

Gleneden Sanitary District Addendum to the Lincoln County Multi-Jurisdictional NHMP



Photos courtesy of Explore Lincoln City

Effective:

December 17, 2025 through December 16, 2030



Prepared for
Gleneden Sanitary District
6595 Gleneden Beach Loop
Gleneden Beach, OR 97388

Prepared by
The University of Oregon
Institute for Policy Research & Engagement
School of Planning, Public Policy, and Management



UNIVERSITY OF
OREGON

Institute for Policy
Research and Engagement

This Natural Hazard Mitigation Plan was prepared by:



UNIVERSITY OF
OREGON

School of Planning, Public
Policy and Management

Institute for Policy
Research and Engagement

Planning grant funding provided by:



FEMA

Federal Emergency Management Agency (FEMA)
Hazard Mitigation Grant Program
Grant No: HMGP-PF-5446-01-P-OR

Additional Support Provided by:



*This material is a result of tax-supported research and, as such, is not copyrightable.
It may be freely reprinted with the customary crediting of the source.*



FEMA

December 17, 2025

Stephen Richardson
State Hazard Mitigation Officer
Oregon Department of Emergency Management
3930 Fairview Industrial Dr SE
Salem, OR 97302

Reference: Approval of the Lincoln County Multi-Jurisdictional Natural Hazard Mitigation Plan

Dear Officer Richardson:

In accordance with applicable¹ laws, regulations and policy, the Risk Analysis Branch of FEMA Region 10 Mitigation Division has approved the local mitigation plan for the following jurisdictions:

Lincoln County	City of Depoe Bay	City of Newport
City of Toledo	Beverly Beach Water District	Central Lincoln People's Utility District
Central Oregon Coast FRD	Depoe Bay Fire District	Gleneden Sanitary District
Kernville-Gleneden Beach-Lincoln Beach Water District	North Lincoln Fire and Rescue District	Otter Rock Water District
Panther Creek Water District	Salishan Sanitary District	Seal Rock Water District
Siletz Valley Fire District	SW Lincoln County Water People's Utility District	

Mitigation plans may include additional content to meet Element H: Additional State Requirements or content the local government included beyond applicable FEMA mitigation planning requirements. FEMA approval does not include the review or approval of content that exceeds these applicable FEMA mitigation planning requirements.

The approval period for this plan is from December 17, 2025 through December 16, 2030.

¹ Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and National Dam Safety Program Act, as amended; 44 CFR Part 201, Mitigation Planning; and Local Mitigation Planning Policy Guide (FP-206-21-0002).

The jurisdictions' plan approval ensures the eligibility for project grants under FEMA's Hazard Mitigation Assistance programs. All requests for funding are evaluated individually according to eligibility and other program requirements. Having an approved mitigation plan does not mean that mitigation grant funding will be awarded. Specific application and eligibility requirements can be found in each FEMA grant program's respective policies and annual Notice of Funding Opportunities, as applicable.

FEMA's approval is for a period of five years, effective the date FEMA received the adoption documentation. For this plan, documentation was received on December 17, 2025 and is considered approved as of then. Prior to December 16, 2030, each jurisdiction must review, revise, and submit their plan to FEMA for approval to maintain eligibility for grant funding. The enclosed plan review tool provides opportunities to incorporate into future updates.

Sincerely,

Wendy Shaw, P.E.
Risk Analysis Branch Chief
Mitigation Division

JG: MB

Attachment: Local Mitigation Plan Review Tool

**GLENEDEN SANITARY DISTRICT
RESOLUTION No. 25-03**

A Resolution Adopting the Gleneden Sanitary District Representation in the Updates to the Lincoln County Multi-Jurisdictional Natural Hazards Mitigation Plan

Whereas, the **Gleneden Sanitary District** recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, the **Gleneden Sanitary District** has fully participated in the FEMA prescribed mitigation planning process to prepare the *Lincoln County, Multi-Jurisdictional Natural Hazards Mitigation Plan*, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities; and

Whereas, the **Gleneden Sanitary District** has identified natural hazard risks and prioritized a number of proposed actions and programs needed to mitigate the vulnerabilities of the **Gleneden Sanitary District** to the impacts of future disasters within the *Lincoln County, Multi-Jurisdictional Natural Hazards Mitigation Plan*; and

Whereas, these proposed projects and programs have been incorporated into the *Lincoln County, Multi-Jurisdictional Natural Hazards Mitigation Plan* that has been prepared and promulgated for consideration and implementation by the participating cities and special districts of Lincoln County; and

Whereas, the Oregon Department of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the *Lincoln County, Multi-Jurisdictional Natural Hazards Mitigation Plan* and pre-approved it contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is in an on-going cycle of development and revision to improve its effectiveness; and

Whereas, **Gleneden Sanitary District** adopts the NHMP and directs the **Contract Superintendent** to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

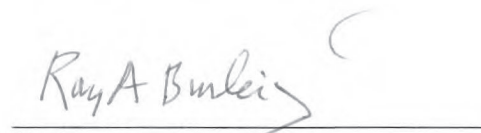
Now, therefore, be it resolved, that the **Gleneden Sanitary District** adopts *the Lincoln County Multi-Jurisdictional Natural Hazards Mitigation Plan* as an official plan; and

Be it further resolved, that the **Gleneden Sanitary District** will submit this Adoption Resolution to the Oregon Department of Emergency Management and Federal Emergency Management Agency, Region X officials to enable final approval of the *Lincoln County Multi-Jurisdictional Natural Hazards Mitigation Plan*.

Adopted this 12th day of November, 2025



President, Board of Directors



Secretary

Table of Contents

INTRODUCTION.....	1
<i>Purpose and Adoption</i>	1
<i>Process and Participation</i>	1
IMPLEMENTATION AND MAINTENANCE.....	2
<i>Implementation through Existing Programs</i>	3
<i>Capability Assessment</i>	3
Policies and Programs.....	3
Personnel.....	3
Mitigation Successes.....	4
MITIGATION STRATEGY.....	4
RISK ASSESSMENT.....	6
<i>Hazard Analysis</i>	6
<i>Community Characteristics and Assets</i>	7
Community Characteristics.....	7
Facilities and Property Assets Inventory.....	7
<i>Hazard Identification</i>	10
<i>Vulnerability Assessment</i>	10
ATTACHMENT A: PUBLIC INVOLVEMENT SUMMARY.....	14
ATTACHMENT B: HAZARD MAPS.....	16

List of Tables

TABLE SD-1 ACTION ITEMS.....	5
TABLE SD-2 HAZARD ANALYSIS MATRIX.....	7
TABLE SD-3 HAZARD RISK AND DESCRIPTION OF IMPACT.....	11
TABLE SD-5 FACILITIES SUMMARY.....	13

List of Maps

MAP SD-1 DISTRICT BOUNDARIES.....	9
MAP SD-2 COASTAL EROSION HAZARD.....	17
MAP SD-3 EARTHQUAKE LIQUEFACTION (SOFT SOIL) HAZARD AND ACTIVE FAULTS.....	18
MAP SD-4 PROBABILITY OF DAMAGING SHAKING.....	19
MAP SD-5 PERCEIVED SHAKING AND DAMAGE POTENTIAL, PROBABILISTIC EARTHQUAKE MODEL.....	20
MAP SD-6 PERCEIVED SHAKING AND DAMAGE POTENTIAL, CSZ EARTHQUAKE MODEL.....	21
MAP SD-7 TSUNAMI INUNDATION SCENARIOS.....	22
MAP SD-8 FLOOD HAZARD ZONES (100- AND 500-YEAR FLOODPLAINS).....	23
MAP SD-9 LANDSLIDE SUSCEPTIBILITY EXPOSURE.....	24
MAP SD-10 BURN PROBABILITY AND FIRE HISTORY (1992-2022).....	25
MAP SD-11 POTENTIAL WILDFIRE IMPACT (OVERALL).....	26

Introduction

Purpose and Adoption

This is the Gleneden Sanitary District (Gleneden SD) addendum to the Lincoln County Multi-Jurisdiction Natural Hazards Mitigation Plan (NHMP). This addendum is not intended to be a standalone document, rather information contained herein supplements information contained in Volume I (Basic Plan) which serves as the NHMP foundation and Volume II (Appendices), which provides additional information. This addendum meets the following requirements:

- Multi-jurisdictional **Plan Requirements: Participation** §201.6(a)(4),
- Multi-Jurisdictional **Plan Content: Risk Assessment** §201.6(c)(2)(iii),
- Multi-jurisdictional **Plan Content: Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-jurisdictional **Plan Content: Documentation** §201.6(c)(5).

This is the first addendum to the Lincoln County NHMP for the Gleneden SD.

Gleneden SD adopted their addendum to the Lincoln County Multi-jurisdictional NHMP on November 12, 2025. FEMA Region X approved the Lincoln County NHMP and the district’s addendum on December 17, 2025. With approval of this NHMP the district is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act’s hazard mitigation project grants through December 16, 2030.

Process and Participation

This section of the NHMP addendum addresses 44 CFR 201.6(a)(3), *Participation* and 44 CFR 201.6(c)(5), *Plan Adoption*.

In addition to establishing a comprehensive community-level mitigation strategy, the Disaster Mitigation Act of 2000 (DMA2K), and the regulations contained in 44 CFR 201, require that jurisdictions maintain an approved NHMP to receive federal funds for mitigation projects. Local adoption, and federal approval of this NHMP ensures that the Gleneden SD will remain eligible for hazard mitigation assistance project grants.

The Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon’s Institute for Policy Research and Engagement (IPRE) collaborated with the Oregon Department of Emergency Management (OEM), Lincoln County, and Gleneden SD to develop this addendum. Members of Gleneden SD participated in the County NHMP update process (Attachment A and Volume II, Appendix B).

Convener and Committee

The district’s Finance Manager serves as the NHMP addendum convener. The convener of the NHMP addendum will take the lead in implementing, maintaining, and updating the

addendum in collaboration with the designated convener of the Lincoln County NHMP (Lincoln County Emergency Manager).

Representatives from the District met formally, and informally, to discuss the development of their addendum (Attachment A). They reviewed and developed the district's addendum, with a focus on their risk assessment and mitigation strategy (action items).

This addendum reflects decisions made at the designated meetings, and during subsequent work, and communication with OPDR.

The Gleneden SD steering committee was comprised of the following representatives:

- Convener, Danielle Eisenbarth, Finance Manager
- Jeramy Price, Superintendent

Implementation and Maintenance

The Gleneden SD Board of Directors will be responsible for adopting the addendum to the Lincoln County NHMP. This addendum designates the steering committee, and a convener to oversee the development, and implementation of action items. Because the District is part of the County's multi-jurisdictional NHMP, the District will look for opportunities to partner with the County. The district's steering committee will convene after adoption of the addendum on an annual schedule. The County is meeting on a quarterly basis and will provide opportunities for participating jurisdictions (cities and special districts) to report on NHMP implementation and maintenance during their meetings. The steering committee, assembled by the convener, will be responsible for:

- Reviewing existing action items to determine suitability of funding;
- Reviewing existing, and new risk assessment data to identify issues that may not have been identified at NHMP creation;
- Educating, and training new steering committee members on the NHMP, and mitigation actions in general;
- Assisting in the development of funding proposals for priority action items;
- Discussing methods for continued public involvement;
- Evaluating effectiveness of the NHMP at achieving its purpose and goals (use Table 4-1, Volume I, Section 4, as one tool to help measure effectiveness); and
- Documenting successes, and lessons learned.

The convener will also remain active in the County's implementation and maintenance process (Volume I, Section 4).

The Steering Committee will be responsible for activities outlined in Volume I, Section 4.

The district will utilize the same action item prioritization process as the County (Volume I, Section 4 and Volume II, Appendix D).

Implementation through Existing Programs

Many of the NHMP’s recommendations are consistent with the goals and objectives of the district’s existing plans and policies. Where possible, the Gleneden SD will implement the NHMP’s recommended actions through existing plans and policies. Plans and policies already in existence have support from residents, businesses, and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, allowing them to adapt to changing conditions and needs. Implementing the NHMP’s action items through such plans and policies increases their likelihood of being supported and implemented.

This NHMP is strategic and non-regulatory in nature, meaning that it does not necessarily set forth any new policy. It does, however, provide: (1) a foundation for coordination and collaboration among agencies, residents, and the district; (2) identification and prioritization of future mitigation activities; and (3) aid in meeting federal planning requirements and qualifying for assistance programs. The Gleneden SD currently has the following plans that relate to natural hazard mitigation. For a complete list visit the district’s [website](#).

- Phase I Wastewater Treatment Facilities Plan (2020)
- Geotechnical Report for Pump Station Upgrades (2021)

Capability Assessment

The Capability Assessment identifies and describes the ability of the Gleneden SD to implement the mitigation strategy and associated action items. This is a key component of the 2024 Natural Hazard Mitigation Plan (NHMP) update. Capabilities can be evaluated through an examination of broad categories, including existing authorities, policies, programs, funding, and resources.

Policies and Programs

The NHMP provides direction for the Gleneden SD to explore integration into other planning documents and processes.

Phase I Wastewater Treatment Facilities Plan (2020)

The purpose of this study is to identify and evaluate feasible WW treatment options to meet the District’s projected service needs. The scope of plan consists of a planning area description, evaluation of the existing facilities, development of upgrade options, cost effectiveness analysis, and recommendations. Included in the plan is an evaluation of the seismic risks that could impact the district.

Personnel

The district is governed by a board of five part-time commissioners. The board is responsible for the overall operations and performance of the district’s water distribution. The district contracts the Kernville-Gleneden Beach-Lincoln Beach Water District for the operation of the wastewater system.

Mitigation Successes

This is a list of funding that Gleneden SD has sought out or received, as well as recently completed projects to improve mitigation.

- \$50,000 planning grant for the district to redesign their wastewater treatment plant
- Generators were added to all four pump stations

Mitigation Strategy

This section of the NHMP addendum addresses 44 CFR 201.6(c)(3)(iv), *Mitigation Strategy*.

The Gleneden SD adopts the mission and hazard mitigation goals described in Volume I.

To develop the district's mitigation strategy (action items), the Steering Committee assessed the district's risk and identified potential issues to be addressed. The Steering Committee also noted what mitigation accomplishments have been made in recent years.

Priority Action Items

Table SD-1 presents a list of mitigation actions. The highest priority actions are shown with orange highlight. The District will focus their attention, and resource availability, upon these achievable, high leverage, activities over the next five-years. Although this methodology provides a guide for the steering committee in terms of implementation, the steering committee has the option to implement any of the action items at any time. This option to consider all action items for implementation allows the committee to consider mitigation strategies as new opportunities arise, such as capitalizing on funding sources that could pertain to an action item that is not currently listed as the highest priority.

Table SD-1 Action Items

Mitigation Strategies		Impacted Hazard										Implementation and Maintenance					
Action Item #	Statement	Air Quality	Coastal Erosion	Drought	Earthquake	Extreme Heat	Flood	Landslide	Tsunami	Volcanic Event	Wildfire	Windstorm	Winter Storm	Potential Funding Resources	Lead	Timeline	Cost
1	Replace all aging force mains identified as seismically vulnerable within the Gleneden Sanitary District service area with earthquake-resistant materials. This will reduce the risk of service disruption during a Cascadia Subduction Zone event and align with the district's infrastructure resilience goals outlined in the hazard mitigation planning process.				X				X					Local Funds, Revenue Bond, HMA, IFA	Board of Commissioners	M	H
2	Elevate at least three priority pump stations located in low-lying or flood-prone areas (e.g., Sea Ridge, Holiday Hills) and install permanent backup generators to ensure continued operation during power outages caused by winter storms, earthquakes, or other emergencies.						X		X				X	Local Funds, Revenue Bond, HMA, IFA	Board of Commissioners	L	M
3	Relocate pump stations and gravity lines within 20 feet of the coastal erosion zone (e.g., near Sea Ridge Condos) to more secure inland locations. Replace the existing gravity line with a new alignment that is outside the projected erosion impact zone, ensuring long-term service continuity and protection from tidal flooding and shoreline retreat.		X											Local Funds, Revenue Bond, HMA, IFA	Board of Commissioners	L	H
4	Initiate a joint planning effort with Central Lincoln PUD and other utility providers to address shared vulnerabilities, such as overhead transmission lines and emergency power coordination, especially for infrastructure outside direct control.									X		X	X	Local Funds	Board of Commissioners/ Central Lincoln PUD	M	L
5	Establish a coastal erosion monitoring program to track shoreline changes near vulnerable infrastructure such as the Sea Ridge gravity line. Use drone surveys or GIS mapping to inform future relocation or reinforcement decisions.		X											Local Funds, HMA, OCMP	Board of Commissioners	S	L
6	Conduct a district-wide assessment of emergency power needs and develop a phased plan to install or upgrade generators at all critical pump stations. Include fuel storage and maintenance protocols to ensure readiness during extended outages.							X					X	Local Funds, HMA	Board of Commissioners	S	L

Source: Gleneden SD steering committee, 2025.
 Cost: L (less than \$50,000), M (\$50,000-\$499,999), H (\$500,000-\$5 million), VH (more than \$5 million).
 Potential Funding Sources: HMA=FEMA's Hazard Mitigation Assistance disaster and non-disaster grant programs
 Timing: Ongoing (continuous), Short (1-4 years), Medium (4-10 years), Long (10 or more years)
 Priority Actions: Identified with orange highlight
 Dark Grey highlight indicates that the hazard does not impact the jurisdiction.

Risk Assessment

This section of the NHMP addendum addresses 44 CFR 201.6(b)(2) - *Risk Assessment*. In addition, this chapter can serve as the factual basis for addressing Oregon Statewide Planning Goal 7 – Areas Subject to Natural Hazards. Assessing natural hazard risk has three phases:

Phase 1: Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.

Phase 2: Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.

Phase 3: Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein, and within Volume I, Section 2, and Volume II, Appendix C.

Hazard Analysis

The district developed their hazard analysis, using the County’s (Volume I, Section 2) as a reference. Where appropriate, changes were made to distinguish the district’s risks from those in the County’s hazard analysis, as detailed throughout this addendum.

Table SD-2 shows the hazard analysis matrix listing each hazard in rank from high to low. For local governments, conducting hazard analysis is a useful step in planning for hazard mitigation, response, and recovery. The method provides the jurisdiction with a sense of hazard priorities but does not predict the occurrence of a particular hazard. See Volume I, Section 2 for methodology details.

Flood (riverine), wildfire, landslide, Cascadia Subduction Zone earthquake, and local tsunami are the **high hazard threats** to the district. Windstorm, coastal erosion, winter storm, and volcanic event are the **low hazard threats**.

The sanitary district’s primary responsibilities center on the management, protection, and operation of wastewater infrastructure. While public safety is a critical consideration in the district’s mission, the district does not serve as the lead agency for emergency response or public safety during hazard events.

Instead, the district collaborates closely with county and city agencies that have broader mandates for managing community-wide impacts. The district provides technical expertise and operational support related to wastewater systems, while local jurisdictions lead efforts in emergency response, public safety, and disaster recovery.

Given this operational scope, the district is not directly impacted by the following hazards and does not maintain infrastructure or responsibilities that warrant profiling them in its

hazard analysis: air quality, coastal flood, drought, extreme heat, distant tsunami, and tornado. These hazards fall outside the district’s direct impact zone or operational purview and are more appropriately addressed by other agencies within the broader emergency management framework.

In addition, hazards identified within the “bottom tier” have low vulnerability and/or low probability to the district. as such the district has elected to not include mitigation strategies. Instead. the district will collaborate with the County and applicable cities to implement mitigation strategies related to these hazards.

Table SD-2 Hazard Analysis Matrix

Hazard	Maximum				Total Threat Score	Hazard Rank	Hazard Tiers
	History	Vulnerability	Threat	Probability			
Flood (Riverine)	14	35	90	70	209	#1	Top Tier
Wildfire	14	35	90	70	209	#2	
Landslide	18	40	80	70	208	#3	
Earthquake (Cascadia)	2	50	100	49	201	#4	
Local Tsunami	2	50	100	49	201	#5	
Windstorm	20	20	50	70	160	#6	Bottom Tier
Coastal Erosion	18	20	50	70	158	#7	
Winter Storm	18	20	50	70	158	#8	
Volcanic Event	2	10	40	7	59	#9	

Source: Gleneden SD steering committee, 2025.

Community Characteristics and Assets

The following section provides information on Gleneden SD specific demographics and assets (see Table SD-4). Many of these community characteristics can affect how natural hazards impact communities, and how communities choose to plan for natural hazard mitigation. Considering the District specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Community Characteristics

The Gleneden Sanitary District (GSD), established in 1968, owns, operates, and maintains a wastewater collection and interceptor system serving the unincorporated coastal communities of Gleneden Beach and Lincoln Beach, Oregon. The system became operational in June 1976 and includes 16 pump stations, approximately 110,000 feet of pipeline, and 390 manholes. While GSD manages the collection infrastructure, wastewater treatment is handled through a longstanding agreement with the City of Depoe Bay, with GSD currently responsible for 58% of shared facility costs.

GSD contracts with the Kernville-Gleneden Beach-Lincoln Beach Water District (K-GB-LB WD) for operations and administrative services, though the two entities maintain separate assets. The district continues to assess vulnerabilities such as tidal flooding and seismic risks and is actively identifying mitigation strategies to enhance infrastructure resilience.

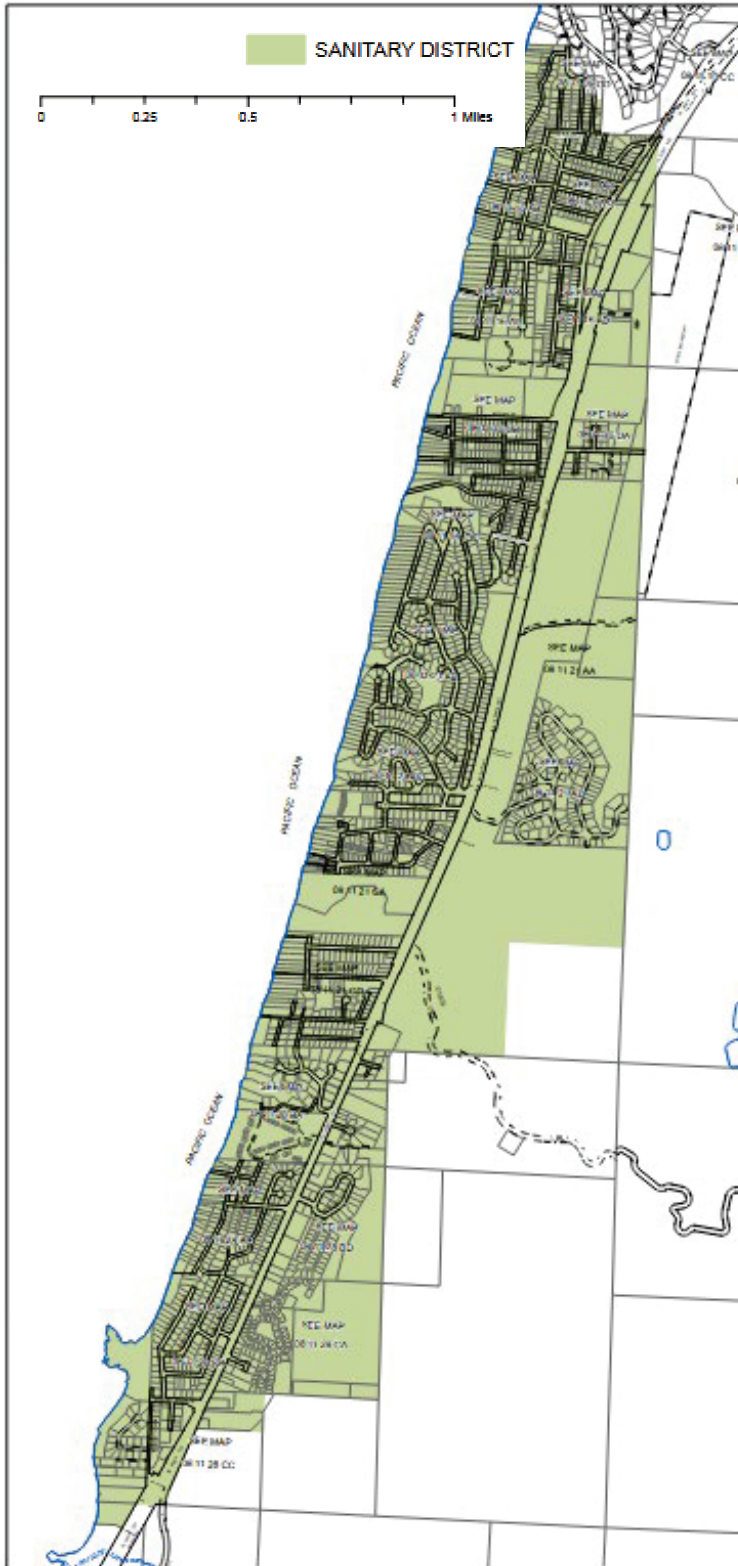
Facilities and Property Assets Inventory

This section provides information on district specific assets. Assets that may be affected by hazard events include residential and nonresidential buildings, critical facilities, and infrastructure. Considering the district specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Table SD-4 lists the resources, facilities, and infrastructure that, if damaged, could significantly impact the public safety, economic conditions, and environmental integrity of the district.

The district's facilities are located within their service area (Map SD-1) which is the Lincoln County unincorporated communities of Gleneden Beach and Lincoln Beach.

Map SD-1 District Boundaries



Source: Lincoln County GIS - Click [link](#) for more information

Hazard Identification

This section profiles the district’s hazards and assesses their vulnerabilities, distinct from the countywide planning area. Detailed hazard profiles of the most significant countywide hazards are described in Volume I, Section 2. The detailed profiles include hazard characteristics, history, location, extent, previous occurrences, and probability of future occurrences. An event that affects the County is likely to affect the district as well. However, not all hazards impact the district assets. The district chose to profile the hazards shown in Table SD-2 due to the impact these hazards have upon their assets. Factors included during discussions by the district included the number of potential assets damaged, extent of damage, and length of time required for repairs (economic losses were also considered). Hazards that were determined to not impact the district include: air quality, tornado, drought, extreme heat, coastal flood, and distant tsunamis.

Additional information is found in the [Risk Assessment for Region 1, Oregon Coast, Oregon SNHMP \(2020\)](#).

National Flood Insurance Program (NFIP)

The district does not have the authority to adopt and enforce floodplain management or other land use regulations for the areas within its jurisdiction. For more information on National Flood Insurance Program (NFIP) claims and other potential flood impacts, see the County plan (Volume I).

Vulnerability Assessment

Development and population forecasts are not expected to increase or decrease the impact of their profiled hazards.

The district’s concentrated population and resources, as well as the soil characteristics and relative earthquake hazards described herein and in Volume I, Section 2 are cause for significant effort toward mitigating the earthquake hazard. The district’s infrastructure (sanitary sewer pipelines, pump stations, etc.) is highly vulnerable to a severe earthquake event. No quantitative assessment of the risk of natural hazards has been conducted at a district wide scale. However, there have been several reports conducted for the unincorporated region of the county that include the district’s service area.

Table SD-3 provides the ranking of hazards of concern based on total threat score and Table SD-4 shows hazard impact to the district’s assets.

Hazard area extent and location maps are included in Attachment B. Information shown on the maps is for planning purposes, represents the conditions that exist at the map date, and is subject to change. Refer to the original source documentation to better understand the data sources, results, methodologies and limitations of each dataset presented.

Table SD-3 Hazard Risk and Description of Impact

Hazard	Description of Impact	Total Threat Score
Flood (Riverine)	Flooding is a moderate concern, particularly in areas like Holiday Hills, Laurel, and Sea Ridge, where King Tides can cause tidal flooding and deposit debris at pump stations. While riverine flooding is not a primary threat, the proximity of some infrastructure—such as a pump station located just 20 feet from the coastal erosion zone—warrants monitoring during heavy rain events.	209
Wildfire	Although the district is located in a coastal environment with lower wildfire risk than inland areas, the increasing frequency of wildfires in Oregon poses a potential threat to above-ground infrastructure and power supply. Smoke and ash could impact operations, especially if emergency generators are needed for extended periods.	209
Landslide	Landslide risk is relatively low but may affect areas where pipelines traverse slopes or where pump stations are located near unstable terrain. Prolonged rainfall or seismic activity could trigger slope movement, potentially disrupting service lines or access routes.	208
Earthquake (CSZ Event)	A Cascadia Subduction Zone earthquake could significantly impact GSD’s infrastructure. Force mains and gravity lines, some of which are located near the shoreline, are vulnerable to ground shaking and liquefaction. Seismic upgrades to pump stations and mains are a priority to maintain service continuity.	201
Local Tsunami	Parts of the service area, including the Sea Ridge Condo area, fall within the tsunami inundation zone. A local tsunami could damage low-lying infrastructure, isolate neighborhoods, and disrupt access to pump stations, complicating emergency response and recovery.	201
Windstorm	High winds can knock down trees and power lines, leading to power outages that affect operations, especially if regional infrastructure is compromised.	160
Coastal Erosion	Coastal erosion is a growing concern, particularly near Sea Ridge, where the ocean is encroaching on infrastructure. A gravity line may be as close as 12 feet from the shore, and	158

Hazard	Description of Impact	Total Threat Score
	continued erosion could necessitate relocation or reinforcement of key assets.	
Winter Storm	Winter storms bring high winds and heavy rain, which can lead to power outages and stress on overhead transmission lines. The main transmission line is overhead and located outside the district, increasing vulnerability. Backup power and storm-hardened infrastructure are essential for resilience.	158
Volcanic Event	While volcanic activity is a low-probability hazard for the district, ashfall from a distant eruption could still affect operations.	59

Source: Gleneden SD steering committee, 2025.

Table SD-4 Facilities Summary

Name/Number	Address	Identified Hazard Exposure											
		AQ	CE	DR	EQ	EH	FL	LS	TS	VE	WF	WS	WT
Pump Stations													
16 pump stations			X		X		X	X	X	X			X
Piping, Hydrants, Generators, and other infrastructure													
Sanitation lines			X		X			X	X				
Force mains					X			X	X				

Source: Information provided by Gleneden SD

Dark Grey highlight indicates that the hazard does not impact the jurisdiction.

Table Key:

“X” – Facility may be exposed and may be impacted by the identified hazard per a visual inspection of the mapped hazard area
 [blank] = facility exposure has not been assessed for this hazard

Hazard Descriptions:

- AQ = Air Quality
- CE = Coastal Erosion
- DR = Drought
- EH = Extreme Heat
- EQ = Earthquake
- FL = Flood
- LS = Landslide
- TS = Tsunami
- VE = Volcanic Event
- WF = Wildfire
- WS = Windstorm/Tornado
- WT = Winter Storm

Attachment A: Public Involvement Summary

Members of the Steering Committee provided edits and updates to the NHMP prior to the public review period as reflected in the final document. In addition, a survey was distributed that included responses from residents of the district (Volume II, Appendix F).

To provide the public information regarding the draft NHMP addendum, and provide an opportunity for comment, an announcement was provided from August 7 through 21, 2025 on the County's website and publicized by the district. Comments were reviewed and integrated into the NHMP as applicable. Additional opportunities for stakeholders and the public to be involved in the planning process are addressed in Volume II, Appendix B.

Various agencies and organizations contributed input through multiple channels, including comments on the draft. These groups include local and regional hazard mitigation agencies, development regulators, neighboring communities, businesses, academia, nonprofits, and community-based organizations serving underserved and socially vulnerable populations (see Volume II, Appendix B).

Steering Committee

Steering Committee members possessed familiarity with the district and how it is affected by natural hazard events. The Steering Committee guided the update process through several steps including goal confirmation and prioritization, action item review and development, and information sharing, to update the NHMP and to make the NHMP as comprehensive as possible. The Steering Committee met formally on the following dates:

Meeting #1: April 14, 2025 (virtually via Zoom)

During this meeting, the Steering Committee was provided updates on hazard mitigation planning, the NHMP update process, and project timeline. The Steering Committee meeting details include:

- Reviewed and provided feedback on recent history of hazard events.
- Reviewed and confirmed the County NHMP's mission and goals.
- Discussed the NHMP public outreach strategy.
- Reviewed and provided feedback on the draft risk assessment including community vulnerabilities and hazard information.
- Developed their mitigation strategy (actions).
- Reviewed and provided feedback on their implementation and maintenance program.

Meeting Attendees:

- Convener, Danielle Eisenbarth, Finance Manager
- Jeramy Price, Superintendent

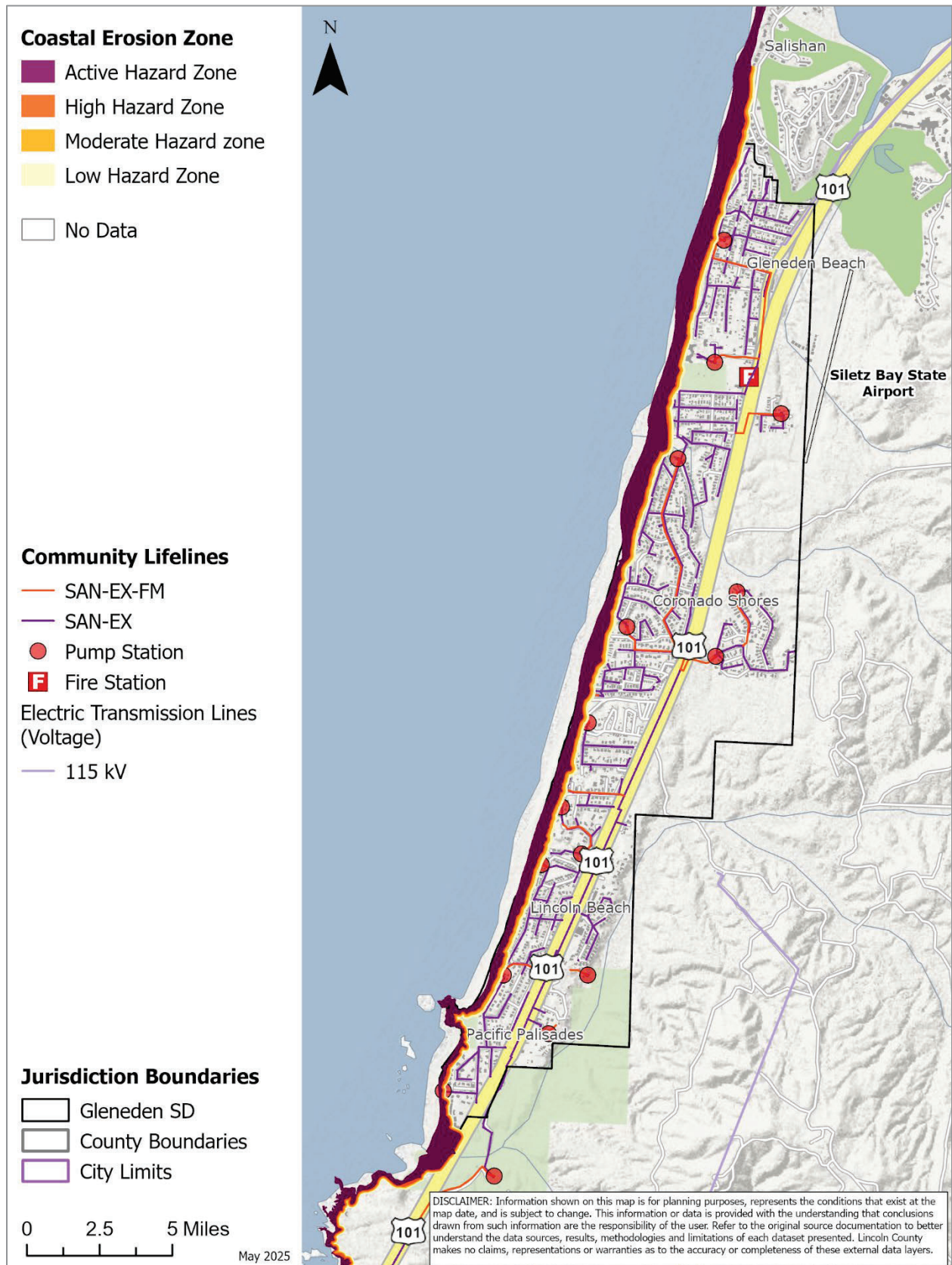
Meeting Summary:

Key agenda items included reviewing the districts' capabilities, assets, and hazard vulnerability assessments (HVAs), identifying infrastructure vulnerabilities, and crafting new action items to address the most relevant natural hazards. The meeting highlighted specific community concerns like tidal flooding in certain neighborhoods and the proximity of infrastructure to coastal erosion zones.

Attachment B: Hazard Maps

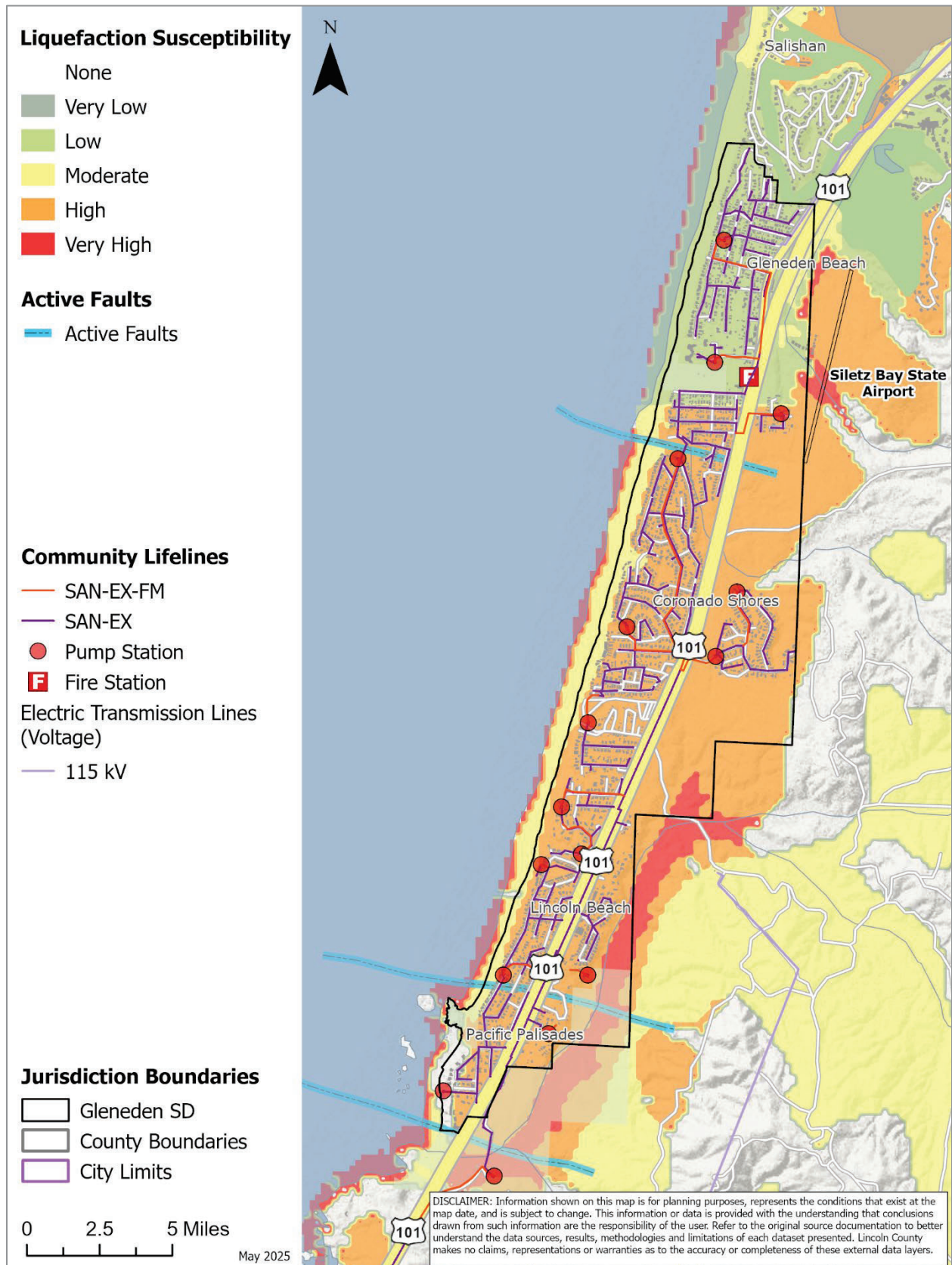
MAP SD-2 COASTAL EROSION HAZARD	17
MAP SD-3 EARTHQUAKE LIQUEFACTION (SOFT SOIL) HAZARD AND ACTIVE FAULTS	18
MAP SD-4 PROBABILITY OF DAMAGING SHAKING	19
MAP SD-5 PERCEIVED SHAKING AND DAMAGE POTENTIAL, PROBABILISTIC EARTHQUAKE MODEL	20
MAP SD-6 PERCEIVED SHAKING AND DAMAGE POTENTIAL, CSZ EARTHQUAKE MODEL	21
MAP SD-7 TSUNAMI INUNDATION SCENARIOS	22
MAP SD-8 FLOOD HAZARD ZONES (100- AND 500-YEAR FLOODPLAINS)	23
MAP SD-9 LANDSLIDE SUSCEPTIBILITY EXPOSURE	24
MAP SD-10 BURN PROBABILITY AND FIRE HISTORY (1992-2022)	25
MAP SD-11 POTENTIAL WILDFIRE IMPACT (OVERALL)	26

Map SD-2 Coastal Erosion Hazard



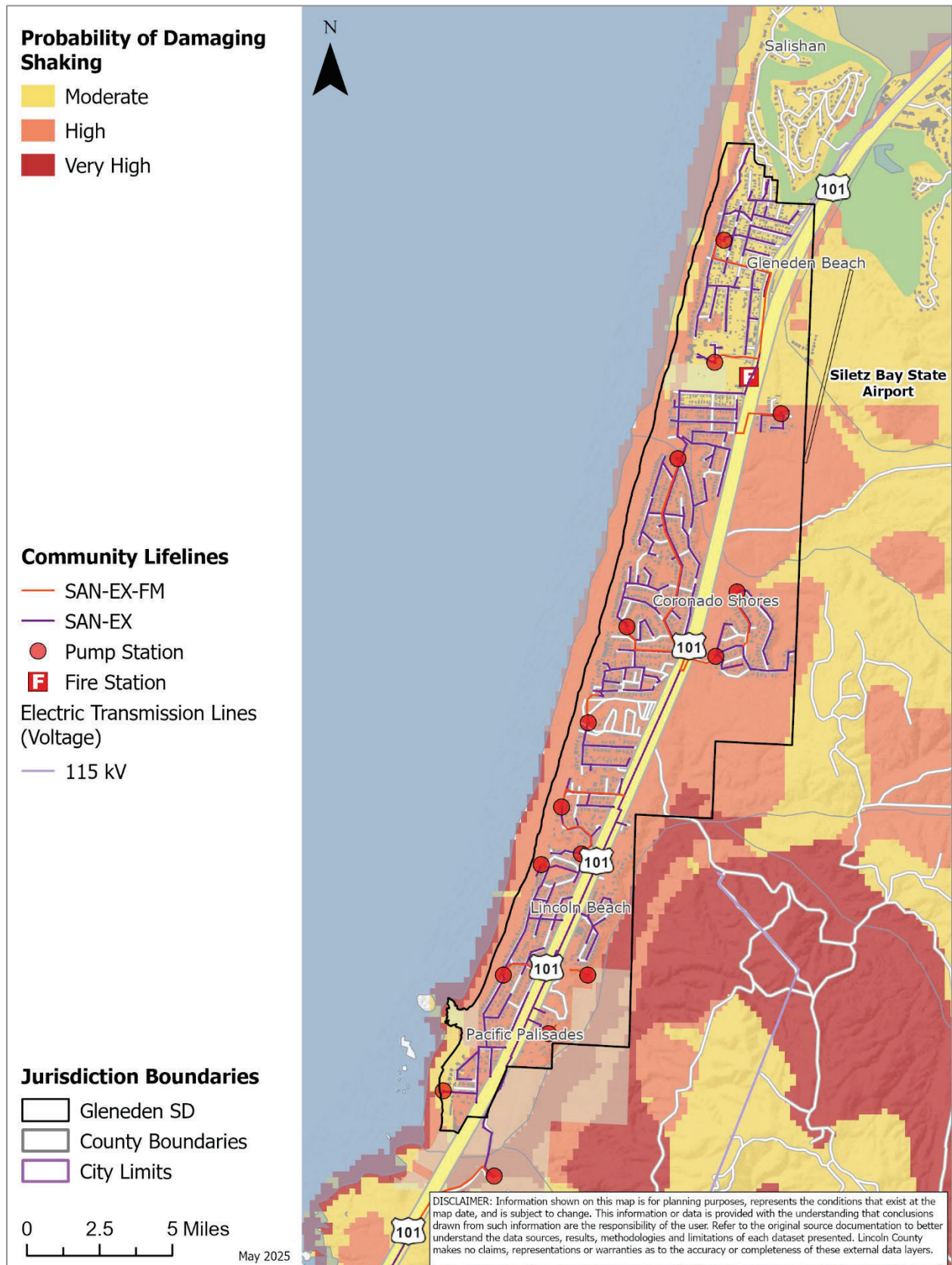
Source: [Oregon Explorer: Map Viewer](#) – To view map detail click hyperlink to left.

Map SD-3 Earthquake Liquefaction (Soft Soil) Hazard and Active Faults



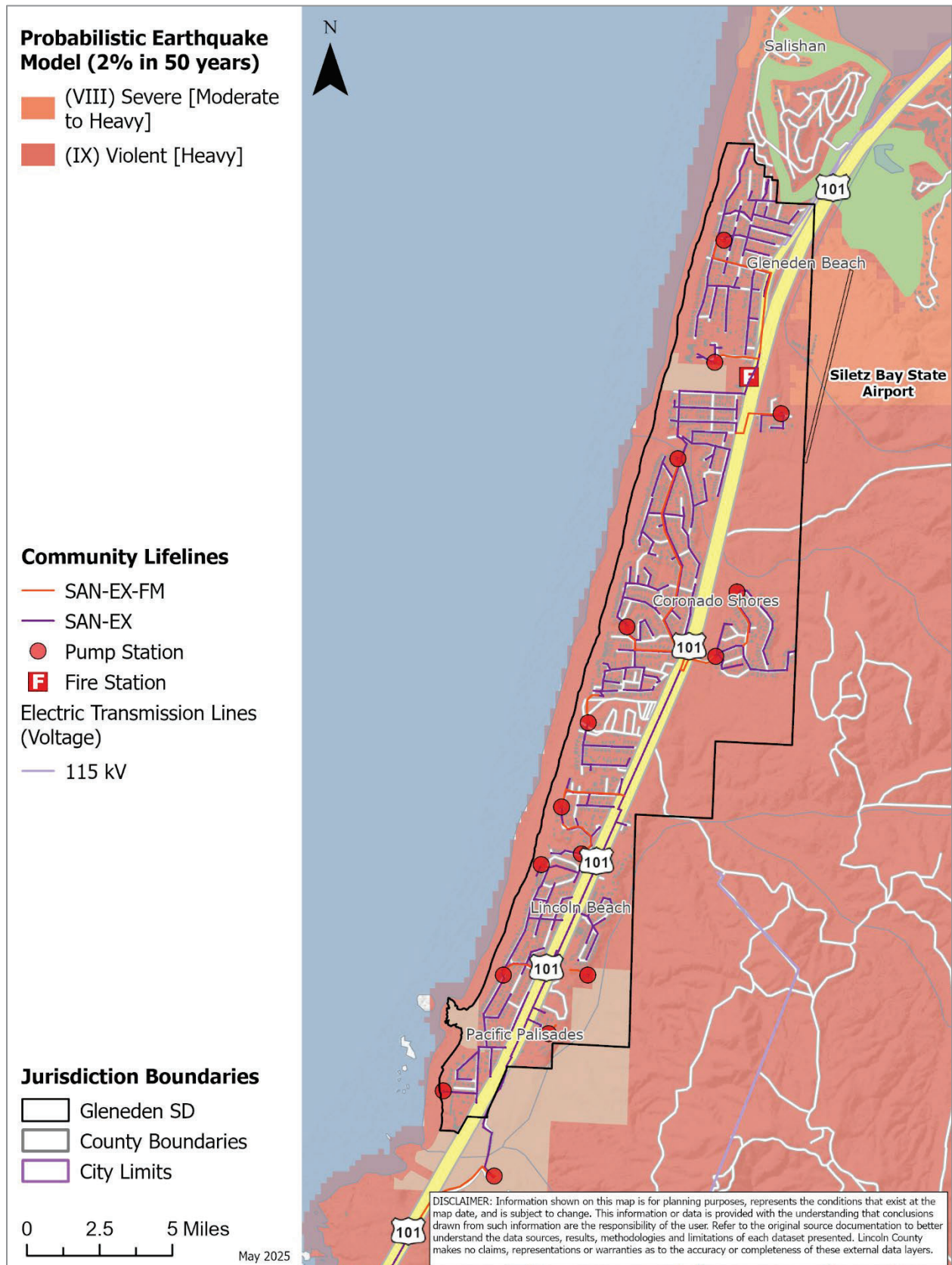
Source: [Oregon Explorer: Map Viewer](#) – To view map detail click hyperlink to left.

Map SD-4 Probability of Damaging Shaking



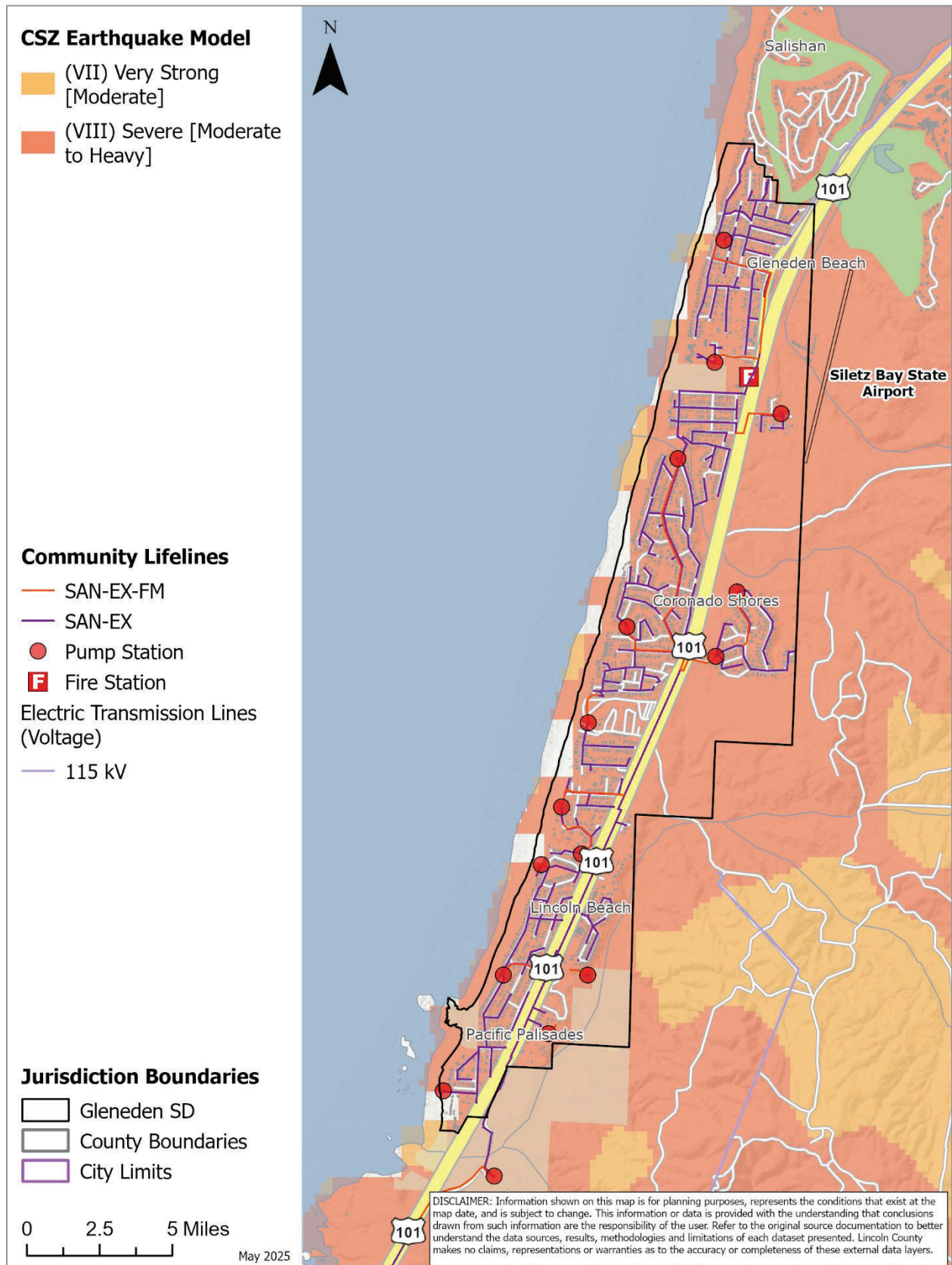
Source: [Oregon Explorer: Map Viewer](#) – To view map detail click hyperlink to left.

Map SD-5 Perceived Shaking and Damage Potential, Probabilistic Earthquake Model



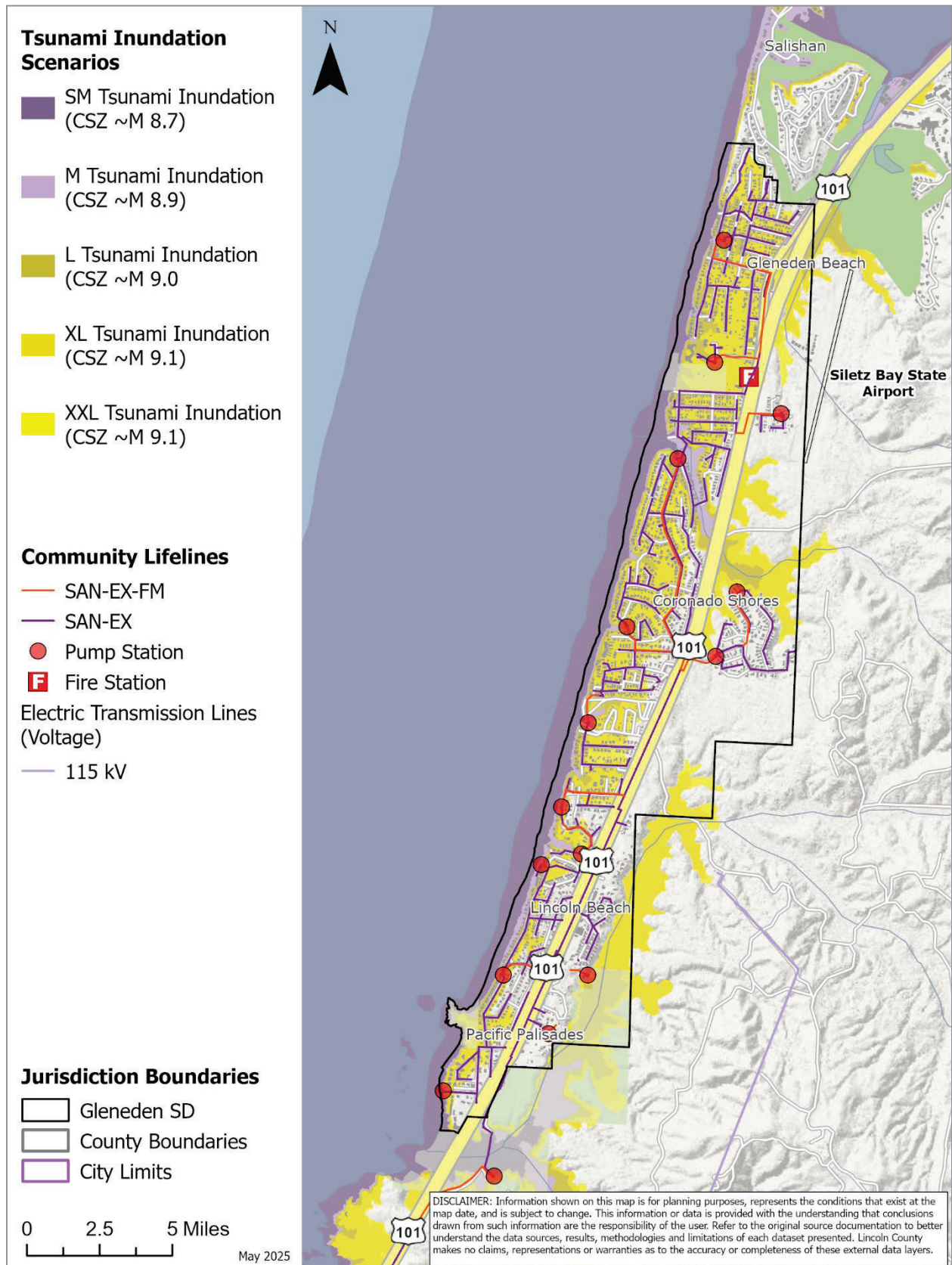
Source: [Oregon Explorer: Map Viewer](#) – To view map detail click hyperlink to left.

Map SD-6 Perceived Shaking and Damage Potential, CSZ Earthquake Model



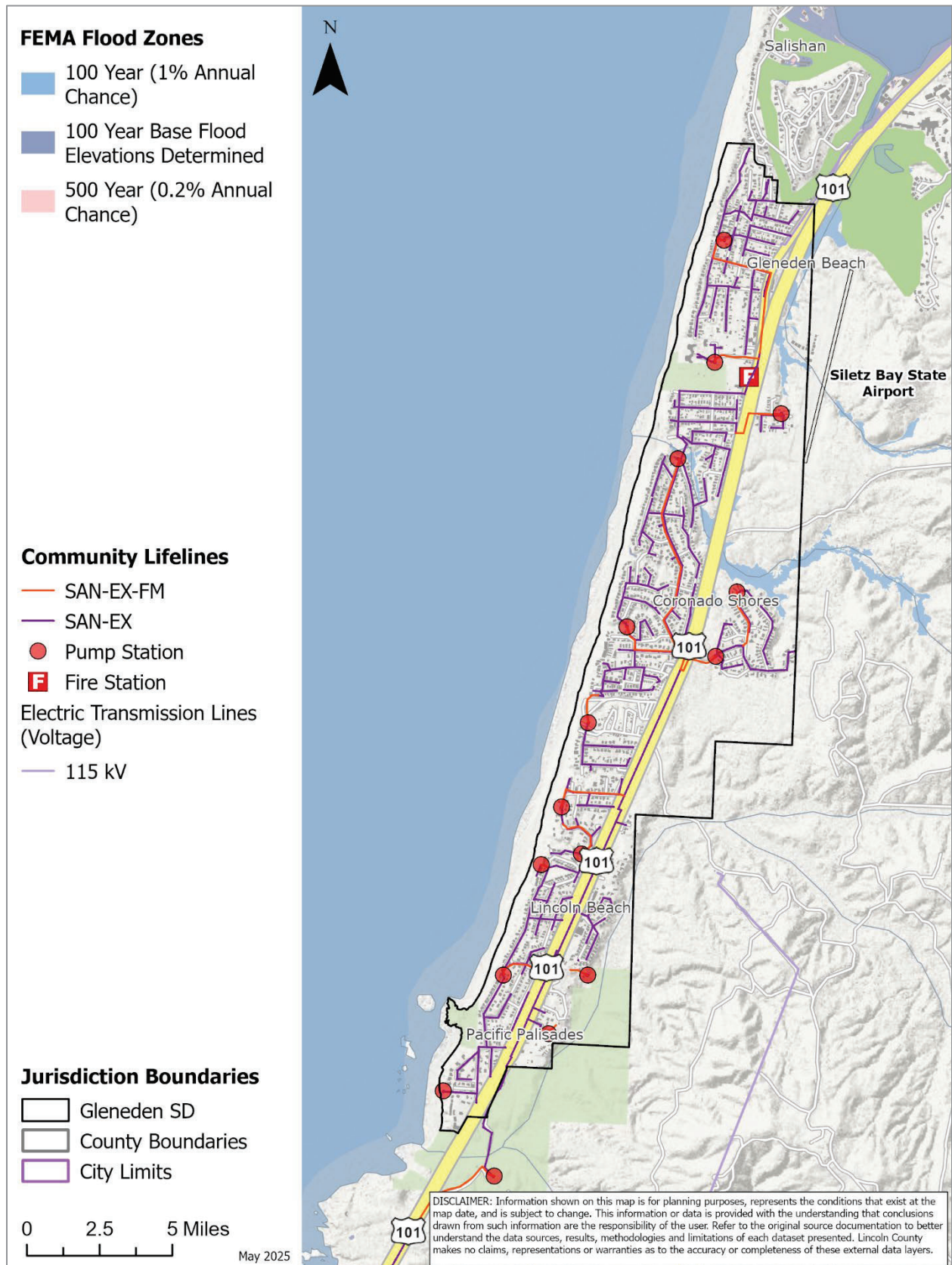
Source: [Oregon Explorer: Map Viewer](#) – To view map detail click hyperlink to left.

Map SD-7 Tsunami Inundation Scenarios



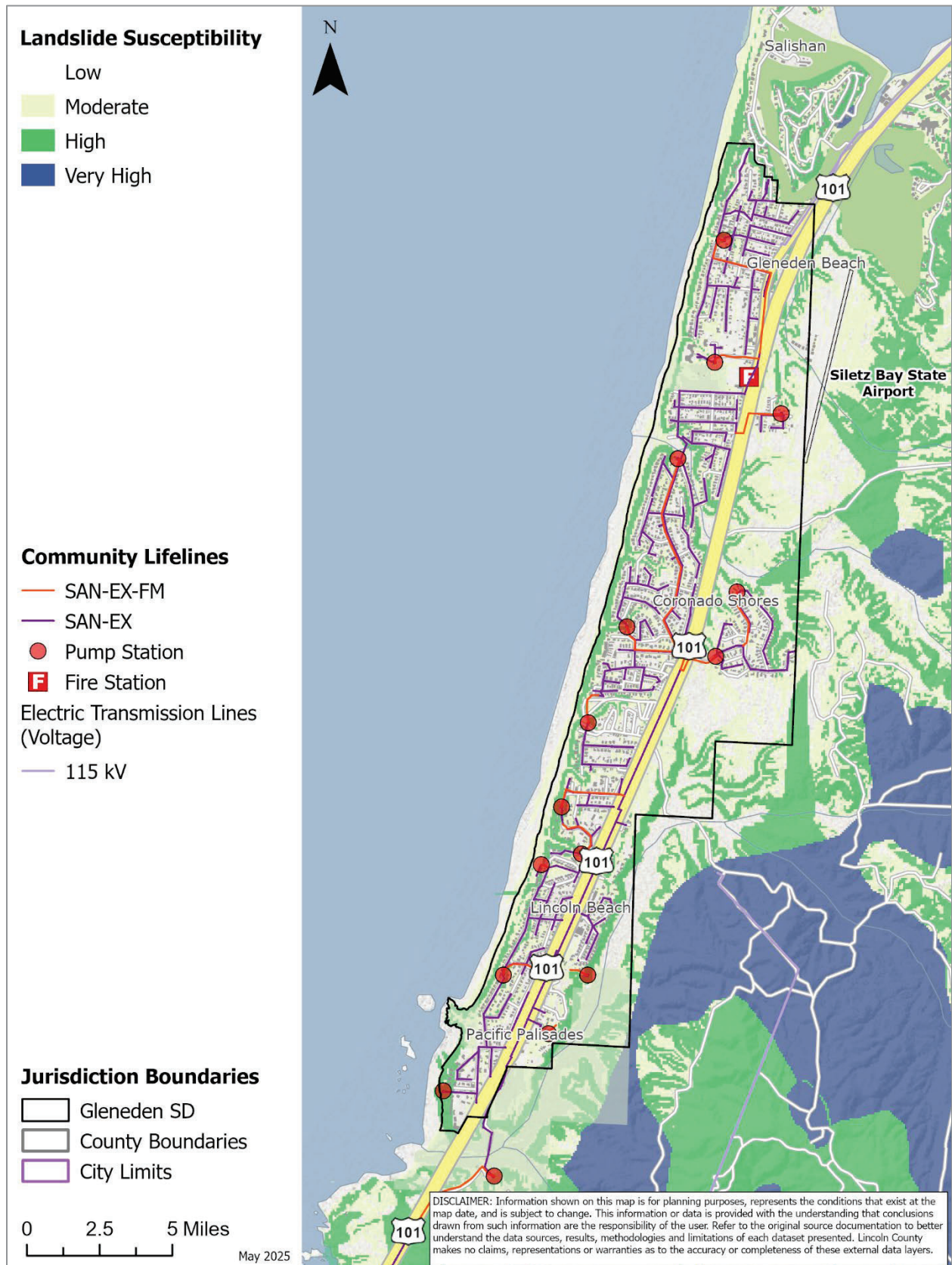
Source: [Oregon Explorer: Map Viewer](#) – To view map detail click hyperlink to left.

Map SD-8 Flood Hazard Zones (100- and 500-year floodplains)



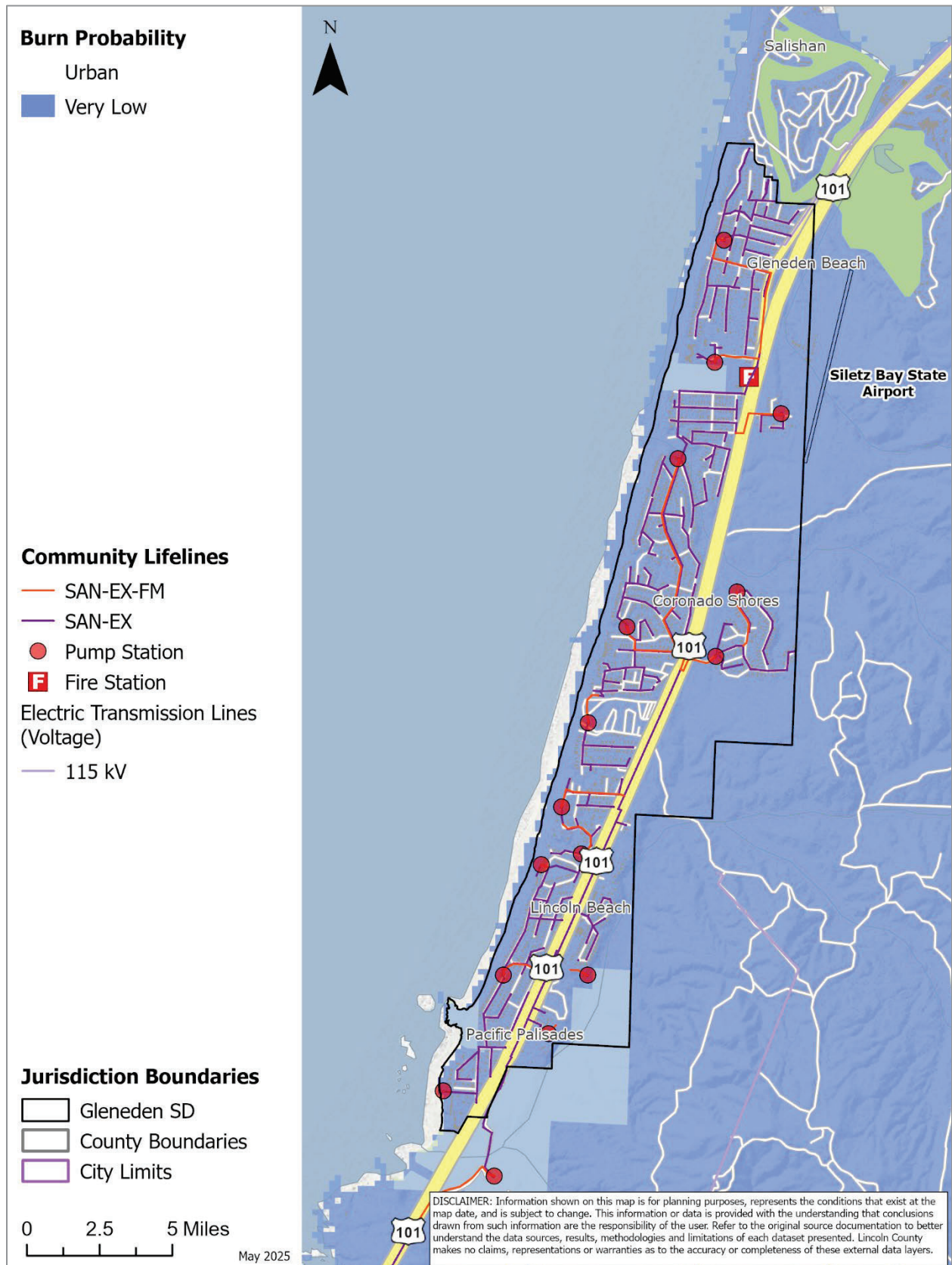
Source: [Oregon Explorer: Map Viewer](#) – To view map detail click hyperlink to left.

Map SD-9 Landslide Susceptibility Exposure



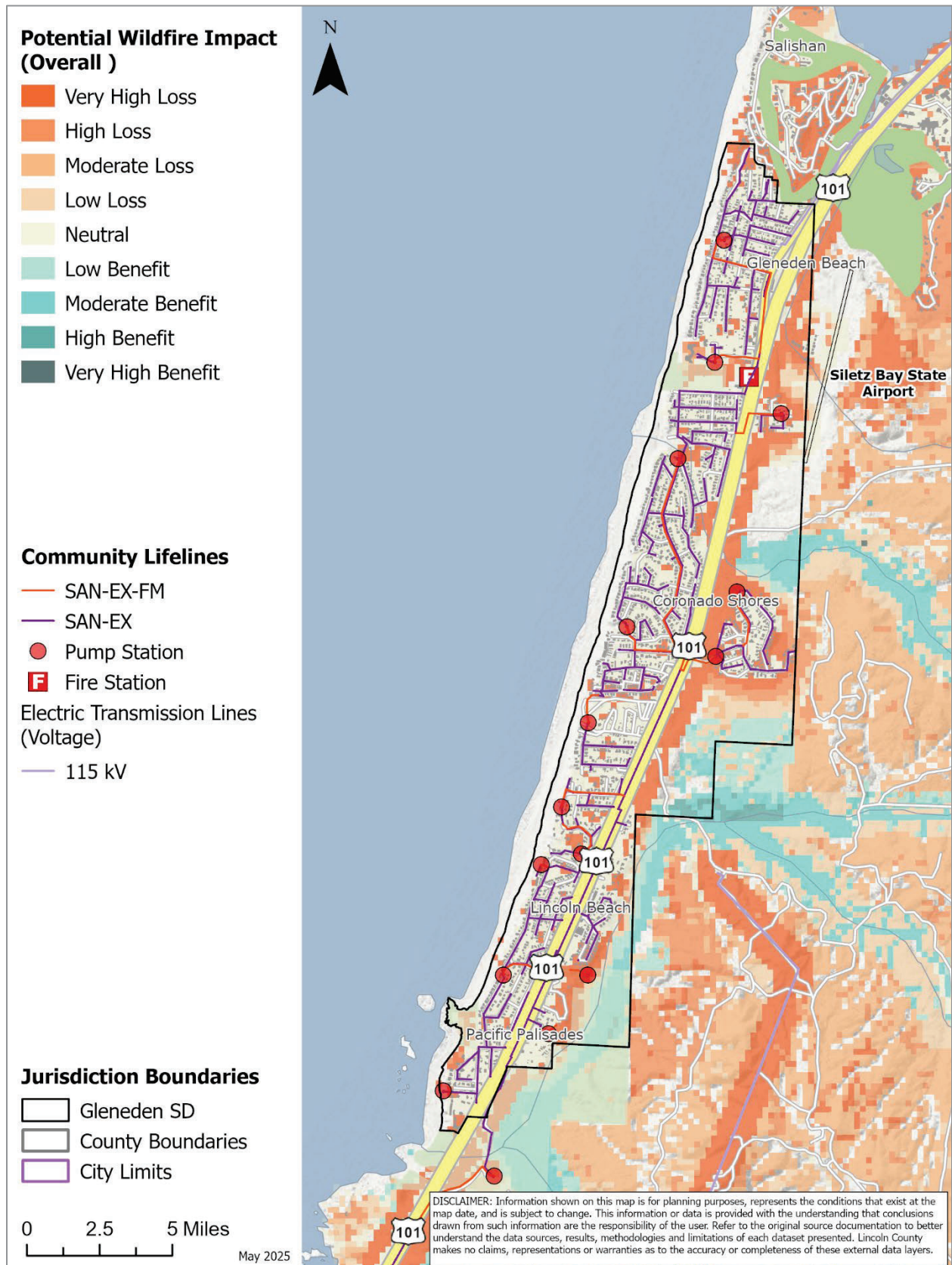
Source: [Oregon Explorer: Map Viewer](#) – To view map detail click hyperlink to left.

Map SD-10 Burn Probability and Fire History (1992-2022)



Source: [Oregon Explorer: Map Viewer](#) – To view map detail click hyperlink to left.

Map SD-11 Potential Wildfire Impact (Overall)



Source: [PNW Quantitative Wildfire Risk Assessment](#) (2023, layer name = icNVC), To view map detail click hyperlink to left..