOUGLAS COUNTY SHERIFFS OFFICE - REEDPORT SUBSTATION	850024	
Critical facility	Gardiner RFPD	204336	
Critical facility	Reedsport Fire Department - Station 1	553960	
Critical facility	REEDSPORT STP	214950	

Tsunami Rank 9 – Lincoln County 41041951500

Figure 9.3.3-10: Ninth ranked census tract for tsunami hazard

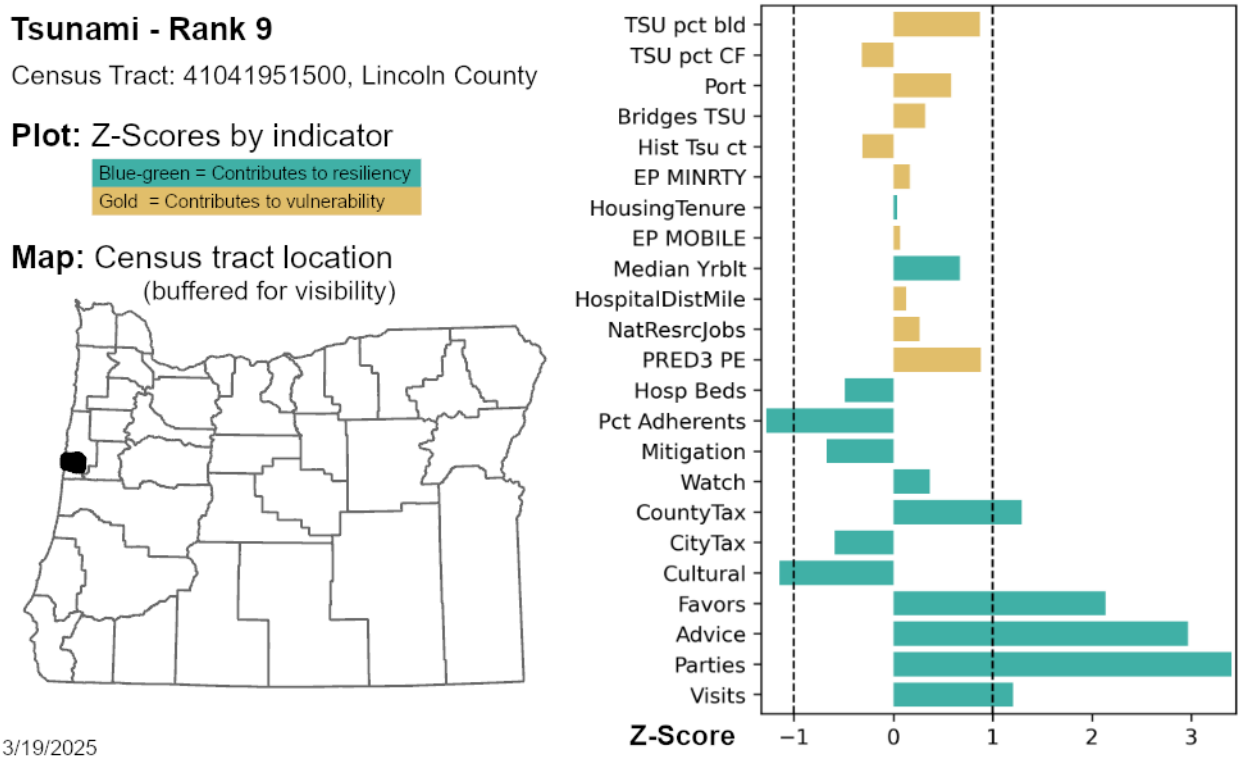


Table 9.3.3-10: State-owned Buildings or Critical Facilities in Tsunami XXL Zone

	Building Name 41041951500	Value	Source
State-owned	Brian Booth State Park		

Tsunami Rank 10 – Coos County in the vicinity of Coquille 41011000902

Tsunami risks in this census tract are dominated by a larger than average estimated percentage of BIPOC populations and a higher than average percentage of workers in natural resource jobs. The reasons for the risk assessment showing a higher that average proportion of critical facilities is not clear (Table xx). The NRI estimates that 185 residents, or 5 percent of the census tract population is exposed to tsunami risk. The census tract hosts the large Bullards Beach State Park Campground, which is serviced with electrical hook-ups, yurts, and a meeting room. This park attracts a large number of visitors who would be exposed to tsunami risk in addition to census tract residents. No Tribal census areas.

Figure 9.3.3-11: Tenth ranked census tract for tsunami hazard

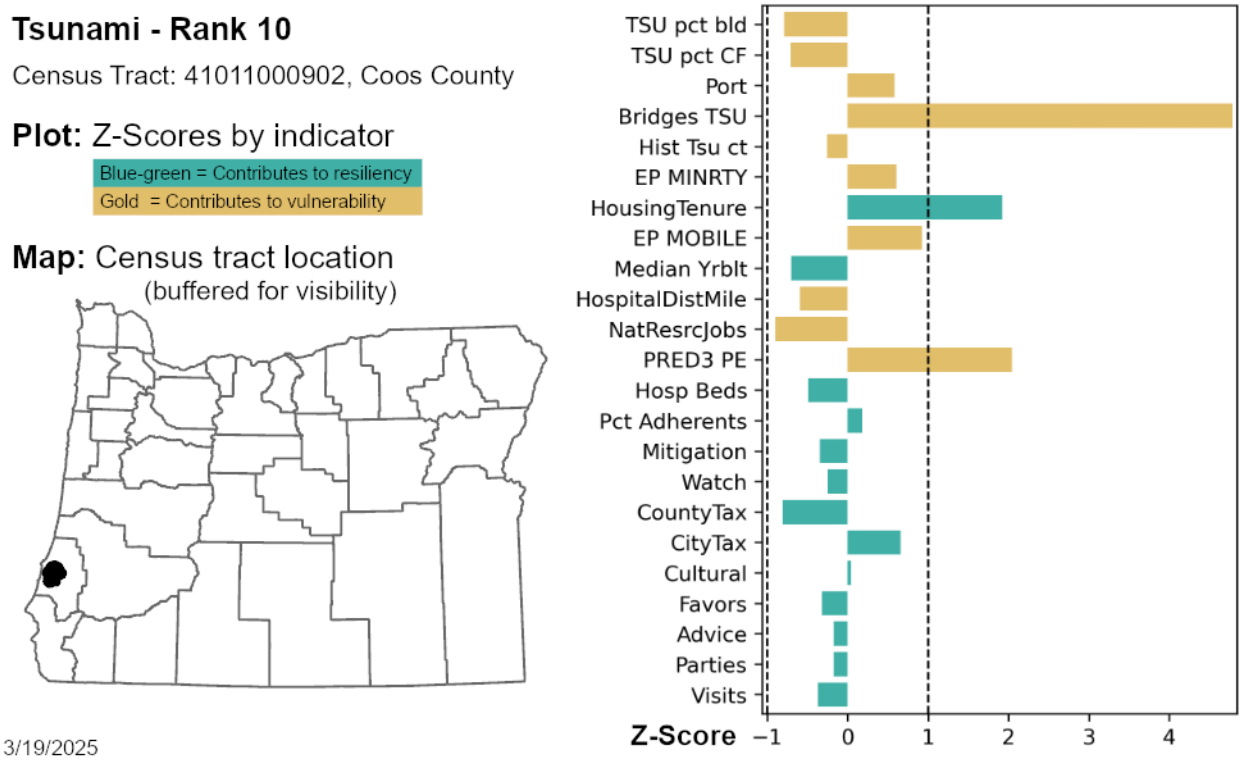


Table 9.3.3-11: State-owned Buildings or Critical Facilities in Tsunami XXL Zone

	Building Name 41011000902	Value ($)	Flood Losses
State-owned	Unknown structures off of Beach Loop Road	898857	
State-owned	Site Systems - Four Mile M/W Operating Grounds	44635	
State-owned	Four Mile M/W Building	53018	
State-owned	Coquille River Lighthouse	2935688	

State-owned	Bullards Beach State Park Campground	4473338	
Critical facility	Communication Structure	750000	

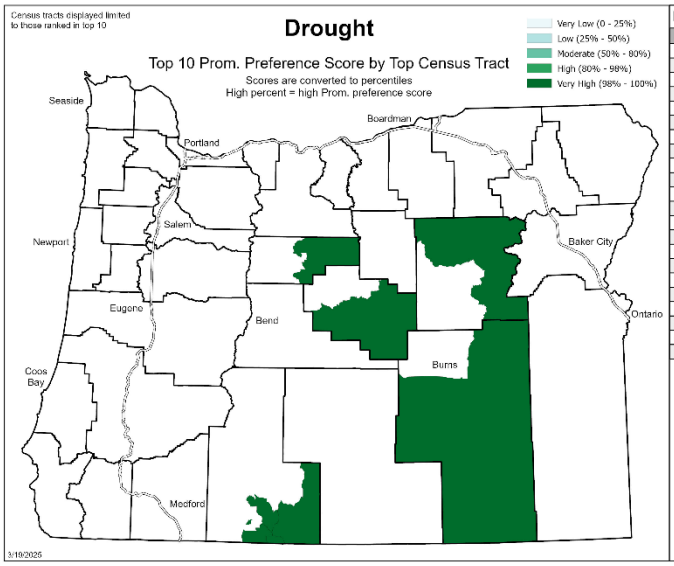
9.3.4 Drought

9.3.4.1 Hazard Scenario

Drought risk was evaluated using the number of drought events and annualized drought frequency as reported in the National Risk Index. According to NRI documentation, drought **annualized frequency** value represents the average number of recorded drought hazard occurrences (event-days) per year over the period of record (21.8 years).

9.3.4.2 Top Ranked Drought Risk Areas

Figure 9.3.4-1: Top Ranked Risk Areas in Drought Risk Areas



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

Hazard	Indicator Name	Direction	Weight	Short Description
Drought	Drght_NRI_rate	1	0.07	Drought rate from the NRI.
Drought	Drght_Events	1	0.07	Number of drought events from the NRI.
Drought	Drght_AL_AG	1	0.07	Annualized loss for agriculture from NRI.
Drought	Over90th	1	0.07	Mean days that are above the historic 90th percentile temp
Drought	Over90F	1	0.07	Mean days above 90 degrees Fahrenheit
General	EP_MINRTY	1	0.05	Percentage of Black, Indigenous, and People of Color (2020 Census).
General	HousingTenure	-1	0.05	Housing tenure from the US Census.
General	EP_MOBILE	1	0.05	Percentage of people that live in mobile homes
General	Median_Yrblt	-1	0.05	Median year built of general building stock based on HAZUS default.
General	HospitalDistMile	1	0.05	Distance from tract centroid to nearest hospital.
General	NatResrcJobs	1	0.05	Rate of natural resource jobs.
General	PRED3_PE	1	0.05	Community Resilience Estimate
General	Hosp_Beds	-1	0.05	Estimated number of hospital beds based on square footage .
General	Pct_Adherents	-1	0.05	Percentage of members to a religious group
General	Watch	-1	0.05	Neighborliness: Will watch neighbor's house
General	CountyTax	-1	0.05	County tax rate
General	CityTax	-1	0.05	City tax rate
General	Cultural	-1	0.01	Number of cultural-related buildings
General	Favors	-1	0.01	Neighborliness: Willing to do favors for neighbor
General	Advice	-1	0.01	Neighborliness: Seeks advice from neighbor
General	Parties	-1	0.01	Neighborliness: Attended parties that occur in neighborhood
General	Visits	-1	0.01	Neighborliness: Has visited neighbor's house

Table 9.3.4-1: NRI Risk Ranking

Oregon Rank	Census Tract	County	National Risk Index Hazard Rating
1	41025960200	Harney	Relatively Moderate
2	41035970700	Klamath	Relatively Moderate
3	41035970600	Klamath	Relatively Moderate
4	41013950402	Crook	Relatively Low
5	41035970400	Klamath	Relatively Moderate
6	41035971500	Klamath	Very Low
7	41035971200	Klamath	Very Low
8	41031960100	Jefferson	Relatively Low
9	41023960100	Grant	Relatively Low

Oregon Rank	Census Tract	County	National Risk Index Hazard Rating
10	41035970500	Klamath	Relatively Low

*Compared to census tracts nationwide

Table 9.3.4-2: Top 10 Census Tract Demographics

Census Tract	Drought Risk Rank	2020 Population[1]	2023 Population[2]	% Change in Population	2016 SVI[3]	2022 SVI[4]	Change in SVI
41025960200	1	2165	2261	4%	0.50	0.71	0.21
41035970700	2	2069	2361	14%	0.72	0.57	-0.16
41035970600	3	1472	1624	10%	0.88	0.87	-0.01
41013950402	4	2397	2739	14%	#N/A	0.51	#N/A
41035970400	5	1474	1679	14%	0.69	0.50	-0.19
41035971500	6	4309	4725	10%	0.95	0.94	-0.01
41035971200	7	2547	2156	-15%	0.88	0.91	0.03
41031960100	8	2482	2163	-13%	0.38	0.50	0.13
41023960100	9	2050	2214	8%	0.62	0.65	0.03
41035970500	10	1608	1663	3%	0.60	0.54	-0.06

[1] 2020 Decennial Census Census Tract Level Population Data HC2020.P1 - 2020 data was used rather than 2018 due to changes in census tract boundaries in 2020

[2] 2023 ACS 5-Year Estimates Census Tract Level Age and Sex Data S0101

[3] 2016 US CDC Social Vulnerability Index - "#N/A" cells represent census tracts that did not exist before changes to census tract boundaries in 2020

[4] 2022 US CDC Social Vulnerability Index

Drought Risk Rank 1—Harney County 41025960200

This census tract encompasses much of Harney County in Oregon's Outback of Southeastern Oregon. The NRI reports relatively moderate drought risk for this area, with a score of 94.6. The NRI does not estimate population at risk for this hazard. In this rural county, distances to hospitals and occurrence of drought events drives risk.

Figure 9.3.4-2: First ranked census tract for drought hazard

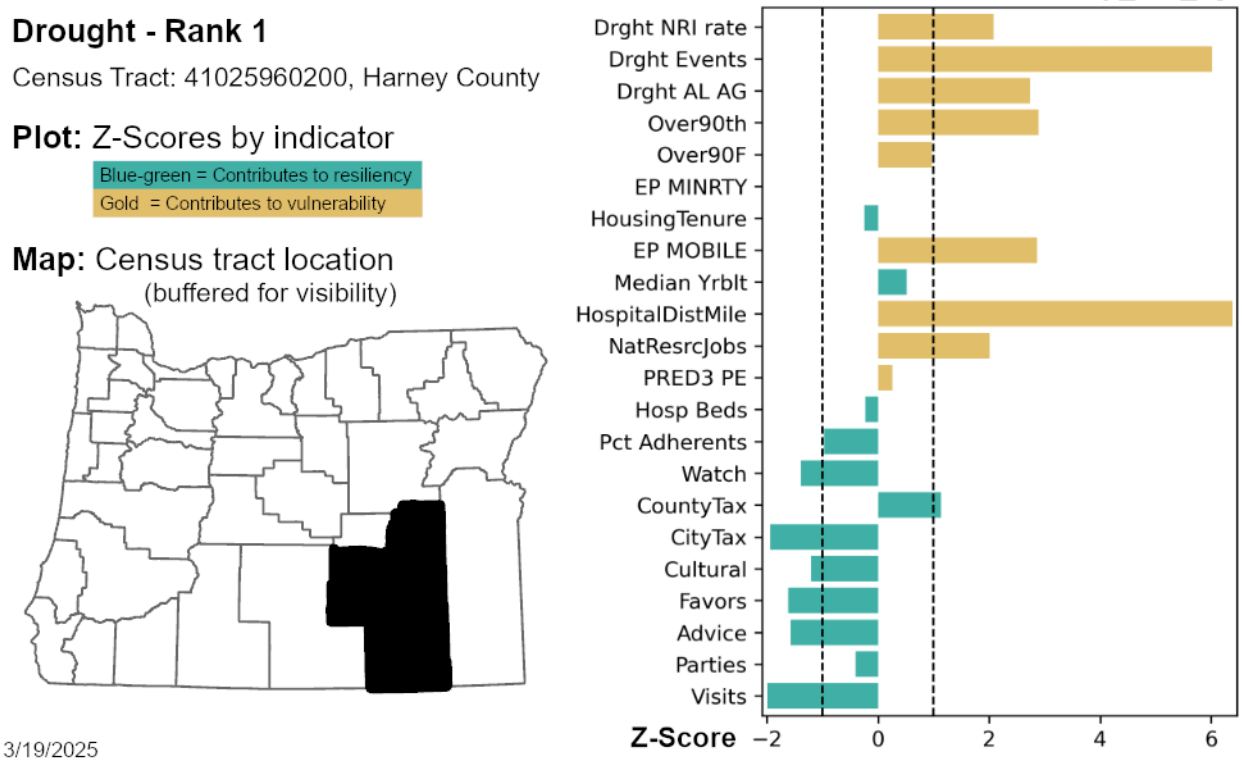


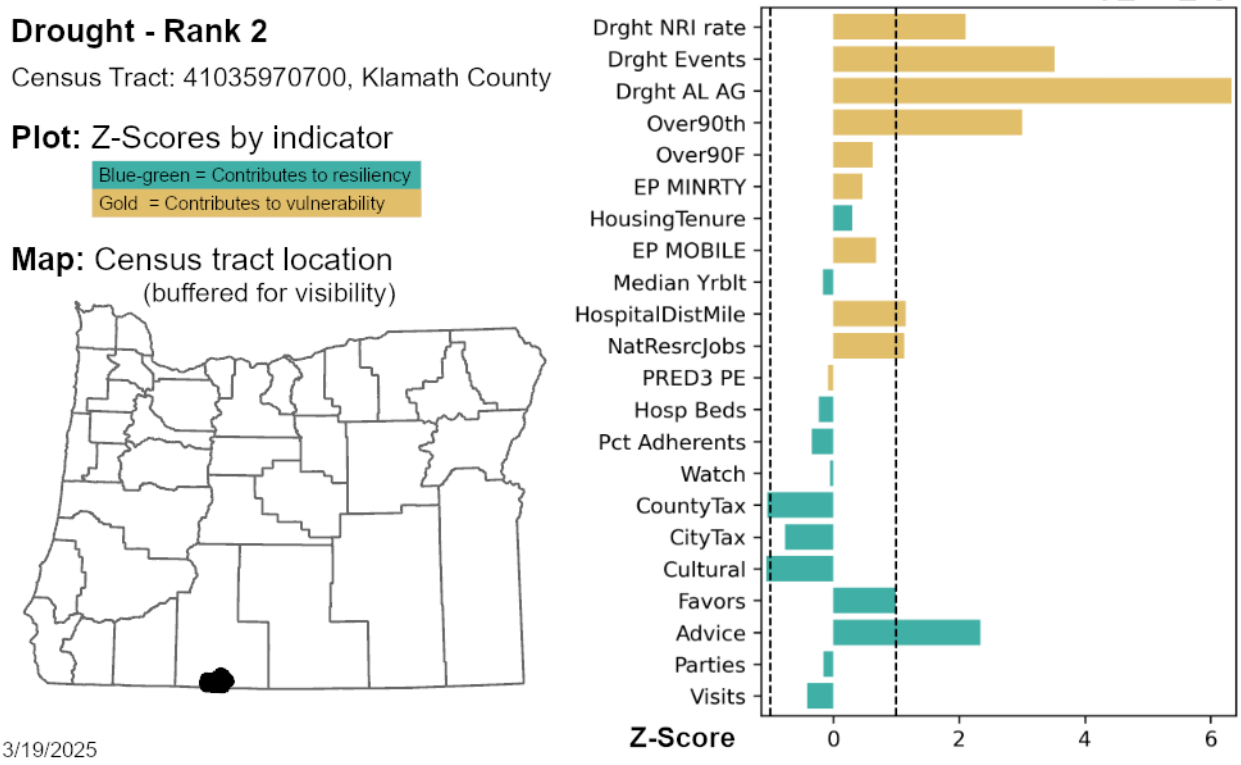
Table 9.3.4-3: State-owned buildings or critical facilities

	Building Name	Value	Source
State-owned	Brown Reservoir (Dept. State Lands)		

Drought Risk Rank 2 – Klamath County 41035970700

This census tract is located near Klamath Falls, Oregon, in southern Oregon. The NRI reports a relatively moderate drought risk for this area. The NRI does not estimate population at risk for this hazard. A higher than average number of hot days, a higher than average drought rate, coupled with higher-than-average drought events, drives risk in this analysis.

Figure 9.3.4-3: Second ranked census tract for drought hazard

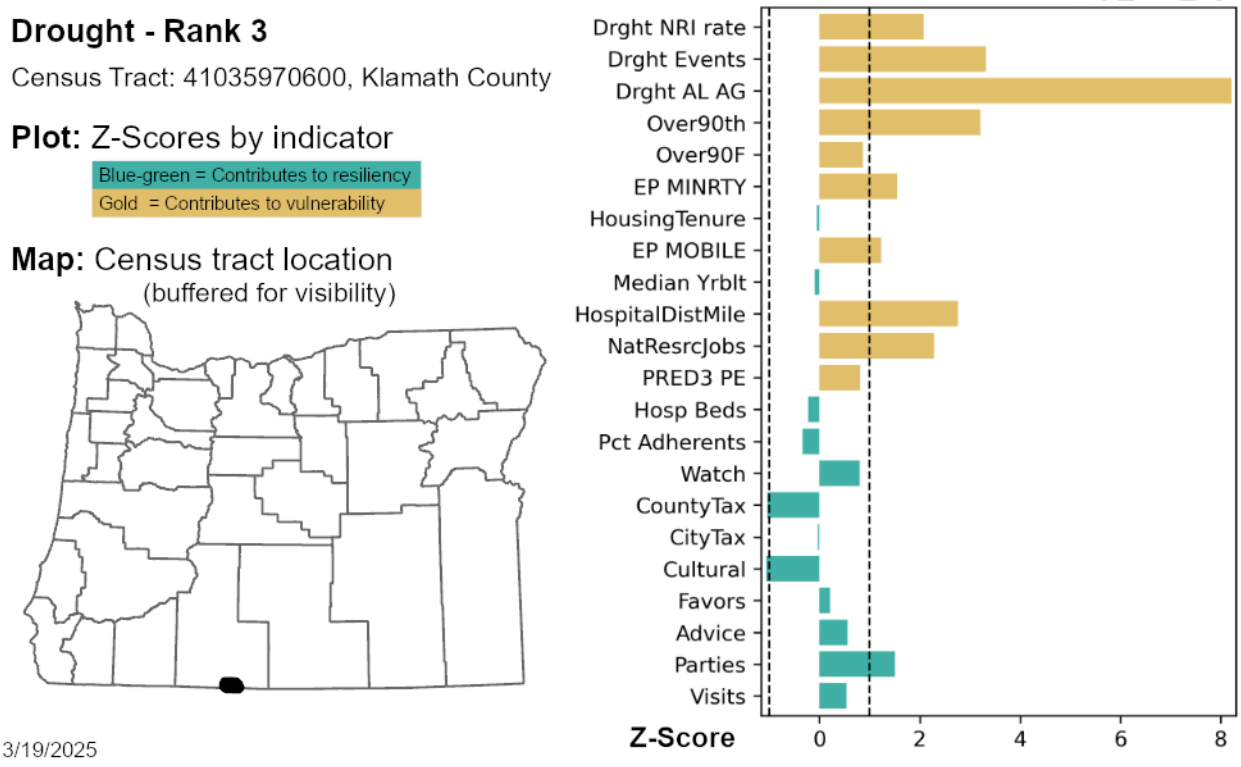


No state-owned buildings or critical facilities are identified for the drought hazard.

Drought Risk Rank 3 – Klamath County 41035970600

This census tract is located east of Klamath Falls, Oregon, in southern Oregon. The NRI reports a relatively moderate drought risk for this area. The NRI does not estimate population at risk for this hazard. High estimated social cohesion supports community resilience, but higher than average drought and heat occurrences drive risk in this area.

Figure 9.3.4-4: Third ranked census tract for drought hazard

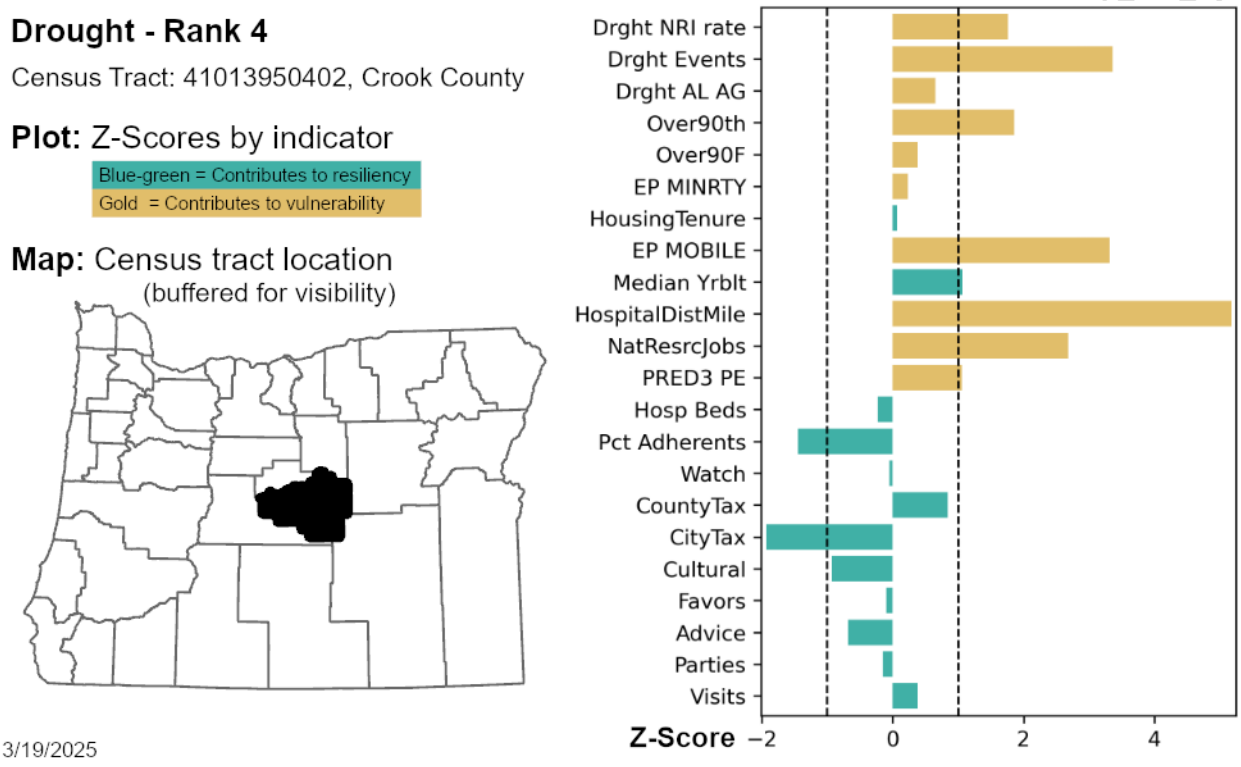


No state-owned buildings or critical facilities are identified for the drought hazard.

Drought Risk Rank 4 – Crook County 41013950402

This census tract is located east of Bend, Oregon, in central Oregon. The NRI reports a relatively low drought risk for this area, with a score of 83.1. The NRI does not estimate population at risk of this hazard. In this analysis, reliance on natural resource jobs, higher than average distances to hospitals, higher than average manufactured homes, and a higher drought occurrences drive risk.

Figure 9.3.4-5: Fourth ranked census tract for drought hazard

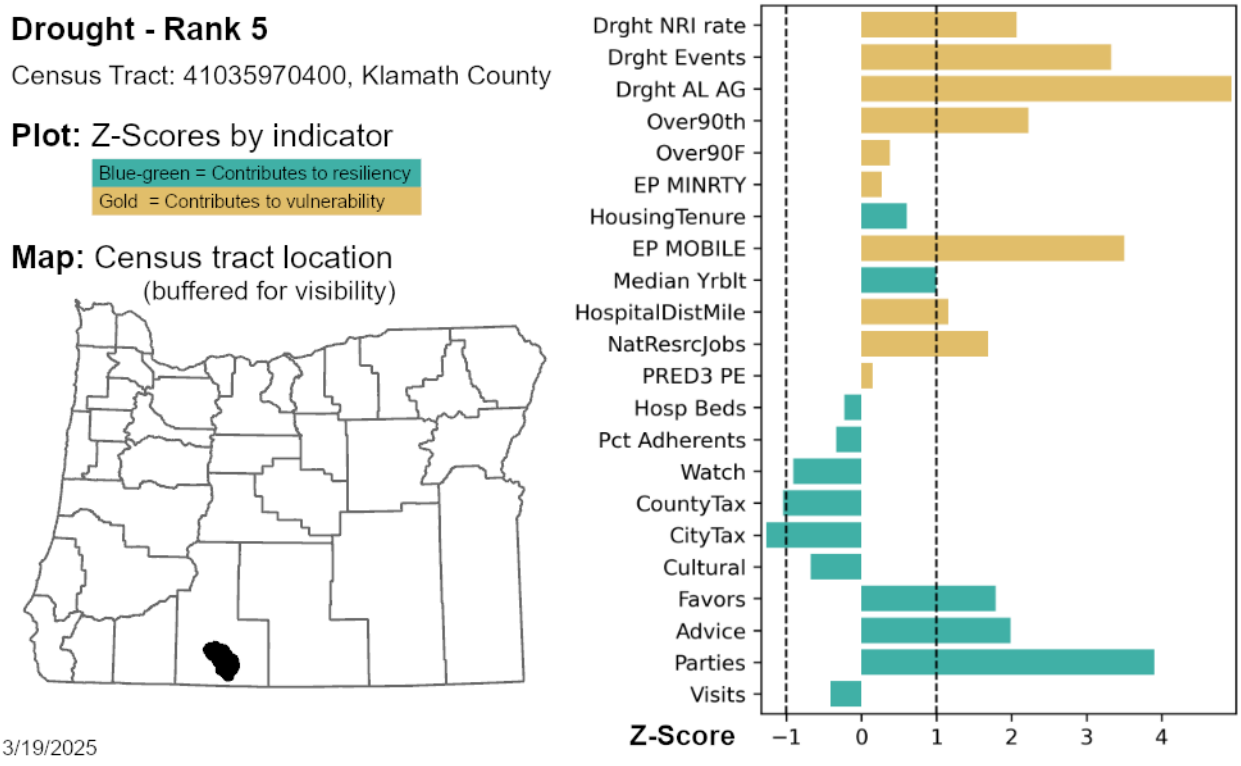


No state-owned buildings or critical facilities are identified for the drought hazard.

Drought Risk Rank 5 – Klamath County 41035970400

This census tract is located east of Klamath Falls, Oregon, in southern Oregon. The NRI reports a relatively moderate drought risk for this area. The NRI does not estimate population at risk for this hazard. In this analysis, higher than average drought occurrences drive risk in this area.

Figure 9.3.4-6: Fifth ranked census tract for drought hazard

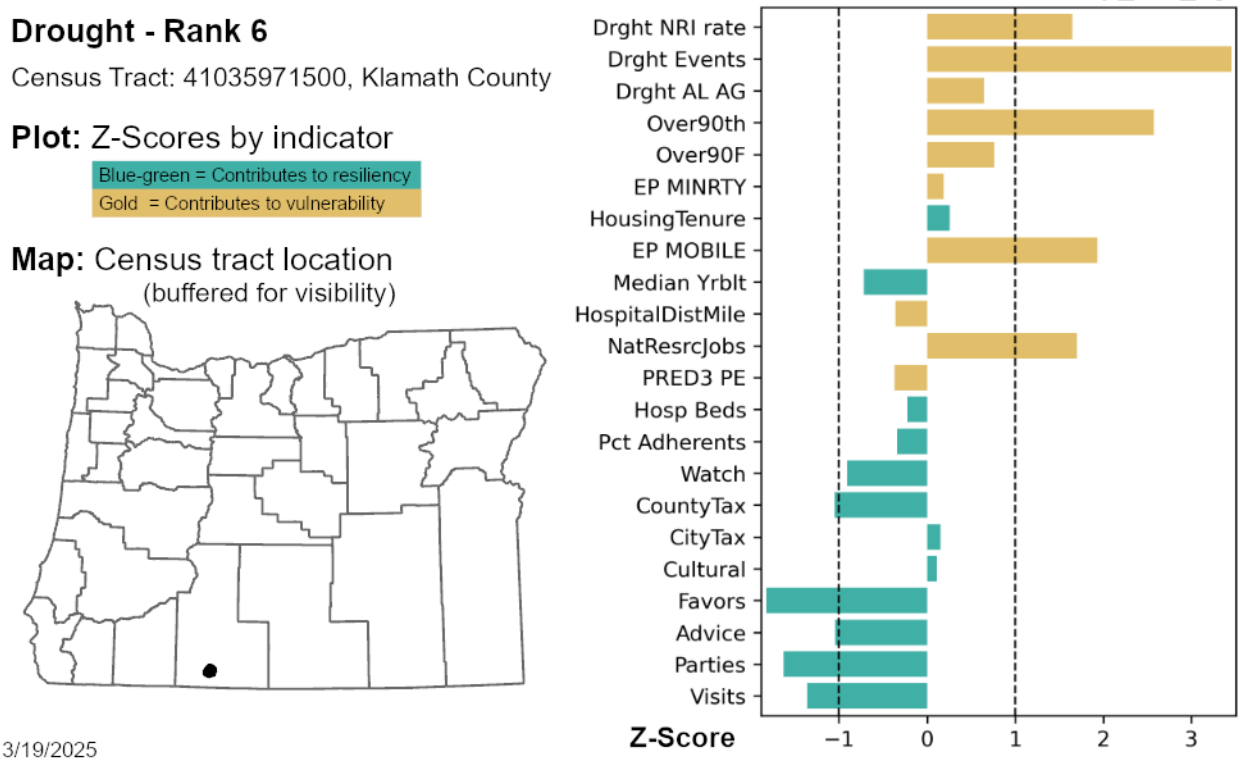


No state-owned buildings or critical facilities are identified for the drought hazard.

Drought Risk Rank 6-- Klamath County 41035971500

This census tract is located between Klamath Falls and Altamont, Oregon, in Southern Oregon. The NRI reports a relatively moderate drought risk for this area. The NRI does not estimate population at risk for this hazard. Droughts that affect agriculture, and a higher than average prevalence of drought events, drive risk in this analysis.

Figure 9.3.4-7: Sixth ranked census tract for drought hazard

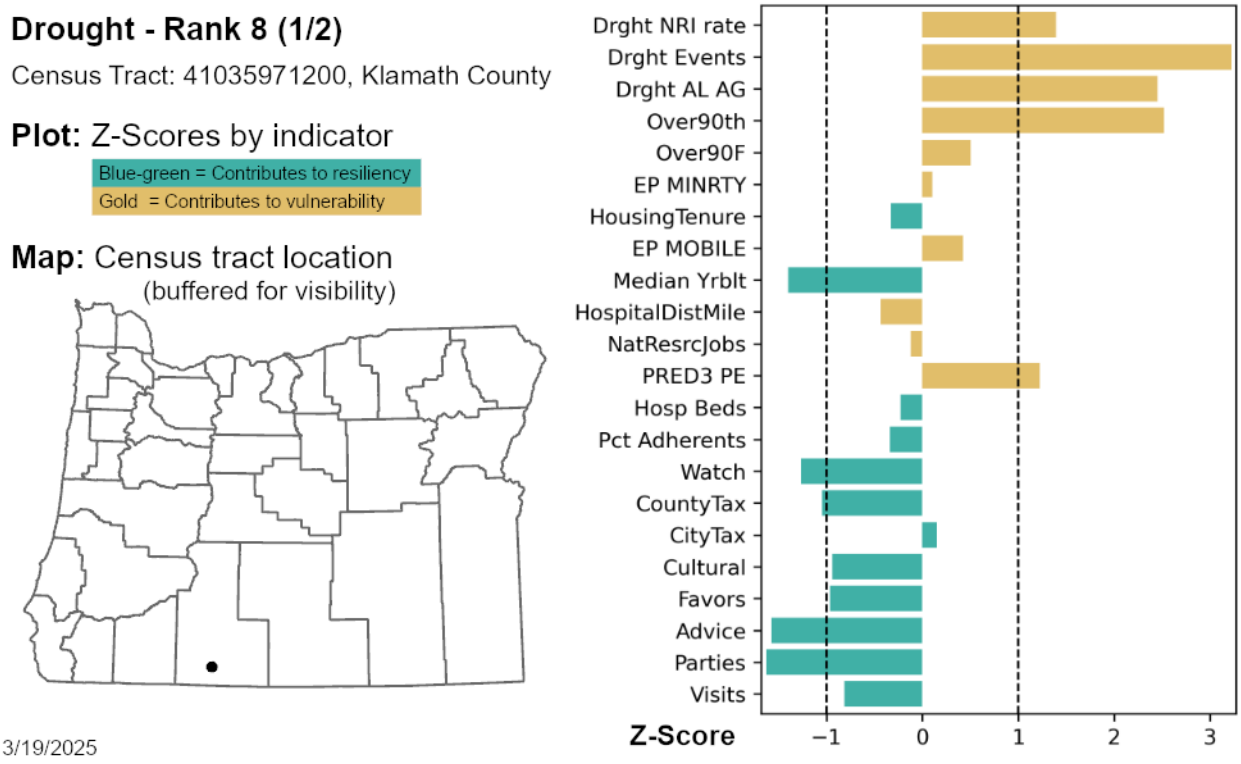


No state-owned buildings or critical facilities are identified for the drought hazard.

Drought Risk Rank 7 – Klamath County 41035971200

This census tract is located south of Klamath Falls, in southern Oregon. The NRI reports a relatively very low drought risk for this area. The NRI does not estimate population at risk for this hazard. Droughts that affect agriculture drive risk in this analysis.

Figure 9.3.4-8: Eighth ranked census tract for drought hazard

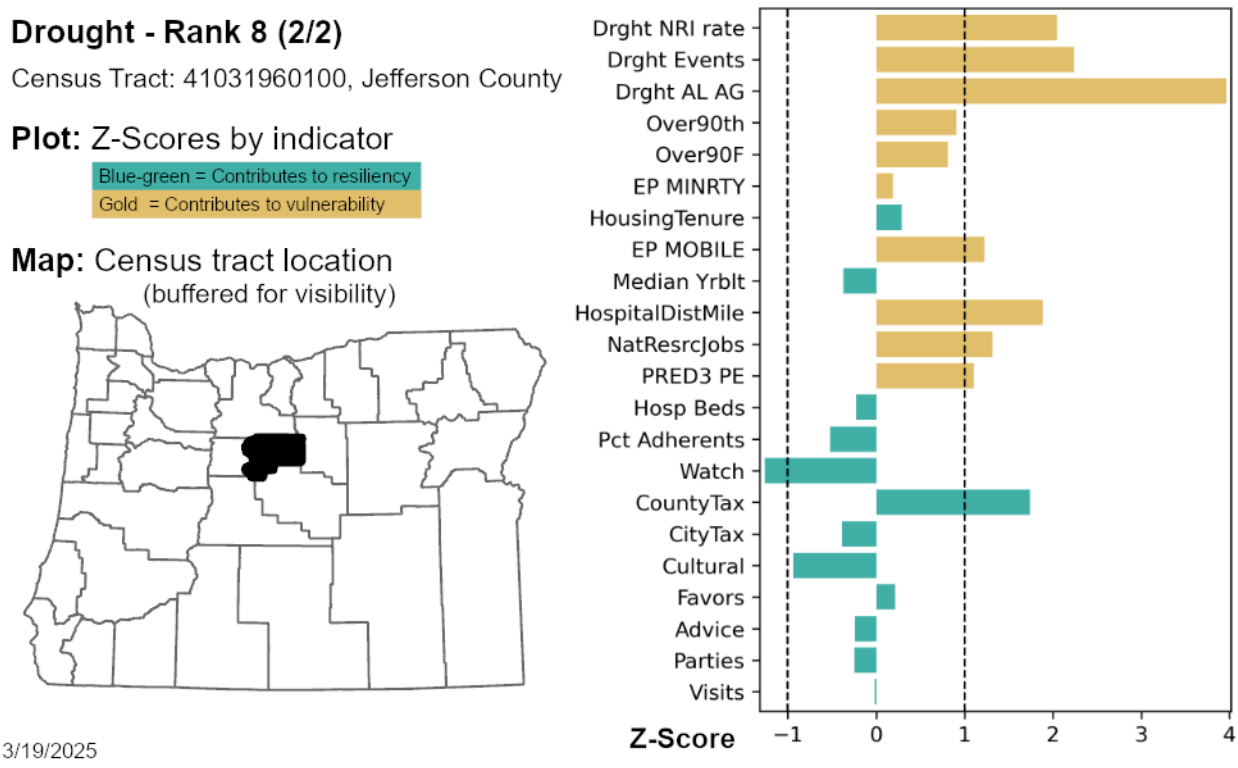


No state-owned buildings or critical facilities are identified for the drought hazard.

Drought Risk Rank 8—Jefferson County 41031960100

Relatively low

Figure 9.3.4-9: Eighth ranked census tract for drought hazard



No state-owned buildings or critical facilities are identified for the drought hazard.

Drought Risk Rank 9 – Grant County 41031960100

This census tract is located west of Baker City, in eastern Oregon. The NRI reports a relatively low drought risk for this area, with a score of 82.1. The NRI does not estimate population at risk of this hazard. In this analysis, local tax capacity and low social cohesion and community resilience negatively influence drought risk. Additionally, a reliance on natural resource jobs, and higher than average distance to hospitals drive risk in this area.

Figure 9.3.4-10: Ninth ranked census tract for drought hazard

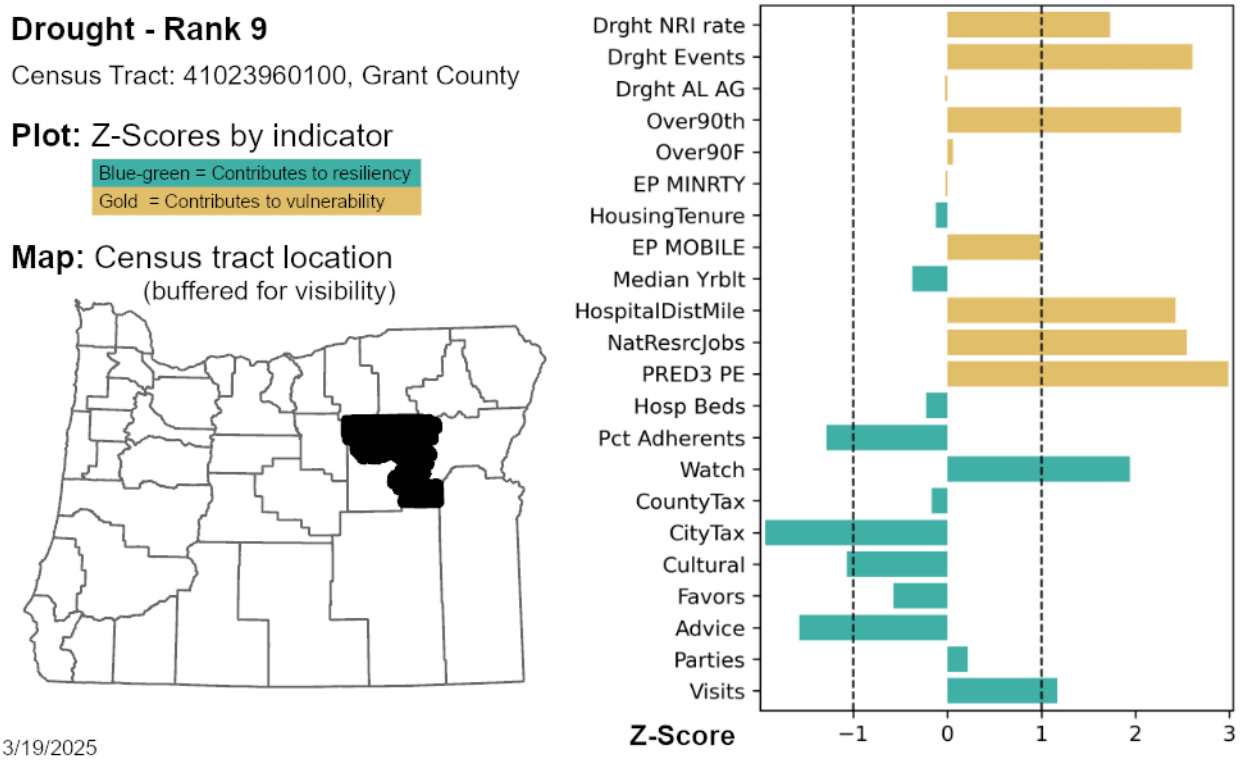


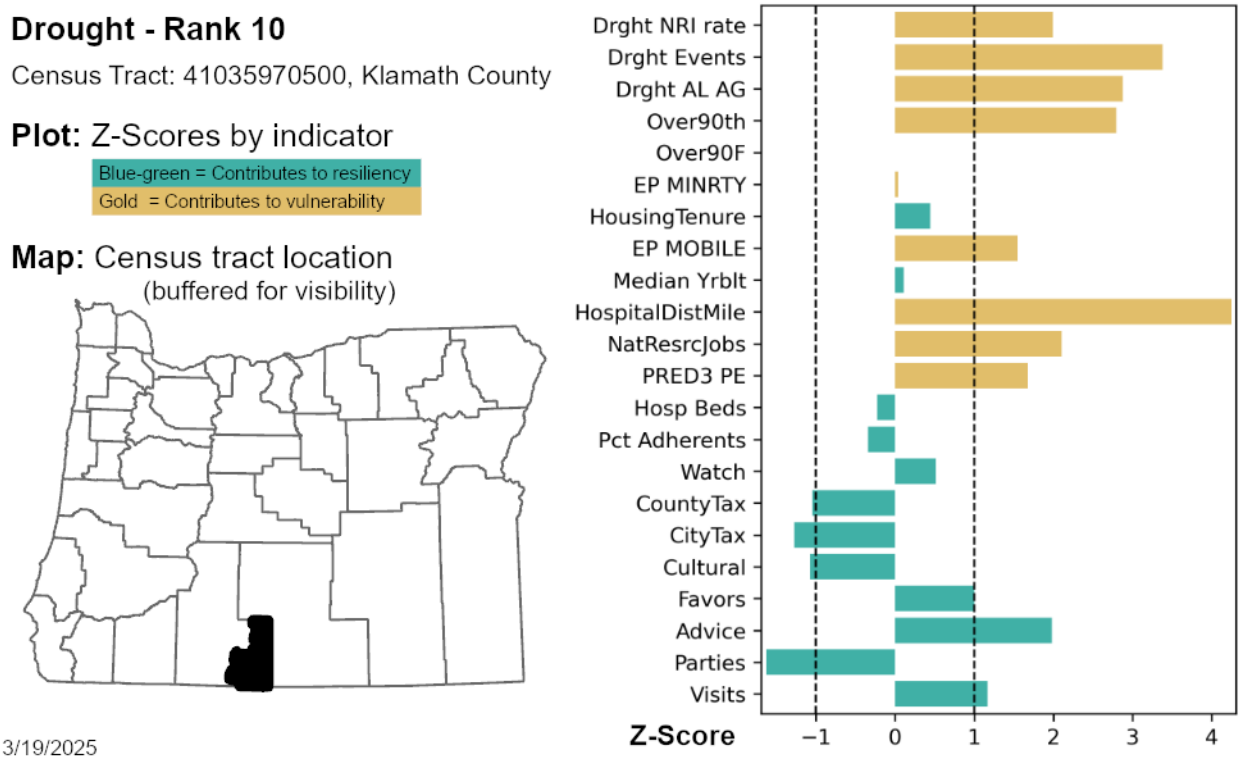
Table 9.3.4-4: State-owned buildings or critical facilities

	Building Name	Value ($)	Source
State-owned	Bull Prairie Reservoir (ODFW), Canyon Creek Meadows Dame (ODFW)		
State-owned	Bates Reservoir (OSP)		

Drought Risk Rank 10 – Klamath County 41035970500

This census tract is located east of the city of Klamath Falls, Oregon, in southern Oregon. The NRI reports a relatively low drought risk for this area. The NRI does not estimate population at risk for this hazard. In this analysis a high number of drought events coupled with low community resilience drive risk.

Figure 9.3.4-11: Tenth ranked census tract for drought hazard



No state-owned buildings or critical facilities are identified for the drought hazard.

9.3.5 Extreme Heat

9.3.5.1 Hazard Scenario

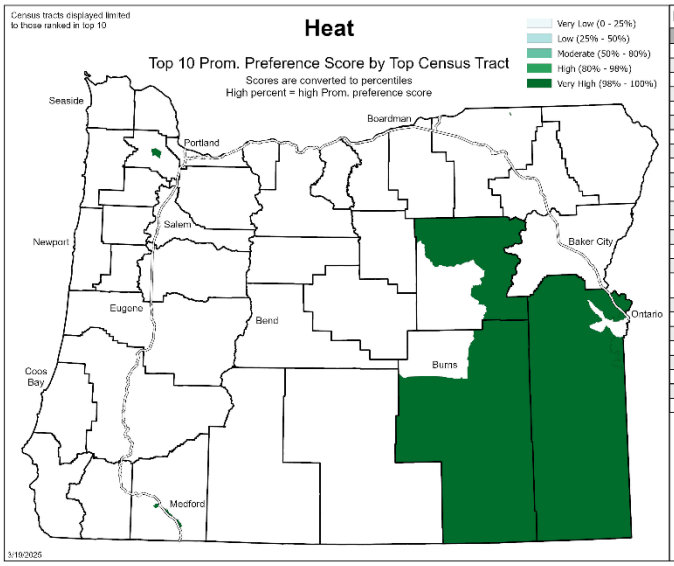
From OCCRI: Mean number of days that are above the historic 90th percentile temp

From OCCRI: Mean number of days above 90 degrees Fahrenheit

Ranking did not account for acclimatization or heat island effects

9.3.5.2 Top Ranked Extreme Heat Risk Areas

Figure 9.3.5-1: Top Ranked Risk Areas in Heat Risk Areas



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

Hazard	Indicator Name	Direction	Weight	Short Description
Heat	Over90th	1	0.05	Mean days that are above the historic 90th percentile temp
Heat	Over90F	1	0.05	Mean days above 90 degrees Fahrenheit
Heat	Heat_Events	1	0.05	Number of heat events.
Heat	Heat_ALAG	1	0.05	Annualized loss to agriculture from heat.
Heat	Heat_ALPOP	1	0.05	Annualized loss to population from heat.
Heat	OutdoorJobs	1	0.05	Rate of jobs that occur outside.
Heat	TreeCan_avg	-1	0.05	Tree canopy density
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 migitation 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

Table 9.3.5-1: Oregon Natural Hazard Risk Assessment Rank Compared to the National Risk Index

Oregon Rank	Census Tract	County	National Risk Index Hazard Rating	Exposed Population According to NRI
1	41029000100	Jackson	Relatively low	5860
2	41025960200	Harney	Relatively low	2145
3	41045970700	Malheur	Relatively moderate	1740
4	41045970900	Malheur	Relatively high	5653
5	41059950201	Umatilla	Relatively high	4171

Oregon Rank	Census Tract	County	National Risk Index Hazard Rating	Exposed Population According to NRI
6	41045970200	Malheur	Relatively High	4979
7	41029000800	Jackson	Relatively moderate	7284
8	41067032800	Washington	Relatively low	1309
9	41029002400	Jackson	Relatively low	2134
10	41023960100	Grant	Relatively low	1446

*Compared to census tracts nationwide

Table 9.3.5-2: Top 10 Census Tract Demographics

Census Tract	Heat Risk Rank	2020 Population[1]	2023 Population[2]	% Change in Population	2016 SVI[3]	2022 SVI[4]	Change in SVI
41029000100	1	2063	2390	16%	1.00	0.99	-0.01
41025960200	2	2165	2261	4%	0.50	0.71	0.41
41045970700	3	1740	1975	14%	0.54	0.52	-0.04
41045970900	4	5670	6202	9%	0.69	0.70	0.01
41059950201	5	4171	3639	-13%	#N/A	0.97	#N/A
41045970200	6	4979	4621	-7%	0.97	0.86	-0.11
41029000800	7	7284	7075	-3%	0.90	0.85	-0.05
41067032800	8	1309	1290	-1%	0.22	0.17	-0.20
41029002400	9	2134	2397	12%	0.41	0.66	0.63
41023960100	10	2050	2214	8%	0.62	0.65	0.05

[1] 2020 Decennial Census Census Tract Level Population Data HC2020.P1 - 2020 data was used rather than 2018 due to changes in census tract boundaries in 2020

[2] 2023 ACS 5-Year Estimates Census Tract Level Age and Sex Data S0101

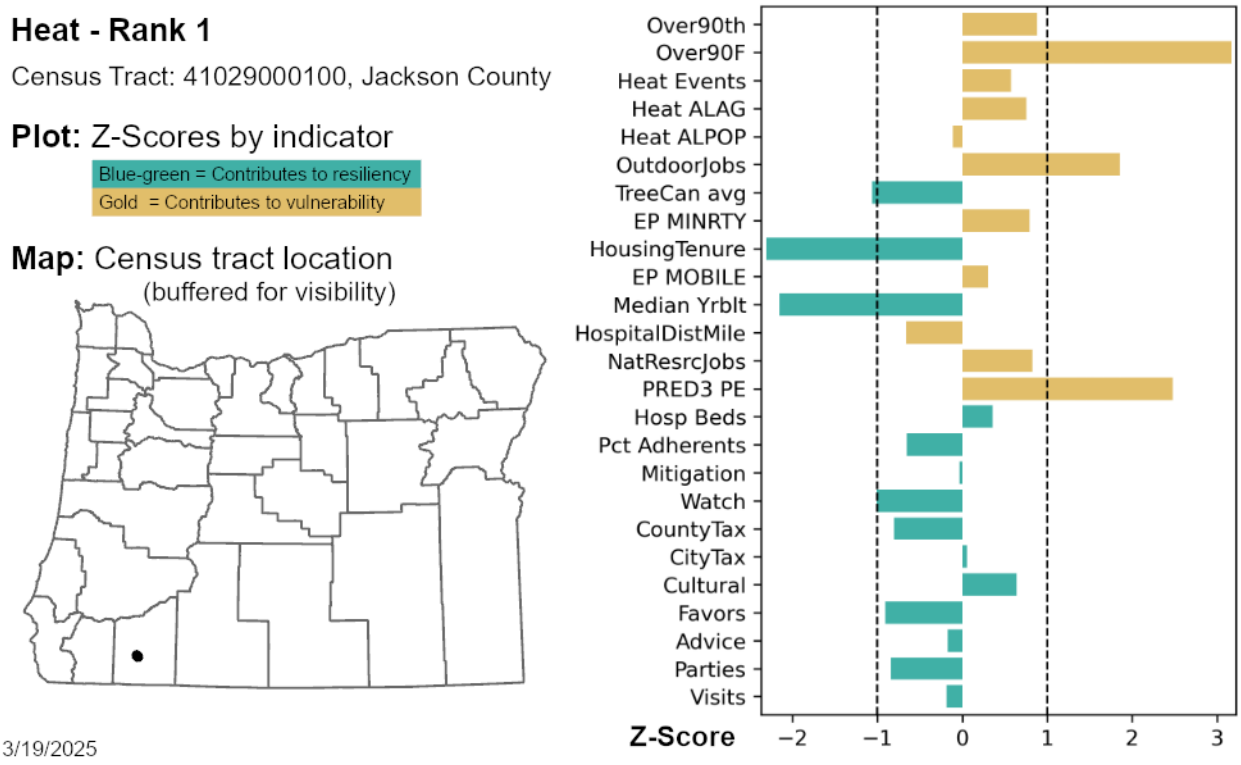
[3] 2016 US CDC Social Vulnerability Index - "#N/A" cells represent census tracts that did not exist before changes to census tract boundaries in 2020

[4] 2022 US CDC Social Vulnerability Index

Extreme Heat Risk Rank 1 – Jackson County 41029000100

This census tract encompasses the city of Medford, Oregon, in southern Oregon. The NRI reports a relatively low heat risk in this area, with a score of 46.8. The NRI estimates the entire population (100%) of this census tract as at-risk of extreme heat. In this analysis, a higher prevalence of heat events, low community resilience, and an older housing stock drives risk.

Figure 9.3.5-2: First ranked census tract for heat hazard



No state-owned buildings of critical facilities identified.

Extreme Heat Risk Rank 2 – Harney County: 41025960200

This rural census tract encompasses much of Harney County. The NRI reports a relatively low heat risk in this area, with a score of 42.8. The NRI estimates the entire population (100%) of this census tract as at-risk of extreme heat. In this analysis, a higher-than-average reliance on outdoor jobs, natural resource jobs, low social cohesion, and higher than average distance to hospitals are the primary drivers of risk.

Figure 9.3.5-3: Second ranked census tract for heat hazard

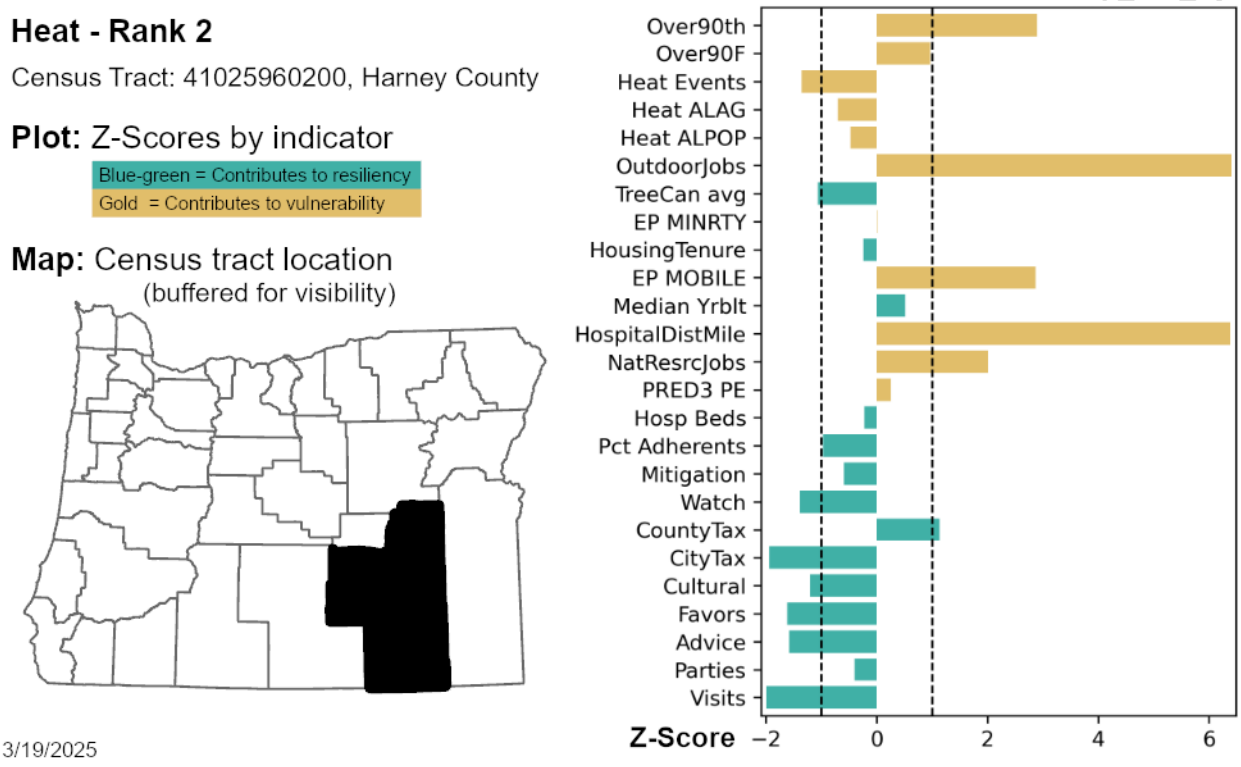


Table 9.3.5-3: State-owned buildings

State-owned Buildings	Value ($)	Source
Stinkingwater Mountain Sand Shed	431817	DOGAMI
Pete French Round Barn	509322	DOGAMI
Sagehen Hill RA Grounds	835829	DOGAMI
Stinking Water Scoop Shed	82741	DOGAMI
Sagehen Hill RA Grounds	486577	DOGAMI
Frenchglen Hotel	690192	DOGAMI

State-owned Buildings	Value ($)	Source
Frenchglen Hotel	175447	DOGAMI
Buchanan Springs RA Shelter	106513	DOGAMI
Site Systems - Steens Radio Operating Exp Grounds	31564	DOGAMI
Steens Radio Building	76217	DOGAMI
Site Systems - King Mountain M/W Grounds	31564	DOGAMI
King Mountain M/W Building	60474	DOGAMI
King Mountain M/W Battery Building	60474	DOGAMI
Alkali Lake MS Deicer Building	156455	DOGAMI
Alkali Lake MS Residence Garage	104851	DOGAMI
Alkali Lake MS Residence Garage	104851	DOGAMI
Alkali Lake MS Mobile Home 17	274408	DOGAMI

Table 9.3.5-4: Critical facilities

Critical Facilities	Value ($)	Source
DREWSEY ELEMENTARY SCHOOL	190960	DOGAMI
CRANE ELEMENTARY SCHOOL	1070893	
CRANE UNION HIGH SCHOOL	1581720	
CRANE UNION HIGH SCHOOL	92838	
CRANE UNION HIGH SCHOOL	202202	
CRANE UNION HIGH SCHOOL	68603	
CRANE UNION HIGH SCHOOL	165974	
CRANE UNION HIGH SCHOOL	165974	
CRANE ELEMENTARY SCHOOL	98478	
FIELDS ELEMENTARY SCHOOL	1111350	
FIELDS ELEMENTARY SCHOOL	421350	

Critical Facilities	Value ($)	Source
DIAMOND ELEMENTARY SCHOOL	39964	
CRANE UNION HIGH SCHOOL	783727	
CRANE UNION HIGH SCHOOL	88801	
CRANE ELEMENTARY SCHOOL	6311	
DIAMOND ELEMENTARY SCHOOL	39964	
Double O Elementary School	323300	
Frenchglen Elementary School	288690	
Communication Structure	750000	
Communication Structure	33750	
Communication Structure	750000	
Communication Structure	750000	
Communication Structure	750000	
BUREAU OF LAND MANAGEMENT - BURNS FIELD OFFICE	2016150	
Burns Municipal Airport	2654381	
Roaring Springs Ranch Airport	402150	
El Rancho Airport	85950	
Wildhorse Valley Airport	750000	
Barton Lake Ranch	377700	
Wagontire	270450	
Arnold Airstrip	750000	
Whitehorse Ranch Airport	750000	

Extreme Heat Risk Rank 3– Malheur County 41045970700

This census tract is in eastern Oregon, on the border with Idaho. The NRI reports a relatively moderate heat risk in this area, with a score of 71.9. The NRI estimates the entire population (100%) of this census tract as at-risk of extreme heat. Extreme high and low temperatures, and a higher than average annualized loss to population due to heat drives risk in this area. Additionally, variable social cohesion and slightly lower community resilience affects extreme heat risks in this area.

Figure 9.3.5-4: Third ranked census tract for heat hazard

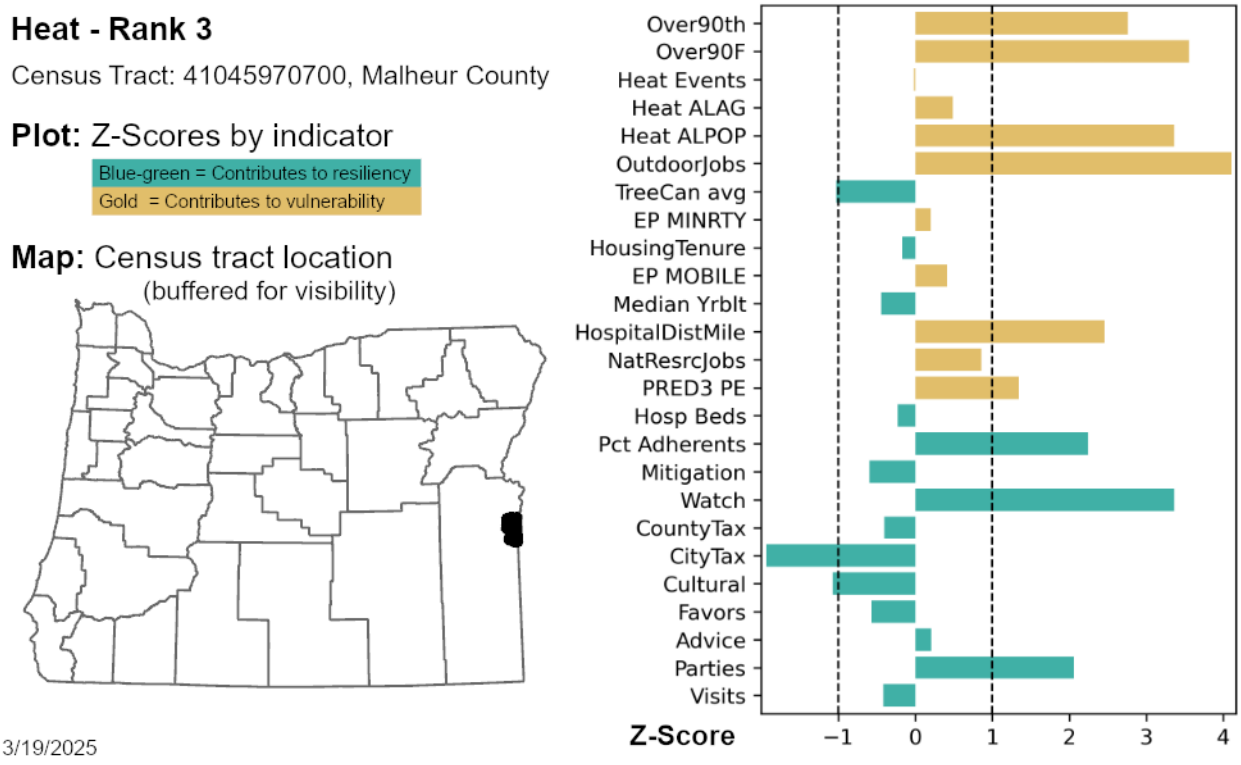


Table 9.3.5-5: State owned buildings

State-owned Buildings	Value	Source	
Vault Single - CXT (Indian Creek-ADA)	38472	DOGAMI	
Vault Single - CXT (Indian Creek Boat Ramp-ADA)	20675	DOGAMI	

Table 9.3.5-6: Critical Facility

Critical Facility	Value	Source
ADRIAN HIGH SCHOOL	2844900	DOGAMI

Critical Facility	Value	Source
ADRIAN HIGH SCHOOL	3365100	DOGAMI
ADRIAN HIGH SCHOOL	3127050	DOGAMI
ADRIAN HIGH SCHOOL	431400	DOGAMI
ADRIAN HIGH SCHOOL	1031550	DOGAMI
ADRIAN HIGH SCHOOL	533850	DOGAMI
ADRIAN HIGH SCHOOL	139950	DOGAMI
ADRIAN HIGH SCHOOL	764400	DOGAMI
Adrian Rural Fire Dept	488850	DOGAMI

Extreme Heat Risk Rank 4 – Malheur County 41045970900

This census tract encompasses much of Malheur County. The NRI reports a relatively high heat risk in this area, with a score of 89.9. According to the NRI, almost all (99.7) of the population is at risk to this hazard. In this analysis, higher than average distance to hospitals and higher than average annualized loss to the population due to heat events drives risk.

Figure 9.3.5-5: Fourth ranked census tract for heat hazard

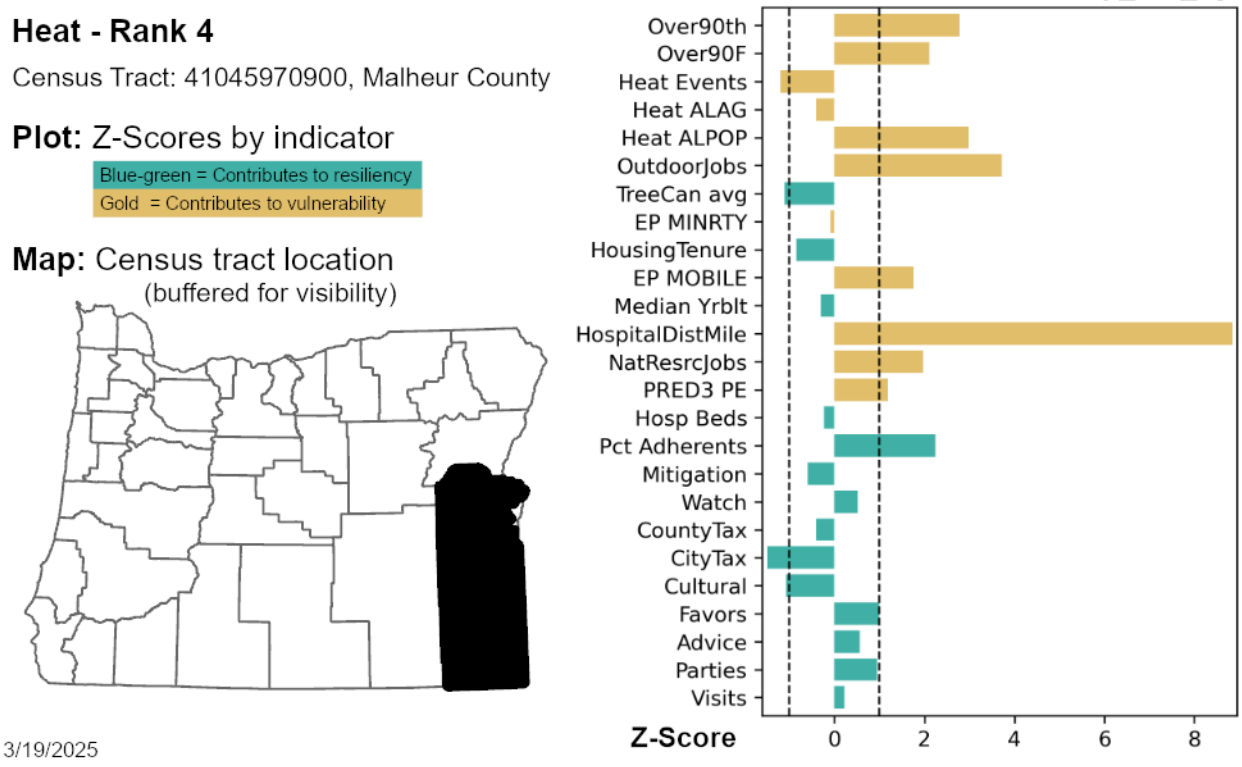


Table 9.3.5-7: State-owned buildings or critical facilities

	Building Name 41045970900	Value	Source
SOB	None identified.		
CF	None identified.		

Extreme Heat Risk Rank 5 – Umatilla County 41059950201

This census tract is located in Milton-Freewater, in the northeast corner of Oregon. The NRI reports a relatively high heat risk in this area, with a score of 82.2. The NRI estimates the entire population (100%) of this census tract as at-risk of extreme heat. In this analysis, higher than average distances to hospitals, somewhat low social cohesion, and higher prevalence of heat events and loss to the population as a result of these heat events, drives heat risk in this area.

Figure 9.3.5-6: Fifth ranked census tract for heat hazard

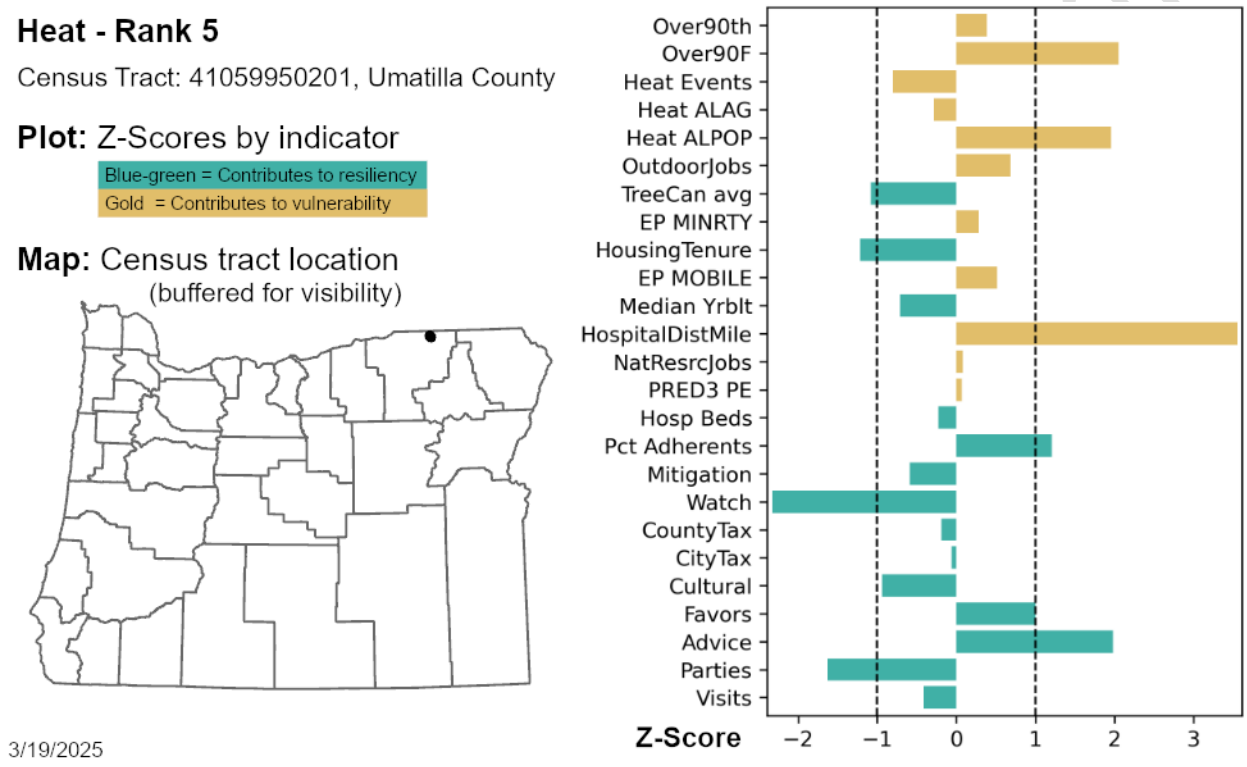


Table 9.3.5-8: State-owned buildings or critical facilities

	Building Name 41059950201	Value	Source
CF	Ferndale Elementary School		RAPT
CF	Mcloughlin High School		RAPT
CF	Gib Olinger Elementary School		RAPT
CF	Cascade Valley Assisted Living		RAPT
	Evergreen Oregon Rehabilitation		RAPT

Extreme Heat Risk Rank 6 – Malheur County 4105970200

This census tract encompasses the northeast corner of Malheur County in eastern Oregon. The NRI reports a relatively high heat risk in this area, with a score of 91.5. The NRI estimates the entire population (100%) of this census tract as at-risk of extreme heat. In this analysis, high heat events and higher than average annualized loss to the population drives heat risk. Additionally, a reliance on natural resource jobs and outdoor jobs influences heat risk.

Figure 9.3.5-7: Sixth ranked census tract for heat hazard

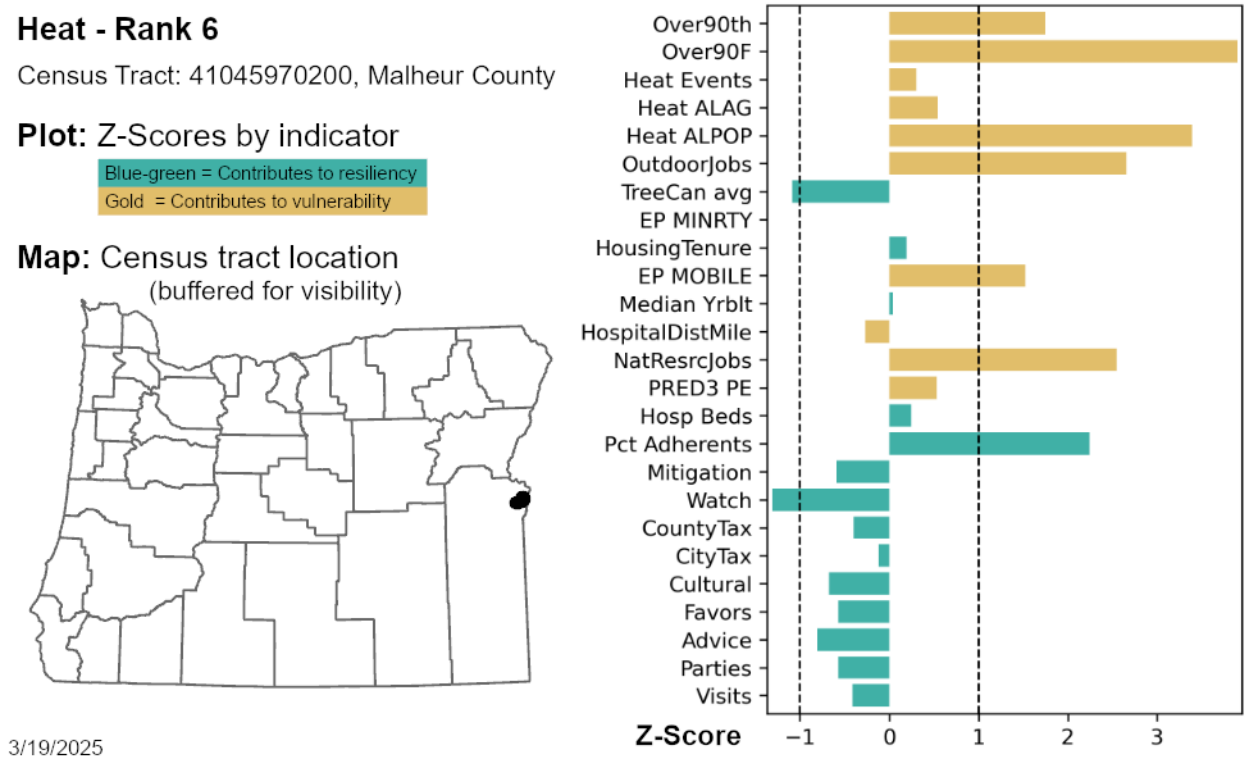


Table 9.3.5-9: State-owned buildings

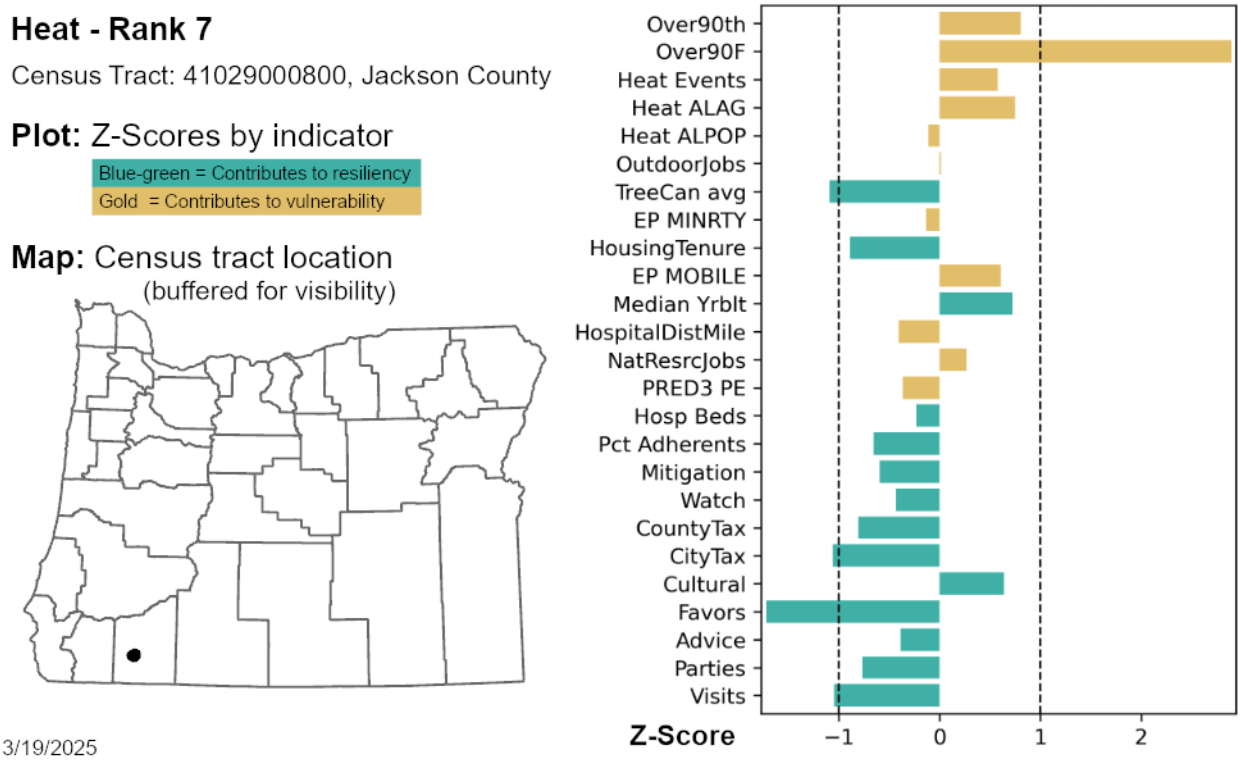
Table 9.3.5-10: Critical facilities

Critical Facility	Value	Source
FOUR RIVERS COMMUNITY SCHOOL	1599450	DOGAMI
TREASURE VALLEY CHRISTIAN SCHOOL	1092000	DOGAMI
AIKEN ELEMENTARY SCHOOL	5991000	DOGAMI

Critical Facility	Value	Source
Communication Structure	91050	DOGAMI
MALHEUR RIVER CLINIC	2459400	DOGAMI
Ontario Municipal Airport	1442850	DOGAMI
ONTARIO, CITY OF	178500	DOGAMI

Extreme Heat Risk Rank 7 – Jackson County 41029000800

Figure 9.3.5-8: Seventh ranked census tract for heat hazard



No state-owned buildings or critical facilities identified.

Extreme Heat Risk Rank 8 – Washington County 41067032800

This census tract is located northwest of Hillsboro, Oregon, in northwest Oregon. The NRI reports a relatively low heat risk in this area, with a score of 41. The NRI estimates the entire population (100%) of this census tract as at-risk of extreme heat. Low social cohesion, and a reliance on outdoor jobs and natural resource jobs, drives risk in this analysis.

Figure 9.3.5-9: Eighth ranked census tract for heat hazard

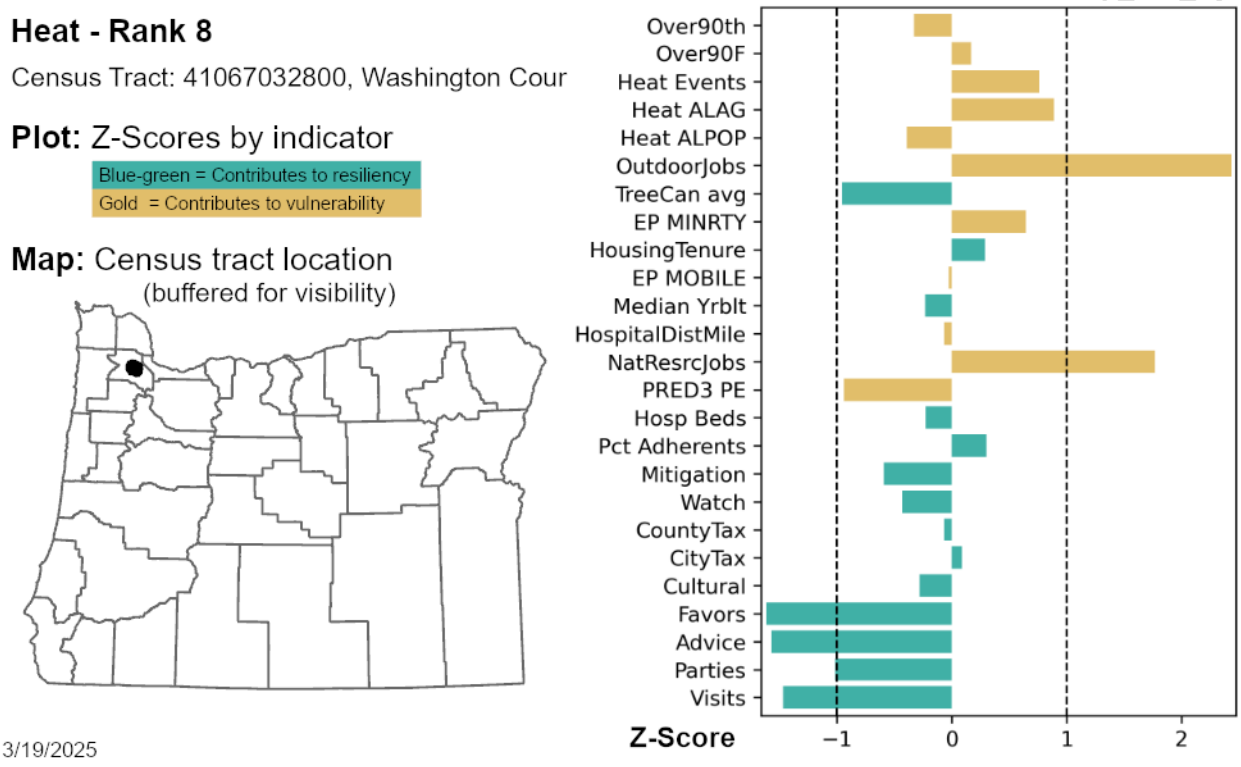


Table 9.3.5-11: State-owned buildings

State-owned Buildings	Value	Source
North Plains Scale House	69027	DOGAMI
Site Systems - North Plains Scale House Grounds	69027	DOGAMI

Table 9.3.5-12: Critical facilities

Critical Facility	Value	Source
ST FRANCIS OF ASSISI SCHOOL	1490400	DOGAMI
VISITATION CATHOLIC SCHOOL	1708050	DOGAMI
School Building	345450	DOGAMI
Communication Structure	81000	DOGAMI
Olinger Airpark	861750	DOGAMI
Sunset Air Strip	750000	DOGAMI
Skyport	750000	DOGAMI
Rieben	750000	DOGAMI

Extreme Heat Risk Rank 9 – Jackson County 41029002400

This rural census tract is east of Grant's Pass, Oregon, in southern Oregon. The NRI reports a relatively moderate heat risk in this area, with a score of 54.8. The NRI estimates the entire population of this census tract as at-risk of extreme heat. According to the NRI, nearly all (99.7%) of the population is at risk of extreme heat. In this analysis, low estimated social cohesion, coupled with a higher prevalence of high heat days, drives risk.

Figure 9.3.5-10: Ninth ranked census tract for heat hazard

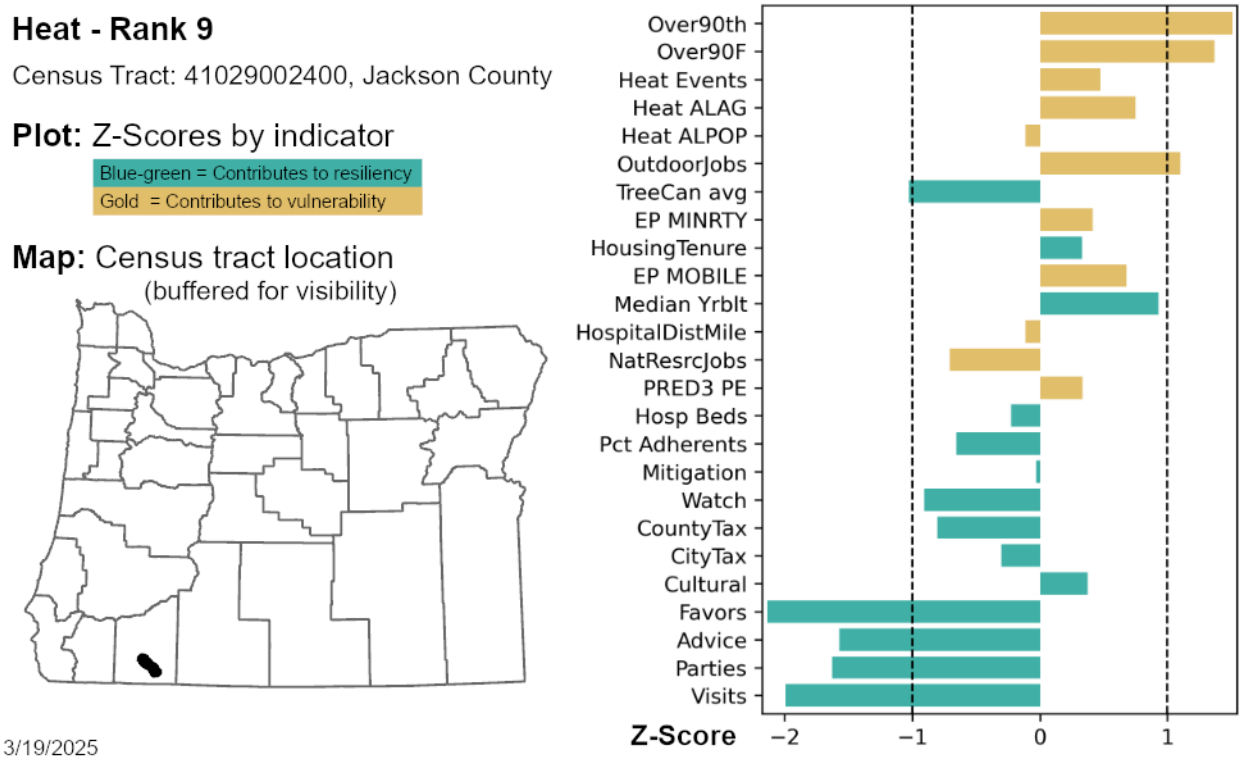


Table 9.3.5-13: State-owned buildings

State-owned Building	Value	Source
Unknown	93457	DOGAMI

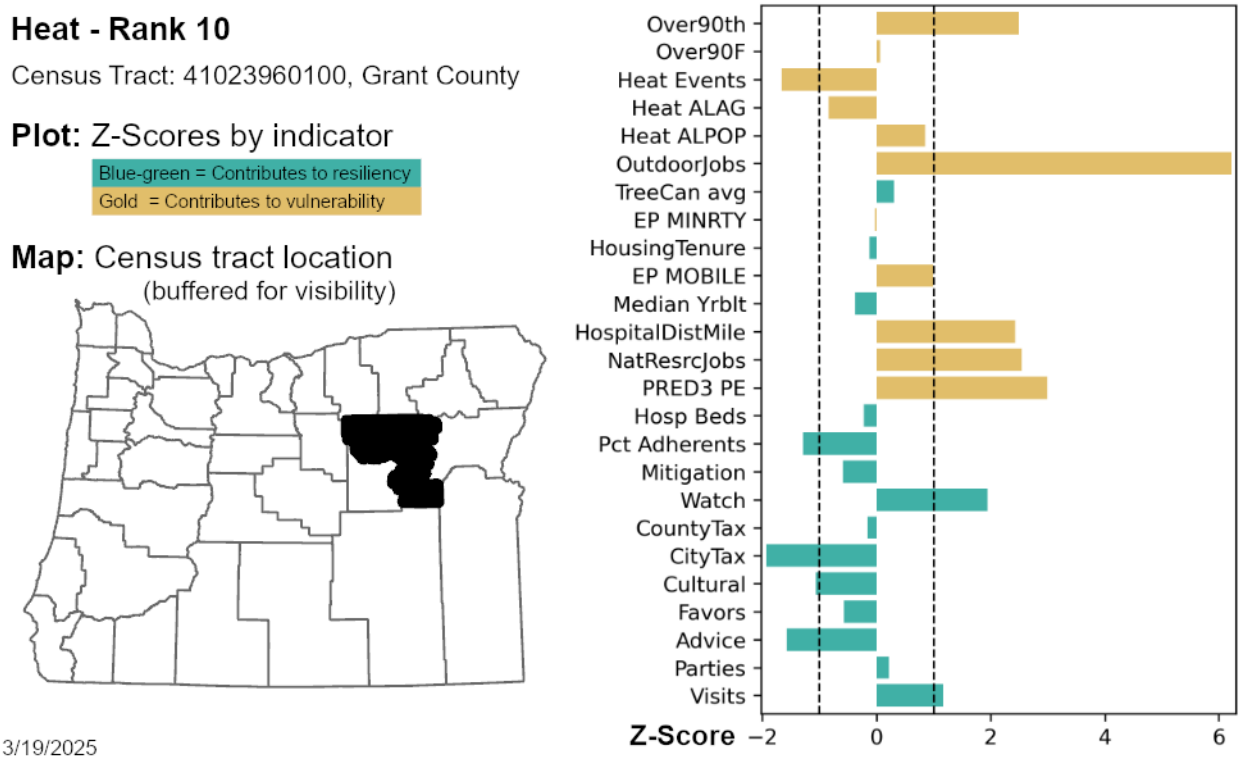
Table 9.3.5-14: Critical facilities

Critical Facilities	Value	Source
SAMS VALLEY ELEMENTARY SCHOOL	8069100	DOGAMI

Critical Facilities	Value	Source
SAMS VALLEY ELEMENTARY SCHOOL	64950	DOGAMI
PATRICK ELEMENTARY SCHOOL	357450	DOGAMI
HANBY MIDDLE SCHOOL	5433450	DOGAMI
PATRICK ELEMENTARY SCHOOL	7696500	DOGAMI
Communication Structure	750000	DOGAMI
Communication Structure	750000	DOGAMI
Communication Structure	32100	DOGAMI
Communication Structure	750000	DOGAMI
Jackson County Fire District 3 - Sams Valley	774750	DOGAMI
Sutton on Rogue Airport	750000	DOGAMI
Firefly Ranch Airfield	234750	DOGAMI
Snider Creek Airport	750000	DOGAMI
East Oregon Cattle Co	750000	DOGAMI
GOLD HILL STP	155400	DOGAMI

Extreme Heat Risk Rank 10 –Grant County 41023960100

Figure 9.3.5-11: Tenth ranked census tract for heat hazard



No state-owned buildings or critical facilities identified.

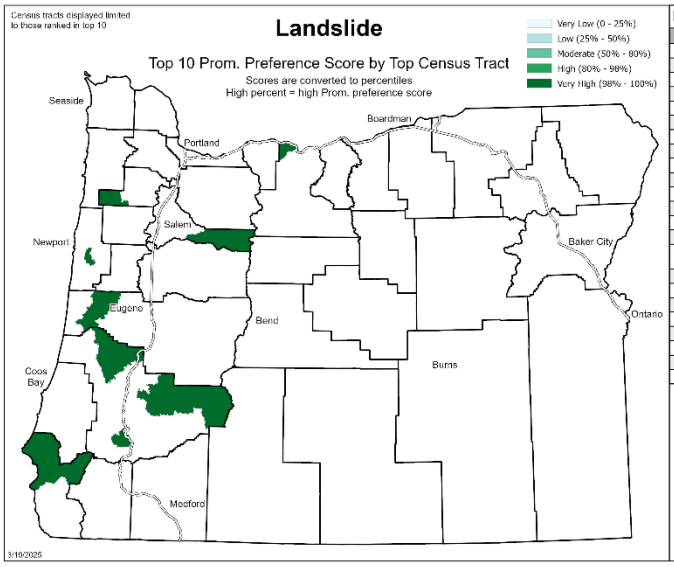
9.3.6 Landslide

9.3.6.1 Hazard Scenario

Statewide Landslide susceptibility

9.3.6.2 Top Ranked Risk Areas

Figure 9.3.6-1: Top Ranked Risk Areas in Landslide Risk Areas



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

Hazard	Indicator Name	Direction	Weight	Short Description
Landslide	LSS_pct_bld	1	0.07	Percentage of SBFO buildings exposed to existing landslide deposit.
Landslide	LSS_pct_CF	1	0.07	Percentage of critical facilities exposed to existing landslide deposit.
Landslide	Hwy_LSS_pct	1	0.07	Major roadway miles that are exposed to existing landslide deposits.
Landslide	Hist_LSS_ct	1	0.07	Percentage of historic buildings exposed to existing landslide deposit.
Landslide	LSS_Haz_Area	1	0.07	Area of tract in high or very high landslide hazard.
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 migitation 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

Table 9.3.6-1: Oregon Natural Hazard Risk Assessment Rank Compared to the National Risk Index

Oregon Rank	Census Tract	County	National Risk Index Hazard Rating	Exposed Population According to NRI
1	41019100000	Douglas	Very high	2392
2	41047010600	Marion	Very high	1995
3	41039000500	Lane	Very high	2159
4	41015950202	Curry	Very high	1246
5	41015950100	Curry	Relatively high	2187
6	41065970600	Wasco	Very high	1361
7	41041951400	Lincoln	Very high	2864

Oregon Rank	Census Tract	County	National Risk Index Hazard Rating	Exposed Population According to NRI
8	41019030000	Douglas	Very high	2791
9	41019200000	Douglas	Relatively high	4232
10	41071030502	Yamhill	Very high	2526

*Compared to census tracts nationwide

Table 9.3.6-2: Top 10 Census Tract Demographics

Census Tract	Landslide Risk Rank	2020 Population[1]	2023 Population[2]	% Change in Population	2016 SVI[3]	2022 SVI[4]	Change in SVI
41019100000	1	3103	3283	6%	0.56	0.56	0.00
41047010600	2	2661	2126	-20%	0.30	0.43	0.13
41039000500	3	2244	2148	-4%	0.53	0.56	0.02
41015950202	4	1923	2074	8%	#N/A	0.34	#N/A
41015950100	5	3296	3226	-2%	0.66	0.56	-0.10
41065970600	6	3007	2965	-1%	0.88	0.67	-0.21
41041951400	7	3044	3003	-1%	0.48	0.77	0.28
41019030000	8	4047	4107	1%	0.39	0.35	-0.04
41019200000	9	4902	4912	0%	0.87	0.91	0.04
41071030502	10	5205	4697	-10%	0.84	0.65	-0.18

[1] 2020 Decennial Census Census Tract Level Population Data HC2020.P1 - 2020 data was used rather than 2018 due to changes in census tract boundaries in 2020

[2] 2023 ACS 5-Year Estimates Census Tract Level Age and Sex Data S0101

[3] 2016 US CDC Social Vulnerability Index - "#N/A" cells represent census tracts that did not exist before changes to census tract boundaries in 2020

[4] 2022 US CDC Social Vulnerability Index

Landslide Susceptibility Rank 1 – Douglas County 41019100000

This census tract is located east of Roseburg, Oregon, in Southern Oregon. The NRI reports a very high landslide susceptibility in this area, with a perfect score of 100. The NRI estimates 77% of this census tract's population are susceptible to landslide. Low social cohesion, large distances to hospitals, and widespread landslide susceptibility are the primary drivers of susceptibility. A higher than statewide average number of buildings are exposed to potential landslides.

Figure 9.3.6-2: First ranked census tract for landslide hazard

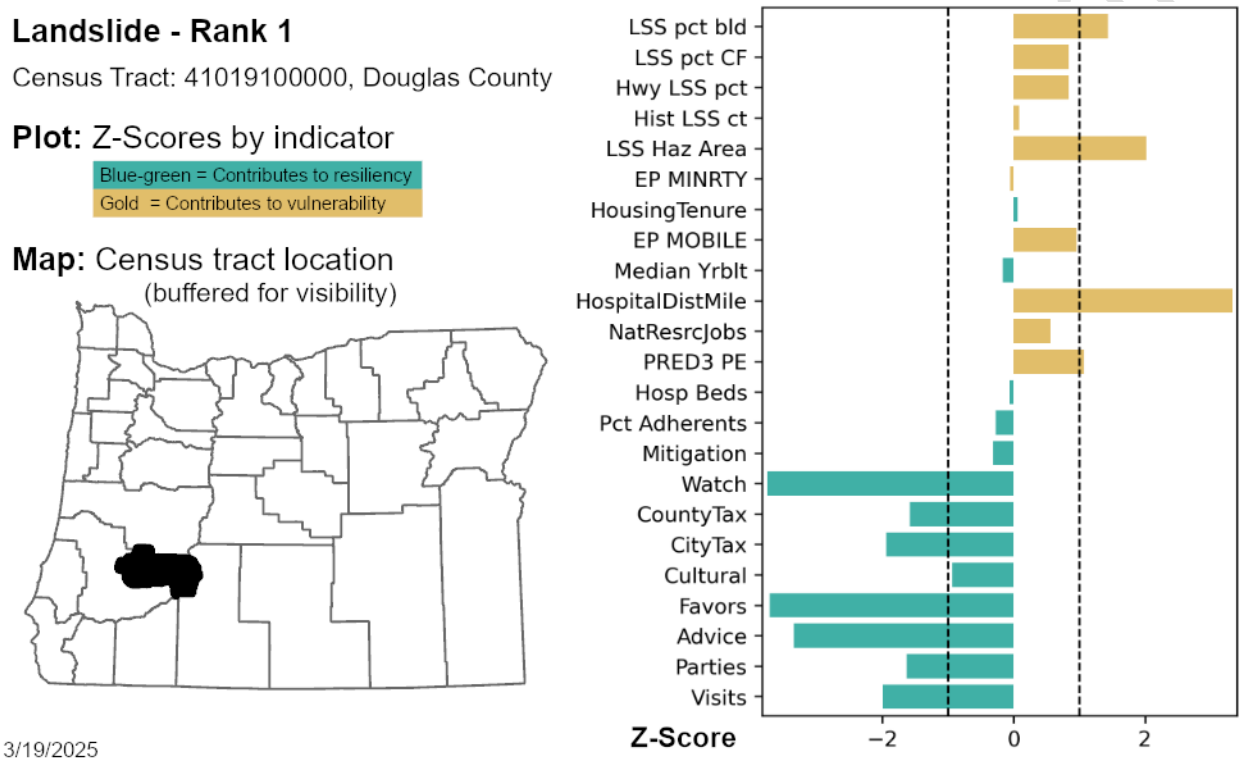


Table 9.3.6-3: State-owned buildings or critical facilities 41019100000

	Building Name	Value	Source
State-owned	Rock Creek Hatchery	259,624	
State-owned	Unknown	252,905	
Critical facility	Toketee Elementary School	516,450	
Critical facility	Steamboat Maintenance Station	127,168	

Landslide Susceptibility Rank 2 – Marion County 41047010600

This census tract is located east of Salem, Oregon, in the Willamette Valley. The NRI reports a very high landslide susceptibility in this area, with a perfect score of 100. The NRI estimates 75% of this census tract's population are susceptible to landslide hazard events. Low social cohesion, large distances to hospitals, widespread landslide susceptibility across the area of the census tract, and critical facilities located with landslide susceptibility areas, drive susceptibility in this analysis.

Figure 9.3.6-3: Second ranked census tract for landslide hazard

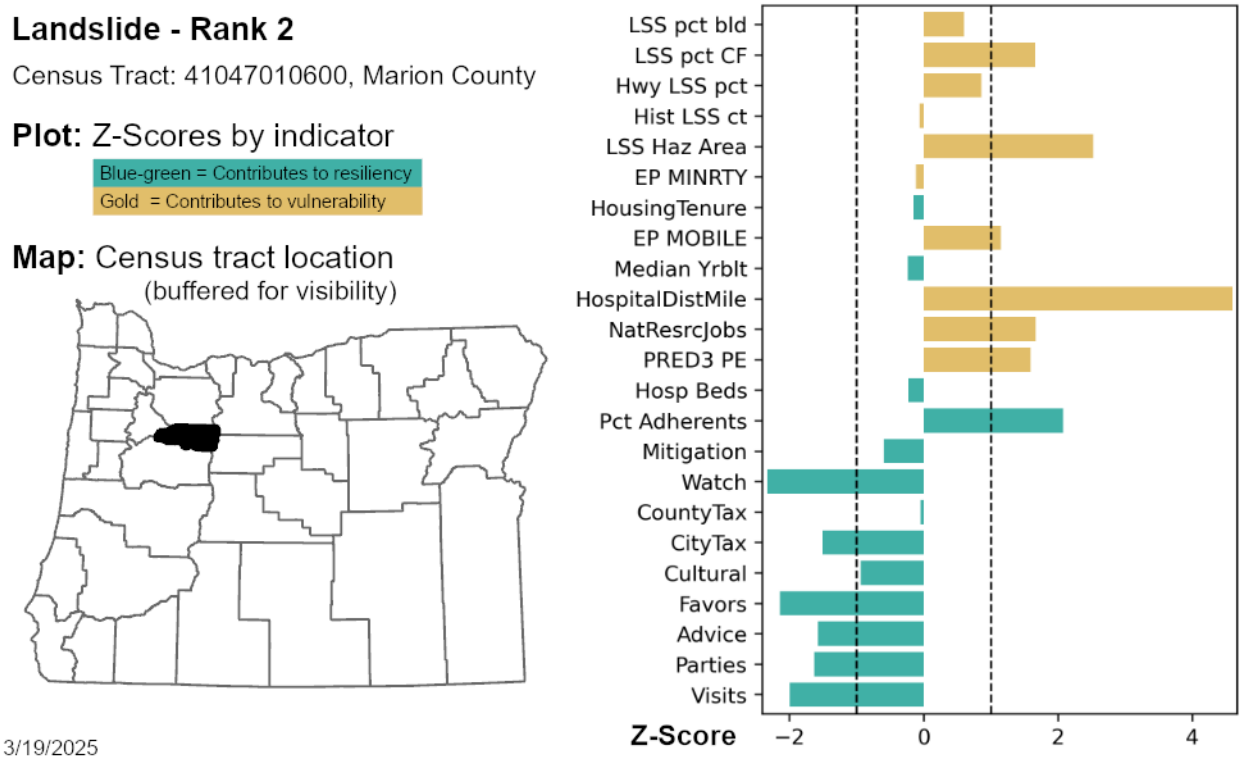


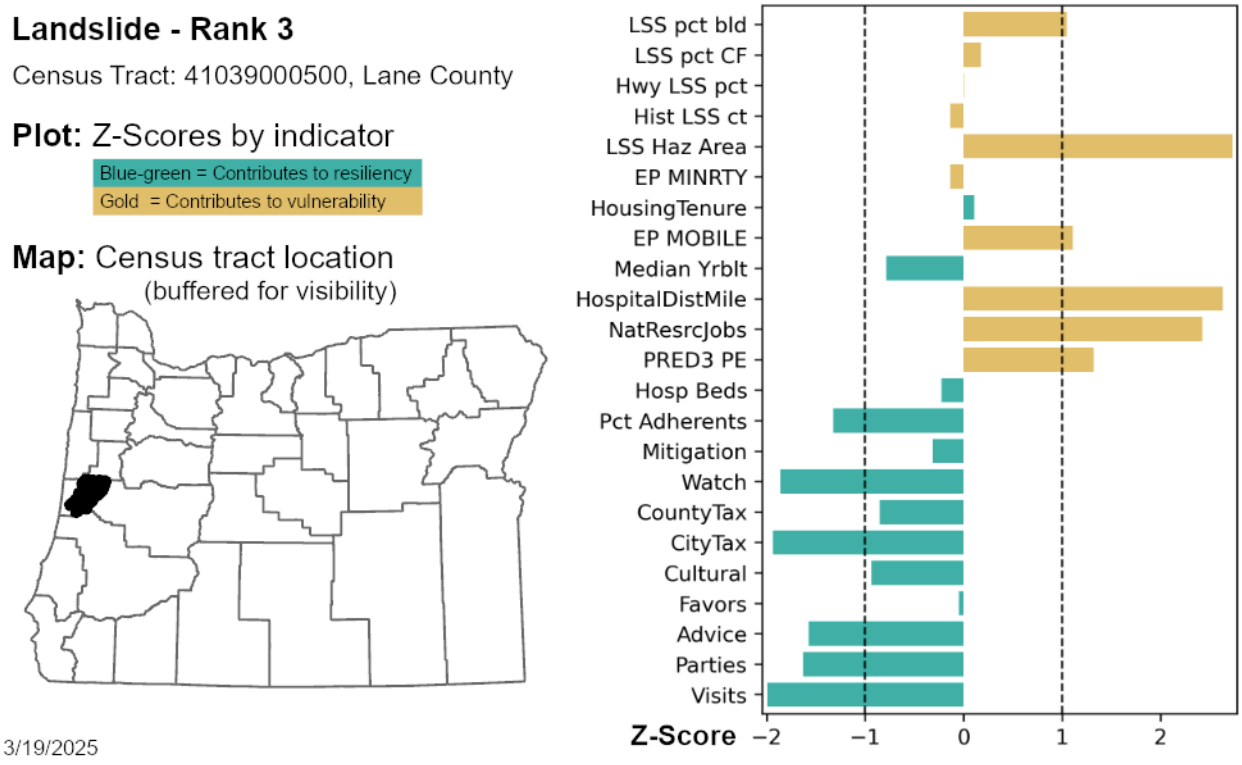
Table 9.3.6-4: State-owned buildings or critical facilities 41047010600

	Building Name	Value	Source
State-owned	Unknown	127,555	DOGAMI
State-owned	Unknown	91,448	DOGAMI
State-owned	Unknown	251,538	DOGAMI
Critical facility	Communications Structure	67,950	DOGAMI
Critical facility	Stayton RFPD	230,400	DOGAMI

Landslide Susceptibility Rank 3 – Lane County 41039000500

This rural census tract is located northeast of the coastal town of Florence, Oregon. The NRI reports a very high landslide susceptibility in this area, with a score of 100. The NRI estimates 96% of this census tract's population are susceptible to a landslide. In this analysis, widespread landslide susceptibility, coupled with low social cohesion and community resilience, and large distances to hospitals, drives overall susceptibility of harm in a landslide event.

Figure 9.3.6-4: Third ranked census tract for landslide hazard



No State-owned buildings or critical facilities in landslide susceptibility area. 41039000500

Landslide Susceptibility Rank 4 – Curry County 41015950202

This rural census tract is located north of Gold Beach, Oregon, on the southern Oregon coast. The NRI reports a very high landslide risk in this area, with a score of 99.7. The NRI estimates 64% of this census tract's population are susceptible to landslides. In this analysis, low taxing capacity, coupled with higher than average landslide susceptibility in areas with highways and buildings are the primary drivers of susceptibility to landslides, potentially due to a lower capacity to issue bonds or other tax mechanisms to adapt or respond in the event of a landslide. Additionally, low community resilience as estimated by the Census' Community Resilience Estimates (CRE) and large distances to hospitals drives susceptibility in this area.

Figure 9.3.6-5: Fourth ranked census tract for landslide hazard

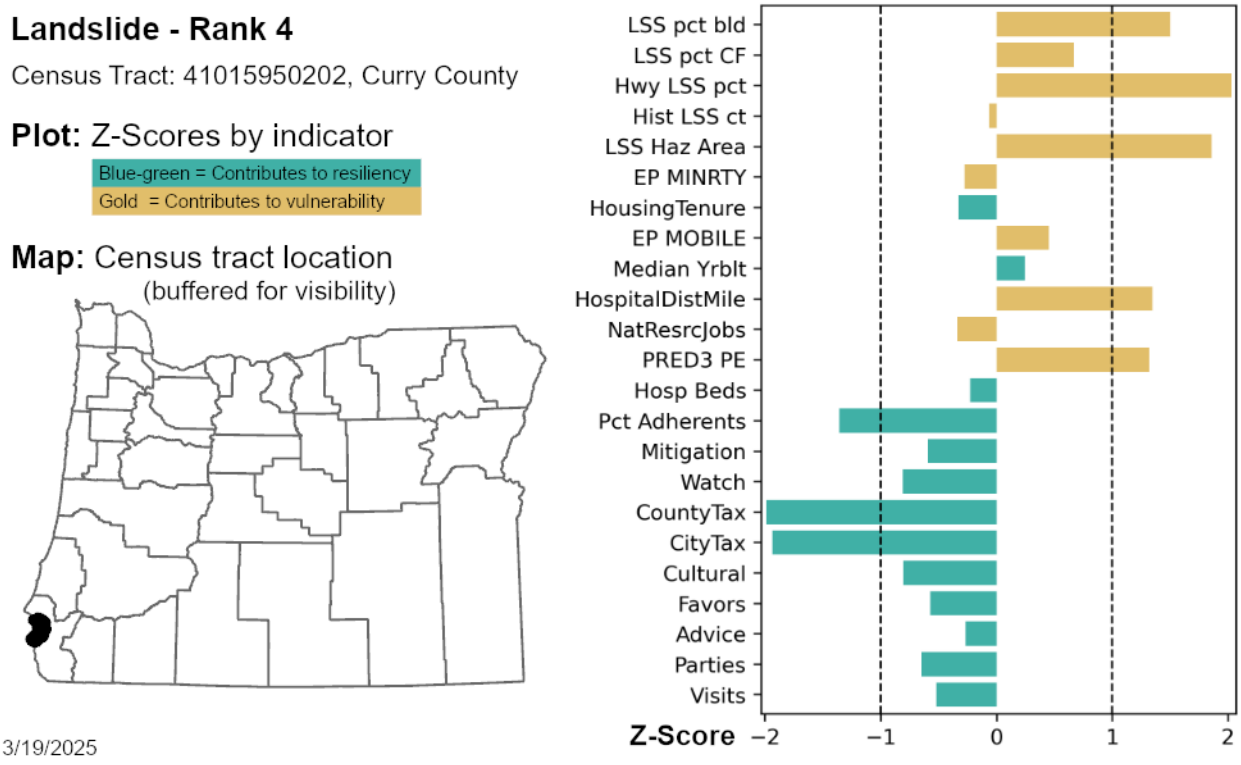


Table 9.3.6-5: State-owned buildings or critical facilities 41047010600

	Building Name	Value	Source
State-owned	Unknown	1,005,735	DOGAMI
State-owned	Unknown	929,953	DOGAMI

Landslide Susceptibility Rank 5 – Curry County 41015950100

This rural coastal census tract encompasses Port Orford, Oregon, on Oregon's southern coast. The NRI reports a relatively high landslide susceptibility in this area, with a score of 99.1. The NRI estimates that two-thirds (66.3%) of this census tract's population are susceptible to a landslide hazard. Low social cohesion and high landslide susceptibility area are the primary drivers in this analysis.

Figure 9.3.6-6: Fifth ranked census tract for landslide hazard

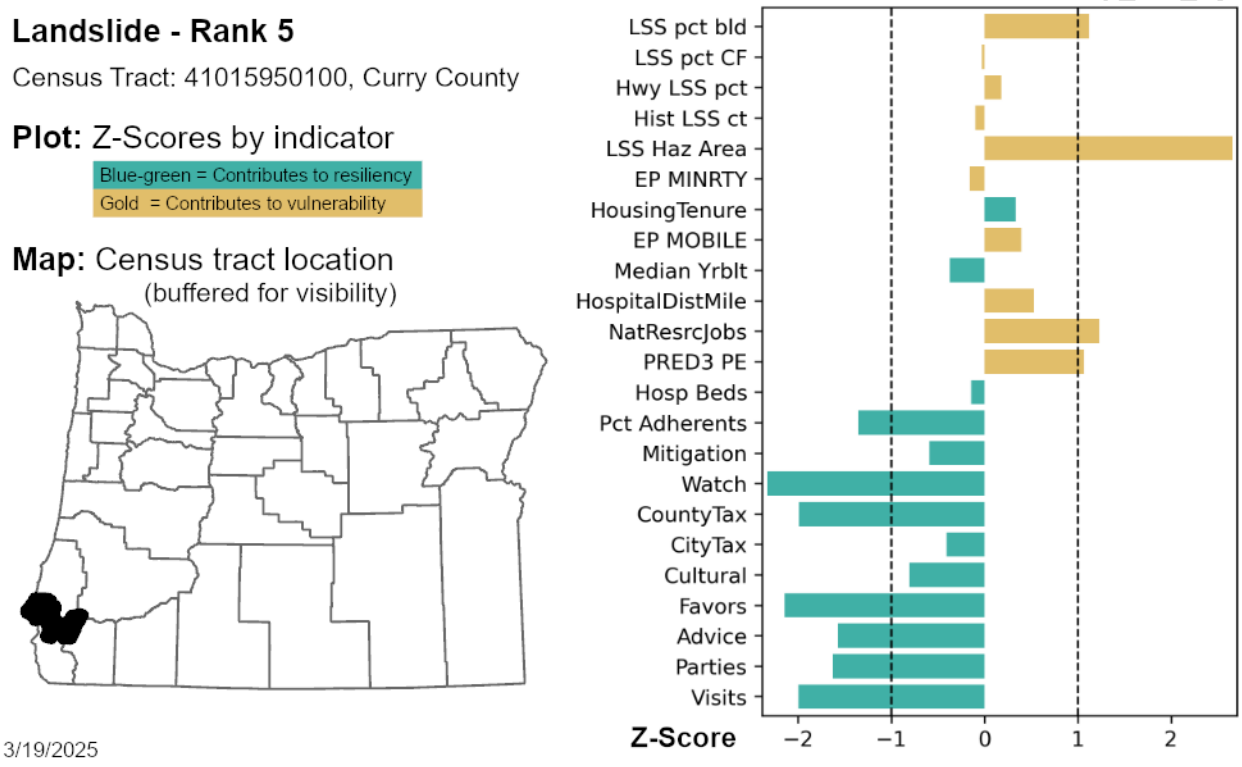


Table 9.3.6-6: State-owned buildings or critical facilities 41047010600

	Building Name	Value	Source
Critical facility	Communication Structure	268,050	DOGAMI
Critical facility	Unknown	142,009	DOGAMI

Landslide Susceptibility Rank 6 – Wasco County 41065970600

This census tract encompasses Mosier and The Dalles, Oregon, in the Columbia River Gorge. The NRI reports a very high landslide susceptibility in this area, with a score of 99.5. The NRI estimates nearly half (45.2%) of this census tract's population are susceptible to a landslide. In this analysis, critical facilities and historic buildings within the landslide susceptibility area are the primary drivers of this susceptibility ranking.

Figure 9.3.6-7: Sixth ranked census tract for landslide hazard

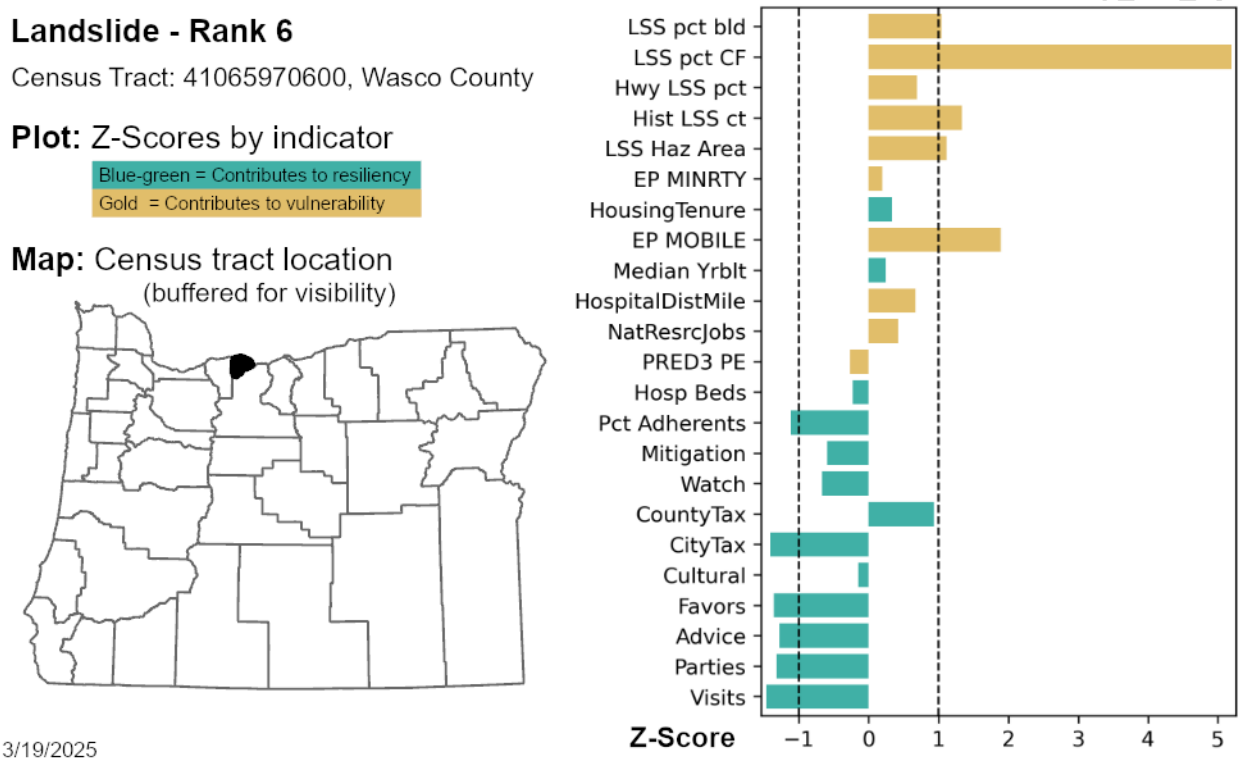


Table 9.3.6-7: State-owned buildings or critical facilities 41047010600

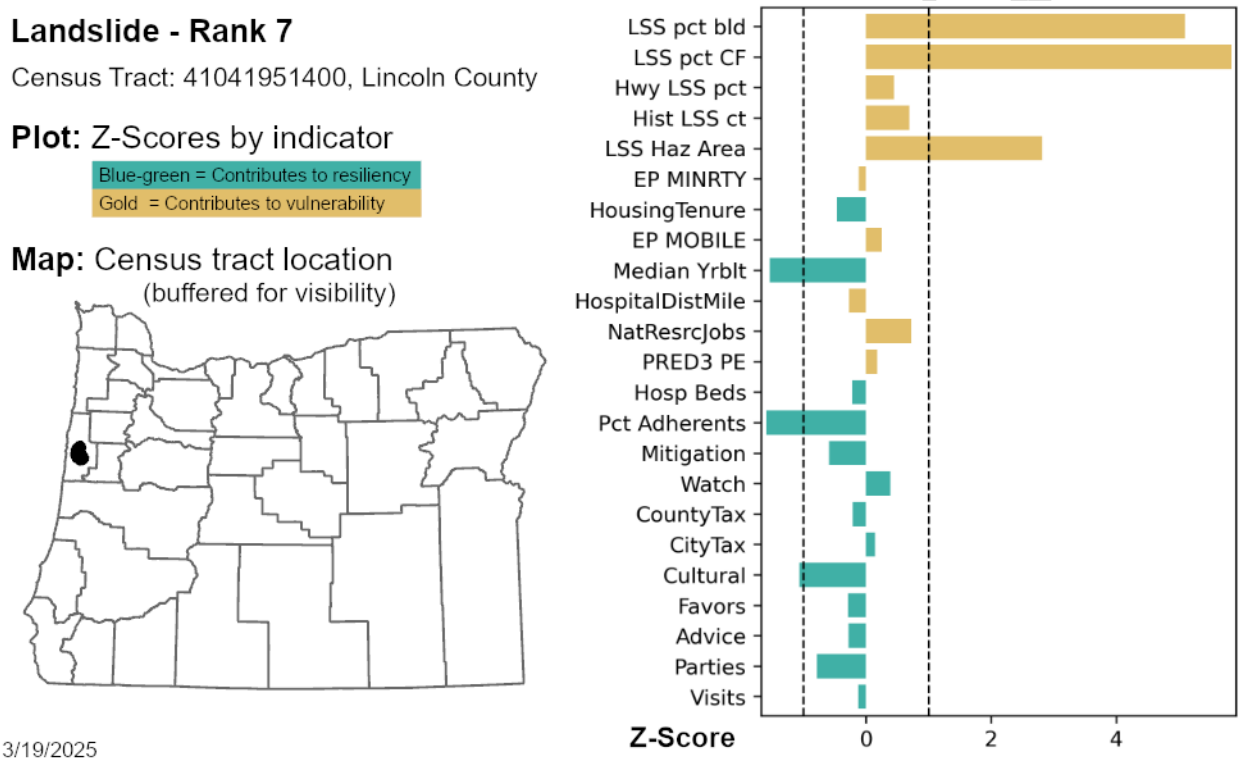
	Building Name	Value	Source
State-owned	Unknown AGR	345,336	
State-owned	Unknown AGR	475,424	
Critical facility	Mosier Fire Department		
Critical facility	Mosier Community School		
Critical facility	Mosier STP		

Landslide Susceptibility Rank 7 – Lincoln County 41041950400

This census tract is located east of the coastal city of Newport, Oregon. The NRI reports a very high landslide susceptibility in this area, with a score of 99.5. The NRI estimates 94% of this census tract's population are susceptible to landslide. In this analysis, widespread landslide susceptibility and exposed buildings in landslide areas are the primary drivers of this susceptibility ranking.

may be susceptible to landslide damage when compared to other census tracts in the state.

Figure 9.3.6-8: Seventh ranked census tract for landslide hazard

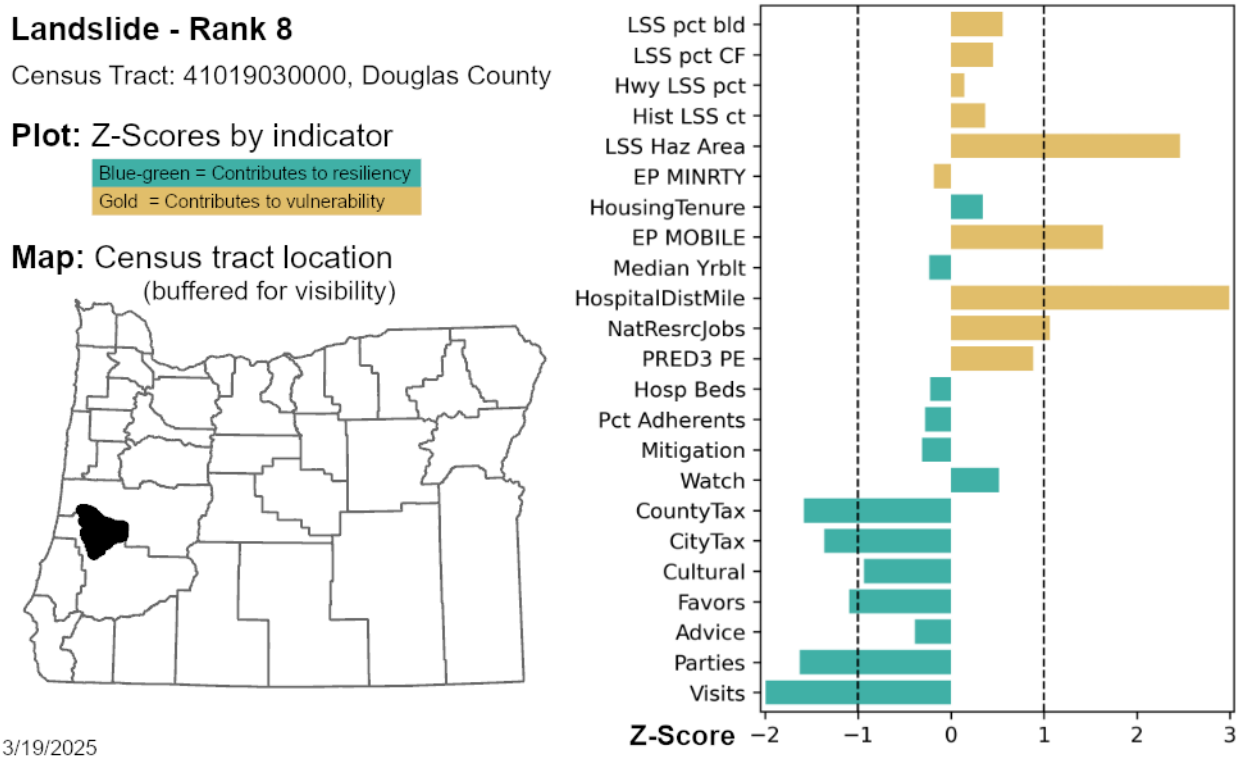


No State-owned buildings or critical facilities in landslide susceptibility area. 41041950100

Landslide Susceptibility Rank 8 — Douglas County 41019030000

This rural census tract is located northwest of Roseburg, Oregon, in southern Oregon. The NRI reports a very high landslide susceptibility in this area, with a score of 100. The NRI estimates around two-thirds (69%) of this census tract's population are susceptible to landslide. In this analysis, low social cohesion, large distances to hospitals, and widespread landslide susceptibility hazard areas are the primary drivers of this susceptibility ranking.

Figure 9.3.6-9: Eighth ranked census tract for landslide hazard

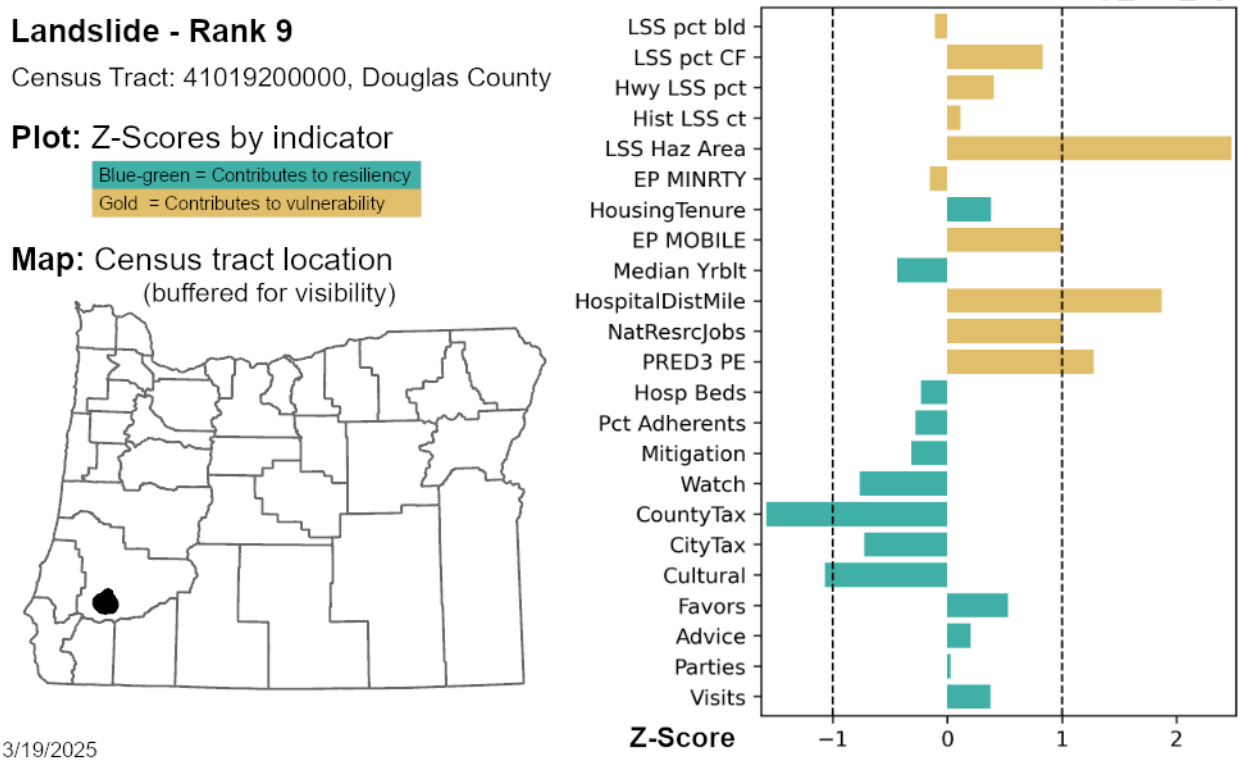


No State-owned buildings or critical facilities in landslide susceptibility area.

Landslide Susceptibility Rank 9 – Douglas County 410192200000

This rural census tract is located north of the coastal city of Newport, Oregon. The NRI reports a very high landslide susceptibility in this area, with a score of 99.9. The NRI estimates around half (56%) of this census tract's population are susceptible to landslide. In this analysis, lower social cohesion, coupled with higher exposure of buildings and critical facilities in landslide hazard area, drive this susceptibility ranking.

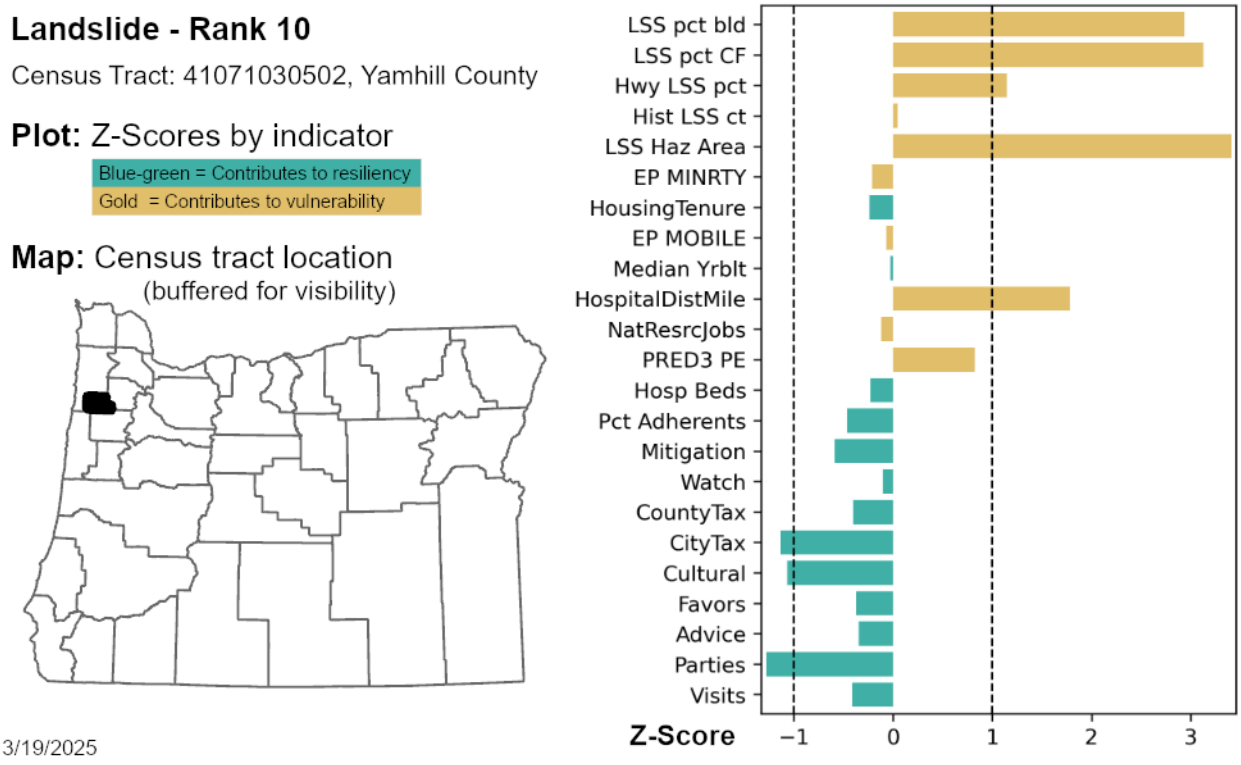
Figure 9.3.6-10: Ninth ranked census tract for landslide hazard



No State-owned buildings or critical facilities in landslide susceptibility area. check

Landslide Susceptibility Rank 10 – Yamhill County 41071030502

Figure 9.3.6-11: Tenth ranked census tract for landslide hazard



No State-owned buildings or critical facilities in landslide susceptibility area. check

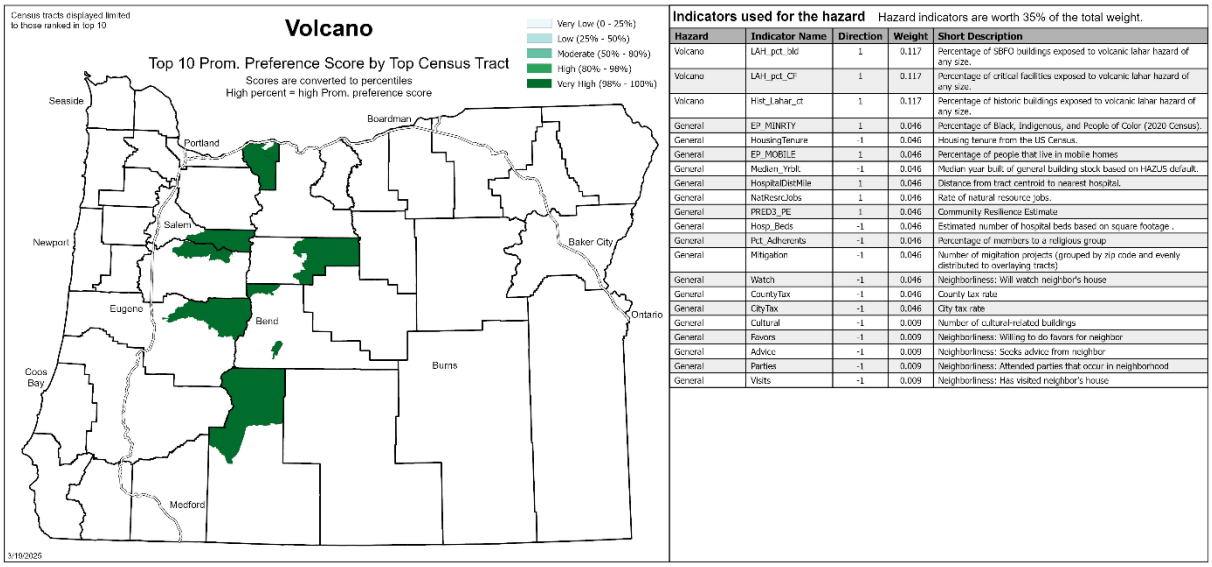
9.3.7 Volcano

9.3.7.1 Hazard Scenario

Lahar inundation zones	USGS (Mt. Jefferson, Sisters, Crater Lake)
Lahar inundation zones	Mt. Hood – DOGAMI (Burns and others, 2011)

9.3.7.2 Top Ranked Volcano Risk Areas

Figure 9.3.7-1: Top Ranked Risk Areas in Volcano Risk Areas



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

Hazard	Indicator Name	Direction	Weight	Short Description
Volcano	LAH_pct_bld	1	0.117	Percentage of SBFO buildings exposed to volcanic lahar hazard of any size.
Volcano	LAH_pct_CF	1	0.117	Percentage of critical facilities exposed to volcanic lahar hazard of any size.
Volcano	Hist_Lahar_ct	1	0.117	Percentage of historic buildings exposed to volcanic lahar hazard of any size.
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	Medien_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 migitation 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

Table 9.3.7-1: Oregon Natural Hazard Risk Assessment Rank Compared to the National Risk Index

Oregon Rank	Census Tract	County	National Risk Index Hazard Rating *	Exposed Population According to NRI
1	41019030000	Marion	Very Low	na
2	41035970100	Klamath	No Rating	na
3	41017000501	Deschutes	Not Applicable	na
5	41027950400	Hood River	Very High	5508

Oregon Rank	Census Tract	County	National Risk Index Hazard Rating *	Exposed Population According to NRI
4	41017000301	Deschutes	Not Applicable	na
6	41027950100	Hood River	Very High	4446
7	41039000100	Lane	Not Applicable	na
8	41031960100	Jefferson	Relatively Low	2123
9	41043030201	Linn	Relatively Low	2551
10	41039001804	Lane	Not Applicable	na

*Compared to census tracts nationwide

Table 9.3.7-2: Top 10 Census Tract Demographics

Census Tract	Volcano Risk Rank	2020 Population[1]	2023 Population[2]	% Change in Population	2016 SVI[3]	2022 SVI[4]	Change in SVI
41019030000	1	4047	4107	1%	0.39	0.35	-0.11
41035970100	2	3301	3546	7%	0.76	0.57	-0.25
41017000501	3	3057	3013	-1%	#N/A	0.05	#N/A
41027950400	4	5519	5455	-1%	0.81	0.82	0.01
41017000301	5	4679	4024	-14%	#N/A	0.11	#N/A
41027950100	6	4449	4873	10%	0.64	0.74	0.16
41039000100	7	5232	4838	-8%	0.16	0.25	0.59
41031960100	8	2482	2163	-13%	0.38	0.50	0.33
41043030201	9	3501	3216	-8%	#N/A	0.50	#N/A
41039001804	10	3687	4312	17%	0.20	0.17	-0.14

[1] 2020 Decennial Census Census Tract Level Population Data HC2020.P1 - 2020 data was used rather than 2018 due to changes in census tract boundaries in 2020

[2] 2023 ACS 5-Year Estimates Census Tract Level Age and Sex Data S0101

[3] 2016 US CDC Social Vulnerability Index - "#N/A" cells represent census tracts that did not exist before changes to census tract boundaries in 2020

[4] 2022 US CDC Social Vulnerability Index

Volcano Risk Rank 1 – Marion County 41047010600

This census tract is located east of Salem, and encompasses the towns of Lyons and Mill City. The NRI reports a very low volcanic risk in this area, with a score of 40.4. The NRI estimates nearly all (98.9%) of the population in this census tract to be at risk of volcanic hazards. In this analysis, buildings and critical facilities exposed to lahar flows and higher than average distance to hospitals drives risk.

Figure 9.3.7-2: First ranked census tract for volcano hazard

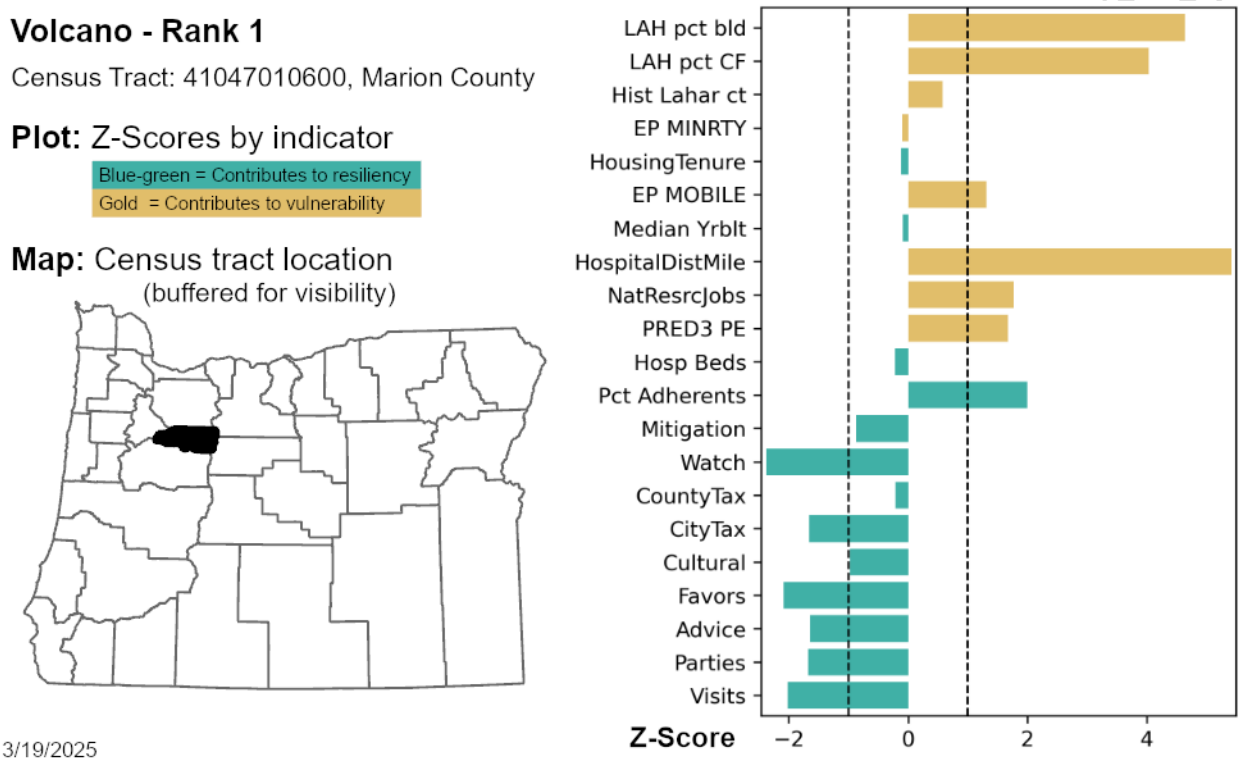


Table 9.3.7-3: State-owned buildings or critical facilities 41047010600

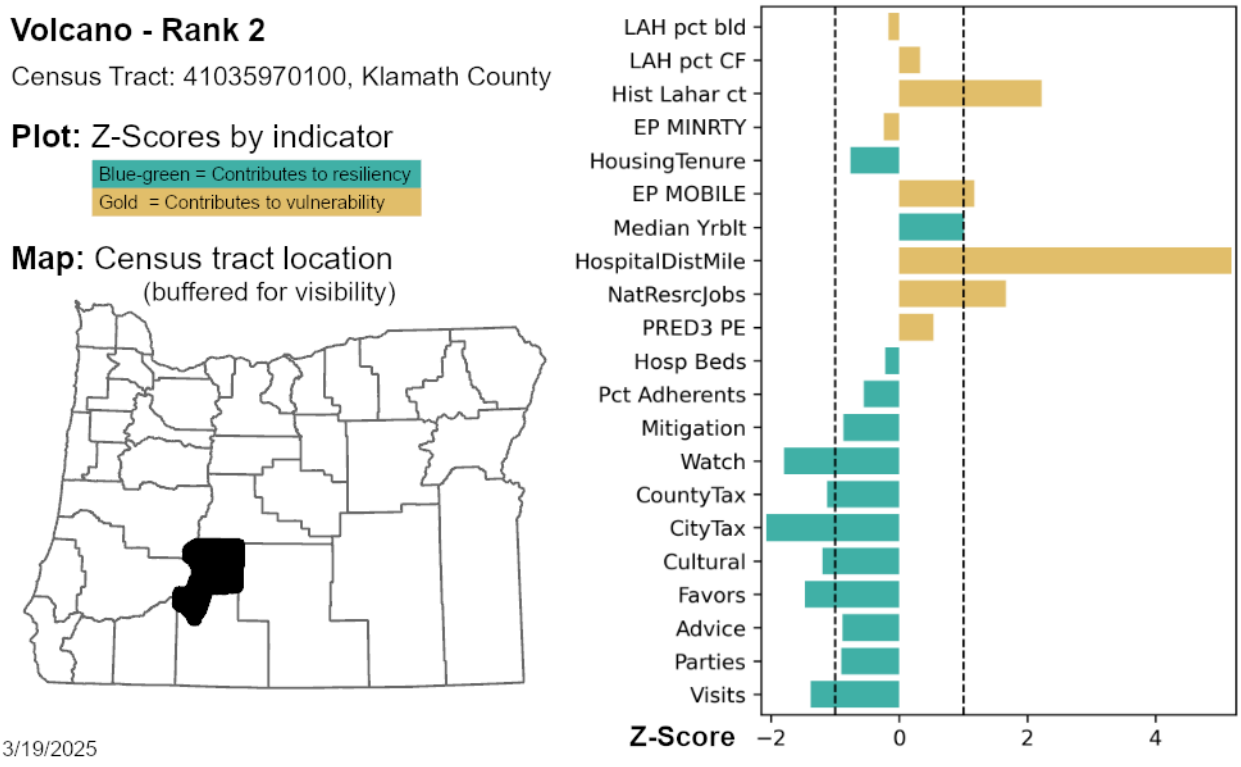
State-owned Buildings	Value	Source
Storage	123725	DOGAMI
Detroit Maintenance Station Grounds	1859548	DOGAMI
Detroit Maintenance Station Grounds	1005053	DOGAMI
Unknown	291080	DOGAMI
North Santiam Boat Ramp Restroom	153767	DOGAMI
ODOT Maintenance Station	161240	DOGAMI

State-owned Buildings	Value	Source
Ranger station garage	694500	DOGAMI
Storage	462550	DOGAMI
Restroom	174780	DOGAMI
Site Systems - Minto Creek Stockpile Grounds	86142	DOGAMI
Minto Creek Scoop Shed	215659	DOGAMI
The Maples RA Pumphouse/ Storage	117943	DOGAMI
Site Systems - The Maples RA Grounds	86142	DOGAMI
The Maples RA New Restroom	430171	DOGAMI

Volcano Risk Rank 2 – Klamath County 41035970100

This census tract is located in southern Oregon. The NRI does not report a volcanic risk in this area and does not provide a score for this hazard in this area. The NRI does not estimate people at risk for this hazard. Risk is primarily driven by historic lahar flows and greater distance to hospitals.

Figure 9.3.7-3: Second ranked census tract for volcano hazard



No state-owned buildings or critical facilities in volcano hazard area 41035970100

Volcano Risk Rank 3 – Deschutes County 41017000501

This census tract is located northwest of Bend, Oregon, in central Oregon. The NRI does not report a volcanic risk in this area and does not provide a score for this hazard in this area. The NRI does not estimate people at risk for this hazard. Historic lahar flows and exposures of critical facilities and buildings, in addition to large distances to hospitals, drives risk.

Figure 9.3.7-4: Third ranked census tract for volcano hazard

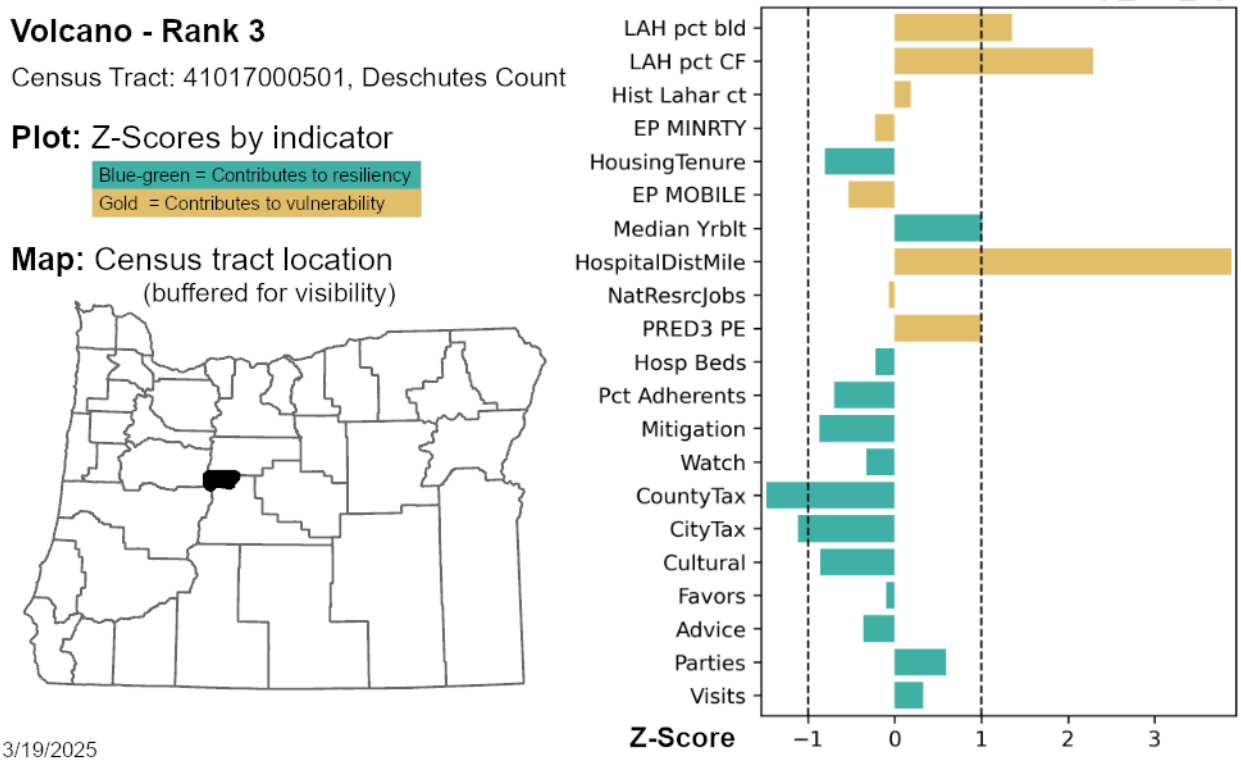


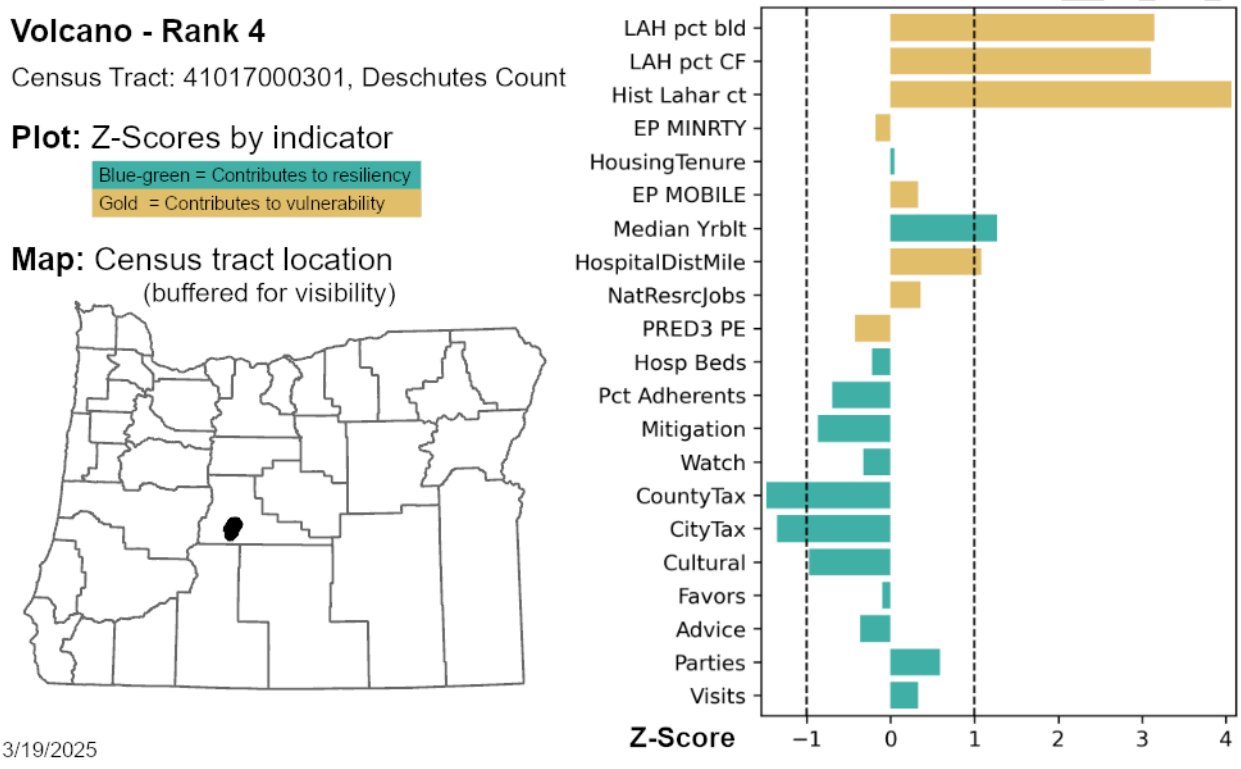
Table 9.3.7-4: State-owned buildings or critical facilities identified in lahar zones 41017000501

	State-owned Buildings	Value	Source
State-owned	Sisters Sub-Unit	1899604	DOGAMI
State-owned	Sisters Sub-Unit	94103	DOGAMI

Volcano Risk Rank 4 – Deschutes County 41017000301

This census tract is located south of Bend and Sunriver, Oregon, in central Oregon. The NRI does not report a volcanic risk in this area, and does not provide a score for this hazard in this area. The NRI does not estimate people at risk for this hazard. Historic lahar flows primarily drive risk.

Figure 9.3.7-5: Fourth ranked census tract for volcano hazard



No state-owned buildings or critical facilities identified in volcano hazard zone

Volcano Risk Rank 5 – Hood River County 41027950400

This census tract is located adjacent to Hood River, Oregon, in the Columbia River Gorge. The NRI reports a very high volcanic risk in this area, with a score of 99.3. The NRI estimates nearly all (99.7%) of the population in this census tract to be at risk of this hazard. Reliance on natural resource jobs and historic lahar flows primarily drives risk in this analysis.

Figure 9.3.7-6: Fifth ranked census tract for volcano hazard

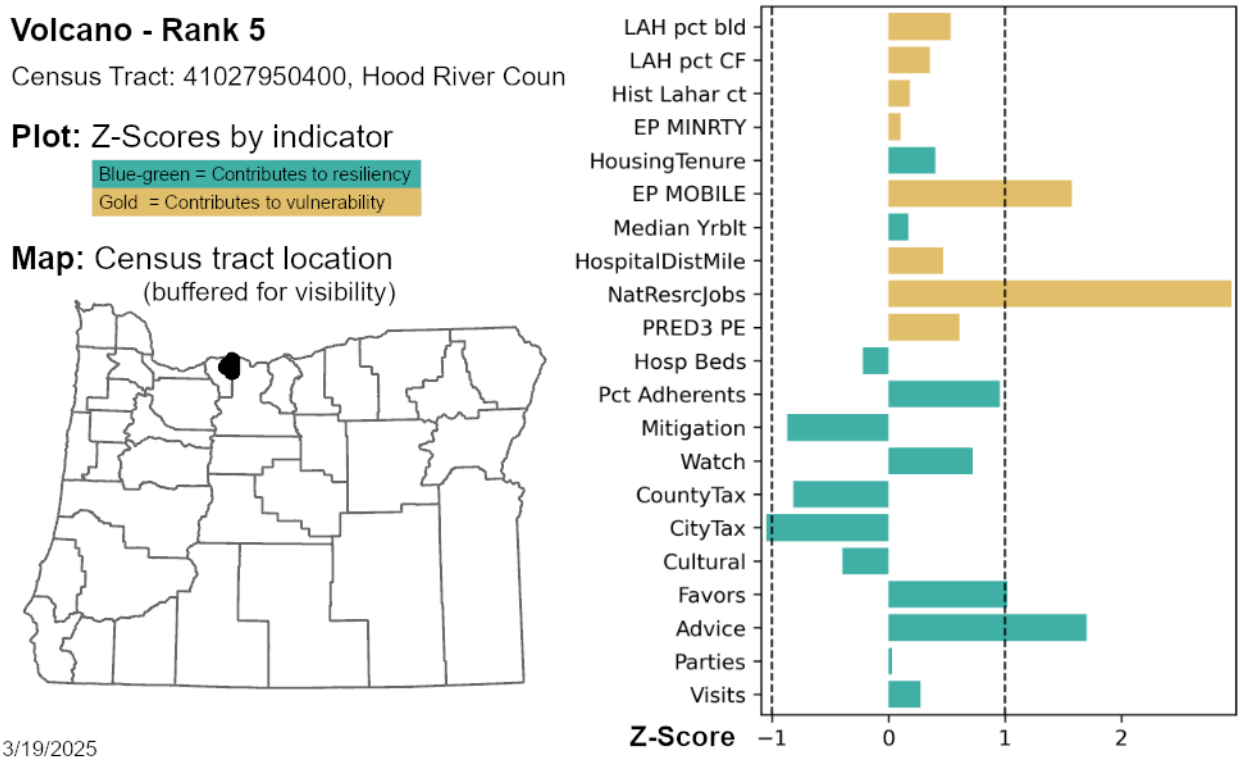


Table 9.3.7-5: State-owned buildings or critical facilities

	Building Name 41027950400	Value	Source
State-owned	Unknown	424668	DOGAMI

Volcano Risk Rank 6 – Hood River County:

This census tract encompasses much of Hood River County, in the Columbia River Gorge. The NRI reports a very high volcanic risk in this area, with a score of 98.6. The NRI estimates nearly all (99.9%) of the population in this census tract to be at risk for this hazard. Historic lahar flows, and exposure of state owned buildings and critical facilities to lahar flows, drives risk in this analysis.

Figure 9.3.7-7: Sixth ranked census tract for volcano hazard

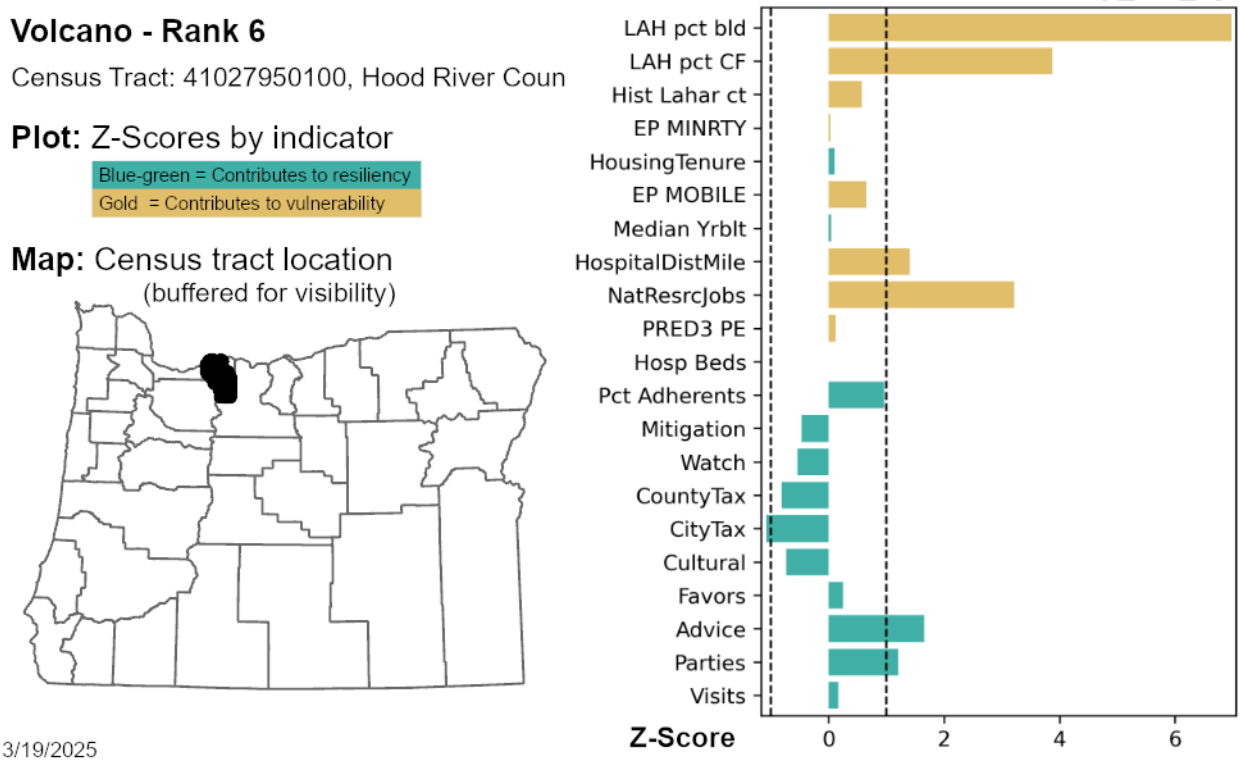


Table 9.3.7-6: State-owned buildings or critical facilities

	Building Name	Value	Source
State-owned	Parkdale Maintenance Station New Grounds	2026059	DOGAMI
State-owned	Parkdale Maintenance Station New Grounds	421722	DOGAMI
State-owned	Parkdale Maintenance Station New Grounds	1757869	DOGAMI
State-owned	Fire Guard Station, maintenace buiding	344838	DOGAMI
State-owned	Unknown	1485289	DOGAMI
State-owned	Dept of Forestry, house	321233	DOGAMI

Volcano Risk Rank 7 – Lane County 41039000100

This census tract is east of Eugene and Springfield, Oregon, in the Willamette Valley. The NRI does not report a volcanic risk in this area, and does not score this hazard. The NRI does not estimate people at risk for this hazard. Exposure of buildings and critical facilities to potential lahars, and historic lahar flows, are the primary drivers of risk. Additionally, higher than average distances to hospitals drives risk.

Figure 9.3.7-8: Seventh ranked census tract for volcano hazard

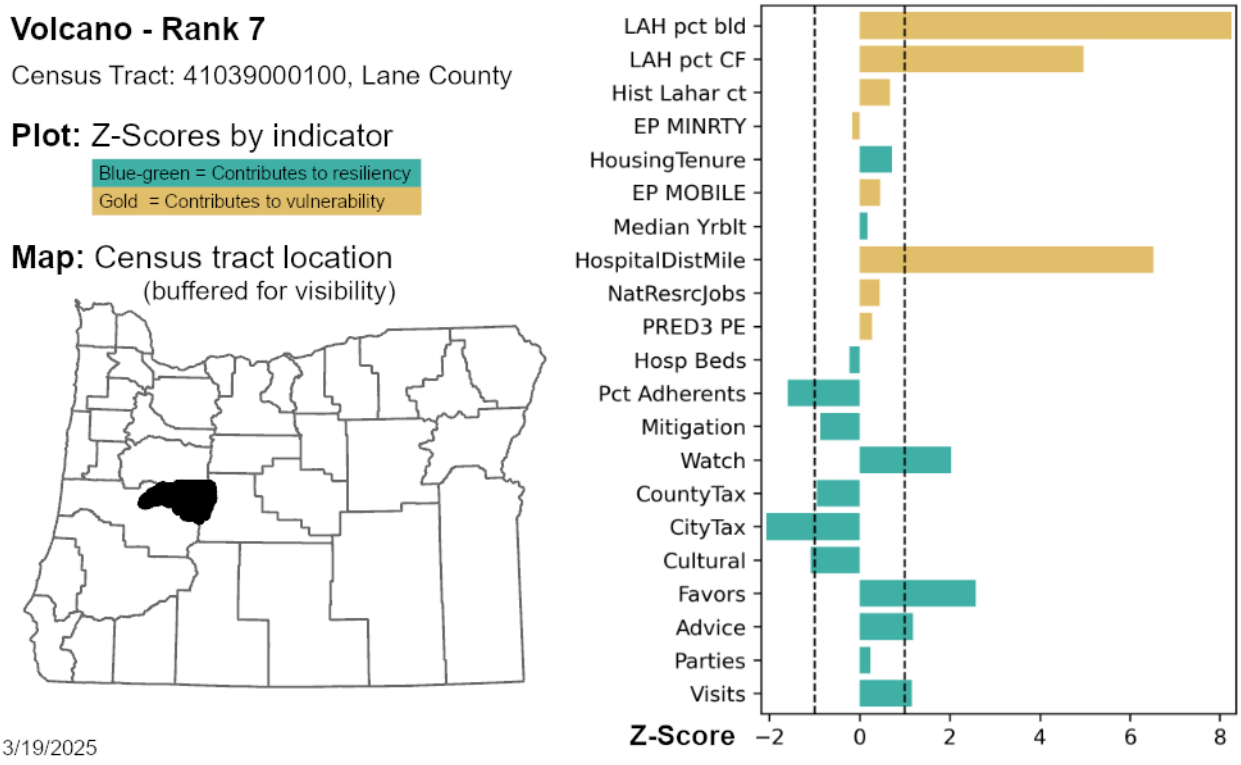


Table 9.3.7-7: State-owned buildings or critical facilities

	Building Name 41039000100	Value	Source
State-owned	Unknown	1112233	DOGAMI
State-owned	McKenzie River Ranger Station	846509	DOGAMI
State-owned	Holman Guard Station	1026117	DOGAMI
State-owned	ODOT McKenzie Bridge Maintenance Station	1161757	DOGAMI
State-owned	McKenzie River Ranger Station	708786	DOGAMI
State-owned	McKenzie River Ranger Station	690311	DOGAMI

	Building Name 41039000100	Value	Source
State-owned	<Null>	681544	DOGAMI
State-owned	ODOT McKenzie Maintenace Station	1040027	DOGAMI
State-owned	McKenzie Hatchery	4366318	DOGAMI
State-owned	McKenzie River Ranger Station	850963	DOGAMI
State-owned	Unknown	1004841	DOGAMI
State-owned	Unknown	769060	DOGAMI
State-owned	Unknown	1063182	DOGAMI
State-owned	McKenzie River Ranger Station	680673	DOGAMI
State-owned	McKenzie Bridge Maintenance Station Grounds	2159576	DOGAMI
State-owned	McKenzie Bridge State Airport (00S)	667242	DOGAMI
State-owned	McKenzie Bridge Deicer Building	934370	DOGAMI
State-owned	Site Systems - McKenzie Bridge MS Grounds	667242	DOGAMI
State-owned	Offices, Fire House, & Equipment Storage	1026117	DOGAMI
State-owned	Leaburg Hatchery Residence Duplex	667242	DOGAMI
State-owned	Leaburg Hatchery Garage	667242	DOGAMI
State-owned	Leaburg Hatchery Residence Duplex	667242	DOGAMI
State-owned	Leaburg Hatchery Spawning House	667242	DOGAMI
State-owned	Leaburg Hatchery Offices/Garage/Shop/River Building	667242	DOGAMI
State-owned	Leaburg Hatchery Residence Duplex	667242	DOGAMI
State-owned	Leaburg Hatchery Garage/Truck Shop/Paint	667242	DOGAMI
State-owned	Leaburg Hatchery Residence and Garage Utility	667242	DOGAMI
State-owned	Leaburg Hatchery Garage	667242	DOGAMI
State-owned	Site Systems - Walterville Scale House Grounds	667242	DOGAMI
State-owned	Walterville Scale House	719280	DOGAMI

Volcano Risk Rank 8 – Jefferson County:

This census tract is located to the northeast of Bend, Oregon, in central Oregon. The NRI reports a relatively low volcanic risk in this area, with a score of 58.2. The NRI estimates 85% of the population of the census tract to be at risk of this hazard. Higher than average distances to hospitals, and slightly lower than average social cohesion drives risk in this area.

Figure 9.3.7-9: Eighth ranked census tract for volcano hazard

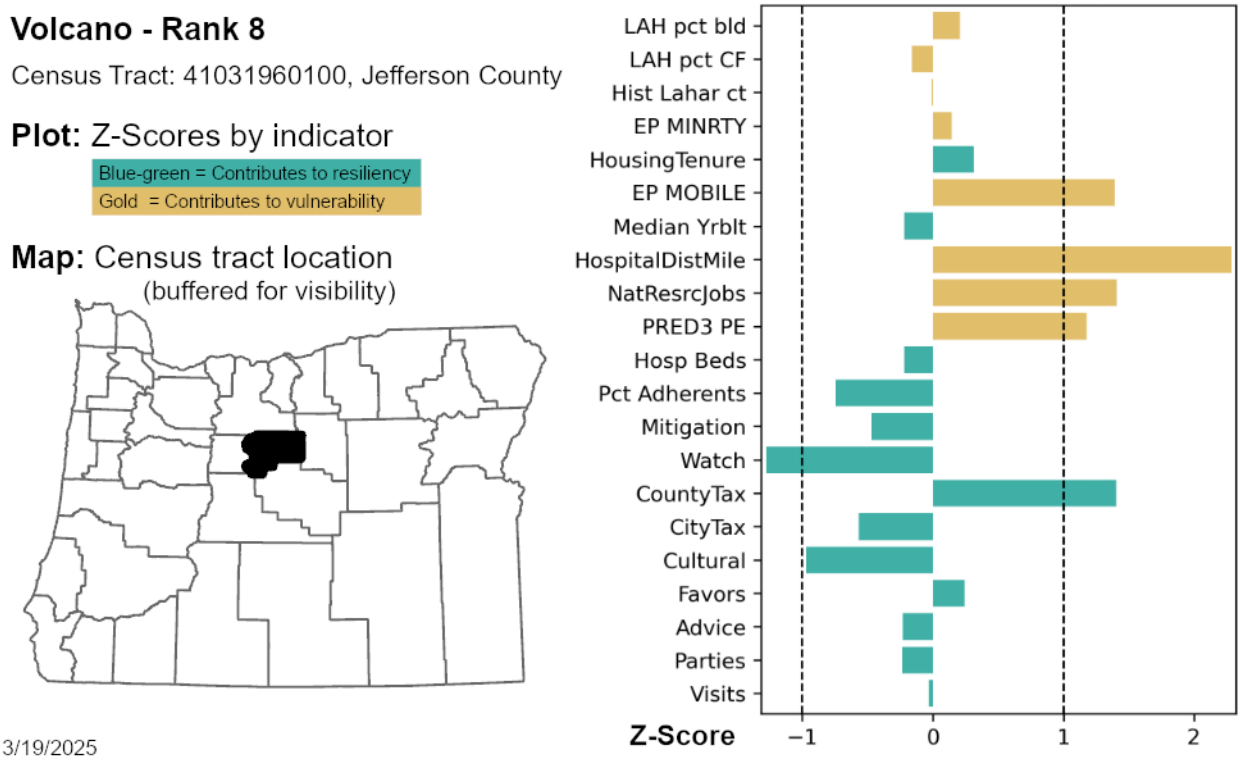


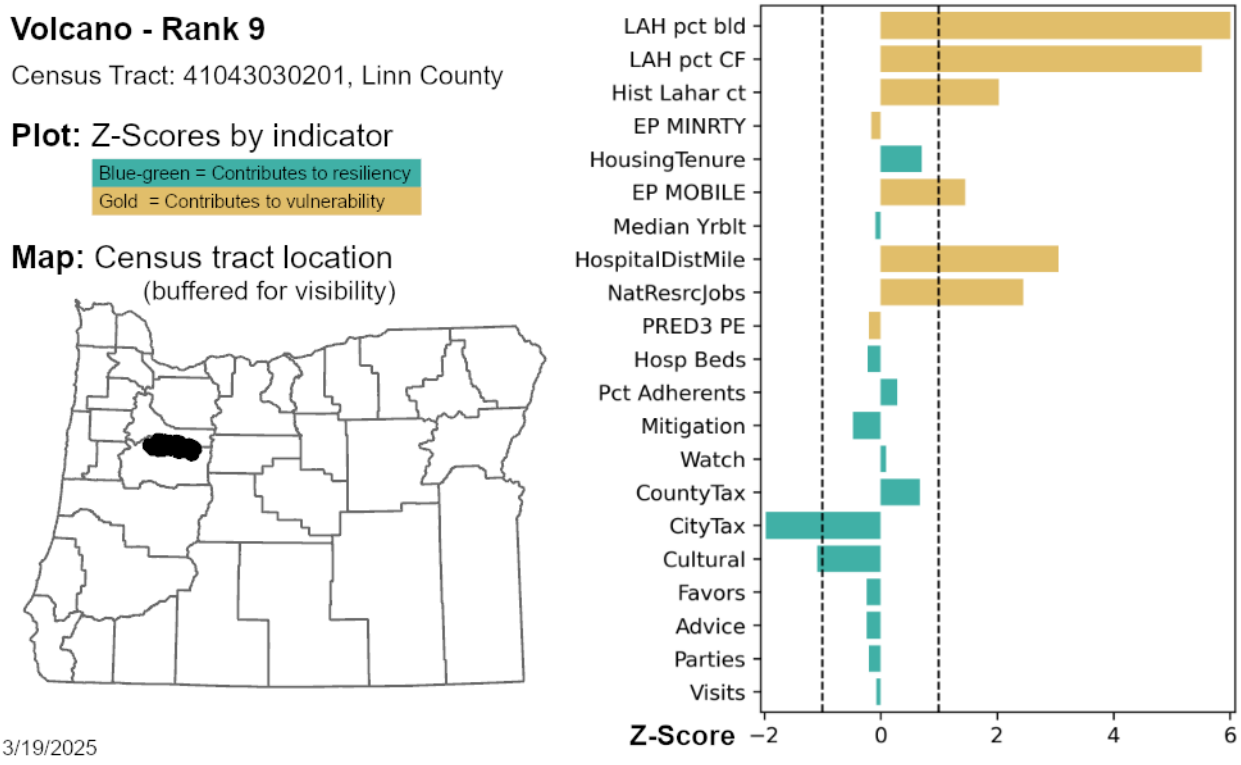
Table 9.3.7-8: State-owned buildings or critical facilities

	Building Name	Value	Source
State-owned	Unknown	39065	DOGAMI

Volcano Risk Rank 9 – Linn County:

This census tract is located east of Albany, Oregon, in the Willamette Valley. The NRI reports a relatively low volcanic risk in this area, with a score of 78.2. The NRI estimates 72% of the population within this census tract to be at risk of volcanic hazards. Exposure of critical facilities and state owned buildings, coupled with historic lahar flows, drives risk.

Figure 9.3.7-10: Ninth ranked census tract for volcano hazard

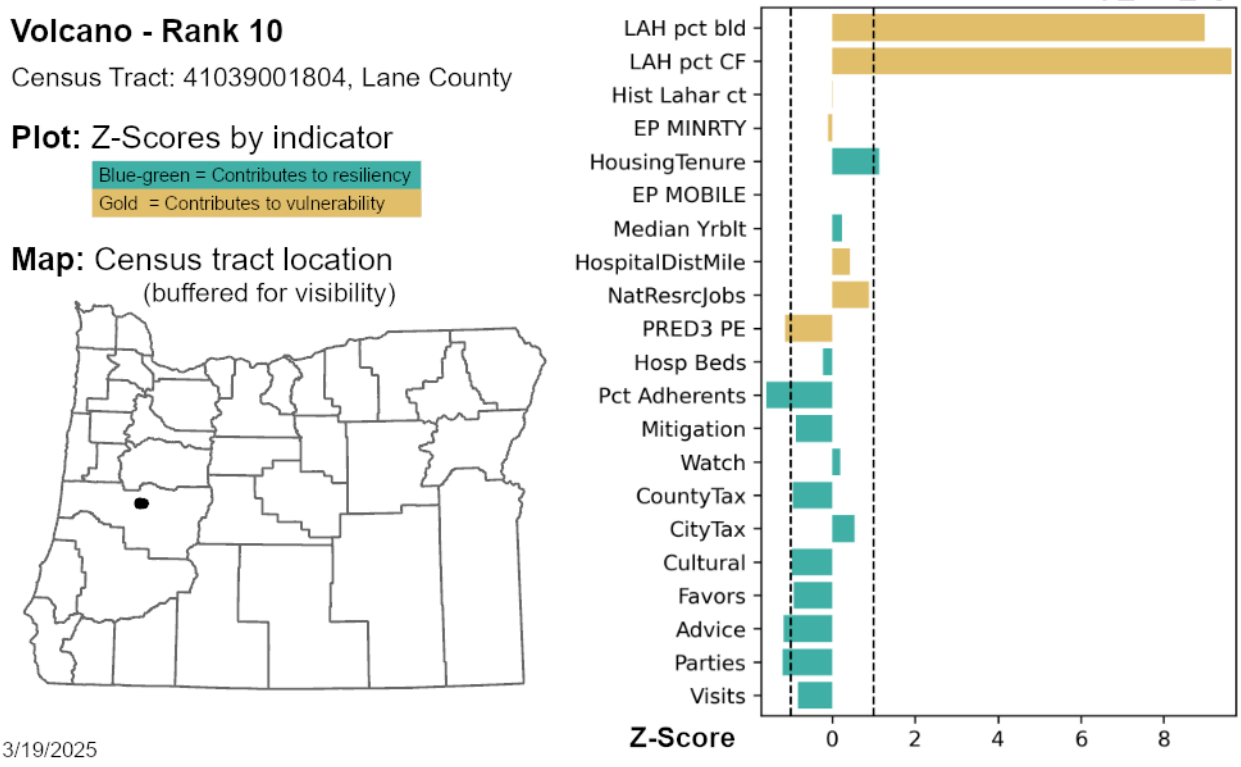


No state-owned buildings or critical facilities identified in volcano hazard zone.

Volcano Risk Rank 10 – Lane County:

This census tract is located east of Eugene, Oregon, in the Willamette Valley. The NRI does not report a volcanic risk in this area, and does not score this hazard. The NRI does not estimate people at risk for this hazard. Exposure of critical facilities and state owned buildings, coupled with historic lahar flows, are the primary drivers of risk.

Figure 9.3.7-11: Tenth ranked census tract for volcano hazard



No state-owned buildings or critical facilities identified in volcano hazard zone.

9.3.8 Wildfire

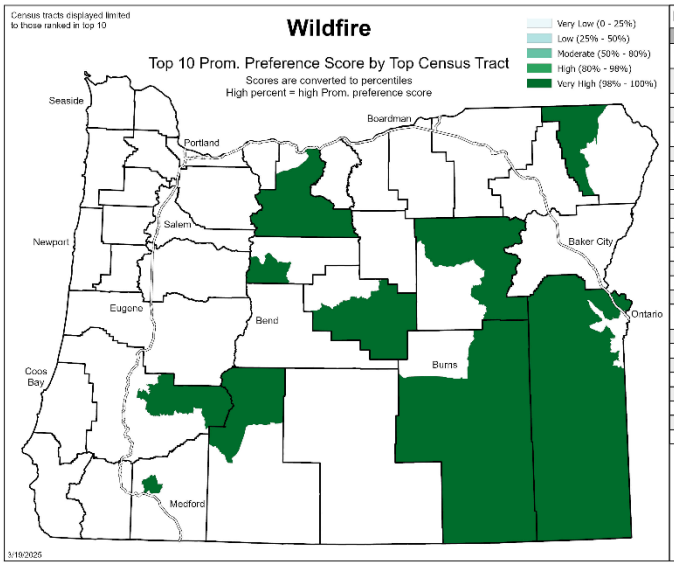
9.3.8.1 Hazard Scenario

Burn probability	Oregon Dept. of Forestry (McEvoy and others, 2023)

The Pacific Northwest Quantitative Wildfire Risk Assessment (QWRA): Methods and Results (McEvoy and others, 2023) is a comprehensive report that includes a database of spatial information related to wildfire hazard developed by the United States Forest Service (USFS) for the states of Oregon and Washington. For this project, DOGAMI used the burn probability dataset from the QWRA to measure exposure to wildfire risk. While this risk assessment uses some of the same underlying data as the statewide wildfire hazard map developed by ODF and Oregon State University, this risk assessment and related maps are not intended for regulatory purposes. Rather, they will be used to identify state-owned buildings and critical facilities for possible mitigation actions. To learn more about the statewide wildfire hazard map, visit https://www.oregon.gov/odf/fire/pages/wildfire-hazard.aspx.

9.3.8.2 Top Ranked Wildfire Risk Areas

Figure 9.3.8-1: Top Ranked Risk Areas in Wildfire Risk Areas



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

Hazard	Indicator Name	Direction	Weight	Short Description
Wildfire	WF_pct_bld	1	0.05	Percentage of SBFO buildings exposed to Medium and High Burn Probability.
Wildfire	WF_pct_CF	1	0.05	Percentage of critical facilities exposed to Medium and High Burn Probability.
Wildfire	BurnProb	1	0.05	Burn probability from the QPNW.
Wildfire	Hwy_WF_pct	1	0.05	Percentage of highway within High Burn Probability zones
Wildfire	Hist_WF_ct	1	0.05	Percentage of historic buildings exposed to Medium and High Burn Probability.
Wildfire	Over90th	1	0.05	Mean days that are above the historic 90th percentile temp
Wildfire	Over90F	1	0.05	Mean days above 90 degrees Fahrenheit
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 migitation 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

Table 9.3.8-1: Oregon Natural Hazard Risk Assessment Rank Compared to the National Risk Index

Oregon Rank	Census Tract	County	National Risk Index Hazard Rating *	Exposed Population According to NRI
1	41025960200	Harney	Very high	1,102
2	41013950402	Crook	Relatively high	1301
3	41023960100	Grant	Relatively high	891
4	41031960303	Jefferson	Relatively high	395
5	41029002800	Jackson	Relatively high	362
6	41045970900	Malheur	Relatively high	679
7	41065970800	Wasco	Very high	1949
8	41035970100	Klamath	Relatively moderate	511
9	41063960200	Wallowa	Relatively high	216
10	41019100000	Douglas	Relatively moderate	481

*Compared to census tracts nationwide
NRI accessed 03/27/2025

Table 9.3.8-2: Top 10 Census Tract Demographics

Census Tract	Wildfire Risk Rank	2020 Population[1]	2023 Population[2]	% Change in Population	2016 SVI[3]	2022 SVI[4]	Change in SVI
41025960200	1	2165	2261	4%	0.50	0.71	0.21
41031960303	2	564	678	20%	#N/A	0.36	#N/A
41029002800	3	4965	4765	-4%	0.52	0.63	0.11
41013950402	4	2397	2739	14%	#N/A	0.51	#N/A
41023960100	5	2050	2214	8%	0.62	0.65	0.03
41045970900	6	5670	6202	9%	0.69	0.70	0.01
41065970800	7	4542	4650	2%	0.71	0.73	0.03
41035970100	8	3301	3546	7%	0.76	0.57	-0.19
41063960200	9	1860	1877	1%	0.72	0.45	-0.28
41019100000	10	3103	3283	6%	0.56	0.56	0.00

[1] 2020 Decennial Census Census Tract Level Population Data HC2020.P1 - 2020 data was used rather than 2018 due to changes in census tract boundaries in 2020

[2] 2023 ACS 5-Year Estimates Census Tract Level Age and Sex Data S0101

[3] 2016 US CDC Social Vulnerability Index - "#N/A" cells represent census tracts that did not exist before changes to census tract boundaries in 2020

[4] 2022 US CDC Social Vulnerability Index

Wildfire Risk Rank 1 – Harney County 41025960200

This rural census tract encompasses much of Harney County. The NRI reports a very high risk of wildfire, with a score of 99.5 and a Risk Index Rating of Very High. According to the NRI, about half (51%) of the population in this area is at risk of this hazard. Large distances to hospitals primarily drive risk in this area. Although a rural census tract, a larger than statewide average percent of buildings, critical facilities and historic buildings could be harmed by wildfire. This is likely due to the large area covered by the census tract. A larger than statewide average number of people in the census tract live in mobile homes. Social cohesion indicators are below statewide average.

Figure 9.3.8-2: First ranked census tract for wildfire hazard

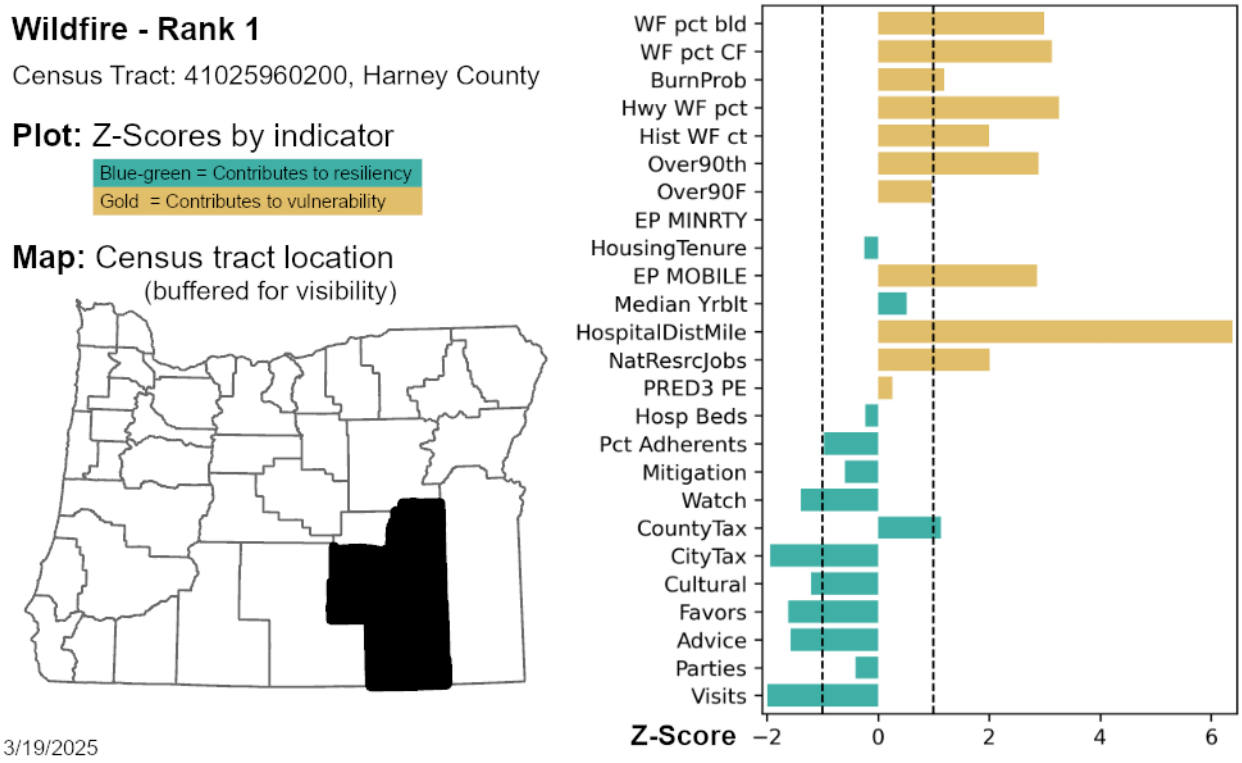


Table 9.3.8-3: State-owned buildings or critical facilities 41025960200

Type of Exposed Structure	Name	Value	Source
State-owned	Sand Shed	431817	DAS 2020
State-owned	Pete French Round Barn	509322	DAS 2020
State-owned	Sagehen Hill RA Grounds	835829	DAS 2020
State-owned	Sagehen Hill RA Grounds	486577	DAS 2020

Type of Exposed Structure	Name	Value	Source
State-owned	Frenchglen Hotel	690192	DAS 2020
State-owned	Frenchglen Hotel	175447	DAS 2020
State-owned	Buchanan Springs Rest Area	106513	DAS 2020
State-owned	Site Systems - Steens Radio Operating Exp Grounds	31564	DAS 2020
State-owned	Steens Radio Building	76217	DAS 2020
State-owned	Site Systems - King Mountain M/W Grounds	31564	DAS 2020
State-owned	King Mountain M/W Building	60474	DAS 2020
State-owned	King Mountain M/W Battery Building	60474	DAS 2020
State-owned	Alkali Lake MS Deicer Building	156455	DAS 2020
State-owned	Alkali Lake MS Residence Garage	104851	DAS 2020
State-owned	Alkali Lake MS Mobile Home 17	274408	DAS 2020
Critical Facility	DREWSEY ELEMENTARY SCHOOL	190960	DAS 2020
Critical Facility	PINE CREEK ELEMENTARY SCHOOL	330490	DAS 2020
Critical Facility	DIAMOND ELEMENTARY SCHOOL	10934	DAS 2020
Critical Facility	CRANE ELEMENTARY SCHOOL	1070893	DAS 2020
Critical Facility	CRANE UNION HIGH SCHOOL	1581720	DAS 2020
Critical Facility	CRANE UNION HIGH SCHOOL	92838	DAS 2020
Critical Facility	CRANE UNION HIGH SCHOOL	202202	DAS 2020
Critical Facility	CRANE UNION HIGH SCHOOL	68603	DAS 2020
Critical Facility	CRANE UNION HIGH SCHOOL	165974	DAS 2020
Critical Facility	CRANE UNION HIGH SCHOOL	165974	DAS 2020
Critical Facility	CRANE ELEMENTARY SCHOOL	98478	DAS 2020
Critical Facility	FIELDS ELEMENTARY SCHOOL	1111350	DAS 2020
Critical Facility	FIELDS ELEMENTARY SCHOOL	421350	DAS 2020

Type of Exposed Structure	Name	Value	Source
Critical Facility	DIAMOND ELEMENTARY SCHOOL	39964	DAS 2020
Critical Facilit	CRANE UNION HIGH SCHOOL	783727	DAS 2020
Critical Facility	CRANE UNION HIGH SCHOOL	88801	DAS 2020
Critical Facility	CRANE ELEMENTARY SCHOOL	6311	DAS 2020
Critical Facility	DIAMOND ELEMENTARY SCHOOL	39964	DAS 2020
Critical Facility	Double O Elementary School	323300	DAS 2020
Critical Facility	Frenchglen Elementary School	288690	DAS 2020
Critical Facility	Communication Structure	750000	DAS 2020
Critical Facility	Communication Structure	33750	DAS 2020
Critical Facility	Communication Structure	750000	DAS 2020
Critical Facility	Communication Structure	750000	DAS 2020
Critical Facility	Communication Structure	750000	DAS 2020
Critical Facility	BUREAU OF LAND MANAGEMENT - BURNS FIELD OFFICE	2016150	DAS 2020
Critical Facility	Burns Municipal Airport	2654381	DAS 2020
Critical Facility	Roaring Springs Ranch Airport	402150	DAS 2020
Critical Facility	El Rancho Airport	85950	DAS 2020
Critical Facility	Wildhorse Valley Airport	750000	DAS 2020
Critical Facility	Barton Lake Ranch	377700	DAS 2020
Critical Facility	Wagontire	270450	DAS 2020
Critical Facility	Arnold Airstrip	750000	DAS 2020
Critical Facility	Whitehorse Ranch Airport	750000	DAS 2020

Wildfire Risk Rank 2 – Crook County 41013950402

This census tract is located east of Bend. The NRI reports a relatively high risk of wildfire, with a score of 98.3. According to the NRI, around half (54.2%) of the population in this area is at risk. Large distances to hospitals, and exposure of buildings, historic buildings, and critical facilities drive risk in this area.

Figure 9.3.8-3: Second ranked census tract for wildfire hazard

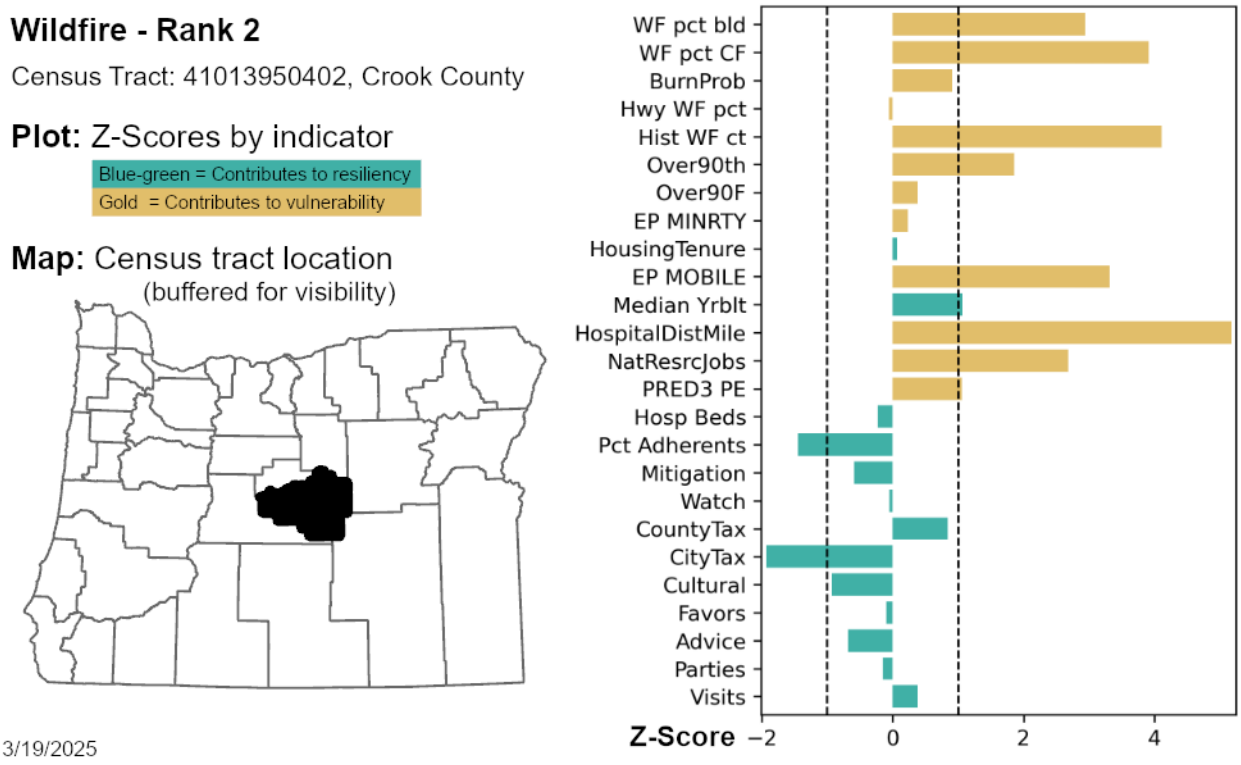


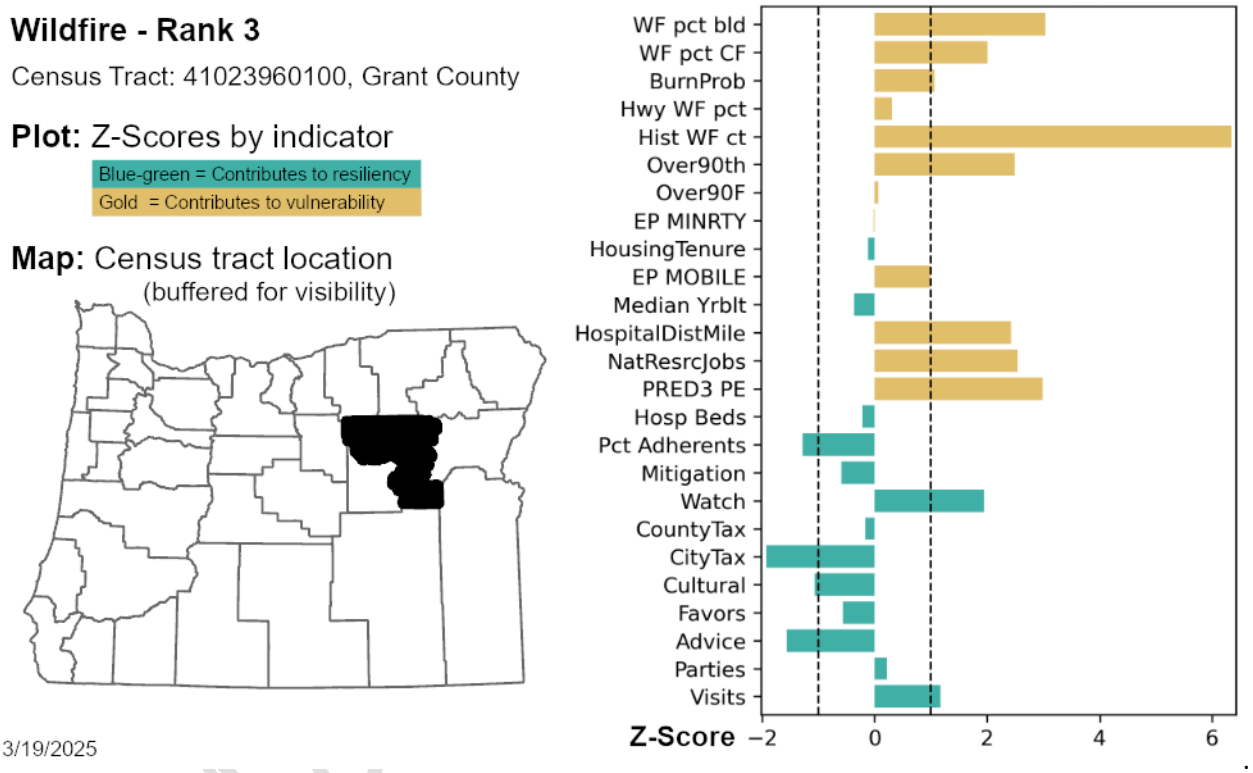
Table 9.3.8-4: State-owned buildings or critical facilities

	Building Name 41013950402	Value	Source
State-owned	Prineville Reservoir State Park	8054379	DAS 2000
State-owned	Powder House Cove Boat Ramp	459018	DAS 2000
State-owned	Lookout Gerow Butte	331558	

Wildfire Risk Rank 3 – Grant County 41023960100

This rural census tract is located in Oregon's northeast corner west of Baker City. The NRI reports a relatively high risk of wildfire, with a score of 99.1. According to the NRI, around half (43.4%) of the population in this area is at risk. Low community resilience, indicated by the Community Resilience Estimate score, coupled with longer distances to hospitals and a higher prevalence of natural resource jobs, drive risk in this area. Additionally, while there is not a higher burn probability, there is a higher than stateside average of exposed structures and historic buildings exposed to potential wildfires in this area.

Figure 9.3.8-4: Third ranked census tract for wildfire hazard



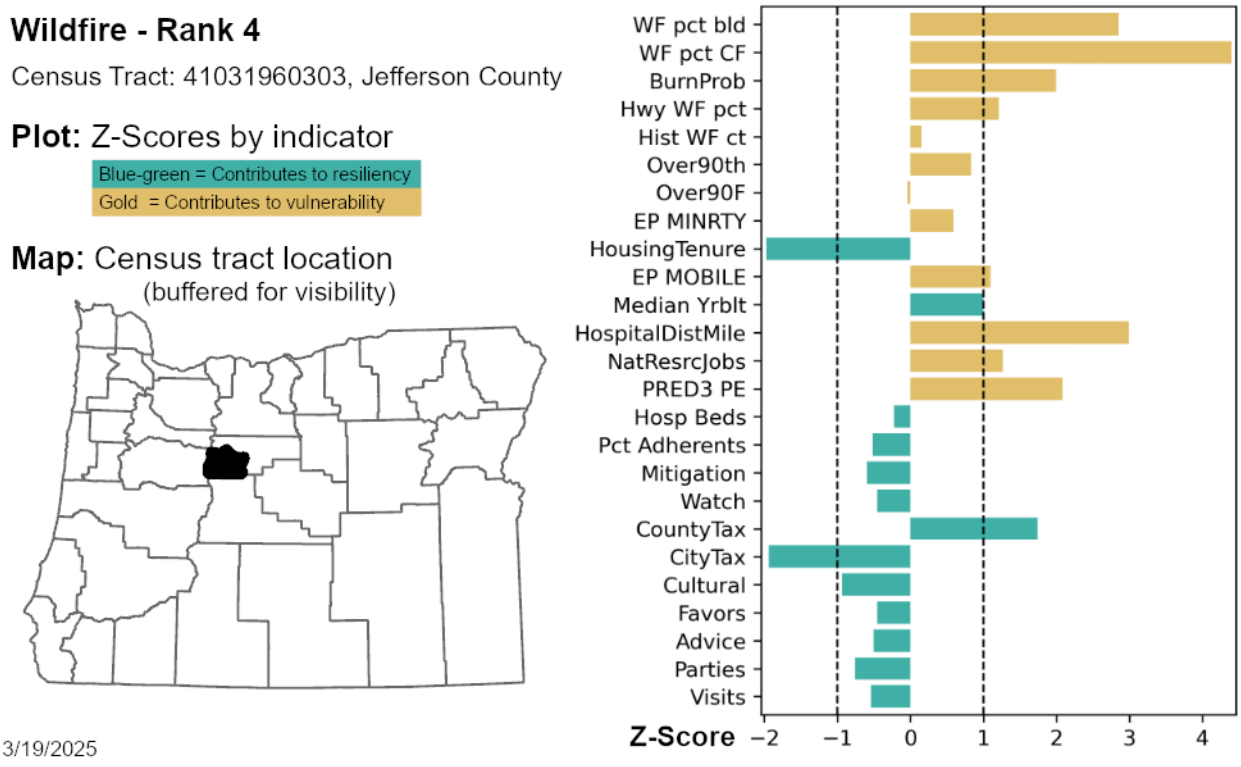
	Name	Total Building Value
State-owned	Austin Maintenance Station	4,407,243
State-owned	Bone Point M/W $ Radio Operations	66,220
State-owned	Long Creek Maintenance Station	1,478,301
State-owned	Tamarack M/W & Radio Operations	89,232
Critical facility	Dayville School	6152537
Critical facility	MALHEUR NATIONAL FOREST - SUPERVISORS OFFICE	4715000

Critical facility	Grant County Road Dept	1132830
Critical facility	Ponderosa Ranch Airport	754350
Critical facility	Communication Structure	750000
Critical facility	Land's Inn Ranch Airport	750000
Critical facility	Cerny Airport	750000
Critical facility	Communication Structure	750000
Critical facility	Hi Country No 2 Airport	750000
Critical facility	Inshallah International Airport	750000
Critical facility	Miranda's Skyranch	750000
Critical facility	Oxbow Ranch Airport	750000
Critical facility	Seneca Emergency Airstrip	750000
Critical facility	Wiley Creek Airport	750000
Critical facility	Grant County Road Dept	748342
Critical facility	Communication Structure	742950
Critical facility	NATIONAL PARK SERVICE - JOHN DAY FOSSIL BEDS NATIONAL MONUMENT RANGER STATION	570450
Critical facility	Communication Structure	516900
Critical facility	Communication Structure	501450
Critical facility	Dayville Fire Department	411853
Critical facility	Communication Structure	402000
Critical facility	Communication Structure	333000
Critical facility	Communication Structure	265350
Critical facility	Communication Structure	227250
Critical facility	Communication Structure	202800
Critical facility	Communication Structure	165450
Critical facility	Communication Structure	114900
Critical facility	Communication Structure	93900
Critical facility	MT VERNON STP	88699
Critical facility	CITY OF DAYVILLE	80550
Critical facility	LONG CREEK STP	62850
Critical facility	Communication Structure	47550
Critical facility	Communication Structure	40200
Critical facility	Monument Municipal Airport	38250

Wildfire Risk Rank 4– Jefferson County

This rural census tract lays north of Bend and Redmond, Oregon. The NRI reports a relatively high risk of wildfire, with a score of 98.5. According to the NRI, an estimated 70% of the population in this area is at risk of wildfire. Exposures of critical facilities, historic buildings, and other buildings primarily drive risk in this census tract, despite normal overall wildfire burn probabilities. CRE scores indicate high social vulnerability in the area, although social cohesion appears to align with statewide averages. A higher than statewide average number of people live in rental housing.

Figure 9.3.8-5: Fourth ranked census tract for wildfire hazard



	Name	Total Building Value
State-owned	Lake Billy Chinook State Airport	237450
Critical facility	Communication Structure	6251550
Critical facility	Black Butte Elementary	810900
Critical facility	3 Rivers Recreation Area Airport	750000
Critical facility	Bombay Farms Airport	750000
Critical facility	Six Springs Ranch Airport	750000
Critical facility	Warm Springs K-8 Academy	750000
Critical facility	Communication Structure	609000
Critical facility	ASHWOOD ELEMENTARY SCHOOL	600300

Critical facility	Three Rivers VFD	288600
Critical facility	Communication Structure	199950
Critical facility	Communication Structure	173250
Critical facility	Communication Structure	147150
Critical facility	Communication Structure	83100
Critical facility	Communication Structure	76950
Critical facility	Communication Structure	54000

Wildfire Risk Rank 5 – Jackson County 41029002800

This census tract is located north of Central Point and Medford, Oregon. The NRI reports a relatively high risk of wildfire, with a score of 96.5. According to the NRI, an estimated 7% of the population is at risk of wildfire. Higher than average exposures of critical facilities and buildings, coupled with higher than average burn probabilities drives wildfire risk in this area. Relatively lower levels of social cohesion also contributes.

Figure 9.3.8-6: Fifth ranked census tract for wildfire hazard

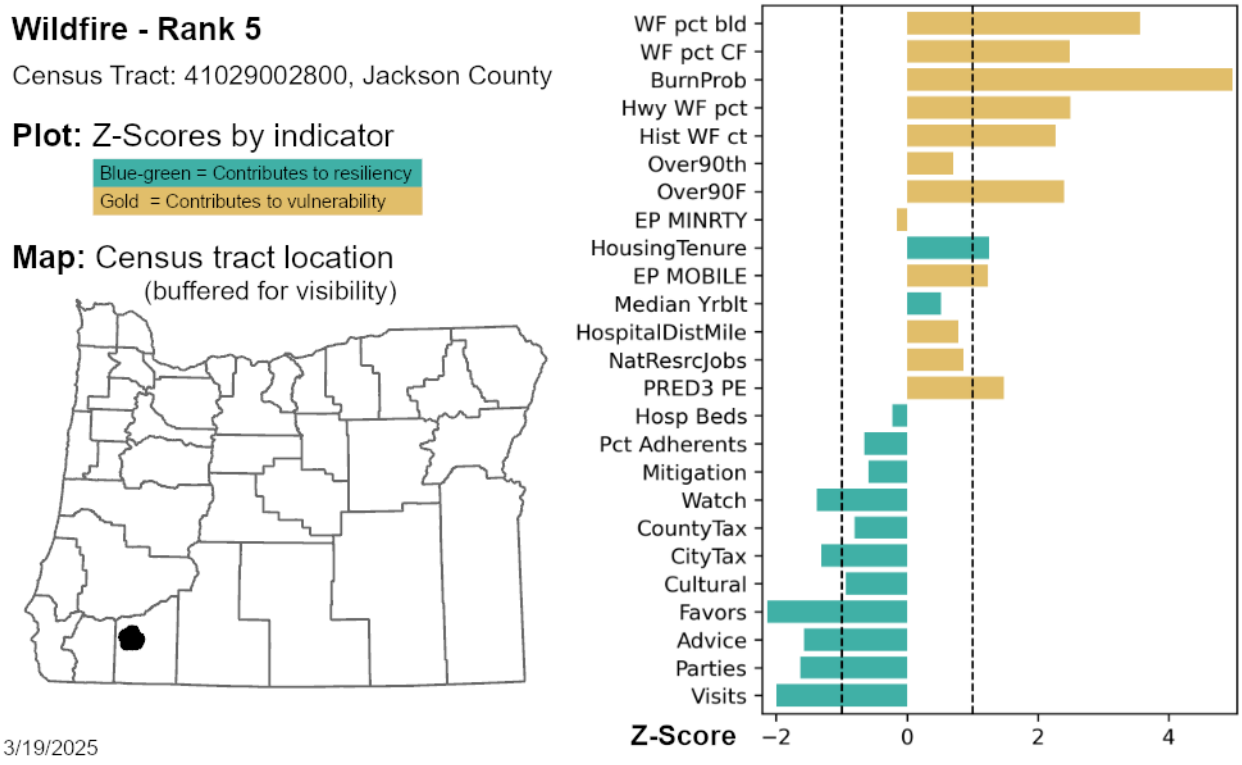


Table 9.3.8-5: State-owned buildings or critical facilities

	Building Name	Value	Source
SOB	Restroom	93457	DAS 2000

Wildfire Risk Rank 6 – Malheur County:

This rural census tract encompasses most of Malheur County. The NRI reports a relatively high risk of wildfire, with a score of 99. According to the NRI, 12% of the population in this area is at risk. Large distances to hospitals dominates risk drivers.

Figure 9.3.8-7: Sixth ranked census tract for wildfire hazard

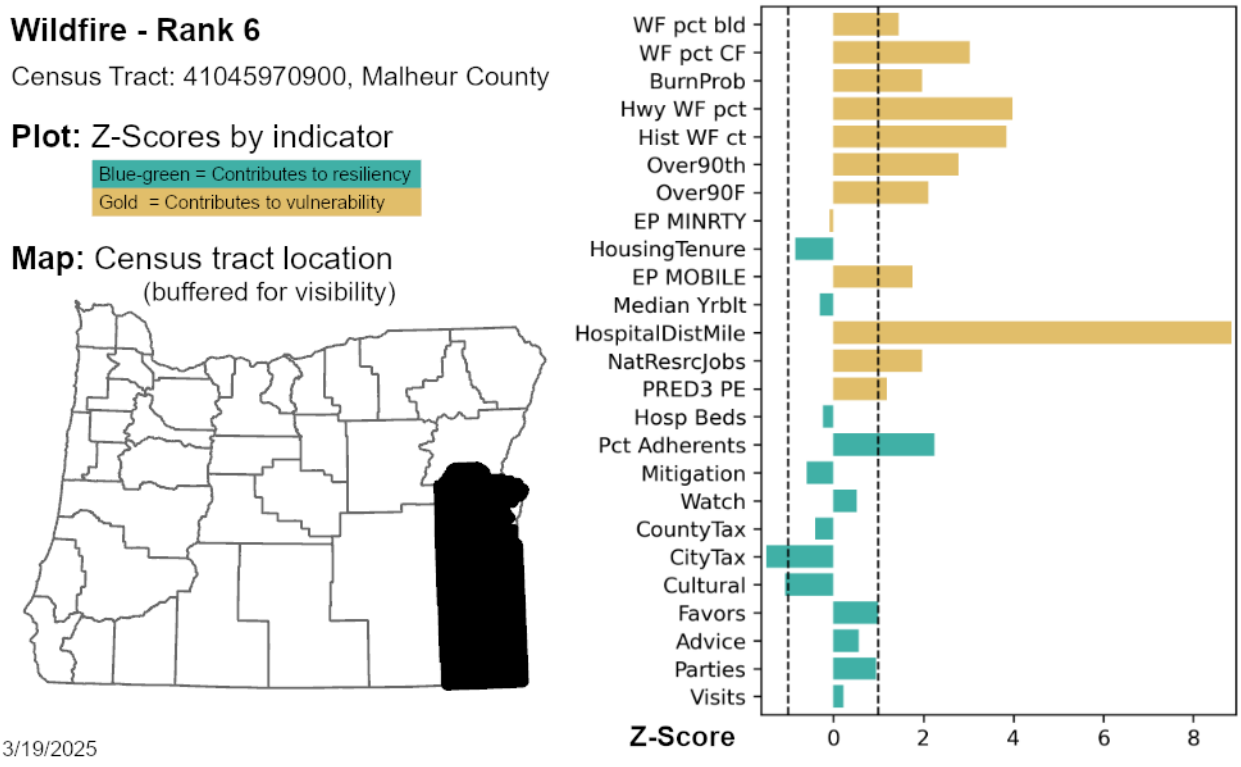
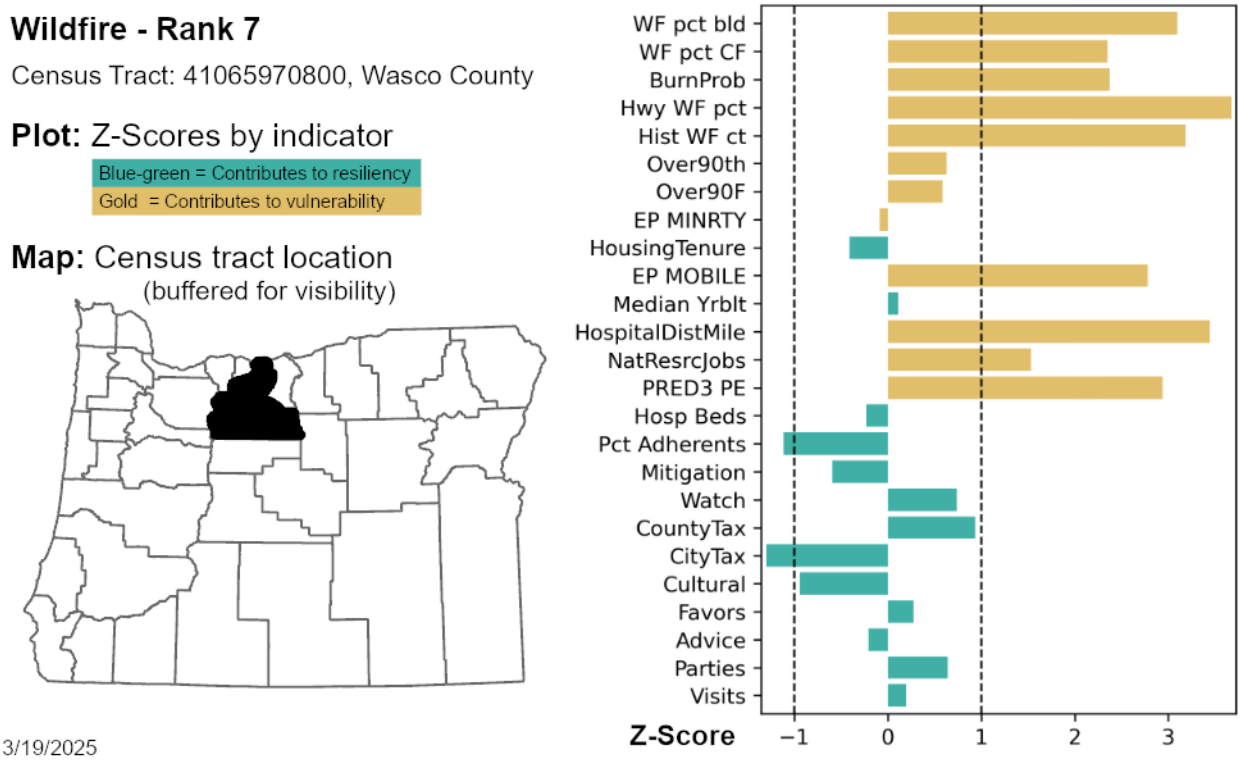


Table 9.3.8-6: State-owned buildings or critical facilities

	Building Name	Value	Source
SOB	Ontario Maintenance Station	18,655,543	
SOB	Snake River Correctional Institution	504,885,082	
CF			
CF			
CF			
CF			

Wildfire Risk Rank 7: Wasco County 41065970800

Figure 9.3.8-8: Seventh ranked census tract for wildfire hazard



Name	Total Building Value
Communication Structure	2269500
Wamic RFD	1361147
Big Muddy School	863881
Communication Structure	750000
Communication Structure	750000
Communication Structure	750000
Communication Structure	750000
Communication Structure	750000
Communication Structure	750000
Communication Structure	750000
Nelson Ranch Airport	750000
Shaniko Cattle Airport	750000
Shaniko Ranch Airport	750000
Wapinitia Airport	750000
Communication Structure	727950
Big Muddy Ranch	368110
Communication Structure	340350

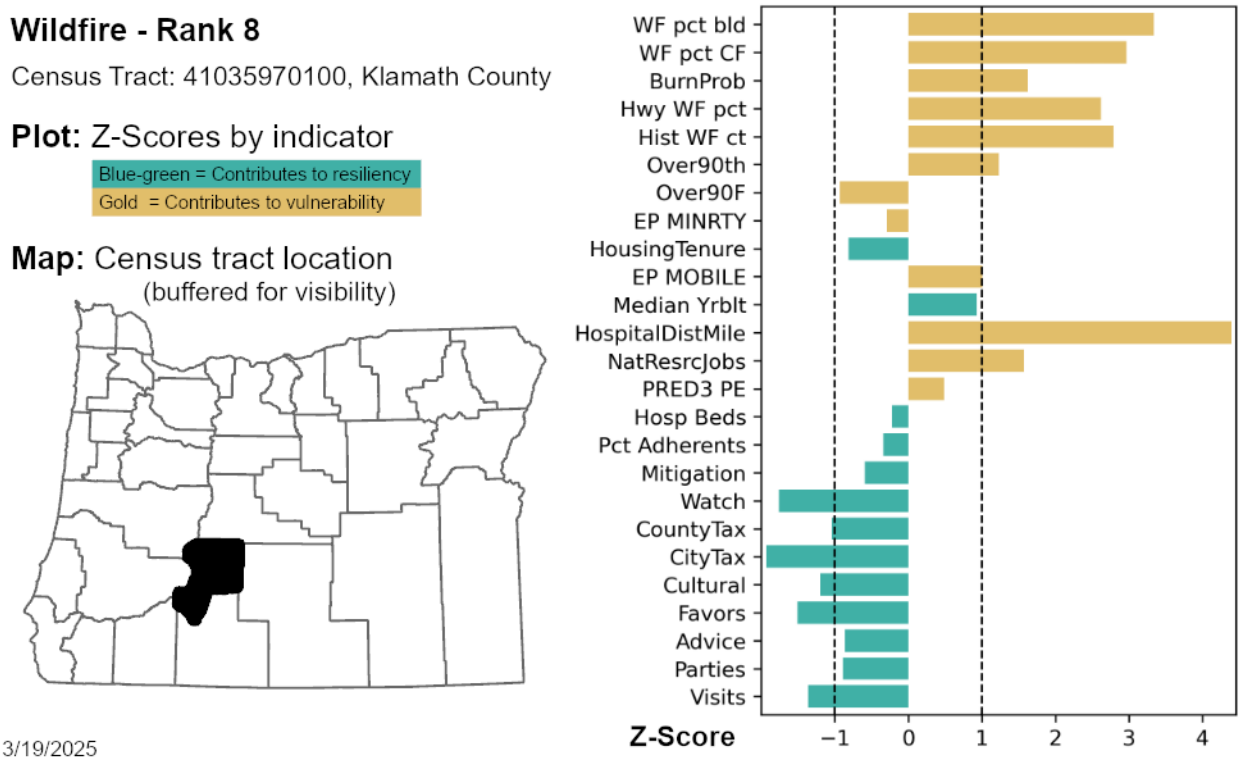
Chenoweth Airpark	325050
Juniper Flat Rural Fire	283650
Communication Structure	235650
Communication Structure	199950
OREGON STRUT CENTER	179550
Communication Structure	103800
Communication Structure	87300
Communication Structure	84450
Communication Structure	77700
Pointers Airport	66300
Communication Structure	66000
Communication Structure	43050
Communication Structure	16957

Table 9.3.8-7: State-owned buildings or critical facilities

	Building Name 41065970800	Value	Source
SOB			
SOB			
CF			
CF			
CF			
CF			

Wildfire Risk Rank 8: Klamath County 41035970100

Figure 9.3.8-9: Eighth ranked census tract for wildfire hazard



Wildfire Risk Rank 9 – Wallowa County 41063960200

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Figure 9.3.8-10: Ninth ranked census tract for wildfire hazard

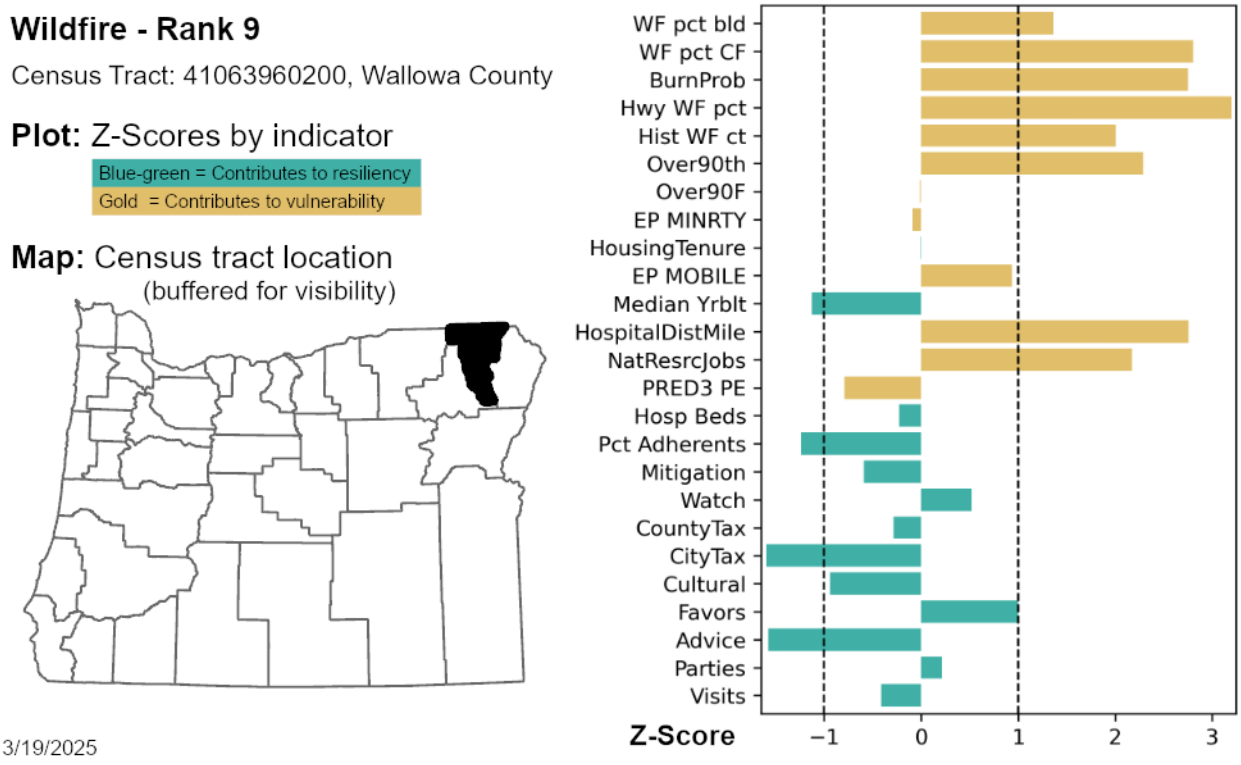


Table 9.3.8-8: State-owned buildings or critical facilities

	Building Name 41063960200	Value	Source
SOB			
SOB			
CF			
CF			
CF			
CF			

Wildfire Risk Rank 10 – Douglas County 41019100000

This census tract is located east of Roseburg in southern Oregon. The NRI reports a relatively moderate risk of wildfire, with a score of 91.7. According to the NRI, an estimated 15% of the population is at risk of this hazard. Transportation systems exposed to wildfire risk is the primary driver of risk in this area. The area shows a higher than statewide average percent of exposed structures and critical facilities.

Figure 9.3.8-11: Tenth ranked census tract for wildfire hazard

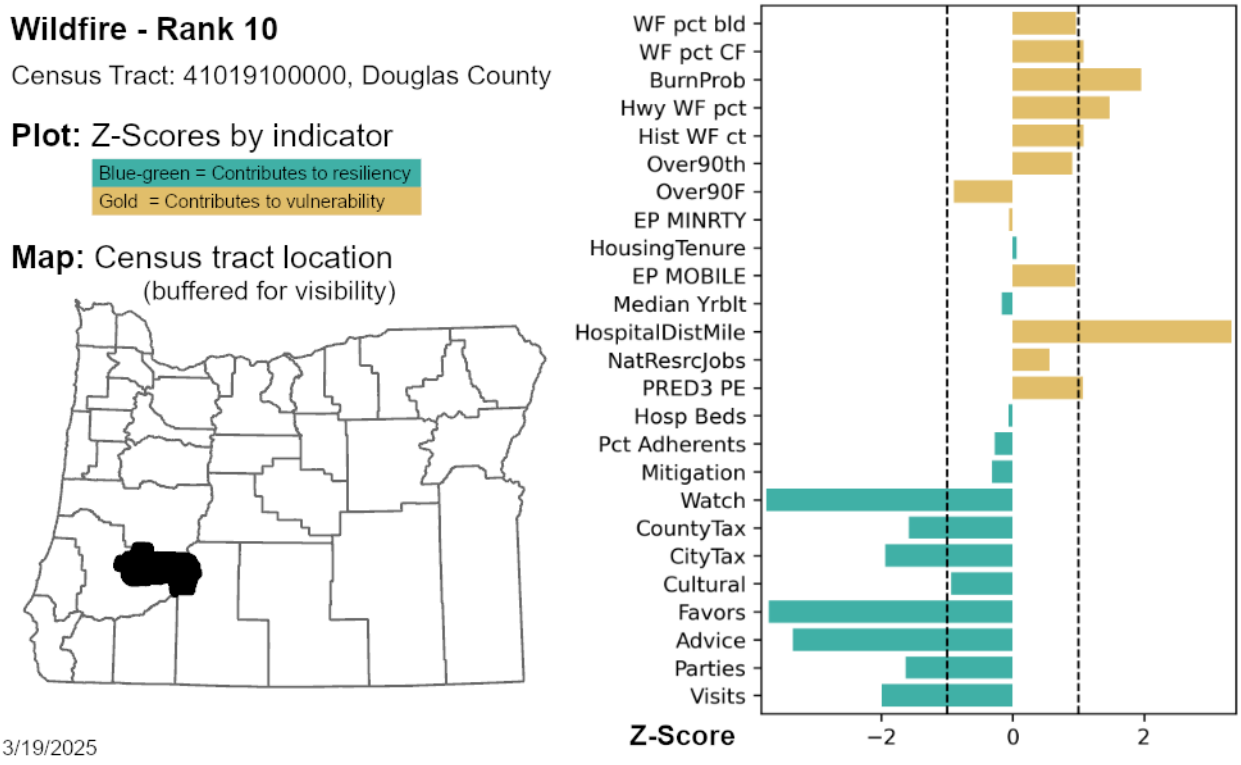


Table 9.3.8-9: State-owned buildings or critical facilities

	Building Name	Value	Source
SOB	Rock Creek Hatchery	1354306	DAS 2000
SOB	Steamboat Maintenance Station Grounds	127168	DAS 2000
SOB	Lemolo Sand Sheds	1018770	DAS 2000, Google
SOB	Storage Building	252905	DAS 2000.
SOB	kiosk	121075	DAS 2000

	Building Name	Value	Source
SOB	Diamond Lake Bunkhouse Building	34345	DAS 2000
SOB	Diamond Lake Residence #1 (Cabin)	34345	DAS 2000
SOB	Site Systems - Chilcoot M/W Site	34345	DAS 2000
SOB	Chilcoot Mountain M/W Building	118346	DAS 2000
SOB	Canyonville Maintenance Station Grounds	1488691	DAS 2000
	Lookout Silver Butte	291239	DAS 2000

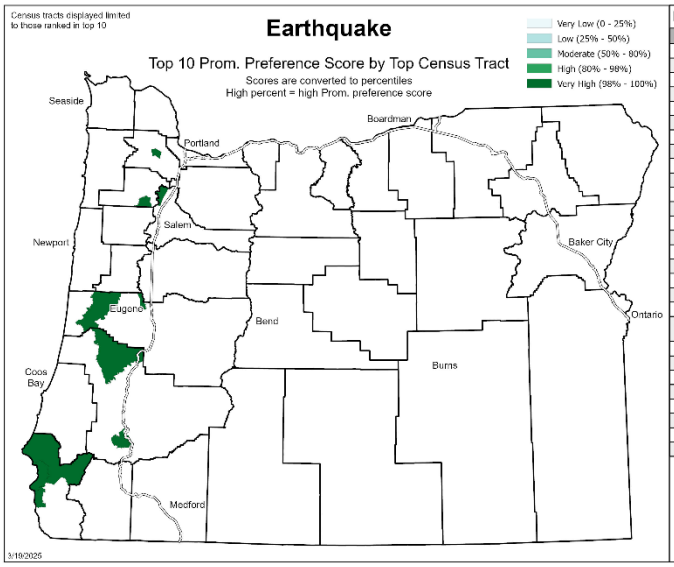
9.3.9 Earthquake

9.3.9.1 Hazard Scenario

Liquefaction	Oregon Seismic Hazard Database (OSHD) – DOGAMI (Madin and others, 2021)
CSZ Hazus Analysis (Coseismic landslide and liquefaction, and NEHRP)	OSHD – DOGAMI (Madin and others, 2021)
2475-year Hazus Analysis (4 ground motions)	OSHD – DOGAMI (Madin and others, 2021)

9.3.9.2 Top Ranked Earthquake Risk Areas

Figure 9.3.9-1: Top Ranked Risk Areas in Earthquake Risk Areas



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

Hazard	Indicator Name	Direction	Weight	Short Description
Earthquake	LQ_pct_bld	1	0.035	Pct. SBFO buildings exposed to Moderate to Very High liq.
Earthquake	LQ_pct_CF	1	0.035	Pct. critical facilities exposed to Moderate to Very High liq.
Earthquake	EQCSZ_pct_CF	1	0.035	Pct. of red or yellow-tagged critical facilities (CSZ Deterministic).
Earthquake	EQ25_pct_CF	1	0.035	Pct. of yellow-tagged critical facilities (2500 Probabilistic).
Earthquake	Hist_LQ_ct	1	0.035	Pct. historic buildings exposed to Moderate to Very High liq.
Earthquake	Hwy_LQ_pct	1	0.035	Major roadway miles exposed to Moderate to Very High liq.
Earthquake	Eqk_NRI_rate	1	0.035	Earthquake risk from NRI.
Earthquake	LQ_Haz_Area	1	0.035	Area of tract in high or very high liquefaction hazard.
Earthquake	Bridges_LIQ	1	0.035	Number of bridges within high or very high liquefaction hazard.
Earthquake	PGA_2500	1	0.035	Average shaking in tract from 2500-year probabilistic earthquake.
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 migitation 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

Table 9.3.9-1: Oregon Natural Hazard Risk Assessment Rank Compared to the National Risk Index

Census Tract Number	County in which census tract is located	Rank	National Risk Index Classification*	People Exposed
41015950201	Curry	1	Very high	3,513
41015950100	Curry	2	Very high	3,296
41039000404	Lane	3	Very high	4,010
41019200000	Douglas	4	Relatively moderate	1309
41039000500	Lane	5	High	2,244
41071031000	Yamhill	6	High	4,321
41047010100	Marion	7	Very high	1,506
41015950202	Curry	8	High	1,923
41019030000	Douglas	9	Relatively high	4047
41067032800	Washington	10	Relatively moderate	1309

Table 9.3.9-2: Top 10 Census Tract Demographics

Census Tract	Earthquake Risk Rank	2020 Population[1]	2023 Population[2]	% Change in Population	2016 SVI[3]	2022 SVI[4]	Change in SVI
41015950201	1	3513	3730	6%	#N/A	0.80	#N/A
41015950100	2	3296	3226	-2%	0.66	0.56	-0.10
41039000404	3	4010	4409	10%	0.83	0.74	-0.08
41019200000	4	4902	4912	0%	0.87	0.91	0.04
41039000500	5	2244	2148	-4%	0.53	0.56	0.02
41071031000	6	4321	4264	-1%	0.63	0.59	-0.04
41047010100	7	1506	1503	0%	0.42	0.40	-0.03
41015950202	8	1923	2074	8%	#N/A	0.34	#N/A
41019030000	9	4047	4107	1%	0.39	0.35	-0.04
41067032800	10	1309	1290	-1%	0.22	0.17	-0.04

[1] 2020 Decennial Census Census Tract Level Population Data HC2020.P1 - 2020 data was used rather than 2018 due to changes in census tract boundaries in 2020

[2] 2023 ACS 5-Year Estimates Census Tract Level Age and Sex Data S0101

[3] 2016 US CDC Social Vulnerability Index - "#N/A" cells represent census tracts that did not exist before changes to census tract boundaries in 2020

[4] 2022 US CDC Social Vulnerability Index

Earthquake Risk Rank 1 Curry County 4101595020

This census tract is located on the southern coast of Oregon. The NRI reports a very high risk of earthquake, with a score of 99.6. According to the NRI, 100% of the population (3,513 people) are at risk of this hazard. High earthquake risk, combined with a higher prevalence of mobile homes, drives risk in this area.

Figure 9.3.9-2: First ranked census tract for earthquake hazard

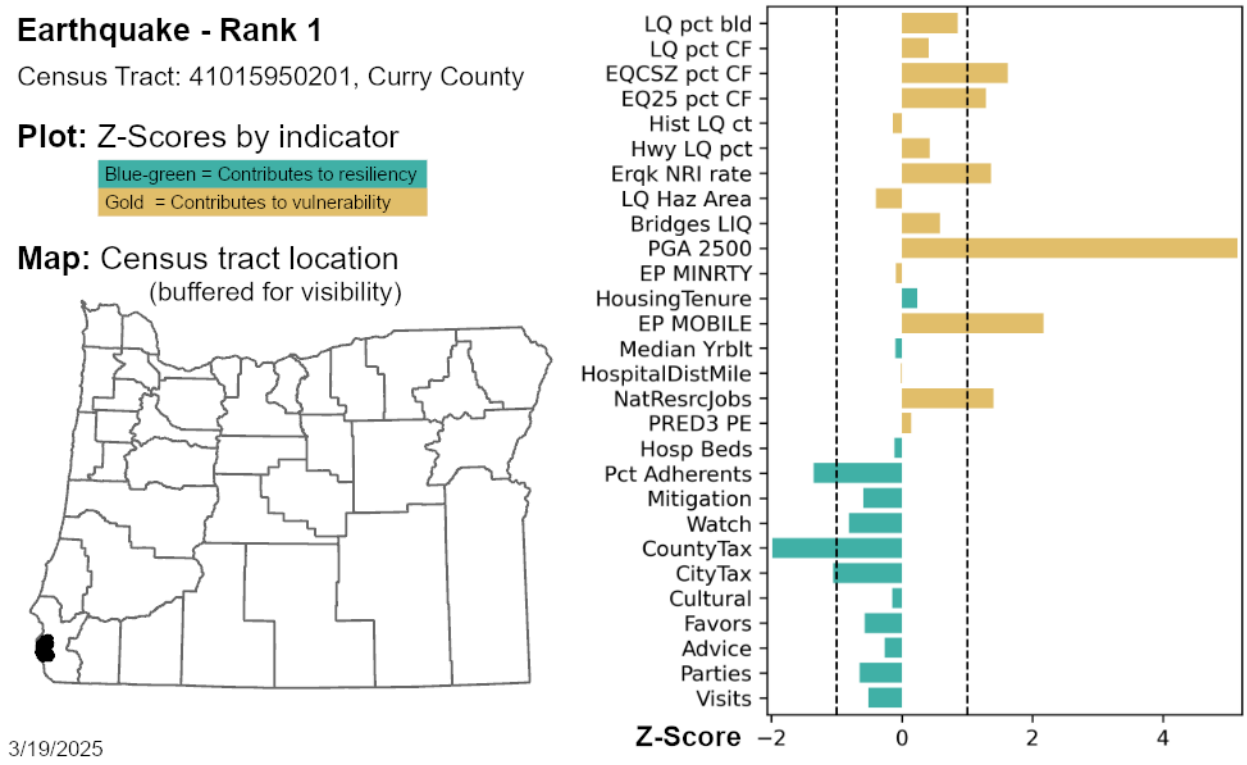


Table 9.3.9-3: State-owned buildings or critical facilities

	State-owned Building Name 4101595020	Value	Source
SOB	Hunter Creek Maintenance Station Grounds	682532	
SOB	Hunter Creek Maintenance Station Grounds	840392	
CF	<Null>	929953	
CF	<Null>	971810	
CF	<Null>	1005735	
CF	Curry County Circuit Court	60668	

Earthquake Risk Rank 2 Curry County 41015950100

This rural census tract is located on the southern Oregon coast. The NRI reports a very high risk of earthquake, with a score of 98.2. According to the NRI, 100% (3,296 people) are exposed to this hazard. Low social cohesion, along with high earthquake risk, primarily drives risk in this area.

Figure 9.3.9-3: Second ranked census tract for earthquake hazard

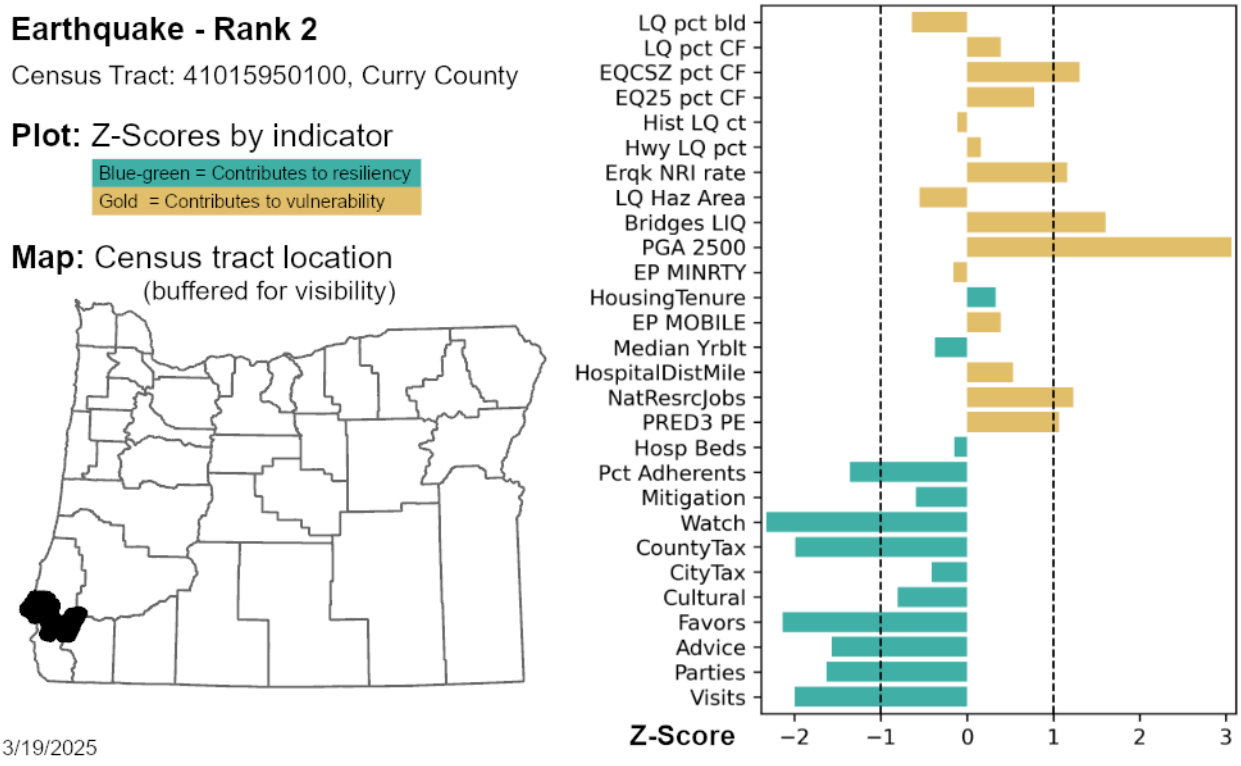


Table 9.3.9-4: State-owned buildings

	State-owned Building Name 41015950100	Value	Source
	<Null>	106834	
	<Null>	462666	
	<Null>	530857	
	<Null>	98227	
	Port Orford Maintenance Station Grounds	243383	
	<Null>	142009	
	Port Orford Maintenance Station Grounds	211401	

	State-owned Building Name 41015950100	Value	Source
	Port Orford Maintenance Station Grounds	458532	
	Port Orford Maintenance Station Grounds	122628	
	<Null>	290531	
	<Null>	132656	
	<Null>	392923	
	<Null>	489339	
	<Null>	281356	
	<Null>	323969	
	<Null>	313538	
	<Null>	226922	
	<Null>	420940	
	Port Orford Maintenance Station Grounds	325501	
	<Null>	281007	
	<Null>	370004	
	Edson Butte M/W Building	86687	
	Site Systems - Edson Butte M/W Grounds	60668	
	Elk River Hatchery Storage Building	60668	
	Elk River Hatchery Residences	60668	
	Elk River Hatchery Generator Building	60668	
	Elk River Hatchery Building Shop Storage	60668	
	Elk River Hatchery STW building	60668	
	Elk River Hatchery Electrical Building	60668	
	Elk River Hatchery Service Building	60668	
	Cape Blanco State Airport (5S6)	60668	
	Port Orford MS Storage Building	450953	

Earthquake Risk Rank 3 Lane County 41039000404

This census tract is located just off the central Oregon coast, northwest of Eugene, Oregon. The NRI reports a very high risk of earthquake, with a score of 98.5. According to the NRI, 100% (4,010 people) are exposed to this hazard. Low social cohesion, and higher than average exposures of buildings and critical facilities to liquefaction due to earthquake primarily drives this risk ranking. Additionally, higher than average liquefaction area increases risk.

Figure 9.3.9-4: Third ranked census tract for earthquake hazard

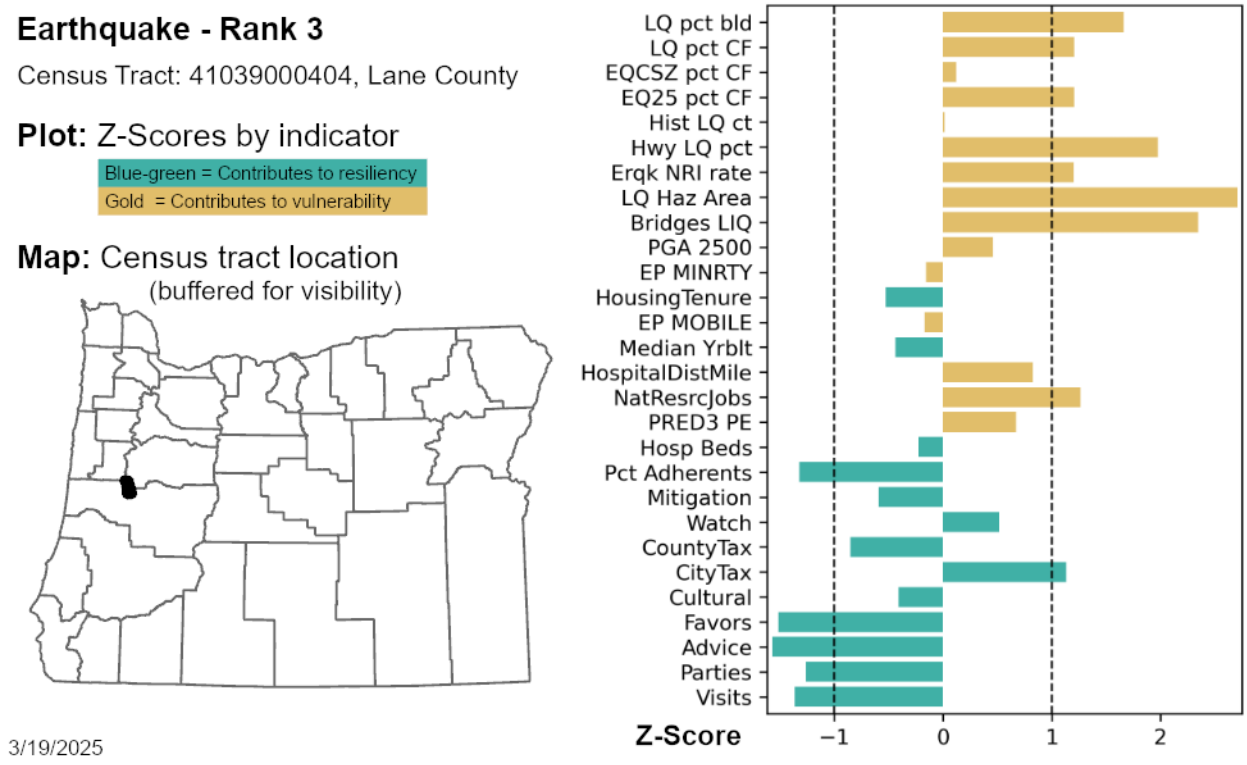


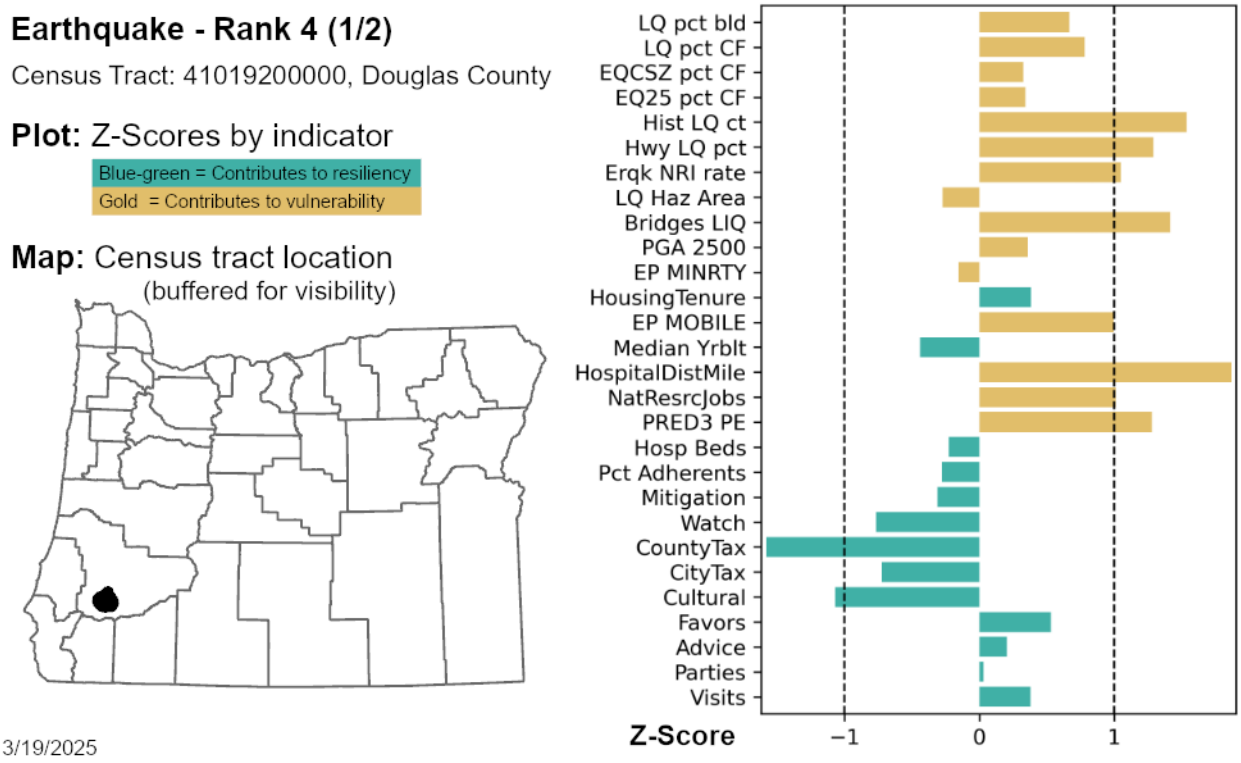
Table 9.3.9-5: State-owned buildings or critical facilities

	State-owned Building Name 41039000404	Value	Source
	<Null>	699239	
	JC Main Building	117098414	
	JC Cottage 2	1977802	
	JC Cottage 1	1852553	
	<Null>	699239	

	State-owned Building Name 41039000404	Value	Source
	JC Main Building	117098414	
	JC Cottage 2	1977802	
	JC Cottage 1	1852553	
	JC Cottage 3	1719870	

Earthquake Risk Rank 4 Douglas County 41019200000

Figure 9.3.9-5: Fourth ranked census tract for earthquake hazard



Earthquake Risk Rank 5 Lane County 41039000500

This rural census tract is located west of Eugene, Oregon, in proximity to the central Oregon coast. The NRI reports a relatively high risk of earthquake, with a score of 93. According to the NRI, 100% (2,244 people) are exposed to this hazard. Large distances to hospitals, low social cohesion, and low community resilience are the primary indicators driving risk in this area. Additionally, reliance on natural resource jobs and exposure of bridges to liquefaction contributes to risk.

Figure 9.3.9-6: Fourth ranked census tract for earthquake hazard

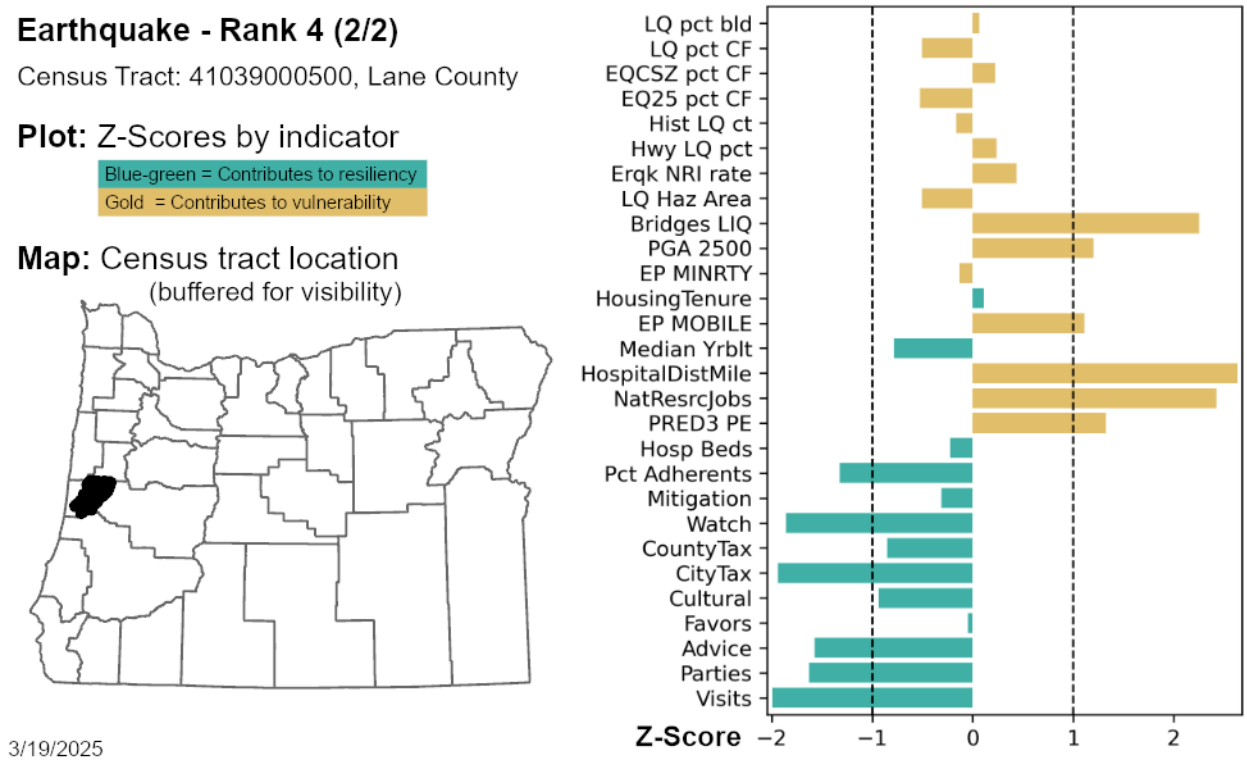


Table 9.3.9-6: State-owned buildings or critical facilities

	State-owned Building Name	Value	Source

Earthquake Risk Rank 6 Yamhill County 41071031000

This census tract is located in northwest Oregon. The NRI reports a relatively high earthquake risk for this area, with a score of 94.9. According to the NRI, 100% (4,321 people) are exposed to earthquake hazards in this census tract. Higher than average exposures of critical facilities and buildings to earthquake hazards, and low social cohesion, primarily drive risk in this census tract.

Figure 9.3.9-7: Sixth ranked census tract for earthquake hazard

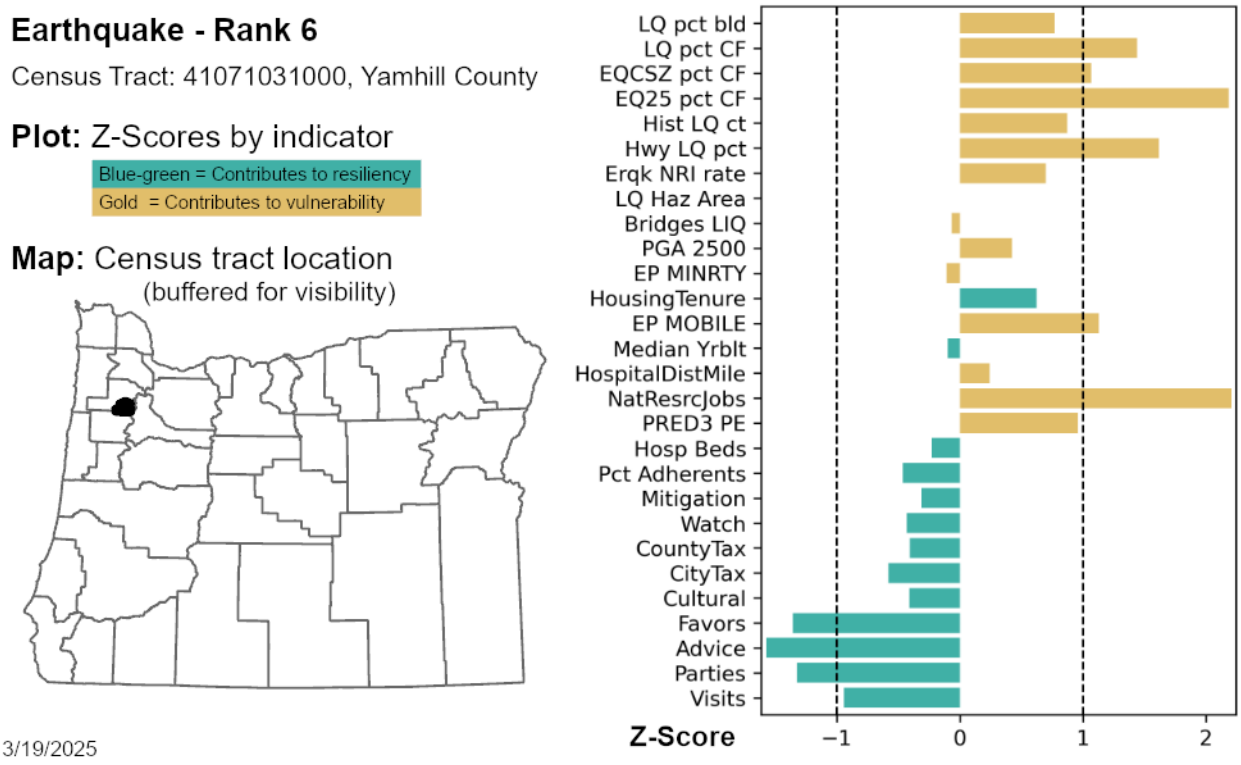


Table 9.3.9-7: State-owned buildings or critical facilities

	Building Name 41071031000	Value	Source

	Building Name 41071031000	Value	Source

Earthquake Risk Rank 7 Marion County 41047010100

This census tract is located in northwest Oregon. The NRI reports a very high earthquake risk, with a score of 99.6. According to the NRI, 100% (4,808 people) are at risk of earthquake hazards in this census tract. High exposure of critical facilities drive risk in this area. Low homeownership rates also contribute. While social cohesion is moderate, exposure of highways and high potential losses from an earthquake event drive risk.

Figure 9.3.9-8: Seventh ranked census tract for earthquake hazard

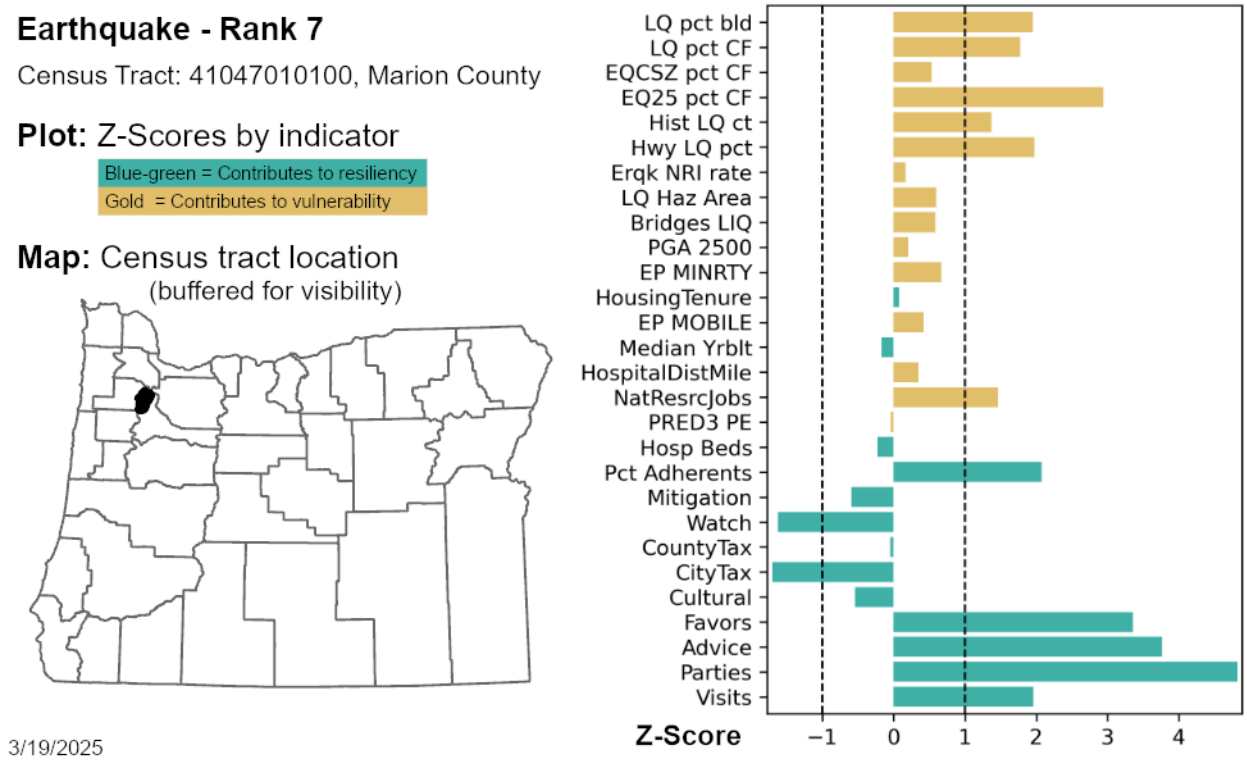


Table 9.3.9-8: State-owned building or critical facility

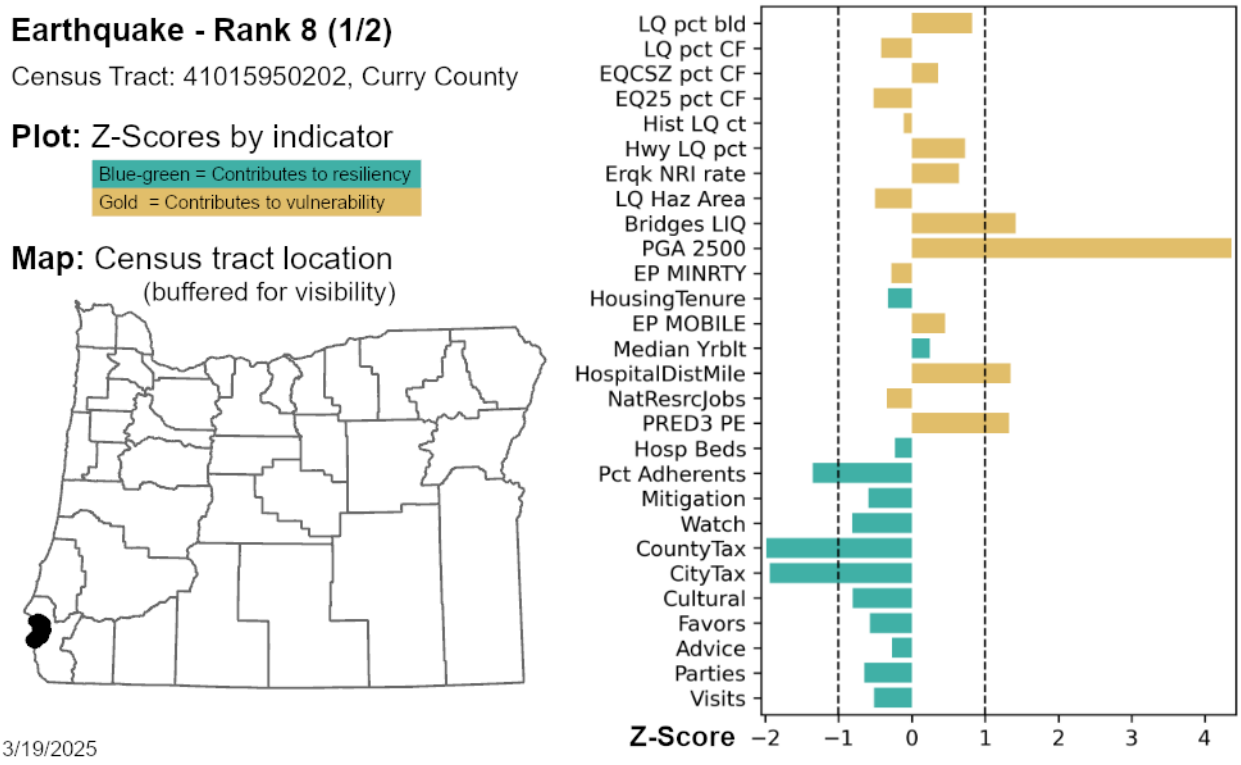
	Building Name	Value	Source

	Building Name	Value	Source

Earthquake Risk Rank 8 Curry County 41041015950202

This census tract is located on the southern coast, north of Gold Beach, Oregon. The NRI reports a relatively high risk of earthquake, with a score of 94.5. According to the NRI, 100% (1,923 people) are at risk of this hazard. Exceptionally high earthquake risk drives this ranking.

Figure 9.3.9-9: Eighth ranked census tract for earthquake hazard



Earthquake Risk Rank 9 Douglas County, including the City of Drain 41019030000

This census tract is located in southwest Oregon, in proximity to Oregon's southern coast. The NRI reports a relatively high earthquake risk for this area, with a score of 97.4. The NRI reports 100% (4,902 people) are at risk of this hazard. Low city and county taxing ability, and low social cohesion primarily drive risk. Large distances to hospitals, and exposure of historic buildings to liquefaction also contribute to risk ranking in this area.

Figure 9.3.9-10: Eighth ranked census tract for earthquake hazard

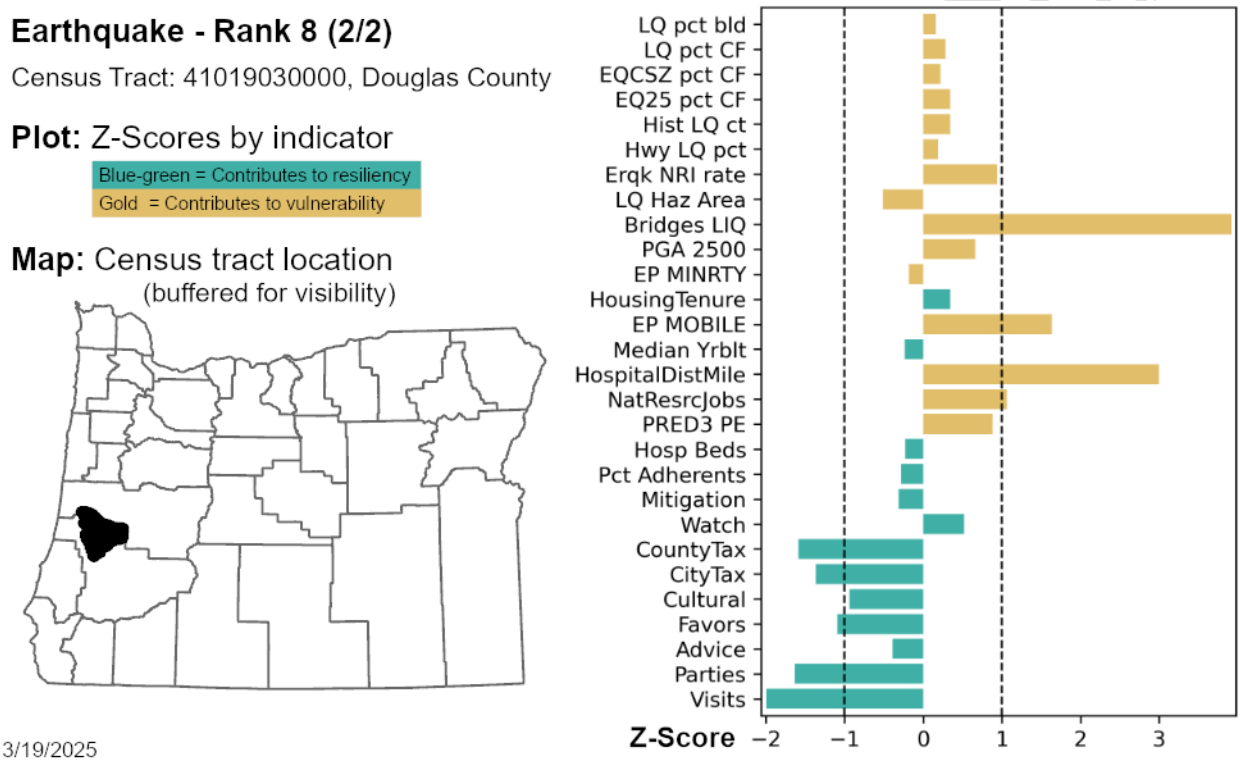


Table 9.3.9-9: State-owned buildings or critical facilities

	Building Name	Value	Source

	Building Name	Value	Source

Earthquake Risk Rank 10 Washington County 41067032800

This census tract is located in northwest Oregon. The NRI reports a very high earthquake risk in this area, with a score of 99.4. According to the NRI, 100% (6,288 people) are at risk of this hazard. High prevalence of those living in mobile homes, and exposure of critical facilities to earthquake hazards, primarily drive risk. While there is strong religious institutions and average social cohesion, exposure of buildings and roadways to liquefaction greatly contributes to this risk ranking.

Figure 9.3.9-11: Tenth ranked census tract for earthquake hazard

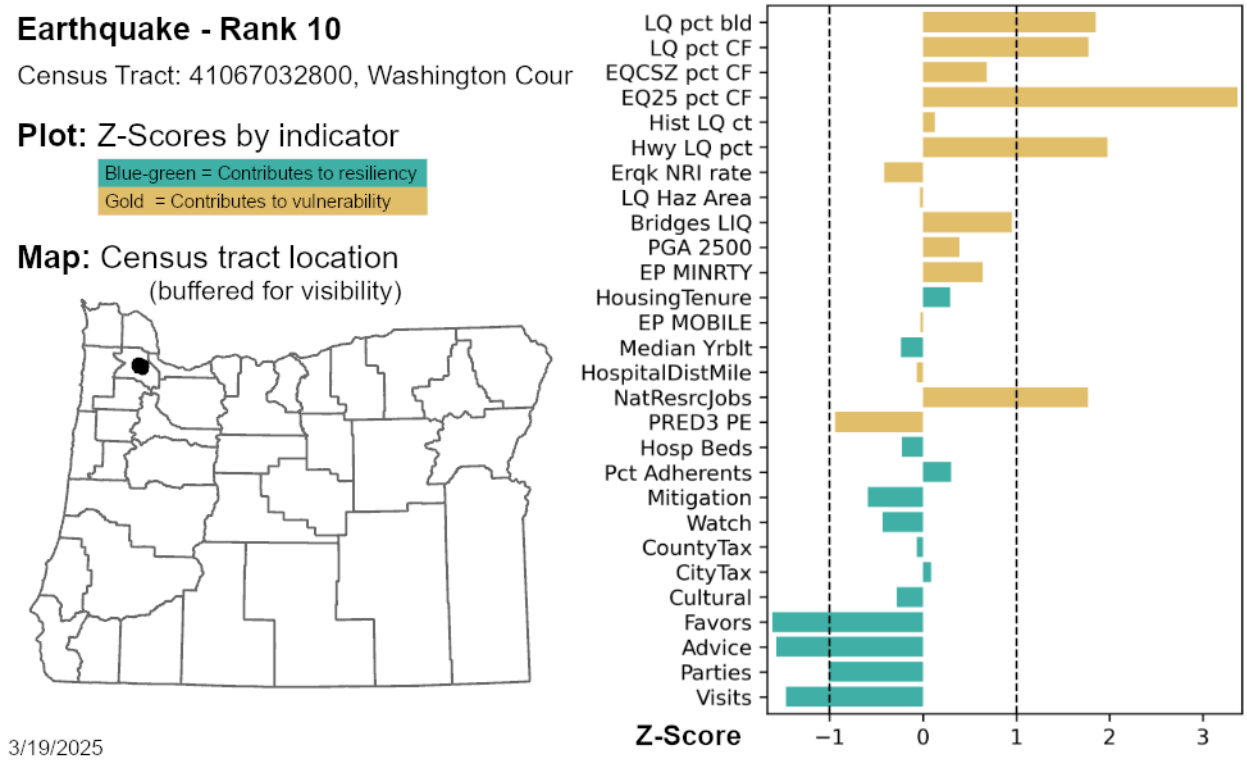


Table 9.3.9-10: State-owned building or critical facility

	State-owned Building Name	Value	Source
	<Null>	232721	
	<Null>	110969	
	<Null>	213244	
	<Null>	312972	
	<Null>	216591	

	State-owned Building Name	Value	Source
	<Null>	173738	
	<Null>	205311	
	<Null>	182451	
	<Null>	108814	
	<Null>	161278	
	<Null>	193038	

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9.4 Comments Received

Comment #1

Commenter and Affiliation: Fran Recht

Hazard: Tsunami

Geography: Coast

Comment: I believe that development of a post tsunami rebuilding plan should be a part of the plan and an eligible priority activity for funds. The time to plan to build back better and away from hazards is before a disaster strikes when there is a rush to recover which means making quick and not the best long term decisions. Looking into transfer of development rights to other non hazard areas ...earmarking areas and applying for exceptions now that could be veted and only triggered after such an event would be valuable.

Response: Pre-disaster recovery planning is very important; however, recovery planning is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #2

Commenter and Affiliation: Fran Recht

Hazard: Sea Level Rise

Geography: Coast

Comment: DLCD has maps of projected sea level rise. It's important to assure that coastal shorelands along estuaries and tidally influenced streams are not developed so that these "floodplains are available to adapt to these rising seas and retain higher water levels instead of causing flooding to structures or damage downstream. These areas within the sea level rise maps (I'd suggest using a moderate to high scenario for 2100 for planning purposes) and within these areas ..any areas zoned for development should be prioritized as eligible for funds to allow land trusts and municipalities, tribes etc. to purchase and hold them for parks, open space and habitat.

Response: The list of mitigation actions in Chapter 5 includes:

> 29. Conduct a pilot project on two coastal estuaries … sea level rise modeling …use the results to minimize future damage or loss of property
>
> 38. Undertake inner bay total water level modeling to assess flooding impacts from sea level rise…

Comment #3

Commenter and Affiliation: Matt Straite, Community Development Director, Millersburg, OR

Hazard: GOALS

Geography: All

Comment: We recommend adding a Goal similar to the following:

"To have a third party review to evaluate impacts of state and federal regulations on impacts to Natural Hazard events which have occurred in Oregon over the last 50 years, such as the Forest Practices Act, Wildfire Management Practices, and Environment regulations and the impacts on Natural Hazard incidents in Oregon".

Response: This would be a mitigation action, not a goal. No change to 2025 Oregon Natural Hazards Mitigation Plan. Could be added in a future update.

Comment #4

Commenter and Affiliation: Treena Jensen, Warning Coordination Meteorologist, National Weather Service Portland, OR

Hazard: Extreme Heat

Geography: All

Comment: The NWS Extreme Heat information in section 3.3.4.1 of the Oregon NHMP February 20, 2025 draft is not correct (Page 92). The NWS Weather Forecast Offices that serve Oregon use NWS HeatRisk to determine Extreme Heat Warnings, not heat index. NWS issues Excessive Heat Warnings when Major or Extreme HeatRisk is expected. FYI - The naming of NWS heat warnings is changing from 'Excessive Heat Warning' to 'Extreme Heat Warning' on March 4, 2025.

Feel free to reach out to me if you have any questions regarding NWS HeatRisk or would like me to review any updates to the extreme heat or other weather sections of the plan.

Response: This section is now correct.

Comment #5

Commenter and Affiliation: Treena Jensen, Warning Coordination Meteorologist, National Weather Service Portland, OR

Hazard: Extreme Cold

Geography: All

Comment: I noticed that there is not a lot of information regarding extreme cold as a hazard. Oregon does not experience extreme cold like other parts of the country and is likely categorized as a low risk in the FEMA maps. Multnomah County Environmental Health Services have been publishing some interesting reports the past few winters showing a possible rise of health hazards due to exposure to extreme cold. I am not sure if other regions of the state are showing an increasing vulnerability to cold. I do not think an

extreme cold section needs to be added to this update of the NHMP, but wanted to mention this for your situation awareness. Here are some of the local cold related reports in case you are interested in exploring this further; 2012-2022 Regional Climate and Health Monitoring Report, Multnomah County Winter 2023-24 Seasonal Health Hazards Brief.

Response: No change to the 2025 Oregon Natural Hazards Mitigation Plan. Extreme cold could be considered in in the next update.

Comment #6

Commenter and Affiliation: Gillian Peden, Assistant Planner, Building & Planning Division, Marion County, OR

Hazard: All

Geography: All

Comment: CH 1: Could be more user friendly for the public. While the methodology and evidence provided is necessary to support the science-based study, I think summarizations of the findings will be important for the public to follow.

Response: We plan to produce a use-friendly summary when we have a final plan approved by FEMA.

Comment #7

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Strength - Identification of Vulnerable Populations

The ONHMP appropriately integrates social vulnerability factors such as:

Houseless populations, people living alone, and rent-burdened households – These groups have limited access to shelter, emergency information, and recovery resources.

People with disabilities and chronic illnesses – The document acknowledges how these populations are disproportionately affected by hazards and the need for inclusive planning.

Institutionalized populations (nursing homes, juvenile facilities, etc.) – These facilities require tailored preparedness and response plans, particularly during evacuations.

Response: Thank you for the positive comment. The Oregon Natural Hazards Risk Assessment did not use houseless population because data is not available at a census tract level.

Comment #8

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Strength - Public Health Considerations

The Oregon Health Authority (OHA) Resilience Goals for 2030 are well-aligned with ESF 6 objectives. Goals include:

50% reduction in heat-related illnesses.

60% reduction in hospitalizations.

70% reduction in heat-related deaths.

Funding is allocated for Healthy Homes Grants and Community-Based Organizations (CBOs), focusing on environmental justice communities.

Response: Thank you for the positive comment.

Comment #9

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Strength - Risk Analysis and Critical Infrastructure

The ONHMP provides a GIS-based analysis of mass care vulnerabilities, including census tracts that rank high in exposure to hazards.

It assesses state-owned critical facilities, including emergency shelters and mass care locations, identifying those in high-risk hazard zones.

The ONHMP utilizes PROMETHEE for Multi-Criteria Decision Analysis (MCDA) to assess vulnerabilities beyond FEMA's monetary-loss focus.

GIS-Based Future Integration will improve local usability for sheltering and evacuation mapping

Response: Thank you for the positive comment.

Comment #10

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Gap/Area for Improvement – Mass Care and Emergency Assistance Planning

Shelter Accessibility & Functional Needs Support

The document does not adequately discuss how shelters will be adapted for people with disabilities, medical conditions, and non-English speakers.

Recommendation: Incorporate functional needs support services (FNSS) explicitly into the mitigation plan.

A need for greater detail on functional needs support in emergency shelters, including ADA compliance, power for medical devices, and non-English language support should be emphasized.

Recommendation: Integrate functional needs support services (FNSS) into mass care planning.

Response: Functional needs support services (FNSS) are very important when planning for mass care emergency shelters; however, emergency response is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #11

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Gap/Area for Improvement – Mass Care and Emergency Assistance Planning

Temporary and Long-Term Housing Solutions

The ONHMP does not provide a detailed post-disaster housing strategy, particularly for houseless populations or those with pre-existing housing instability.

Recommendation: Develop adaptive housing solutions, including partnerships with NGOs, state, and federal housing programs.

Response: Post disaster housing is very important; however, post disaster recovery is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #12

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Gap/Area for Improvement – Mass Care and Emergency Assistance Planning

Preparedness Planning for Residential Care Facilities

The document does not sufficiently address emergency preparedness planning for residential care facilities, particularly regarding evacuation and climate control measures.

Recommendation: Establish facility-specific evacuation plans that account for mobility limitations, medical dependencies, and continuity of care during disasters.

A need for detailed climate control strategies in emergencies, ensuring backup power systems for air conditioning and heating, along with contingency plans for extreme weather events.

Recommendation: Integrate climate control resilience planning and redundancy systems into preparedness plans for residential care facilities.

Response: Preparedness at residential care facilities is very important; however, preparedness is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #13

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Gap/Area for Improvement – Mass Care and Emergency Assistance Planning

Evacuation and Shelter-in-Place Coordination

The ONHMP lacks clear evacuation strategies for ESF 6 priority groups (e.g., institutionalized residents, low-income populations).

There is a lack of planning to manage evacuation route failures and single-point failures in critical facilities like hospitals.

There is a lack of detailed evacuation support plans as part of evacuation and sheltering strategies.

Recommendation: Conduct multi-agency tabletop exercises focusing on ESF 6 evacuation coordination and sheltering strategies and to integrate infrastructure resilience mapping.

Response: Coordinating evacuation and sheltering in place is very important; however, emergency response is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #14

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Gap/Area for Improvement – Community-Based Support & Behavioral Health Services

Behavioral Health & Disaster Trauma Support

While acknowledging climate-related health impacts, the ONHMP does not sufficiently address behavioral health services during and after disasters.

Recommendation: Enhance mental health programs within mass care operations.

Response: Mental health services are very important; however, support services during and after disasters is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #15

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Gap/Area for Improvement – Community-Based Support & Behavioral Health Services

Coordination with Resilience Hubs

The ONHMP references cooling/warming shelters but does not define resilience hubs in its mitigation strategy.

It must be emphasized that community resilience hubs should integrate sheltering, behavioral health services, and community education.

Recommendation: Include the development of resilience hubs statewide and standardize resilience hub integration in mass care and housing plans.

Response: Resilience hubs are very important; however, sheltering and mass care during a disaster are outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #16

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Gap/Area for Improvement – Equity & Inclusion Considerations

Tribal & Rural Community Coordination

The plan mentions vulnerable rural communities, but more detailed planning for tribal nations and culturally competent response strategies is needed.

There is limited solicitation of tribal input in the risk assessment process.

Recommendation: Establish formal partnerships with tribal nations for culturally responsive mass care strategies.

Response: Partnerships with tribal nations are very important; however, mass care is outside the scope of the Oregon Natural Hazards Mitigation Plan. We invited tribes to participate in the planning process for the Oregon Natural Hazard Mitigation Plan, and each tribe chose their level of engagement.

Comment #17

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Gap/Area for Improvement – Equity & Inclusion Considerations

Multilingual Communication in Shelters

There is limited discussion on how emergency notifications and mass care services will be linguistically and culturally accessible.

Recommendation: Expand language access policies within shelter operations.

Response: Multilingual communication is very important; however, emergency notifications and shelter operations are outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #18

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Recommendations for OREM ESF 6

Short-Term Priorities (Next 12 Months)

Revise the ONHMP to include functional needs sheltering and behavioral health support.

Develop partnerships with CBOs and tribal nations for mass care equity.

Pilot evacuation and shelter exercises that test ESF 6 coordination, particularly for rural and urban houseless populations.

Long-Term Priorities (2-5 Years)

Integrate resilience hubs as a cornerstone of the mass care strategy.

Expand post-disaster housing solutions to include transitional and permanent housing options.

Increase investment in multilingual disaster communications for mass care settings.

Enhance GIS-Based Risk Visualization, ensuring local governments can customize risk assessments and shelter planning.

Response: Emergency Support Function 6 – Mass Care is very important; however, emergency response is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #19

Commenter and Affiliation: Gillian Peden, Assistant Planner, Building & Planning Division, Marion County, OR

Hazard: All

Geography: All

Comment: CH 1: The introduction could include how stakeholders are to be included in this plan. It should include how property owners are notified about new research.

Response: Stakeholder engagement is now covered in Chapter 7 – Planning Process. Notifying property owners about new research is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #20

Commenter and Affiliation: Gillian Peden, Assistant Planner, Building & Planning Division, Marion County, OR

Hazard: All

Geography: All

Comment: CH 1: The introduction addressed the relationship with other disaster preparedness agencies.

Response: Thank you for the positive comment.

Comment #21

Commenter and Affiliation: Gillian Peden, Assistant Planner, Building & Planning Division, Marion County, OR

Hazard: All

Geography: All

Comment: CH 3: Each assessment for the different hazard could preface the impacts to the following: fiscal risk, social impact, and environmental impacts. While these will likely be addressed in later chapters, I think this could be briefly discussed.

Response: No change to the 2025 Oregon Natural Hazards Mitigation Plan. These impacts (fiscal, social, and environmental) could be covered in a summary after FEMA approves the plan, or analyzed in the next update.

Comment #22

Commenter and Affiliation: Gillian Peden, Assistant Planner, Building & Planning Division, Marion County, OR

Hazard: All

Geography: All

Comment: CH 3: I thought the risk assessment was extremely thorough. I especially like how almost each specific natural hazard that has ever occurred in the state was considered. There were specific examples of hazards large and small, showing how diligently the history of Oregon's natural hazards were combed through when compiling the data

Response: Thank you for the positive comment.

Comment #23

Commenter and Affiliation: Gillian Peden, Assistant Planner, Building & Planning Division, Marion County, OR

Hazard: All

Geography: All

Comment: CH 3: The document could be more user-friendly. The public will have a hard time trying to access quick information. It would be helpful to have different sections linked on the website so people can access the information they need more quickly.

Response: We plan to produce a use-friendly summary and webpages when we have a final plan approved by FEMA.

Comment #24

Commenter and Affiliation: Gillian Peden, Assistant Planner, Building & Planning Division, Marion County, OR

Hazard: All

Geography: All

Comment: CH 3: While thorough descriptions are good, I thought some sections were too wordy. For example, the "Defining Resiliency" seemed too long. It should focus more on the quick reasons as to why the public should care about resiliency.

Response: We plan to produce a summary when we have a final plan approved by FEMA. That summary will focus on quick explanations useful to a general public.

Comment #25

Commenter and Affiliation: Gillian Peden, Assistant Planner, Building & Planning Division, Marion County, OR

Hazard: All

Geography: All

Comment: CH 3: It was addressed how the two risk assessments complement each other; shows that data was collected through multiple methods with a holistic approach.

Response: Thank you for the positive comment.

Comment #26

Commenter and Affiliation: Gillian Peden, Assistant Planner, Building & Planning Division, Marion County, OR

Hazard: All

Geography: All

Comment: CH 3: The assessment should include how property owners should be given the opportunity to participate in the decision to develop new data. Public involvement in decision making could indicate the need for new programs, incentives, funding toward research, or the lack of desire for new data. It is crucial that the plan addresses the needs from stakeholders that will be directly affected by natural hazards.

Response: Public involvement is now covered in Chapter 7 – Planning Process.

Comment #27

Commenter and Affiliation: Gillian Peden, Assistant Planner, Building & Planning Division, Marion County, OR

Hazard: All

Geography: All

Comment: CH 3: I am looking forward to reading how the plan addresses the importance of investing in hazard mitigation. Addressing the social, economic and environmental benefits of planning for hazards is very important and having tangible evidence to support planning would be a benefit for the public.

Response: Chapter 5 – Mitigation Strategy covers the benefits of hazards mitigation.

Comment #28

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: Does the risk assessment achieve the goal of providing actionable information? Yes

Response: Thank you for the positive comment.

Comment #29

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: What would make the risk assessment easier to understand? The primary challenge is complexity and data presentation. The weighting of risk factors (65% socio-economic, 35% hazard-specific) is not intuitive for all stakeholders. Additionally, the maps lack color-coded differentiation that clearly distinguishes high-risk areas.

Suggested Improvements:

Color-coded differentiation for risk categories: Use blue for positive indicators (resilience factors) and red for negative indicators (hazard risks).

Break down vulnerability weighting visually: Use Z-score plots or simple bar graphs to explain how census tracts are ranked.

Provide local risk summaries: A one-page summary for each county or city would improve usability for decision-makers.

Response: The plan now has an indicator key using color coding to distinguish vulnerability indicators from resilience indicators. The appendix includes z-score plots and summaries for the highest risk census tracts.

Comment #30

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: What is missing from the risk assessment? Key missing elements include:

Infrastructure resilience analysis – The assessment does not fully account for single-point failures in critical infrastructure (e.g., hospitals, evacuation routes, water treatment plants).

Mass care and functional needs sheltering – There is limited information on how emergency shelters will accommodate people with disabilities, medical needs, and non-English speakers.

Integration with local zoning and development policies – Stakeholders expressed concerns that the risk rankings could conflict with housing development policies (e.g., middle housing policies in wildfire-prone areas).

Behavioral health services in disaster response – The assessment acknowledges climate-related health risks but lacks a detailed strategy for post-disaster mental health support.

Suggested Improvements:

Expand infrastructure risk assessment to highlight at-risk hospitals, emergency service hubs, and transportation corridors.

Develop clear sheltering strategies that align with FEMA Functional Needs Support Services (FNSS) guidelines.

Include policy integration recommendations to resolve conflicts between hazard mitigation and housing development plans.

Incorporate behavioral health as a mitigation priority, ensuring counseling, peer support, and culturally competent crisis care are available post-disaster.

Response: Future upgrades to the Oregon Natural Hazards Risk assessment could consider cascading effects from failures of hospitals, emergency service hubs, or transportation corridors.

Post-disaster sheltering strategies are outside the scope of the Oregon Natural Hazards Mitigation Plan.

The Oregon Natural Hazards Mitigation Plan is not a policy or regulatory document, and therefore cannot resolve potential conflicts between increasing housing and hazard mitigation. Any actual conflicts would be resolved by the legislature, rulemaking commissions, tribal governments, or local governments.

Post-disaster crisis care is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #31

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: What do you like about the risk assessment and why?

PROMETHEE MCDA provides a data-driven, reproducible ranking – This method avoids subjective expert bias and ensures quantifiable hazard and vulnerability assessments.

Inclusion of socio-economic vulnerability factors – The assessment goes beyond traditional monetary-loss models, considering poverty, age, access to medical care, and community resilience.

Statewide consistency – The model applies uniform risk criteria across all Oregon census tracts, making it easier to compare risk levels across regions.

Future GIS-based improvements – The plan to integrate GIS customization tools will make the assessment more interactive and useful for local planners.

Response: Thank you for the positive comments.

Comment #32

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: All

Geography: All

Comment: What concerns do you have and why?

Limited applicability at the local level – Without city- and county-specific data inputs, local governments may struggle to apply the results to zoning, emergency planning, and infrastructure investment.

Potential conflicts with land use policies – Wildfire mitigation measures (e.g., defensible space requirements) could conflict with urban housing policies, particularly in areas promoting denser housing.

Incomplete infrastructure risk analysis – The risk assessment does not fully account for transportation failures, hospital service disruptions, or cascading effects from infrastructure damage.

Lack of integration with FEMA and insurance industry risk maps – Different methodologies between state and federal assessments may cause inconsistencies in mitigation funding and insurance rates.

Suggested Solutions:

Ensure Phase Two GIS tools allow local agencies to refine risk scores based on their specific infrastructure and land-use policies.

Improve infrastructure assessment by incorporating transportation, healthcare, and water system vulnerabilities.

Collaborate with FEMA and insurance providers to standardize risk classification for funding and policy alignment.

Response: The next phase of the Oregon Natural Hazards Risk Assessment will create an online tool that cities and counties can use to add local data to refine the analysis of high risk areas.

Future upgrades to the risk assessment could consider cascading effects on transportation, healthcare, and water systems.

The Oregon Natural Hazards Mitigation Plan identifies general areas that may need mitigation projects. It does not set insurance rates on specific properties, and does not determine whether specific projects qualify for grant funding. Different risk classifications are appropriate at different scales for different purposes.

Comment #33

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Coastal

Geography: Coast

Comment: Strength: Identifies erosion, storm surge, and tsunami risks.

Gap: Lacks resilience hub integration.

Recommendation: Improve local response coordination for isolated communities.

Response: Thank you for the positive comment. Emergency response coordination is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #34

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: High Hazard Potential Dams

Geography: All

Comment: Strength: Acknowledges lack of quantifiable failure risk data.

Gap: Downstream vulnerability analysis is incomplete.

Recommendation: Enhance risk assessments and emergency planning.

Response: Thank you for the positive comment. The Oregon Natural Hazards Risk Assessment did not analyze downstream vulnerability because of a lack of statewide data. Downstream vulnerability analysis

could be considered in a future update to the Oregon Natural Hazards Risk Assessment. Emergency response planning is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #35

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Droughts

Geography: All

Comment: Strength: Links drought to economic and agricultural impacts.

Gap: Lacks focus on rural water system resilience.

Recommendation: Expand climate adaptation for groundwater and drought-tolerant infrastructure.

Response: Thank you for the positive comment. The Oregon Natural Hazards Risk Assessment does not analyze rural water systems because of a lack of statewide data. The list of mitigation actions in Chapter 5 includes:

> 50. Develop an improved methodology for gathering data on drought and related impacts in the areas most vulnerable to drought…
>
> 81. Document the economic, social, cultural, and environmental impacts of drought, especially in the most vulnerable jurisdictions…

Comment #36

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Earthquakes

Geography: All

Comment: Strength: Recognizes Cascadia risk with seismic maps.

Gap: Lacks liquefaction risk analysis for infrastructure.

Recommendation: Prioritize retrofitting for transportation and hospitals.

Response: Thank you for the positive comment. The Oregon Natural Hazard Mitigation Plan does not prioritize projects for specific transportation facilities or specific hospitals. Projects to retrofit transportation systems and hospitals are in tribal and local natural hazards mitigation plans. Thus, no change to the Oregon Natural Hazards Mitigation Plan.

Comment #37

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Extreme Heat

Geography: All

Comment: Strength: Strong focus on public health and OHA resilience goals.

Gap: Cooling centers and resilience hubs lack funding.

Recommendation: Secure seed and long-term funding, expand public awareness.

Response: Thank you for the positive comment. The list of mitigation actions in Chapter 5 includes:

83. Provide ongoing funding for the expansion of the Oregon Resilience Hubs …

Comment #38

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Floods

Geography: Urban Areas

Comment: Strength: Uses FEMA floodplain mapping.

Gap: Lacks urban stormwater planning.

Recommendation: Develop strategies for flash flooding in urban areas.

Response: Thank you for the positive comment. Urban flooding is included in the hazard characterization in section 3.3.5.1. Urban flooding is not included in the Oregon Natural Hazards Risk Assessment because statewide data is not available. Tribes, cities and counties address areas of local urban flooding in their natural hazard mitigation plans.

Comment #39

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Landslides

Geography: All

Comment: Strength: Integrates hazard mapping.

Gap: Lacks post-wildfire landslide risk analysis.

Recommendation: Add wildfire-driven landslide projections and mitigation plans.

Response: Thank you for the positive comment. Post-wildfire landslides are included in the hazard characterization in section 3.3.7.1. Post-wildfire landslides are not included in the Oregon Natural Hazards Risk Assessment because statewide data is not available, and the area at risk will change significantly from year to year. The Oregon Department of Geology and Mineral Industries often studies landslide risk in areas burned by major wildfires. Tribes, counties, and cities can then address specific areas at risk.

Comment #40

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Tsunamis

Geography: Coast

Comment: Strength: Maps multiple tsunami scenarios.

Gap: Evacuation route viability needs assessment.

Recommendation: Increase drill funding and expand vertical evacuation planning.

Response: Thank you for the positive comment. Drills are outside the scope of the Oregon Natural Hazards Mitigation Plan. The list of mitigation actions in Chapter 5 includes:

> 87. Implement improved tsunami way-finding signage solutions to assist with tsunami evacuation under all conditions (day or night). Hardened and improved evacuation routes may include the use of elevated safe areas (vertical evacuation structures)…

Comment #41

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Volcanoes

Geography: All

Comment: Strength: Identifies risks from ashfall.

Gap: Lacks air quality and infrastructure disruption planning.

Recommendation: Develop regional response plans for ashfall impacts.

Response: Thank you for the positive comment. Emergency response plans are outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #42

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Wildfires

Geography: All

Comment: Strength: Aligns with wildfire risk mapping.

Gap: Lacks clarity on housing policy conflicts.

Recommendation: Integrate mitigation with zoning and housing policies.

Response: Thank you for the positive comment. Integrating hazards mitigation with land use zoning is an important mitigation action for cities and counties; however, local zoning decisions are outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #43

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Windstorms

Geography: All

Comment: Strength: Identifies risks but lacks historical data.

Gap: Does not account for power grid vulnerabilities.

Recommendation: Strengthen utility coordination to reduce outages.

Response: Section 3.3.11.2 list historic windstorm events. The Oregon Natural Hazards Risk Assessment does not analyze windstorms and power grid vulnerabilities because of a lack of suitable statewide data. The list of mitigation actions in Chapter 5 includes:

> 88. Strengthen wildfire and winter storm resilience of electrical transmission and distribution systems…

Comment #44

Commenter and Affiliation: Philip Nel, Lead Researcher and Senior Planner, ODHS-OREM

Hazard: Winter Storms

Geography: All

Comment: Strength: Recognizes transportation and power risks.

Gap: Lacks sheltering plans for vulnerable populations.

Recommendation: Expand warming shelters and improve transportation resilience.

Response: Post-disaster sheltering is outside the scope of the Oregon Natural Hazards Mitigation Plan.

Comment #45

Commenter and Affiliation: Marshall Curry

Hazard: All

Geography: All

Comment: I was just doing a brief skim. This section on page 58 has a broken link at the end.

Ham Radio Amateur radio, or ham radio, is a service provided by licensed amateur radio operators. Ham radio is an alternate means of communicating when normal systems are down or at capacity. Emergency communication is a priority for the Amateur Radio Relay League (ARRL), the national association for amateur radio operators. Each region is served by Amateur Radio Emergency Service (ARES) districts. Radio Amateur Civil Emergency Services (RACES) is a special phase of amateur radio recognized by FEMA that provides radio communications for civil preparedness purposes including natural disasters. Official ham emergency station calls for each region can be found with the American Relay Radio League Oregon Chapter, www.arrloregon.org. "

Response: Corrected link to https://oregonarrl.org/ares/.

Comment #46

Commenter and Affiliation: Chantal Wikstrom, Water Quality Specialist & Emergency Coordinator, OHA - Drinking Water Services

Hazard: None

Geography: All

Comment: Feedback on Chapter 2 – Oregon Profile

"Pg 58: Drinking water supplies in Oregon are primarily groundwater (GW) sources. There are 686 Community Water Systems (CWSs) with GW as their primary source of water supply. There are 234 CWSs with surface water as their primary source of water supply. Some systems do have multiple types of sources (SW, GW or GWUDI). You can search public drinking water inventories here: https://yourwater.oregon.gov/inventorylist.php. We also have a map showing the different public water systems: https://geo.maps.arcgis.com/apps/webappviewer/index.html?id=86938c6844be48b0b75a9326f500a748.

Pg 59: Region 2 - might be good to add that Portland sells a lot of water to surrounding communities such as Tualatin Valley Water District, etc. "

Response: Used the website suggested to update wording to be more specific and give counts of surface and groundwater sources and filtered by systems over 10,000 people to give an understanding of larger municipal systems. Added information about Portland Water Bureau's water wholesale relationship with surrounding cities.

Comment #47

Commenter and Affiliation: Chantal Wikstrom, Water Quality Specialist & Emergency Coordinator, OHA - Drinking Water Services

Hazard: None

Geography: All

Comment: Feedback on Chapter 4 – Statewide Mitigation Capability Assessment

"Pg 22: OHA contracts source water protection activities for public water systems to DEQ.

Pg 23: OHA - Public Health Division - Drinking Water Services implements the Safe Drinking Water Act for Oregon's public water systems."

Response: Both comments incorporated into the IHMT table.

Comment #48

Commenter and Affiliation: Chantal Wikstrom, Water Quality Specialist & Emergency Coordinator, OHA - Drinking Water Services

Hazard: All

Geography: All

Comment: Feedback on Chapter 5 –Mitigation Strategy

“Priority 47: public water systems are susceptible to all hazards depending on their geography, infrastructure, and operations - not just landslides. All natural hazards can all impact drinking water quality, source water availability, operations, and infrastructure.”

Response: This action (renumbered to 72) remains focused on erosion and landslides so that it is specific enough to meet the criteria for a mitigation action. The next update to the Oregon Natural Hazard Mitigation Plan could include additional specific actions to address other hazards that threaten drinking water supplies.

Comment #49

Commenter and Affiliation: Lisa Dawson, Executive Director, Northeast Oregon Economic Development District

Hazard: Wildfire

Geography: All

Comment: Feedback on Chapter 5 –Mitigation Strategy

"42 Continue to analyze interdependencies between lifelines and energy:

assess and plan for backup power needs for critical facilities, such as

water/wastewater, fire stations, and hospitals). Provide support for

energy resilience at certain facilities. See the Oregon Energy Security

Plan for further background. - this should also apply to wildfires"

Response: Wildfire added to this action (renumbered to 64).

Comment #50

Commenter and Affiliation: Brandy Bishop, Emergency Preparedness Coordinator, The Confederated Tribes of Grand Ronde

Hazard: None

Geography: Grande Ronde Reservation

Comment: Feedback on Chapter 2 – Oregon Profile

"In the section 2.3 Human Geography in the subsection for the information on The Confederated Tribes of Grand Ronde I would like to make a couple corrections as follows:

While there are over 30 tribes and bands within the confederated tribes of grand ronde there are five main bands and those are, Molalla, Rouge River, Kalapuya, Chasta, and Umpqua. The CTGR reservation is located in western Oregon in Yamhill county but also in Polk County. In section 2.3.5 under the Confederated Tribes of Grand Ronde subsection ceded and ancestral homelands are mentioned but in the previous sections it states there are only two types of Tribal lands reservations and trust lands. I feel that a quick definition of what ceded lands are might be helpful here. "

Response: Description corrected to refer to the five main bands of the Confederated Tribes of Grand Ronde and to add Polk County. A definition for ceded lands added to section 2.3.2 land ownership.

Comment #51

Commenter and Affiliation: Jason McClaughry, RG, Geological Survey and Services Program Manager, DOGAMI

Hazard: Many

Geography: All

Comment: For at least many of the hazards, there is a disconnect between the extensive background information in the Risk Assessment chapter and the specific indicators that were used to score the hazard and risk preference rankings. It is unclear why the specific indicators were chosen among many possibilities. The subjective choices of which indicators are used ultimately drive how the hazard is perceived through

this analysis. Perhaps the indicators are generally a reasonable set for most hazards, but eliciting opinion from a group of interested experts and describing the reasoning for this set of indicators would greatly strengthen the assessment.

Response: Explanations and justifications of the indicators added to Chapter 9 – Appendix.

Comment #52

Commenter and Affiliation: Jason McClaughry, RG, Geological Survey and Services Program Manager, DOGAMI

Hazard: Many

Geography: All

Comment: For many of the indicators, much of the available information about the likelihood of a hazard is being discarded through simplification into binary options, i.e., is a structure in a moderate to very high hazard zone or not. If these indicators were recast such that high hazard/ higher probability factors were scored higher than lower hazard areas, it would better represent our current understanding of these hazards. As currently implemented, communities with exposed structures in predominantly very high hazard zones are scored equivalently to communities with a similar fraction of structures in moderate hazard zones for many of the indicators.

Response: The next phase of the Oregon Natural Hazards Risk Assessment will give users more flexibility to use different hazard scenarios or add additional hazard indicators to better represent hazards.

Comment #53

Commenter and Affiliation: Jason McClaughry, RG, Geological Survey and Services Program Manager, DOGAMI

Hazard: Many

Geography: All

Comment: Many of the hazards include exposure of historic buildings as one of the indicators, and for at least some of the high priority tracts, hazard to historic buildings is a key indicator on the z score plots in the appendix. The numbers and statewide distribution of these buildings was not clear from the report, but based on a discussion with Matt Williams, some census tracts have small numbers of historic structures so that the % exposure could produce a wide range of values depending on the details of a few buildings. This (potentially) non-robust indicator is weighted equally to more impactful parts of the hazard. In general the use of percentages involving small sample numbers per tract should be evaluated critically.

Response: Risk analysis was changed to use number of historic buildings in a census tract rather than percentage.

Comment #54

Commenter and Affiliation: Jason McClaughry, RG, Geological Survey and Services Program Manager, DOGAMI

Hazard: Volcanic

Geography: Volcanic Hazard Areas

Comment: As raised in a previous email to Trisha Patterson, the volcanic hazard analysis is particularly problematic, as most of the factors discussed in the hazard description are excluded from the indicators used in the risk scoring.

Response: Thank you for your comment. Further discussion is warranted concerning data availability and map symbology.

Comment #55

Commenter and Affiliation: Jason McClaughry, RG, Geological Survey and Services Program Manager, DOGAMI

Hazard: All

Geography: All

Comment: DOGAMI staff are interested in improving the maps and making improvements. What is the timeline to make these changes? If there is no time and capacity to improve the maps, would DLCD be open to revising the language describing the nature of these maps? For example, since many of the maps are primarily a demonstration of social vulnerability and not hazard or risk, they could be reframed to inform the readers understanding and interpretation of the maps.

Response: Thank you for your comment. DLCD anticipates further work to improve the risk assessment by creating a public facing tool for use in local jurisdictions' natural hazard mitigation planning.

Comment #56

Commenter and Affiliation: Jason McClaughry, RG, Geological Survey and Services Program Manager, DOGAMI

Hazard: All

Geography: All

Comment: Given the complexity of the analysis and the choice to make the hazard exposure subordinate to socioeconomic factors, it is unclear if improvements to the hazard scoring system would change the risk prioritization in a significant way. In an extreme case, some of the top 20% census tracts for volcano hazard preference are tracts with 0% hazard. Perhaps this relative insensitivity of the overall ranking to the hazard

does not motivate any revision to the scoring in this round (except for the volcanic hazard?). However, justification of how and why the indicators were used should be added to the assessment document.

Response: Thank you for your comment. We have included additional explanation and justification of how and why indicators were used in this particular hazard to the Chapter 9 – Appendix.

Comment #57

Commenter and Affiliation: Erica Fleishman, Director, Oregon Climate Change Research Institute, Professor, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University

Hazard: Drought

Geography: All

Comment: On page 37 of chapter 3, there is a reference to snow drought that is incomplete. There are two types of snow drought. Dry snow drought: precipitation falls as snow, but little precipitation falls. Warm snow drought: ample precipitation, but falls as rain. See https://www.drought.gov/topics/snow-drought#definitions

Response: Thank you for your comment. This change has been made.

Comment #58

Commenter and Affiliation: Erica Fleishman, Director, Oregon Climate Change Research Institute, Professor, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University

Hazard: All

Geography: All

Comment: Table 2.2.4-1. - Habitat is a species-specific construct. It's not clear to me how changes in species' habitats lead to coastal hazards. I suggest deleting this row. Also consider deleting the windstorms column. And spell out CMZ.

Response: Thank you for your comment. We will remove the windstorms column and remove CMZ from the Floods column. Habitat changes can affect coastal hazards; for example, loss of kelp near the shoreline can influence coastal erosion.

Comment #59

Commenter and Affiliation: Erica Fleishman, Director, Oregon Climate Change Research Institute, Professor, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University

Hazard: Coastal Hazards

Geography: Oregon Coast

Comment: Coastal Hazards Section, next-to-last paragraph, "…surfing resources." I don't understand this. Waves?

Response: Thank you for your comment. We have reviewed and deleted "surfing resources".

Comment #60

Commenter and Affiliation: Erica Fleishman, Director, Oregon Climate Change Research Institute, Professor, College of Earth, Ocean, and Atmospheric Sciences, Oregon State University

Hazard: All

Geography: All

Comment: "%" - Symbol or written out? Not consistent across document.

Response: Thank you for your comment. We have updated the text for consistency.

Comment #61

Commenter and Affiliation: Amie Hyatt, Producer, Thelittlethings503

Hazard: Earthquake, High Hazard Potential Dam

Geography: Salem

Comment: Feedback on Chapter 6:

Oregon has done the very minimum when it comes to informing the public. I live in Salem Oregon and we are one the top cities with the highest probability for disaster yet I havent noticed any true form of community education or preparedness. The city should be doing things for instance my grandson's School is located in one of the main areas that would be affected if the Detroit dam were to break our entire neighborhood would be fully submerged underwater. High School doesn't have earthquake drills or flood drills. Should have something happen tomorrow no one would be prepared and nobody would know what to do and that's a serious problem. Educating its citizen is one of the top things that they should be prioritizing under the circumstances because when the cascadia quake does take place we're going to have to rely on ourselves for survival oregon is in no way shape or form prepared for such a catastrophe. They should be doing something to compensate for that for instance providing each community with free EMS courses and search and rescue training so people are prepared to take action as they're going to be forced to do. Two weeks is a long time without help and that's what they're predicting. It should be training its communities to be able to help themselves. It should be providing swim classes for low-income children and families it should be requiring schools churches and community watch organizations to establish an emergency plan and providing them with the things they might need such a storage to begin gathering the necessities they will need to have ready in order for its community members to survive. Water, food, medical supplies, shelters, emergency blankets etc. if every single neighborhood was prepared to take care of its own people this is what's going to save lives. It should be encouraging people to get to know their neighbors and create a buddy system and not just mentioning it on the internet but repeatedly reminding

people that this is a serious disaster that we need to be preparing for on a regular basis that way when it does come we're actually prepared. The other thing is the Detroit dam. The state of Oregon's been informed that that damn is it's not up to par to withstand an earthquake of such magnitude the aftermath if that should break would be horrific and the death toll would be astronomical. Reinforcement of our dams should be a top priority. They've been aware of this for several years and and have no excuse for not addressing the issue.

Response: Local capabilities are very important; however, most of the specific suggestions in this comment are outside the scope of the Oregon Natural Hazards Mitigation Plan. Text added to Section 6.2.2.6 - Educational Outreach, Groups, & Organizations to incorporate the general comments about the level of local capability.

Comment #62

Commenter and Affiliation: Camille Collett, Geotechnical Specialist, ODF

Hazard: Landslides

Geography: All

Comment: I'm wondering if in chapter 3.3.7 you would want to include a sentence or two about how logging and clearcutting can increase the likelihood of there being landslides. You mention the ODF 1996 study but don't really mention that aspect. There are rules that try to prevent this from happening but they still do occur in forestry operations – also frequently along forest roads.

Response: Logging and forest roads added to section 3.3.7.1 – Analysis and Characterization.

Comment #63

Commenter and Affiliation: Hilary Olivos-Rood, UCF Grant Program Administrator , ODF

Hazard: All

Geography: All

Comment: Hello,

The DLCD Community Green Infrastructure Grant Program (CGI) works with the Oregon Department of Forestry's Urban & Community Forestry Subaward Program to collaborate and provide technical assistance for the DLCD CGI program, codified through Oregon Legislation (2023) House Bill 3409. As agency partners, there is much intersectionality between the two programs. ODF requests to add the following paragraph to Chapter 4 - Statewide Mitigation Capability Assessment under section "4.2.3 New Natural Hazard Mitigation and Resilience Programs, Plans, and Funding."

ODF Request to add the following section:

4.2.3.7 Urban and Community Forestry

In 2023, the Oregon Department of Forestry's Urban and Community Forestry (UCF) Program was awarded two domestic grants ($26.6 million, in total) from the U.S. Forest Service to develop and implement two subaward programs. These programs fund urban, rural community, and Tribal forestry projects across the state for social, environmental, and resiliency benefits. The Urban and Community Forestry Program has six priority areas: 1) supporting forestry assessment and planning; 2) supporting culturally responsive forestry education and community-building initiatives; 3) enhancing the urban and community forestry network; 4) expanding urban forestry workforce and career development; 5) expanding tree production, planting, and maintenance; and 6) supporting monitoring, adaptive management, and lesson sharing. These priorities promote resilience in urban and wildland-urban interface areas where communities stand to gain significant benefits from trees and forests.

Response: Added as section 4.2.3.4, immediately following the section on DLCD Community Green Infrastructure program.

Comment #64

Commenter and Affiliation: Mandy Watson, Coastal Conservation Manager, Oregon Shores Conservation Coalition

Hazard: All

Geography: All

Comment: March 19, 2025

To: Oregon Department of Land Conservation and Development and Oregon Department of Emergency Management

RE: Oregon's Natural Hazard Mitigation Plan Update

I want to express my gratitude for allowing public comments on the Oregon Natural Hazard Mitigation Plan Update (NHMP), as well as, my admiration for the work that has gone into this document. Thank you for your efforts to make Oregon communities, people, and places more resilient to natural hazards.

Oregon Shores Conservation Coalition is a non-profit organization that is dedicated to protecting the natural shoreline and equal access to it. We are committed to progressing diversity, equity, and inclusion in coastal and ocean spaces in the face of planning, management, and adapting to climate change. We want to applaud all you've done to recognize and mitigate the disproportionate impact of natural hazards on historically marginalized groups and underserved communities and the incorporation of current and future effects of climate change into this plan.

As organizations strive to meaningfully engage, listen, and amplify the voices of marginalized peoples, we must also acknowledge the additional burden this can place and the risk of unintentionally imposing extractive practices through this work. In light of this, we suggest the agencies think about, and discuss with impacted Tribes, how indigenous Traditional Ecological Knowledge could be incorporated into this or future NHMPs. Currently, the plan seems to lack this important perspective, which would enhance its effectiveness and inclusivity.

We also would like to see the conservation and restoration of estuaries and wetlands distinguished as a mitigation strategy for global climate change due to their ability to sequester carbon as well as localized protection from storms and flooding. Updating Estuary Management Plans should be prioritized as Oregon's estuaries require strong, updated management policies to continue providing their ecosystem benefits. In addition, we would like to see stronger language that discourages the use of hard armoring such as rip rap as it prioritizes short-term private property protection over long-term public beach access.

See specific comments organized by chapter and section below.

Thank you for taking my comments into consideration. Feel free to reach out if you would like to discuss any points further. Again, I appreciate the Department of Land Conservation and Development and Office of Emergency Management efforts in making Oregon more resilient to natural hazards.

Sincerely,

Mandy Watson, Coastal Conservation Manager

Oregon Shores Conservation Coalition

Response: Thank you for the positive comments.

Comment #65

Commenter and Affiliation: Mandy Watson, Coastal Conservation Manager, Oregon Shores Conservation Coalition

Hazard: All

Geography: All

Comment: Specific comments by chapter and section.

1.1

❖ "All three perspectives – local practitioners, state hazard experts, and objective data – are necessary for reaching the best assessment of vulnerability. However, they can complement one another and lead to more robust mitigation." p. 18 ➢ Traditional ecological knowledge from indigenous populations are also perspectives required for reaching the best assessment of vulnerability.

❖ "Local risk assessments therefore can add depth and granularity to the state risk assessment. As the state strives to incorporate local risk assessments into the state risk assessment (Section X.X), this deeper local understanding of local vulnerability and risk, based in part on state data and analysis and in part on local knowledge and experience, will help the state focus its limited resources in communities that need them most and in the ways those communities need them most. This partnership or linkage between state and local mitigation planning promises to be beneficial to both local and state government and most importantly, to the citizens of Oregon." p. 18 ➢ Thank you for acknowledging the importance of local knowledge. The NHMP would benefit from describing how the state incorporates local risk assessment into

state risk assessment or what the current status between them is. “As the state strives” is vague and noncommittal.

Response: Added traditional ecological knowledge to the list of perspectives for understanding risk in section 1.1.4.

The 2025 update to the Oregon Natural Hazard Mitigation Plan uses the National Risk Index and a new Oregon Natural Hazards Risk Assessment. The new statewide risk assessment uses a different method than local risk assessments. The new risk assessment method will be available to tribes, counties, and cities as they update their local risk assessments, which will better integrate state and local risk assessments.

Comment #66

Commenter and Affiliation: Mandy Watson, Coastal Conservation Manager, Oregon Shores Conservation Coalition

Hazard: Coastal Hazards

Geography: Coast

Comment: Specific comments by chapter and section.

2.2.4

❖ “Public access is one of the coastal resources most at risk from accelerating sea level rise. Rising seas may dramatically impact beaches, accessways, recreational amenities (e.g., parking lots, bathrooms, signage), and even surfing resources. Public access to the coast is important to the economic viability, quality of life, and health and well-being of members of the community, including low-income and underserved populations. By providing low-cost outdoor recreational opportunities through public access to Oregon’s beaches and estuaries, communities can improve their overall economic and health outcomes. Where development already exists, and particularly where there is substantial shoreline armoring to protect this development, Oregon may lose significant recreational beach areas. Additional shoreline armoring can decrease access to sandy recreational beaches, remove or impact public access locations to the water, diminish the ability to include accessibility features at public access sites, require increased costs and maintenance of public access amenities, and contribute to a general loss of public access locations.” p.18-19

➢ We appreciate this paragraph. It could be improved by specifically calling out rip rap as a threat to public beach access, as the most common shoreline armoring

method in Oregon. Having a picture to illustrate how it hinders lateral beach access would help demonstrate.

Response: Thank you for your comment. We have added wording about how rip-rap hinders lateral beach access to the sentence that describes the ways that shoreline armoring hinders beach access. We were not able to include an image to illustrate it at this time.

Comment #67

Commenter and Affiliation: Mandy Watson, Coastal Conservation Manager, Oregon Shores Conservation Coalition

Hazard: All

Geography: All

Comment: Specific comments by chapter and section.

2.3.5

❖ "Tribal Natural and Cultural Resources Indigenous people often do not draw a hard line between natural resources and cultural resources because they are so intertwined. (NOAA, 2025)" p. 41 ➢ Citing a tribal literature, group, or member rather than a federal agency would be the best practice here.

Response: Updated the text and source with a resource from Cultural Survival, an indigenous led NGO and registered non-profit that advocates for indigenous rights.

Comment #68

Commenter and Affiliation: Mandy Watson, Coastal Conservation Manager, Oregon Shores Conservation Coalition

Hazard: All

Geography: All

Comment: Specific comments by chapter and section.

3.2.1.1

❖ Regarding the whole section ➢ It's great to see the acknowledgement of the intricacies to measuring vulnerability and equitable mitigation. Thank you for your work.

Response: Thank you for your positive comment.

Comment #69

Commenter and Affiliation: Mandy Watson, Coastal Conservation Manager, Oregon Shores Conservation Coalition

Hazard: Coastal Hazards

Geography: Coast

Comment: Specific comments by chapter and section.

3.3.1

❖ “All of these sites are highly susceptible to increased impacts as erosion processes and flood hazards intensify, driven by rising sea level and increased storminess.” p. 17 ➢ Add, “especially when combined with shoreline armoring such as rip rap.”

❖ “Human influences associated with jetty construction, dredging practices, coastal engineering, and the introduction of non-native dune grasses have all affected the shape and configuration of the beach, including the volume of sand on a number of Oregon’s beaches, ultimately influencing the stability or instability of these beaches.” p. 18 ➢ Add stronger language that highlights that most settler human influences have had long-term negative consequences on the beaches, dunes, estuaries.

➢ Such as, “Human activities such as jetty construction, dredging, coastal engineering, shoreline armoring, and the planting of non-native dune grasses have led to long-term negative impacts on Oregon's beaches and dunes. These developments restrict the natural movement of sand and the ability of estuaries to migrate inland, causing the phenomenon known as 'coastal squeeze.' Coastal squeeze occurs when coastal habitats, like beaches and wetlands, are confined between human-made structures and rising sea levels, preventing them from naturally shifting or adapting to environmental changes. This not only undermines the natural resilience of coastal ecosystems but also increases the vulnerability of coastal communities to flooding, erosion, and storm surges.”

❖ “The estuaries are all ecologically important to many fish and wildlife species and in many cases are the sites of important recreational and commercial enterprise.” p. 20 ➢ Recognize estuaries as a mitigation measure. Add, “Additionally, estuaries play a crucial role in carbon sequestration, acting as natural carbon sinks that help mitigate climate change. When unaltered, undeveloped estuary also provide valuable localized protection against storms and flooding, buffering coastal communities from extreme weather events and rising sea levels.”

❖ “In some areas, the erosion has become acute, requiring various forms of coastal engineering (commonly riprap) to mitigate the problem (Figure 3.3.1-4B), and in a few cases the landward relocation of the homes.” p. 20 ➢ Change to “as an attempt to mitigate the problem”

Response: Complete. Thank you for your comment.

Comment #70

Commenter and Affiliation: Mandy Watson, Coastal Conservation Manager, Oregon Shores Conservation Coalition

Hazard: All

Geography: All

Comment: Specific comments by chapter and section.

3.3.3

❖ “Since the mid-1980s, an increasing body of geologic and seismologic research has changed the scientific understanding of earthquake hazards in Oregon, and in recent years several large and destructive earthquakes around the world have heightened public awareness. Recognized hazards range from moderate sized crustal earthquakes in eastern Oregon to massive subduction zone megathrust events off the Oregon coast. ” p. 49 ➢ Add, “Indigenous peoples in the Pacific Northwest, who experienced the 1700 earthquake and tsunami, passed down their knowledge through oral histories and storytelling long before Western science fully recognized these hazards."

❖ 3.3.3-2 Table. Historic Earthquake Events ➢ Add acknowledgement sentences such as, “This is a settler account of historic earthquakes and does not include earthquakes experienced and documented by indigenous peoples before 1873.”

➢ Or better yet, include examples of earthquakes documented by indigenous histories

➢ Same for 3.3.5-2. Table Historic Damaging Floods in Oregon, Table 3.3.8-1. Historic distant tsunamis that have been observed on the Oregon Coast, and all similar tables.

Response: Thank you for your comment. We considered this comment and added clarifying language.

Comment #71

Commenter and Affiliation: Mandy Watson, Coastal Conservation Manager, Oregon Shores Conservation Coalition

Hazard: All

Geography: All

Comment: Specific comments by chapter and section.

5.2

❖ “2. Prioritize and direct state mitigation resources and investments to build resilience in the populations and communities indicated by the risk assessment to be the most vulnerable. 3. Align natural hazards mitigation and climate adaptation efforts based on the evolving understanding of the relationships between climate change and climate-related natural hazard events.” p. 1

➢ In other sections, the pros and cons of the risk assessment are discussed. Consider who is left out by the risk assessment, who doesn’t get captured based on the framework of the decided risk assessment.

Prioritized Mitigation Action

❖ “21 Conduct a pilot project on two coastal estuaries to develop a framework for modeling sea level rise and to assess the overall impact of sea level rise on the estuaries. Implement sea level rise modeling for the pilot study areas. Use study results to guide a future, more comprehensive and coast-wide assessment of sea level rise impacts. Once completed, use the results to minimize future damage or loss of property and the environment. In 2024, DLCD completed an updated version of the Sea Level Rise Guide for local

governments based on this work. Integration through the Climate Change Adaptation Framework." p. 10 ➢ I would love to be kept in the loop about this if possible.

Response: It is important to be aware of who and what is left out of the National Risk Index and the Oregon Natural Hazards Risk Assessment. This is covered in Chapter 3, but not repeated in Chapter 5.

Request to be kept in the loop forwarded to the Oregon Coastal Management program.