Lincoln City Addendum

to the Lincoln County Multi-Jurisdictional NHMP

Photos courtesy of Gary Halvorson, Oregon State Archives

Effective: December 17, 2025 through December 16, 2030

Prepared for
City of Lincoln City
801 SW HWY 101
Lincoln City, OR 97367

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

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U.S. Department of Homeland Security
Federal Emergency Management Agency
Region 10

130 228th St SW
Bothell, WA 98021

March 17, 2026

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 applicable[1] 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	City of Siletz
Lincoln County School District	City of Lincoln City	

[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).

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.

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

MB:WS

Attachment**:** Local Mitigation Plan Review Tool

RESOLUTION 2026-03

A Resolution of the City of Lincoln City, Adopting the Lincoln County Multi-Jurisdictional Natural Hazards Mitigation Plan, Including Specifically the City of Lincoln City Addendum to the Plan

Recitals

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

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

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

Whereas, the Oregon Office of Emergency Management and Federal Emergency Management Agency, Region X (10) officials have reviewed the *City of Lincoln City addendum* to the *Lincoln County Multi-Jurisdictional Natural Hazard Mitigation Plan* (NHMP) and pre-approved it contingent upon this official adoption of the participating governments and entities;

Whereas, the NHMP is comprised of three volumes: Volume I: Basic Plan, Volume II: Jurisdictional Addenda, and Volume III: Appendices, collectively referred to herein as the NHMP; and

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

Whereas, City of Lincoln City adopts the NHMP, including specifically the Lincoln City Addendum, and directs the City Manager or his designee to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP

Now, Therefore, be it Resolved by the City Council of the City of Lincoln City, as Follows:

Section 1. Recitals. The above recitals are true and correct and are incorporated herein by this reference.

Section 2. Adoption. The City of Lincoln City hereby adopts the Lincoln County Multi-Jurisdictional Natural Hazards Mitigation Plan, including specifically the Lincoln City Addendum to the Plan, as an official plan. A copy of the City of Lincoln City Addendum is attached hereto as "Exhibit A" and incorporated herein by this reference. A copy of the full Lincoln County, Multi-Jurisdictional Natural Hazard Mitigation Plan shall be maintained in the Office of the City Emergency Manager.

Section 3. Submittal. The City of Lincoln City will submit this Adoption Resolution to the Oregon Office of Emergency Management and Federal Emergency Management Agency, Region X (10) officials to enable final approval of the Lincoln County Multi-Jurisdictional Natural Hazards Mitigation Plan.

SECTION 4. EFFECTIVE DATE. This resolution is effective as of the date of its adoption and signature by the Mayor.

Passed and Approved by the City Council of the City of Lincoln City this 26th day of January 2026.

Susan Kay Wahlke
_____
Susan Wahlke, Mayor

Attest:

Jamie Young
_____
Jamie Young, City Recorder

Approved as to Form:

_____
Emily Farrell, Legal Counsel for COLC

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Introduction

Purpose and Adoption

This is the Lincoln City (LC) addendum to the Lincoln County Multi-Jurisdictional Natural Hazards Mitigation Plan (NHMP). This addendum is not intended to be a standalone document, rather information contained in Volume I (Basic Plan), which serves as the foundation for this jurisdiction's addendum and Volume III (Appendices), which provides additional information. This addendum meets all the requirements of Title 44 §201.6 including:

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

Lincoln City's original addendum to Lincoln County's NHMP was completed and approved by FEMA in 2009.

For planning purposes, this addendum provides additional information specific to the jurisdiction, with a focus on providing greater details on the risk assessment and mitigation strategy. A description of the jurisdiction specific planning and adoption process follows, along with detailed community specific action items. Information about the jurisdiction's risk relative to the county's risk to natural hazards is documented in the addendum's Hazard Analysis and Issue Identification section. The section considers how the city's risk differs from or matches that of the county's; additional information on Risk Assessment is provided within the Lincoln County NHMP's Section 2 – Risk Assessment.

Process, Participation, and Adoption

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

The City of Lincoln City adopted their addendum to the Lincoln County Multi-jurisdictional NHMP on January 26, 2026. FEMA Region X approved the Lincoln County NHMP on December 17, 2025 and the city's addendum on March 17, 2026. With approval of this NHMP the city 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.

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 city will remain eligible for pre-, and post-disaster mitigation 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 City of Lincoln City to update their NHMP. Members of the NHMP steering committee also participated in the County NHMP update process (Attachment B and Volume II, Appendix B).

Convener and Committee
The Lincoln City Emergency Preparedness Coordinator serves as the NHMP addendum convener. The convener of the NHMP will take the lead in implementing, maintaining, and updating the addendum to the Lincoln County NHMP in collaboration with the designated convener of the Lincoln County NHMP.

Representatives from the City of Lincoln City met formally, and informally, to discuss updates to their addendum. The steering committee reviewed and revised the city's addendum, with focus on the plan's risk assessment and mitigation strategy (action items).

This addendum reflects decisions made at the designated meetings, and during subsequent work, and communication with OPDR. Other documented changes include revisions to the city's risk assessment and mitigation strategies (action items).

The Lincoln City Steering Committee was comprised of the following representatives:

- Convener, Cassidy Boyle, Emergency Preparedness Coordinator
- Weston Fritz, Planner & Certified Floodplain Manager

Implementation and Maintenance

The City Council will be responsible for adopting the addendum to the Lincoln County NHMP. This addendum designates a steering committee and a convener to oversee the development and implementation of action items. Because the city is part of the county's multi-jurisdictional NHMP, the city will look for opportunities to partner with the county. The city's steering committee will convene after re-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 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 city will remain active in the county's implementation and maintenance process and utilize the process internally (Volume I, Section 4).

The city will provide continued public participation during the plan maintenance process through periodic presentations to elected officials, public meetings, postings on social media, and/or through interactive content on the jurisdiction's website.

The city 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 city's existing plans and policies. Where possible, the city 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.

Capabilities Assessment

The Capability Assessment identifies and describes the ability of Lincoln City to implement the mitigation strategy and associated action items. This is a key component of the NHMP update. Capabilities can be evaluated through an examination of broad categories, including existing authorities, policies, programs, funding, and resources. Information from the 2020 NHMP was not directly integrated into other planning mechanisms, in part due to the impact of the COVID-19 pandemic. However, the city utilizes the NHMP as a tool when implementing the existing authorities referenced herein.

Existing Authorities

Hazard mitigation can be executed at a local scale through three (3) methods: integrating hazard mitigation actions into other local planning documents (i.e., plan integration), adopting building codes that account for best practices in structural hardening, and codifying land use regulations and zoning designations that prescribe mitigation into development requirements. The extent to which a municipality or multi-jurisdictional effort leverages these approaches is an indicator of that community's capabilities.

Existing Mitigation Activities

Existing mitigation activities include current mitigation programs and activities that are being implemented by the community to reduce the community's overall risk to natural hazards. Documenting these efforts can assist participating jurisdictions better understand risk and can assist in documenting successes. The following efforts have occurred or are on-going within Lincoln City:

- The city maintains an emergency preparedness website that's devoted to earthquakes, tsunamis, storms/flooding, and pandemic flu. FEMA's "Are you Prepared?" document is posted for reference, as well as a link to the Community Emergency Response Team's (CERT) website. The Earthquake and Tsunami hazards have their own web pages for additional information.
    - Tsunami webpage: includes information about tsunamis' causes and characteristics, recommendations for how to prepare and survive a tsunami, and information about how to plan an evacuation route. Additionally, there is tsunami information for kids, post-tsunami information, and a listing of preparedness events in Lincoln City. Tsunami evacuation maps are posted as well.
    - Earthquake webpage: includes information about the latest earthquakes in Washington, Oregon, and Northern California. Additionally, the city provides earthquake preparedness recommendations, as well as some tips about what to do during and after an earthquake. Links to the American Red Cross and US Geological Survey (i.e., for more information about vulnerabilities and preparedness strategies) are posted as well.
- A Community Emergency Response Team (CERT) is active in Lincoln City. The CERT Program educates people about disaster preparedness for hazards that may impact their area, and trains them in basic disaster response skills such as fire safety, light search and rescue, team organization, and disaster medical operations. Lincoln City's CERT group has begun a 'Map Your Neighborhood' effort, which seeks to help neighborhoods prepare for disasters.
- The city enforces a setback requirement for all developments located along the coast. The purpose of the setback is to reduce property damages related to coastal erosion, windstorms, and flooding. The setback requirement also serves to meet the city's natural hazard goal, as defined within the Lincoln City Comprehensive Plan: "The city shall control development in hazardous areas to protect life and property from natural disasters and hazards."
- The city's Comprehensive Plan addresses natural hazards. Specific hazardous areas have been identified by RNKR Associates in their work Environmental Hazards, Coastal Lincoln County Oregon, 1979. The city has defined 'hazardous areas' on the RNKR map and will allow development in these areas if adequate protective measures can be employed to prevent or minimize damage. This portion of the Comprehensive Plan also lists policies related to development in hazardous areas.
- Lincoln City distributes evacuation maps, and pamphlets that address preparedness strategies. A Tsunami Preparedness Coordinator conducted a public awareness survey, as well as an evacuation drill in the Nelscott and Delake areas; she initiated the "Neighbor Helping Neighbor" tsunami buddy system, and created door signs for hotels to show evacuation information (among several other education and outreach projects for the city).
- The city built a new Police Station in 2020 and worked with County School District to move school bus facilities out of the inundation zone.
- The city and county utilize a reverse 911 system for use during natural hazard events.

- State legislation:
    - SB 378 requires schools in potential inundation zones to teach students in K-8 grades about tsunamis and evacuation
    - SB 379, implemented as Oregon Revised Statutes (ORS) 455.446 and 455.447, limits construction of new essential facilities and special occupancy structures in tsunami flooding zones.

Comprehensive Plan

Oregon's Statewide Planning Goal 7 requires comprehensive planning within every jurisdiction that is designed to reduce risks to people and property from natural hazards. The Lincoln City Comprehensive plan provides the policy and regulatory foundation for all land use management in the city. It integrates policies and recommendations to meet the Oregon Statewide Planning Goals, including Statewide Planning Goal 7, Natural Hazards.

The Lincoln City Comprehensive Plan (2023), Chapter 4, Environment, implements Statewide Planning Goal 7. This section includes policies/objectives related to building community resilience. There are overall goals for the city, including building public awareness, agency coordination, and retrofitting existing critical infrastructure, and emergency preparedness goals, including developing a community culture of preparedness, implementing the county's emergency operations plan, and developing area-specific response plans.

Land Use Regulations

Existing land use policies that define zoning and address hazardous conditions provide another source of mitigation capability.

Land Use Codes

Title 17 of the Lincoln City Municipal Code is the city's zoning ordinance. Chapter 17.47 outlines the city's natural hazard zoning rules, as well as zoning for beaches and dunes. This chapter states that the ordinance is intended to protect public safety and welfare through recognition that different geological formations and landforms have different hazard characteristics with respect to suitability for development. The section goes on to define development requirements in identified hazard areas.

Development standards related to flooding is discussed further in chapter 17.44, Marine Waterway (MW) Zones. All mention of flooding is in subsection 17.44.040, Standards for Conditional Uses. This subsection says filling or dredging activities must not result in increased flood hazards, and marine facility development must not result in increased flood hazards.

Regarding the FEMA Pre-Implementation Compliance Measures (PICM) in response to the National Marine Fisheries Service Biologic Opinion (BiOp), Lincoln City decided to adopt FEMA's model ordinance. The purpose of the PICM is to ensure city compliance with the Endangered Species Act (ESA).

Wildfire Safety
Wildfire measures are not mentioned in the city's zoning ordinance.

New state wildfire defensible space code is scheduled to be completed this December with an effective date announced in 2024. Fire hardening requirements were adopted on October 1, 2022, and effective April 1, 2023.

The Community Wildfire Protection Plan (CWPP, 2024) helps the city communicate its priorities for the protection of life, property, and critical infrastructure in the wildland–urban interface on both public and private land. Local fire service organizations help define issues that may place the county, communities, and/or individual homes at risk. The North Lincoln Fire & Rescue District has their own profile in the CWPP, in which issues of concern, collaboration with other fire districts, and areas of response are addressed.

Structural Building Codes
The Oregon Legislature recently adopted updated building codes for both residential (2021 adoption) and commercial structures (2022) since the last update of the NHMP. These building codes are based on the 2021 version of the International Building Code, International Fire Code, and International Existing Building Code.

Lincoln City adopts the State Specialty Code as defined in ORS 455 as the Lincoln City Building Code.

Chapter 15.16 of the Lincoln City Municipal Code details the flood damage prevention standards for the city. Subchapter 15.16.545 says the freeboard requirement for the city is two (2) feet above base flood elevation.

Policies and Programs

City Plans
The Lincoln City Emergency Operations Plan (EOP, 2018) ensures coordination of protection, prevention, mitigation, response, and recovery activities. Authorities are listed by what Emergency Support Function (ESF) they are responsible for.

The Lincoln City Evacuation Plan (2021) has the purpose of providing for the orderly and coordinated evacuation of all or any part of the population of Lincoln City if it is determined that such action is the most effective means available for protecting the population from the effects of an emergency situation.

Additionally, The Lincoln County Evacuation Plan has a priority area plan for Lincoln City. The purpose of the priority area plan is to help the community prepare for disasters and to help facilitate any needed evacuations. This aligns with the city's own evacuation plan. The priority area plan outlines the city's natural disaster risks, the current emergency response system, different evacuation routes, and recommendations for improving the city's disaster response and evacuation process.

The Lincoln City Transportation System Plan: Volumes I & II (TSP, 2015) prepares Lincoln City for accommodating traffic within the urban growth boundary (UGB) until 2035. The TSP

serves as the transportation element of the city's comprehensive plan. Volume I contains the entirety of the plan, while volume II represents the iterative process and refinements that went into developing the TSP. All information in volume I should supersede volume II. Objective 5d of the TSP is to improve and maintain tsunami evacuation and Seismic Lifeline routes. The Seismic Lifeline routes are not named in the TSP. The TSP also recommends adding traffic calming measures to streets. Traffic calming projects must coordinate with emergency services to ensure the project does not impede disaster response. Pg. 36, table 1 contains a list of financially constrained and aspirational projects for the city. Project #D10 is to elevate NE East Devils Lake Road. The project elements say coordination with the county is needed to develop a long-term solution to avoid flooding of the road.

Volume II of the TSP includes memorandums that technical memorandums that inform and support the overall TSP. Related to objective 5d,

The Lincoln City Parks & Recreation Systems Plan (PRSP, 2016) takes flood and tsunami hazards into account when maintenance and development is planned for the city's parks. Wildfire hazards are not mentioned.

National Flood Insurance Program (NFIP)
Lincoln City participates in the National Flood Insurance Program (NFIP). The program is managed by the Planning & Community Development Department. The program makes flood insurance available to all property owners. To maintain eligibility for the NFIP, Lincoln City has adopted and enforces special building and development restrictions for lands that are subject to flooding.

Lincoln City is not a Community Rating System (CRS) community. The CRS system is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the National Flood Insurance Program.

Oregon Department of Transportation (ODOT) Seismic Lifelines
According to the Oregon Department of Transportation, Lincoln City has two highways that are considered seismic lifelines. Highway 101 and highway 18 to the north of the city are tier 1 lifelines. These routes are a part of the state's overall network of streets, highways, and bridges that will facilitate emergency service response and support in the event of a seismic event.

Government Structure

The City Council is the policy making body for Lincoln City. As the elected legislative body in Lincoln City, the City Council has overall responsibility for the scope, direction and financing of city services. Council members serve four-year terms. Additional departments within the city include the following:

City Manager's Office: The city manager is appointed by City Council and serves as the administrative head of the city government. As chief executive officer, the city manager provides the leadership and direction for the operation and management of all city departments.

City Recorder: The city recorder assures the timely presentation of formal communications from the public, other agencies and city staff to the City Council. The recorder prepares City Council meeting agendas in coordination with the city manager; maintains official city records which reflect the actions of the governing body; maintains a depository of contracts, agreements and official Council actions and ensures the timely availability of these records to the Council, public, other agencies and staff.

Planning and Community Development Department: The Planning and Community Development Department provides service and information to the general public regarding all phases of community development. Planning staff implements ordinance and plan requirements through the Site Review Process, Land Use Action Process and Special Projects. Specifically, the Planning and Community Development Department reviews potential development opportunities to ensure compliance with zoning, setback, parking, landscaping, access and other city requirements.

In addition to oversight of the development process, the Planning and Community Development Department advises the City Council and Planning Commission on all land use and special project matters.

Public Works Department: The Lincoln City Public Works Department provides responsive community services related to planning, design, construction, operation, maintenance and management of public infrastructure, including streets, sewer, water treatment, wastewater treatment, public buildings and other facilities. Services provided by the department contribute to the public health, safety, economic diversity, environmental quality and citizen convenience.

Finance Department: The Finance Department serves the community by managing utility billing, business licenses, collecting taxes and fees, dealing with city expenditures, preparing the city's budget and managing investments. The goal of the Finance Department staff is to provide all services with an emphasis on timeliness, accuracy and courteous customer service.

Police Department: The mission of the Lincoln City Police Department is to maintain human rights while enforcing state and local laws, protecting persons, property and providing the highest quality professional service to all.

Parks and Recreation Department: The Parks and recreation Department oversees parks and recreation activities for the city. There are several activities/areas the Parks and Recreation department oversee, such as: the swimming pool, rock climbing wall, youth activities, senior activities, adult fitness, after school program and camps.

Public Library: The Lincoln City Public Library collects, preserves, and administers organized collections of books and related materials. The library can also be used for public meetings and other organized activities for the community.

Urban Renewal Agency: Established in 1988, the Lincoln City Urban Renewal Agency aims to eliminate blight, boost property values, and attract job-creating private investment, enhancing the area's visual appeal and its connection to the Pacific Ocean, while preserving the city's natural and built character.

Mitigation Successes

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

- North Lincoln Fire and Rescue Station 1400 (2015-17, Phase II grant award, $1,048,039)
- The police department and Samaritan North Lincoln Hospital were rebuilt through local funding resources in 2020

Mitigation Strategy

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

Lincoln City adopts the mission and hazard mitigation goals described in Volume I.

The city's action items were first developed through a two-stage process during the 2009 NHMP development and revised in 2015 and 2020. In stage one, OPDR facilitated a work session with the steering committee to discuss the city's risk and to identify potential issues. In the second stage, OPDR, working with the local steering committee, developed potential actions based on the hazards and the issues identified by the steering committee. During the 2025 update process OPDR re-evaluated the Action Items with the county and local steering committees and updated actions, noting what accomplishments had been made and if the actions were still relevant; any new action items were identified at this time (Table LC-1). For additional information see Attachment B.

The steering committee opted to not include mitigation strategies for low vulnerability and low probability hazards including: Distant tsunami, tornado, crustal earthquake, extreme heat event, and volcanic event. The steering committee will study these hazards further during the implementation and maintenance phase of this NHMP, seeking to identify cost effective actions that might be implemented to reduce community vulnerability.

Priority Action Items

Table LC-1 presents a list of mitigation actions. The steering committee decided to modify the prioritization of action items in this update to reflect current conditions (risk assessment), needs, and capacity. High priority actions are shown with orange highlight. The city 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 LC-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	Acquire and develop a permanent safe haven shelter for Cutler City equipped with essential supplies and facilities. This includes leveraging the existing tent cache and integrating additional resources such as sanitation, power, and communication systems to ensure operational readiness				X				X					Local funding resources (e.g., general fund), FEMA HMA, OREM, private and non-profit	Emergency Preparedness Coordinator	S	M
2	Strengthen Lincoln City's water system resilience by securing funding to expand emergency water storage capacity beyond the current one-day supply, including the construction of additional reservoirs and enhancement of existing infrastructure. Conduct a comprehensive assessment of the water system to identify vulnerabilities, particularly related to drought and contamination risks from Schooner Creek, the city's sole water source. Implement system upgrades, including completing the loop system for redundancy, and continue leak detection and repair efforts. Develop and launch a public education campaign to promote water conservation and drought preparedness among residents and businesses, ensuring sustainable water use during peak tourist seasons and climate-related disruptions.			X	X		X	X	X			X	X	Local funding resources (e.g., general fund), IFA	Public Works	L	H
3	Implement a comprehensive seismic retrofit program for Lincoln City's most vulnerable public facilities and infrastructure, including emergency services, City Hall, and lifeline systems such as water, sewer, and power lines—by prioritizing both structural and non-structural upgrades. This initiative will reduce the probability of collapse during a Cascadia Subduction Zone earthquake, ensuring continuity of government operations, minimizing service disruptions, and enhancing the city's capacity for effective emergency response and recovery. The program will be guided by DOGAMI's seismic risk assessments and coordinated with planned facility upgrades while actively seeking state and federal funding to support rehabilitation efforts.				X									Local funding resources (e.g., general fund), HMA, SRGP	Public Works	L	H
4	Collaborate with owners of repetitive flood loss properties and pre-FIRM structures in flood-prone areas to assess and implement cost-effective mitigation strategies—such as elevation, relocation, or						X							Local funding resources (e.g., general fund), HMA, FMA	Planning and Community Development	L	H

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
	acquisition—prioritizing those at high risk of frequent flooding. Emphasize elevating structures to at least one foot above base flood elevation in accordance with flood hazard codes, particularly in vulnerable zones along major rivers and at the mouth of Schooner Creek. Leverage FEMA's buyout programs where appropriate and continue public education efforts to encourage voluntary participation in mitigation initiatives. Evaluate mobile/manufactured home communities for targeted projects, including potential infrastructure improvements like pump stations to reduce flood impacts.																
5	Implement and monitor the mitigation actions identified in Lincoln City's updated Stormwater Master Plan. By doing so, Lincoln City will reduce vulnerability to flood-related hazards, protect vital water resources, and enhance community livability.		X	X										Local funding resources (e.g., general fund), HMA, IFA	Public Works	Ongoing	M to H
6	Complete a comprehensive inventory of all culverts within the city, identify and assess undersized or damaged culverts based on capacity and condition, and prioritize high-risk culverts for replacement in alignment with the Stormwater Master Plan to reduce flood risk and improve stormwater management.						X							Local funding resources (e.g., general fund), HMA, IFA	Public Works	S	M to H
7	Reduce landslide risk to life, property, and infrastructure by acquiring high-resolution LiDAR data, creating updated landslide inventories and susceptibility maps, and integrating them into local planning, zoning, and development regulations. Use the 2019 Landslide Hazards Land Use Guide to inform policy language and development review procedures.							X						Local funding resources (e.g., general fund), HMA, DLCD Technical Assistance	Planning and Community Development	S	L
8	Develop and implement a comprehensive disaster preparedness plan that includes the strategic siting of emergency supply caches—such as food, water, and first-aid kits—at a minimum of seven locations identified through hazard vulnerability analysis and community input to support residents and visitors. Progress will be measured by the completion of the disaster plan and installation of caches.				X				X					Local funding resources (e.g., general fund), FEMA HMA, OREM, private and non-profit	Emergency Preparedness Coordinator	S	H
9	Incorporate the priority mitigation actions and risk assessments from the most recent FEMA-approved Natural Hazard Mitigation Plan (NHMP) into the local comprehensive plan's land use, housing, and	X	X	X	X	X	X	X	X	X	X	X	X	Local funding resources (e.g., general fund),	Planning and Community Development	M	L

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
	public facilities elements, ensuring consistency with Oregon's Statewide Planning Goal 7. This includes mapping hazard-prone areas (e.g., floodplains, wildfire risk zones, landslide-prone slopes) using data, and adopting policies that restrict or guide development in these areas.													HMA, DLCD Technical Assistance			

Source: City of Lincoln City NHMP 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
* - the windstorm hazard includes tornadoes (water spouts)

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 III, Appendix C.

Hazard Analysis

The NHMP steering committee updated the city's previous hazard analysis to reflect current conditions. Where appropriate, changes were made to distinguish the city's risks from those in the County's hazard analysis, as detailed throughout this addendum.

Table LC-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.

Windstorm, winter storm (snow/ice), Cascadia Subduction Zone earthquake, local tsunami, and landslide are the **high hazard threats** to the city. Riverine flood, coastal flood, wildfire, drought, air quality/smoke, and coastal erosion are the **moderate hazard threats**. Distant tsunami, tornado, crustal earthquake, extreme heat event, and volcanic event are the **low hazard threats**.

Table LC-2 Hazard Analysis Matrix

Hazard	History	Vulnerability	Maximum Threat	Probability	Total Threat Score	Hazard Rank	Hazard Tiers
Windstorm	20	50	100	70	240	#1	
Winter Storm	18	35	90	70	213	#2	*Top Tier*
Earthquake (Cascadia)	2	50	100	49	201	#3	
Local Tsunami	2	50	100	49	201	#4	
Landslide	16	30	80	63	189	#5	
Flood (Riverine)	18	30	60	63	171	#6	
Flood (Coastal)	18	30	60	63	171	#7	
Wildfire	10	30	80	49	169	#8	*Middle Tier*
Drought	20	40	50	49	159	#9	
Air Quality/Smoke	10	10	70	56	146	#10	
Coastal Erosion	14	20	50	56	140	#11	
Distant Tsunami	10	15	60	35	120	#12	
Tornado	8	10	30	56	104	#13	*Bottom Tier*
Earthquake (Crustal)	10	20	40	21	91	#14	
Extreme Heat Event	4	10	30	21	65	#15	
Volcano	2	5	40	7	54	#16	

Source: City of Lincoln City NHMP Steering Committee (2025)

Community Characteristics

Table LC-3 and the following section provide information on city specific demographics and assets. For additional information on the characteristics of the city, in terms of geography, environment, population, demographics, employment, and economics, as well as housing and transportation, see Volume II, Appendix C. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city-specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Unless otherwise specified, data in this section comes from: Social Explorer: American Community Survey 5-Year Estimates (2018-2022). U.S. Census Bureau. https://www.socialexplorer.com/explore-tables.

Location and environment

Lincoln City resides in the northwestern border of Lincoln County. Lincoln City lies at an elevation of 11 feet above sea level. Devils Lake (680-acres) borders the northeast portion of the city. The Siletz Bay and Siletz River are south of the city, and the Salmon River is to the north. Lincoln City is home to one of the world's shortest rivers, the D River, which connects Devils Lake to the Pacific Ocean.

The climate in Lincoln City is moderate. Average monthly temperatures range from lows of 36-39° F (December through March) to highs of 70-72° F (July through September) degrees. The driest months are July and August (average about 1.4-1.5 inches of precipitation per month) the

wettest months are November through January (average 10-15 inches of precipitation per month). Lincoln City has an average annual precipitation of approximately 95.4 inches (69%, 65.5 inches fall November through March).

Population, housing, and development

Between 2019 and 2023 the city grew by 1,577 people (18%). According to the State's official coordinated population forecast, between 2023 and 2045 the city's population is forecast to grow by 19% to 12,382. The city has an educated population with 92% of residents 25 years and older holding a high school degree, 28% have a bachelor's degree or higher. As of 2023-24, Taft High School and the Lincoln County School District have 86% and 82% graduation rates, respectively.[1]

Development in Lincoln City spreads mostly north to south along US-Highway 101. Dense commercial areas in Lincoln City exist along US-Highway 101. Residential development is located west of downtown and US-highway 101 along the Pacific Ocean as well as east near Devils Lake. The city's Comprehensive Plan identifies land use needs within the city and the Urban Growth Boundary.

Economy

Just over 52% of the resident population 16 and over is in the labor force (4,364 people) and 4% are unemployed. Top occupations include service (33%), management, professional, and related (29%), sales and office (23%), construction, extraction, and maintenance (8%), and production, transportation, and material moving (6%) occupations.

Lincoln City is the second largest incorporated community in Lincoln County (incorporated in March 1965). Most workers residing in the city (63%, 2,877 people) travel outside of the city for work primarily to Newport.[2] A significant population of people travel to the city for work, (64% of the workforce, 3,090 people) primarily from Rose Lodge, Lincoln Beach, and Newport. The median household income in the city is $54,210, a 20% increase since 2017.

[1] Lincoln Chronicle, Graduation rate for Lincoln County's class of 2024 improves to 82%, reaching state's average, January 30, 2025.

[2] U.S. Census Bureau. LEHD Origin-Destination Employment Statistics (2022). Longitudinal-Employer Household Dynamics Program, accessed on February 18, 2025 at https://onthemap.ces.census.gov.

Table LC-3 Community Characteristics

Population Characteristics		Population Growth
2019 Population Estimate	8,795	
2023 Population Estimate	10,372	18%
2045 Population Forecast*	12,382	19%
Race		
American Indian and Alaska Native		1%
Asian		4%
Black/ African American		0%
Native Hawaiian and Other Pacific Islander		0%
White		79%
Some Other Race		0%
Two or More Races		6%
Hispanic or Latino/a (of any race)		10%
Limited or No English Spoken	496	5%
Vulnerable Age Groups		
Less than 5 Years	405	4%
Less than 15 Years	1,399	14%
65 Years and Older	2,847	29%
85 Years and Older	102	1%
Age Dependency Ratio		0.77
Disability Status (Percent age cohort)		
Total Disabled Population	2,199	23%
Children (Under 18)	37	< 1%
Working Age (18 to 64)	1,153	12%
Seniors (65 and older)	1,009	10%

Household Characteristics		
Housing Units		
Single-Family (includes duplexes)	5,211	74%
Multi-Family	1,278	18%
Mobile Homes (includes RV, Van, etc.)	538	8%
Household Type		
Family Household	771	18%
Married couple (w/ children)	410	10%
Single (w/ children)	361	8%
Living Alone 65+	845	20%
Year Structure Built		
Pre-1970	2,299	33%
1970-1989	1,880	27%
1990-2009	2,364	34%
2010 or later	484	7%
Housing Tenure and Vacancy		
Owner-occupied	2,570	37%
Renter-occupied	1,721	24%
Seasonal	2,342	33%
Vacant	2,736	39%
Vehicles Available (Occupied Units)		
No Vehicle (owner occupied)	222	5%
Two+ vehicles (owner occupied)	2,116	49%
No Vehicle (renter occupied)	157	9%
Two+ vehicles (renter occupied)	600	35%

Income Characteristics		
Households by Income Category		
Less than $15,000	451	12%
$15,000-$29,999	682	18%
$30,000-$44,999	728	19%
$45,000-$59,999	442	12%
$60,000-$74,999	455	12%
$75,000-$99,999	469	12%
$100,000-$199,999	494	13%
$200,000 or more	63	2%
Median Household Income		$54,210
Gini Index of Income Inequality		0.53
Poverty Rates (Percent age cohort)		
Total Population	1,150	12%
Children (Under 18)	262	17%
Working Age (18 to 64)	635	12%
Seniors (65 and older)	253	9%
Housing Cost Burden (Cost > 30% of household income)		
Owners with a Mortgage		18%
Owners without a Mortgage		7%
Renters		28%

Employment Characteristics		
Labor Force (Population 16+)		
In labor Force (% Total Population)	4,364	52%
Unemployed (% Labor Force)	172	4%
Occupation (Top 5) (Employed 16+)		
Service	1,398	33%
Management, Professional, and Relate	1,221	29%
Sales and Office	969	23%
Constr., Extraction, and Maintenance	339	8%
Product., Transport, and Material Movi	261	6%
Health Insurance		
No Health Insurance	1,093	11%
Public Health Insurance	5,206	54%
Private Health Insurance	5,224	54%
Transportation to Work (Workers 16+)		
Drove Alone	2,857	69%
Carpooled	420	10%
Public Transit	2	< 1%
Motorcycle	0	0%
Bicycle/Walk	197	5%
Worked at Home	552	13%

Source: Social Explorer: American Community Survey 5-Year Estimates (2018-2022). U.S. Census Bureau. https://www.socialexplorer.com/explore-tables; Population Research Center. (2023, April). *Annual Population Estimates.* Portland State University. https://www.pdx.edu/population-research/.
*Source for 2045 Population Estimate: Population Research Center. (2025, March 15). *Region 3: Central Coast Oregon Results (Proposed) – Lincoln County.* Portland State University Oregon Population Forecast Program. https://www.pdx.edu/population-research/population-forecasts.

Note: The U.S. Census Bureau American Community Survey 2018-2022 data used for this analysis has varying levels of reliability depending on geographic area, demographic group, and types of data. These figures are primarily used for estimation and to develop a general understanding of the demographics of a location and should not be mistaken for precise figures.

Community Assets

This section outlines the resources, facilities, and infrastructure that, if damaged, could significantly impact the public safety, economic conditions, and environmental integrity of the city (site map). Mitigating risk to these facilities will increase the community's resilience.

Critical Facilities & Infrastructure

Critical facilities are those that support government and first responders' ability to act in an emergency. They are a top priority in any comprehensive hazard mitigation plan. Individual communities should inventory their critical facilities to include locally designated shelters and other essential assets, such as fire stations, and water and wastewater treatment facilities.

Lincoln City has the following critical facilities (**bold** indicates facility was included in the Risk Report):

- Fire stations:
  - **North Lincoln Fire Station 1400 (Bob Everest):** 2525 NW Hwy 101
  - **North Lincoln Fire Station 1500 (Delake):** 1500 SE 9th Street
  - **North Lincoln Fire Station 1600 (St Clair):** 4520 SE Hwy 101
- Hospitals and clinics
  - **Samaritan North Lincoln Hospital:** 3043 NE 28th St
  - **Samaritan Coastal Clinic:** 825 NW US 101
  - **Samaritan Women's Health Center:** 3100 NE 28th St
- Schools
  - **Oceanlake Elementary School:** 2420 NE 22nd Street
  - **Taft Elementary School:** 4040 High School Drive
  - **Taft 7-12 School:** 3780 SE Spyglass Ridge Road
  - Oregon Coast Community College: 3788 SE High School Dr
- **City Hall:** 801 SW Hwy 101
- **Police Department:** 1503 SE East Devils Lake Rd
- Water treatment plant: 317 S Anderson Creek Rd
  - See Utility Lifelines for additional system details
- Wastewater plant (and 28 lift stations): 5000 SE Port Ave
  - See Utility Lifelines for additional system details
- Post Office:1501 SE East Devils Lake Road & 4994 Hwy 101
- DMV:4422 NE Devils Lake Blvd.
- Lincoln City Cultural Center: 540 NE Hwy 101
- Lincoln City Community Center: 2150 NE Oar Place
- Driftwood Public Library: 801 SE Hwy 101 #201
- Radio Tower: 17th and Oar Street
- Cellco Partnership (1 mile east of Lincoln City & SW 1/4, NW 1/4, Sec. 28, T6s, R1 Rose Lodge)
- New Cingular Wireless Pcs, LLC: 9883 Highland View Lane (45871)

- Chevron: 4648 Hwy 101 & 2320 NE Hwy 101
- Circle K: 1410 SE Hwy 101 & 4031 NW Hwy 101
- US Market & Space Age Fuel: 565 SE Hwy 101
- Carson Oil Co: 1603 SE East Devils Lake Road
- Safeway: 4101 NW Logan Road
- Walgreens: 4048 NE Hwy 101
- McKay's Market: 801 SW Hwy 101
- Bi-Mart: 1030 SE Oar Avenue
- Grocery Outlet: 2429 NW Highway 101
- 1st Choice Fresh Market: 4157 NW Highway 101
- Kenny's IGA Food Market: 4845 SE Highway 101

Transportation

Mobility plays an important role in Lincoln City, and the daily experience of its residents, and businesses. Motor vehicles represent the dominant mode of travel through, and within the city. Lincoln City is also served by Lincoln County Transit Routes 4, 60x, 492, and 495 with service running seven days a week with stops in Lincoln City. Caravan Airport Transportation also provides service from the City to Portland International Airport.

Roads/Seismic lifelines

Seismic lifeline routes help maintain transportation facilities for public safety and resilience in the case of natural disasters. Following a major earthquake, it is important for response and recovery agencies to know which roadways are most prepared for a major seismic event. The Oregon Department of Transportation has identified lifeline routes to provide a secure lifeline network of streets, highways, and bridges to facilitate emergency services response after a disaster.[3]

Highway 101 (Tier I) is the major north-south transportation route through the city (ODOT Map). Highway 18 (Tier I, north of Lincoln City), and Highway 20 (Tier III, Newport) are the major east-west transportation routes connecting the coast to the Willamette Valley.

System connectivity and key geographical features were used to identify a three-tiered seismic lifeline system. Routes identified as Tier 1 are considered the most significant and necessary to ensure a functioning statewide transportation network. The Tier 2 system provides additional connectivity to the Tier 1 system, it allows for direct access to more locations and increased traffic volume capacity. The Tier 3 lifeline routes provide additional connectivity to the systems provided by Tiers 1 and 2.

Bridges

Because of earthquake risk, the seismic vulnerability of the city's bridges is an important issue. Non-functional bridges can disrupt emergency operations, sever lifelines, and disrupt local and

[3] Oregon Department of Transportation. Oregon Seismic Lifeline Evaluation, Vulnerability Synthesis, and Identification, *Oregon Seismic Lifeline Routes,* May 15 2012.

freight traffic. These disruptions may exacerbate local economic losses if industries are unable to transport goods. Bridges within the city that are critical or essential include (Map LC-1):

- Devils Lake Creek, W Devils Lake Rd (1968), (Bridge ID 41C07) – Structurally Deficient
- Devils Lake Outlet, US 101 (D River, 1949), (Bridge ID 00822A) – Structurally Deficient
- E. Devils Lake Rd, Creek (1968), (Bridge ID 12003) – Structurally Deficient
- Rock Creek, E Devils Lake Rd (1954), (Bridge ID 12004)
- Schooner Creek, US 101 (1945), (Bridge ID 00924A)

Map LC-1 Oregon Bridges and Structurally Deficient Bridges

Source: Oregon Department of Transportation, ODOT TransGIS, accessed June 11, 2025
More information on Seismic Design of bridges is on the ODOT website:
https://www.oregon.gov/odot/Bridge/Pages/Seismic.aspx

Railroads
There are no railroads in Lincoln City.

Airports
There are no public airports in Lincoln City. The Siletz Bay State Airport is the nearest airport (a few miles south of the city). The city has no commercial service airports. The nearest commercial airports are in Eugene and Portland.

Utility Lifelines
Utility lifelines are the resources that the public relies on daily such as, electricity, fuel and communication lines. If these lines fail or are disrupted, the essential functions of the community can become severely impaired. Utility lifelines are closely related to physical infrastructures, like dams and power plants, as they transmit the power generated from these facilities.

Generally, the network of electricity transmission lines running throughout the city is operated by Pacific Power. The Williams Gas Pipeline provides natural gas that is delivered to customers in the city by Northwest Natural Gas. These lines may be vulnerable as infrequent natural hazards, like earthquakes, could disrupt service to natural gas consumers across the region.

The city water, wastewater, and storm water (culvert) systems include the following:

Water Infrastructure

- Water Treatment Plant: 317 S. Anderson Creek Rd
- Reservoirs (3): SE 19th St, NE 20th St and Surf St, and Roads End
- Pump stations (6):
    - 4354 SE Jetty Ave
    - 2097 NE West Devils Lake Rd.
    - 2130 NE 36th Dr.
    - 5390 NE Port Ln
    - 1501 SE Oar Ave
    - 2440 SW Coast Ave

Wastewater Infrastructure

- Wastewater Treatment Plant: 5000 SE Port Ave
    - 28 lift stations to transport sewage

Cultural and Historic Resources

The first recorded tourists to the area came in August of 1837, establishing the beginning of the tourist industry that still exists today. In March 1965 the towns of Cutler City, Taft, Nelscott, Delake, Wecoma, and Oceanlake joined together to become Lincoln City, which helped attract

tourists and increase business. Annual events like Taft's Redhead Roundup and Oceanlake's Regatta draw visitors from all over the state.[4]

Historic and cultural resources such as historic structures and landmarks can help to define a community and may also be sources of tourism dollars. Because of their role in defining and supporting the community, protecting these resources from the impact of disasters is important. The National Register of Historic Places and the State Historic Preservation Office lists historic sites and properties within the city:[5]

- The Dorchester House, 2701 NW Highway 101 (1929) – Listed on the National Register of Historic Places
- Lincoln Statue, Kirtsis Park (c. 1965)
- Neel's Autel, 2626 Highway 101, (1948)
- Nelscott Strip Commercial Historic District, Highway 101 (1929)
- Surftides Recreation Building, 2945 NW Jetty Avenue (1953)
- Jason Lee Campsite, Logan Road (1837)
- House, 340 S Drift Creek Road (c. 1928)
- House, 1327 NW 13th Street (c. 1932)
- House, 732 SW 28th Street (c. 1944)
- House, 1903 NW 37th Street (c. 1948)
- House, 2732 SW Coast (c. 1940)
- House, 6432 SW Inlet (c. 1930)
- House, 244 SE Port Avenue (c. 1944)

Lincoln City has many festivals throughout the year, including the Summer Kite Festival, Fall Kite Festival, Lincoln City Pride Festival, Festival of Illusions, and the Sandcastle Contest. Other local attractions include clamming, crabbing, whale-watching, coastal hiking trails, beachcombing, kite flying, and exploring tide pools. Recreational amenities include Devils Lake, factory stores, Chinook Winds Casino, The Connie Hansen Garden, Salmon River Estuary, Siletz Bay (Natural Scenic Wildlife Reserve), Chinook Winds Golf Course, city parks, beach access points, North Lincoln County Museum, Lincoln City Glass Center, Mor Art, and the Alder House glassblower.

Community Organizations and Programs

Social systems can be defined as community organizations and programs that provide social and community-based services, such as health care or housing assistance, to the public. In planning for natural hazard mitigation, it is important to know what social systems exist within the community because of their existing connections to the public. Often, actions identified by the plan involve communicating with the public or specific subgroups within the population (e.g. elderly, children, low income). The county and cities can use existing social systems as resources for implementing such communication-related activities because these service providers already

[4] Lincoln City, on the Central Oregon Coast. "Things to Do – Heritage & History." http://www.oregoncoast.org/pages/things-pages/heritage.php

[5] Oregon Historic Sites Database, http://heritagedata.prd.state.or.us/historic/, accessed February 18, 2025

work directly with the public on several issues, one of which could be natural hazard preparedness and mitigation. The countywide community organizations that are active within the city and county and may be potential partners for implementing mitigation actions can be found in Appendix C: Community Profile.

Lincoln County School District

The Lincoln County School District has three schools in Lincoln City including Oceanlake Elementary, Taft Elementary, and Taft 7-12. For more information on School District assets see their addendum in Volume II.

Hazard Profiles

The following sections briefly describe relevant information for each profiled hazard. More information on Lincoln County hazards and future projections can be found in Volume I, Section 2. Note that these hazards are sorted **alphabetically** and not by hazard tier as determined in the city's Hazard Analysis Matrix (Table LC-2)

In addition, the city incorporates by reference the Oregon Department of Geology and Mineral Industries (DOGAMI) multi-hazard risk assessment (Risk Report, DOGAMI, O-20-11) for Lincoln County that includes economic and population loss estimates for coastal erosion, Cascadia Subduction Zone earthquake and tsunami, flood, landslide, and wildfire (summarized herein).

Development forecasts are not expected to increase or decrease the impact of the profiled hazards. However, the population of adults aged 65 and older is increasing within this jurisdiction. As a result, the impact of the air quality and extreme heat hazards may increase.

Air Quality

The Steering Committee rated the city's **probability of occurrence for air quality/smoke events as "high" and their vulnerability as "low"**. *This hazard was not assessed in the previous version of this NHMP.*

Volume I, Section 2 describes the characteristics of air quality hazards, history, and how they relate to future climate projections as well as the location, extent, and probability of a potential event. Increases in wildfire conditions have shown an increasing potential for air quality hazards.

Additional information can be found on the Lincoln County website: https://www.co.lincoln.or.us/742/Hazards-Air-Quality.

Vulnerability Assessment

Lincoln County has limited capacity to monitor air quality. No development or population changes affected the jurisdiction's overall vulnerability to this hazard. The population of adults aged 65 and older is increasing within this jurisdiction. As a result, the impact of this hazard may increase.

Lincoln County has limited capacity to monitor air quality. Development forecasts are not expected to increase or decrease the impact of this hazard. However, the population of adults aged 65 and older is increasing within this jurisdiction. As a result, the impact of this hazard may increase.

Future Climate Projection:

According to OCCRI report "*Future Climate Projections: Lincoln County*" (Link) the risk of wildfire smoke exposure is projected to increase in Lincoln County. However, the frequency of "smoke

wave" days is projected to decrease by 7% while the intensity of "smoke waves" is projected to increase by 89% by 2046–2051 under a medium emissions scenario compared with 2004–2009.

Coastal Erosion

The Steering Committee rated the city's **probability of occurrence for coastal erosion events as "high" and their vulnerability as "moderate"**. *These ratings have not changed since the previous NHMP.*

Volume I, Section 2 describes the characteristics of coastal erosion hazards, as well as the history, location, extent, and probability of a potential event. Coastal erosion is a natural process that continually affects coastal areas; in Lincoln City and elsewhere along the Pacific, coastal erosion becomes a hazard when lives and properties are at risk of death, injury, or damage. Coastal erosion is typically a gradual process, which can be greatly accelerated in the event of a storm or climate factors that increase the potential for coastal erosion.

Future Climate Projection:

According to OCCRI report "*Future Climate Projections: Lincoln County"* (Link) the risk of coastal erosion is expected to increase due to sea level rise and changing wave dynamics.

Vulnerability Assessment

No development or population changes affected the jurisdiction's overall vulnerability to this hazard. In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

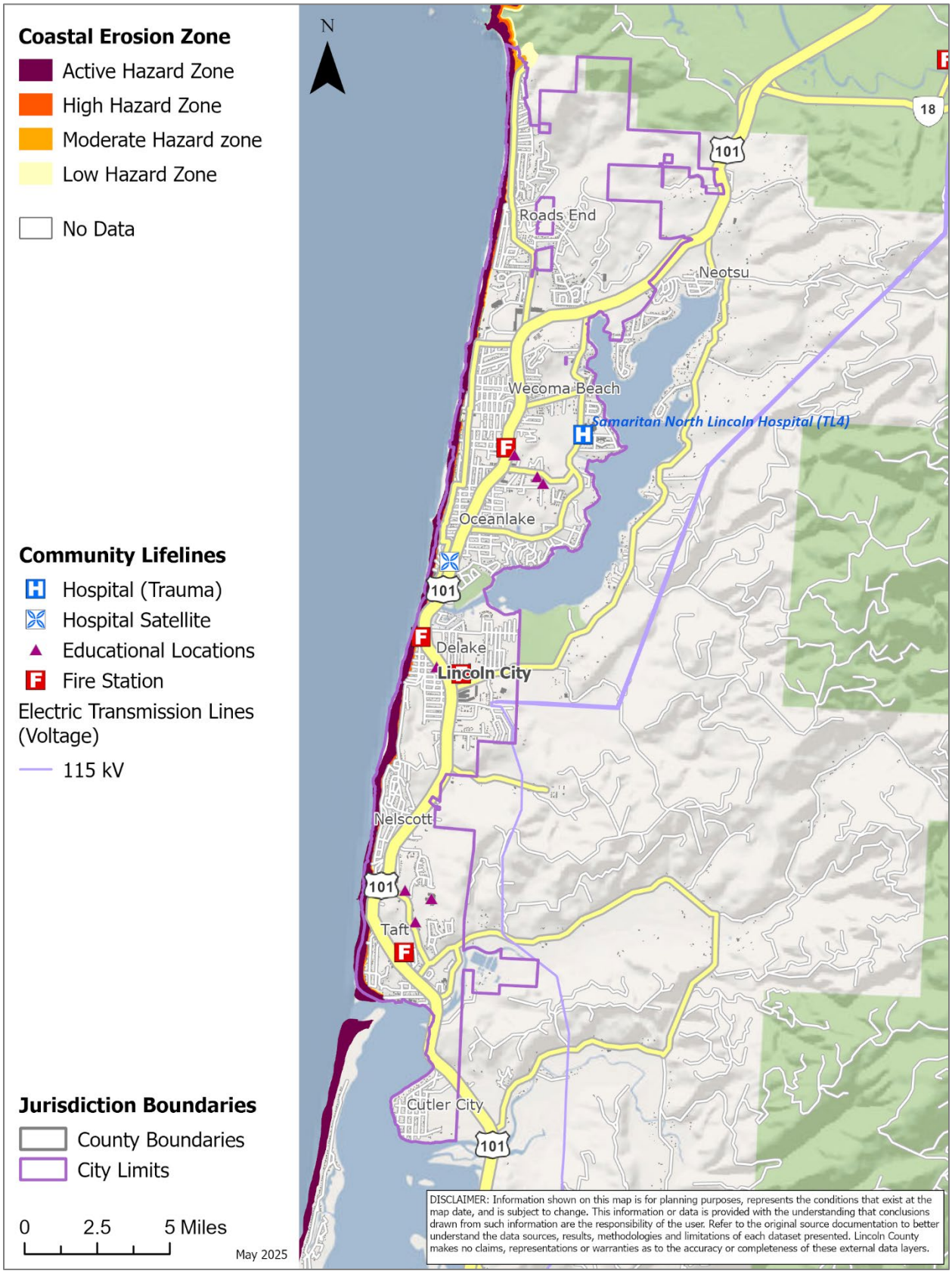
Private sea walls in Lincoln City require constant maintenance, and some property damage has occurred in areas within the city. Records of damages are not available at this time; however, events may have occurred in tandem with previous storms. Properties along Anchor Court, for example, have experienced partial and/or total damages due to storm-induced erosion. Over the last 15 years two houses have been removed and approximately six additional houses are affected in this area; as such, future damages here are likely. The county identified areas along Highway 101 that have sustained erosion-induced damages. Within Lincoln City, however, the Highway is safe.

To mitigate the effects of coastal erosion, the city requires new development to comply with setback restrictions. Permits, additionally, are required for the development of sea walls. Lincoln City believes that, due to their property setback requirements for new developments, they've reduced their vulnerability to this hazard.

Potential community-related impacts, including shoreline reduction, economic (tourism-related) impacts, and property/infrastructural damage, are adequately described within the Volume I, Section 2 of the NHMP. See Map LC-2 for locations of the city's coastal erosion hazard along coastal bluffs on the city's western edge.

To address the risk for coastal erosion, Lincoln City enacted Ordinance 2012-08 (2012) amending the comprehensive plan to include standards for areas affected by coastal erosion.

Map LC-2 Coastal Erosion Hazard



Source: Oregon Explorer: Map Viewer – To view map detail click hyperlink to left.

Natural Hazard Risk Report for Lincoln County

The Risk Report (DOGAMI, O-20-11) provides hazard analysis summary tables that identify populations and property within Lincoln County that are vulnerable to coastal erosion. The Risk Report provides a distinct profile for Lincoln City.

The Risk Report provides an analysis of dune-backed beaches and bluff-backed shorelines to identify the general level of susceptibility due to storm-induced erosion, sea level rise, and subsidence due to CSZ earthquake event. The Risk Report performed an analysis of buildings, including critical facilities, to determine exposure for each community. According to the Risk Report the following resident population and property (public and private) within Lincoln City may be impacted by profiled coastal erosion scenario (Table LC-4).

Less than one percent of the city's population (65 people) may be displaced by coastal erosion. These people are expected to have mobility or access issues and/or may have their residences impacted by coastal erosion. Properties that are most vulnerable to the coastal erosion hazard are those that are developed in an area of steep dunes or cliffs. Just under three percent (184 buildings) of all buildings (residential, commercial, industrial) are exposed to the high coastal erosion hazard zone. The value of exposed buildings is $60.4 million (about 6% of total building value). It is important to note that impact from coastal erosion may vary depending on areas that are impacted during an event.

Table LC-4 Potentially Displaced Residents and Exposed Buildings, Coastal Erosion

Community Overview: Lincoln City						
Population		Buildings		Critical Facilities	Total Building Value ($)	
7,930		6,687		11	1,086,802,000	
Exposure Analysis: Coastal Erosion High Hazard Scenario						
Potentially Displaced Residents		Exposed Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Value ($)	Percent
65	0.8%	184	2.8%	0	60,436,000	5.6%

Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020). Table A-16. Note: city population based on the 2010 Census population.

Critical Facility Vulnerability[6]

There are no critical facilities exposed to the profiled coastal erosion scenario.

[6] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-17.

Drought

The Steering Committee rated the city's **probability of occurrence for drought events as "moderate" and their vulnerability as "high"**. *These ratings have not changed since the previous NHMP.*

Volume I, Section 2 of Lincoln County's NHMP adequately describes the causes and characteristics of drought hazards, as well as the history, location, extent, and probability of a potential event. Due to a cool, wet climate, past and present weather conditions have generally spared coastal communities from the effects of a drought.

Schooner Creek is the city's only water source, and the city's reservoirs store enough water for only one day of use. In the event that climate patterns change and drought becomes a probable hazard, Lincoln City would be extremely vulnerable to drought conditions. Furthermore, Schooner Creek is a direct-flow water source and contamination is a potential threat to the water supply.

Water from the city reservoirs is treated at the water treatment facility that can treat up to 6 million gallons per day (mgd). Following treatment water flows via 12 to 24-inch water transmission mains to three water storage reservoirs (combined 7.25 million gallons capacity) at SE 19th, NE 20th, and Roads End. Most of the system utilizes 6- and 8-inch diameter pipes. There are five (5) pump stations that boost pressure to higher elevations. The city has enough capacity to meet current and anticipated future demand.

Future Climate Projection:

According to OCCRI report "*Future Climate Projections: Lincoln County*" (Link) the probability of future drought conditions (low summer soil moisture, low spring snowpack, low summer runoff, low summer precipitation, and high summer evaporation) is expected to be more frequent by the 2050s.

Vulnerability Assessment

No development or population changes affected the jurisdiction's overall vulnerability to this hazard. In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

Due to insufficient data and resources, Lincoln City is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. State-wide droughts have historically occurred in Oregon, and as it is a region-wide phenomenon, all residents are equally at risk. Structural damage from drought is not expected; rather the risks apply to humans and resources. Industries important to Lincoln City's local economy such as fishing have historically been affected, and any future droughts would have tangible economic and potentially human impacts.

In addition to reduced water supplies, a drought will increase the chances of wildfire and significantly reduce tourism activities. If hotels, for example, are unable to accommodate guests, the city's economy would greatly suffer. Currently, the city has a water curtailment plan that will go into effect in the event of a drought.

Earthquake

The Steering Committee rated the city's **probability of occurrence for Cascadia Subduction Zone (CSZ) Earthquake events as "moderate" and their vulnerability as "high"**. *These ratings have not changed since the previous NHMP.*

The Steering Committee rated the city's **probability of occurrence for crustal earthquake events as "low" and their vulnerability as "moderate"**. *These ratings have not changed since the previous NHMP.*

Volume I, Section 2 of Lincoln County's NHMP adequately describes the causes and characteristics of earthquake hazards, as well as the history, location, extent, and probability of a potential event. Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any site. In many major earthquakes, damages have primarily been caused by the behavior of the soil.

Additional information can be found on the Lincoln County website: https://www.co.lincoln.or.us/749/Hazards-Earthquake

The Pacific Northwest experienced a subduction zone earthquake estimated at magnitude 9 on January 26, 1700. The earthquake generated a tsunami that caused damage as far away as Japan. Cascadia subduction zone earthquakes and associated tsunamis have occurred on average every 500 years over the last 3,500 years in the Pacific Northwest. The time between events has been as short as 100 to 200 years and as long as 1,000 years. The geologic record indicates that over the last 10,000 years approximately 42 tsunamis have been generated off the Oregon Coast in connection to ruptures of the CSZ (19 of the events were full-margin ruptures and arrived approximately 15-20 minutes after the earthquake).[7]

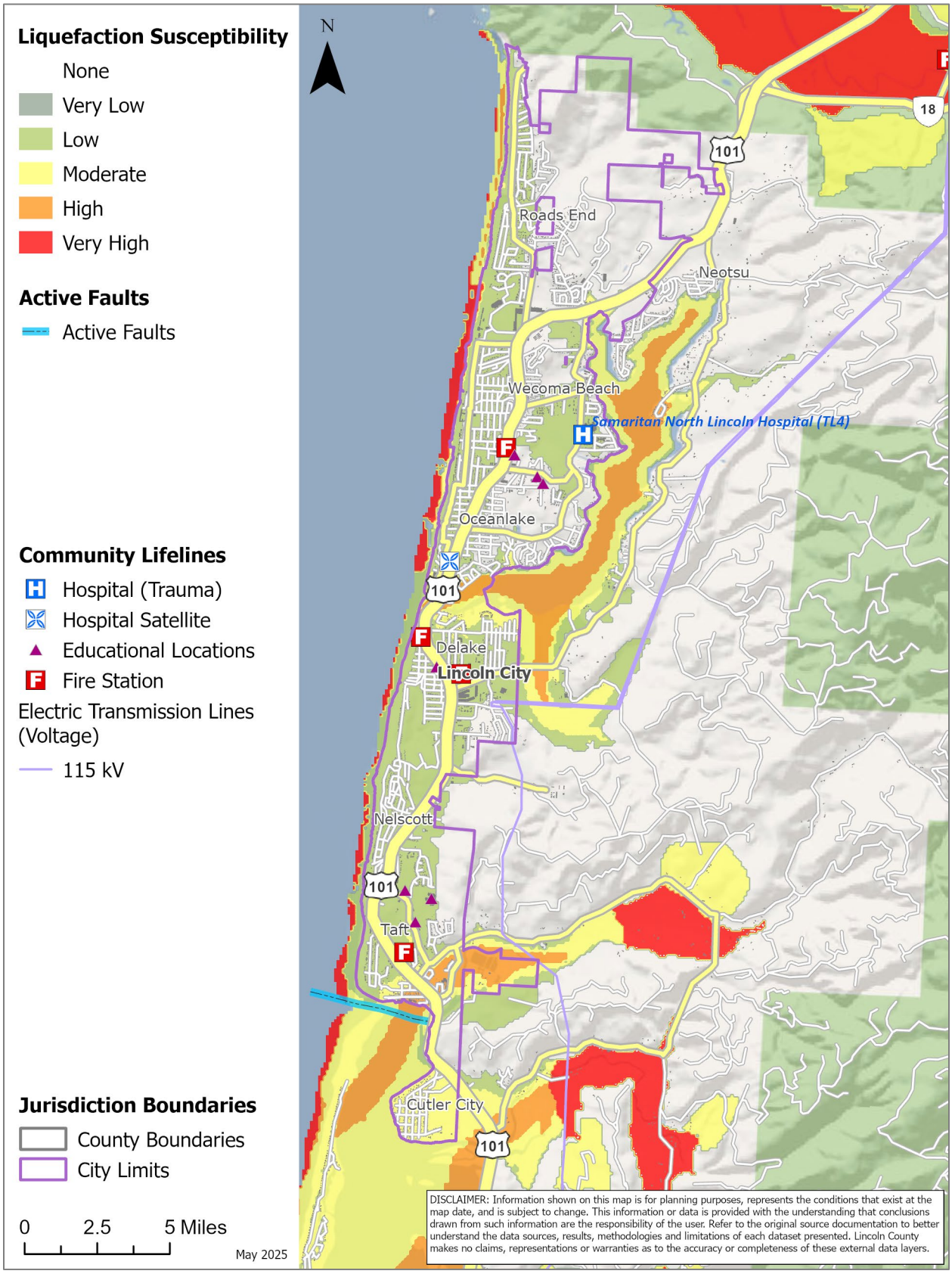
The Oregon Department of Geology and Mineral Industries (DOGAMI), in partnership with other state and federal agencies, has undertaken a rigorous program in Oregon to identify seismic hazards, including active fault identification, bedrock shaking, tsunami inundation zones, ground motion amplification, liquefaction, and earthquake induced landslides.

Lincoln City faces several earthquake-related risks, including soft soil and liquefaction hazards (Map LC-3) and a moderate to high probability over the next 50 years of experiencing shaking strong enough to damage weak buildings (Map LC-4).

- Liquefaction risk is highest along the waterfront and ocean cliffs, where soft, wet soils can lose strength during shaking.
- Damaging shaking—strong enough to affect weak buildings—is more likely near the coast and river areas.
- Inland areas generally face lower liquefaction risk.

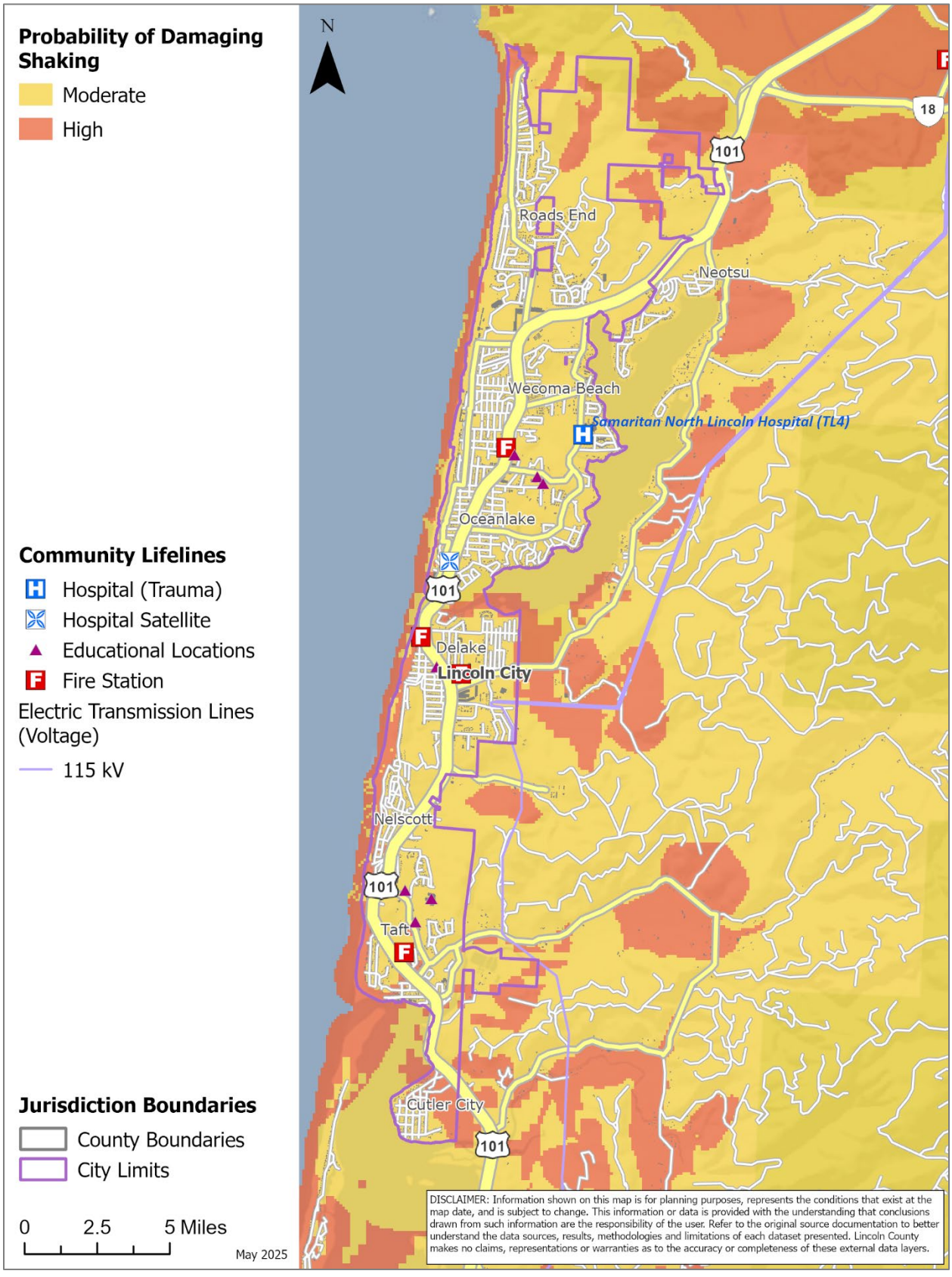
[7] DLCD. *Oregon State Natural Hazard Mitigation Plan*. 2020.

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



Source: Oregon Explorer: Map Viewer – To view map detail click hyperlink to left.

Map LC-4 Probability of Damaging Shaking



Source: Oregon Explorer: Map Viewer – To view map detail click hyperlink to left..

Vulnerability Assessment

See *Earthquake and tsunami impact analysis for coastal Lincoln County, Oregon* (2021, O-21-02) and *Earthquake and tsunami impact analysis for the Oregon* coast (2025, O-25-01) for additional information.

No development or population changes affected the jurisdiction's overall vulnerability to this hazard. In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

The city's concentrated population and resources, as well as the soil characteristics and relative earthquake hazards described above are cause for significant effort toward mitigating the earthquake hazard. The city's infrastructure is highly vulnerable to a severe earthquake event. Sewer lines, water lines, power lines, water tanks, reservoirs, cell towers, the Samaritan North Lincoln Hospital, and City Hall were identified by the Steering Committee as vulnerable assets. The city would expect significant damage to roads and bridges following a Cascadia Subduction Zone event, as well as deaths and severe injuries region wide. Education and outreach regarding earthquakes (and resultant tsunami) is an ongoing endeavor in Lincoln City.

To help communities better prepare for earthquakes, DOGAMI released the Oregon Seismic Hazard Database in 2021.[8] It includes maps showing areas most at risk for hazards like ground shaking and movement. Key map highlight potential damage from rare but severe earthquakes (Map LC-5), expected shaking and damage from large Cascadia subduction zone earthquakes (Map LC-6), and likelihood of damaging shaking (Map LC-4). The extent of the damage depends on the earthquake's type, location, magnitude, and duration.

2007 Rapid Visual Survey

Building codes were implemented in Oregon in the 1970s, however, stricter standards did not take effect until 1991 and early 2000s. As noted in the community characteristics section (Table LC-3), approximately 60% of residential buildings were built prior to 1990, which increases the city's vulnerability to the earthquake hazard. Information on specific public buildings' (schools and public safety) estimated seismic resistance was determined for Lincoln County by DOGAMI in 2007. For more information click this link O-07-02.

A primary mitigation objective of the city is to construct or upgrade critical and essential facilities and infrastructure to withstand future earthquake events. Although seismic retrofit grant awards per the Seismic Rehabilitation Grant Program[9] the School District has retrofitted at risk schools in the city through local resources (see the Lincoln County School District addendum for more information).

[8]Oregon Department of Geology and Mineral Industries (DOGAMI). (2021). Oregon Seismic Hazard Database, Release 1.0 (OSHD-1). By Ian P. Madin, Jon J. Franczyk, John M. Bauer, and Carlie J.M. Azzopardi. Available at: https://pubs.oregon.gov/dogami/dds/p-OSHD-1.htm

[9] The Seismic Rehabilitation Grant Program (SRGP) is a state of Oregon competitive grant program that provides funding for the seismic rehabilitation of critical public buildings, particularly public schools and emergency services facilities.

Natural Hazard Risk Report for Lincoln County

The Risk Report (DOGAMI, O-20-11) provides hazard analysis summary tables that identify populations and property within Lincoln County that are vulnerable to earthquake. The Risk Report provides a distinct profile for Lincoln City.

The Risk Report performed an analysis of buildings, including critical facilities, to determine exposure for each community. According to the Risk Report the following resident population and property (public and private) within Lincoln City may be impacted by the profiled earthquake scenarios (Table LC-5). *Note: Due to the simultaneous nature of a CSZ earthquake and tsunami, loss estimates have been separated in the following tables to avoid double counting. Building losses within the tsunami zone are considered total. See the tsunami section for additional information.* [10]

Approximately 16% of the city's population (1,230 people) may be displaced by a magnitude 9.0 CSZ earthquake and tsunami event. Of those, approximately 3% will be impacted by the accompanying tsunami. *Note: The data does not include potentially impacted visitor populations that may be lodging or at a public venue during a CSZ earthquake and tsunami event.* Earthquakes will impact every building in the city, to some degree, by a CSZ magnitude 9.0 earthquake and tsunami. Building damage (loss) estimates are reported for buildings expected to be damaged by the earthquake outside of the tsunami inundation zone (medium-sized). Additional exposure information is provided for buildings within the tsunami inundation zone to obtain the combined total damage (loss) estimate. Buildings reported as "damaged" in the area *outside* the tsunami zone include yellow tagged (extensive, limited habitability) and red tagged (complete, uninhabitable) buildings, while 100% of buildings exposed *inside* the tsunami inundation area are considered "damaged" (complete, uninhabitable). The city has 1,621 buildings that are expected to be damaged by the CSZ earthquake and tsunami event. The combined (earthquake and tsunami) value of building damage losses are $241 million.

[10] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Tables A-16.

Table LC-5 Potentially Displaced Residents and Exposed Buildings, Earthquake

Community Overview: Lincoln City						
Population		Buildings		Critical Facilities	Total Building Value ($)	
7,930		6,687		11	1,086,802,000	
Exposure Analysis: Earthquake CSZ M9.0 (Deterministic) Scenario						
Potentially Displaced Residents		Damaged Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Loss Estimate ($)	Loss Ratio
1029	13.0%	1350	20.2%	6	209,653,000	19.3%
Exposure Analysis (within Tsunami Zone - Medium)						
201	2.5%	271	4.1%	0	31,377,000	2.9%
Total Exposure						
1230	15.5%	1621	24.2%	6	241,030,000	22.2%

Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020). Table A-16. Note: city population based on the 2010 Census population.

The Risk Report estimated losses show that the age of the building stock is the primary metric of earthquake vulnerability. Communities with older building stock are expected to have higher losses. However, if buildings were retrofitted to at least "moderate code" standards the impact of the event would be reduced. The Risk Report concludes that loss estimates for the city drop from 19% to 12% ($74.3 million decrease in loss) when all buildings are upgraded to at least moderate code level.[11] *Note: earthquake vulnerability retrofit benefits are minimized in areas of liquefaction and landslide where additional geotechnical mitigation would be needed.*

Critical Facility Vulnerability[12]

- Lincoln City City Hall (also houses the Public Library)
- Lincoln City Police Department
  (new building built to current seismic code in 2020)
- Oceanlake Elementary School
- Samaritan North Lincoln Hospital
  (new building built to current seismic code in 2020)
- Taft Elementary School
- Taft 7-12 School

Note 1: In 2020, DOGAMI published an analysis of people and structures impacted by a CSZ earthquake and tsunami for the M, L, and XXL event scenarios. This report provides information on building damage and impact to residents and tourists (including injury and fatality estimates).

[11] Ibid, Table B-2.

[12] Ibid, Table A-17.

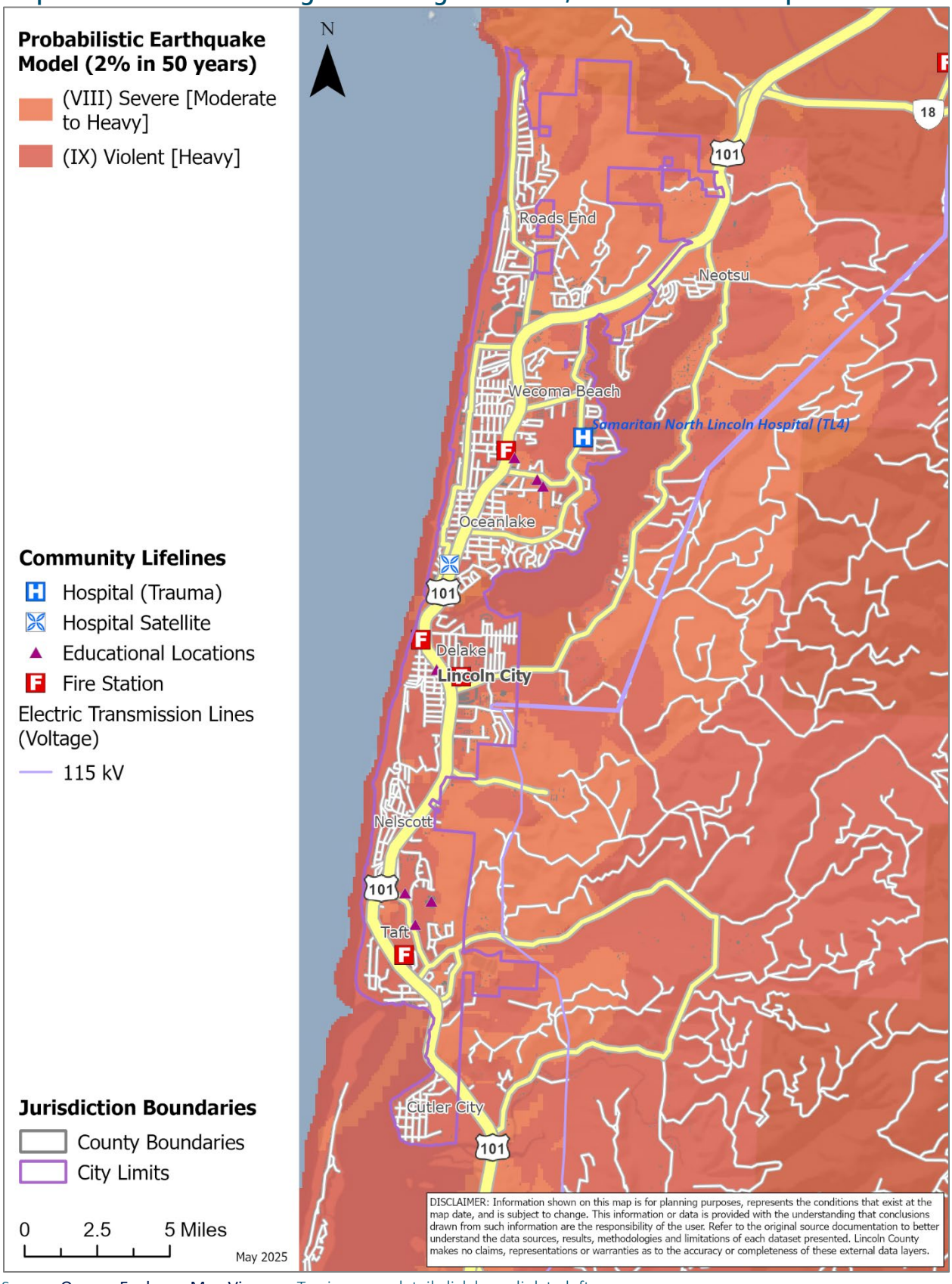
For details, see *Analysis of Earthquake and Tsunami Impacts for People and Structures inside the Tsunami Zone for Five Coastal Communities* (DOGAMI, 2020, O-20-03).

Note 2: It is expected that bridges in the area may be impassable by vehicles for over 24 months. As such bringing resources into Lincoln City by sea and air will be necessary.

For more information, see the following DOGAMI reports:

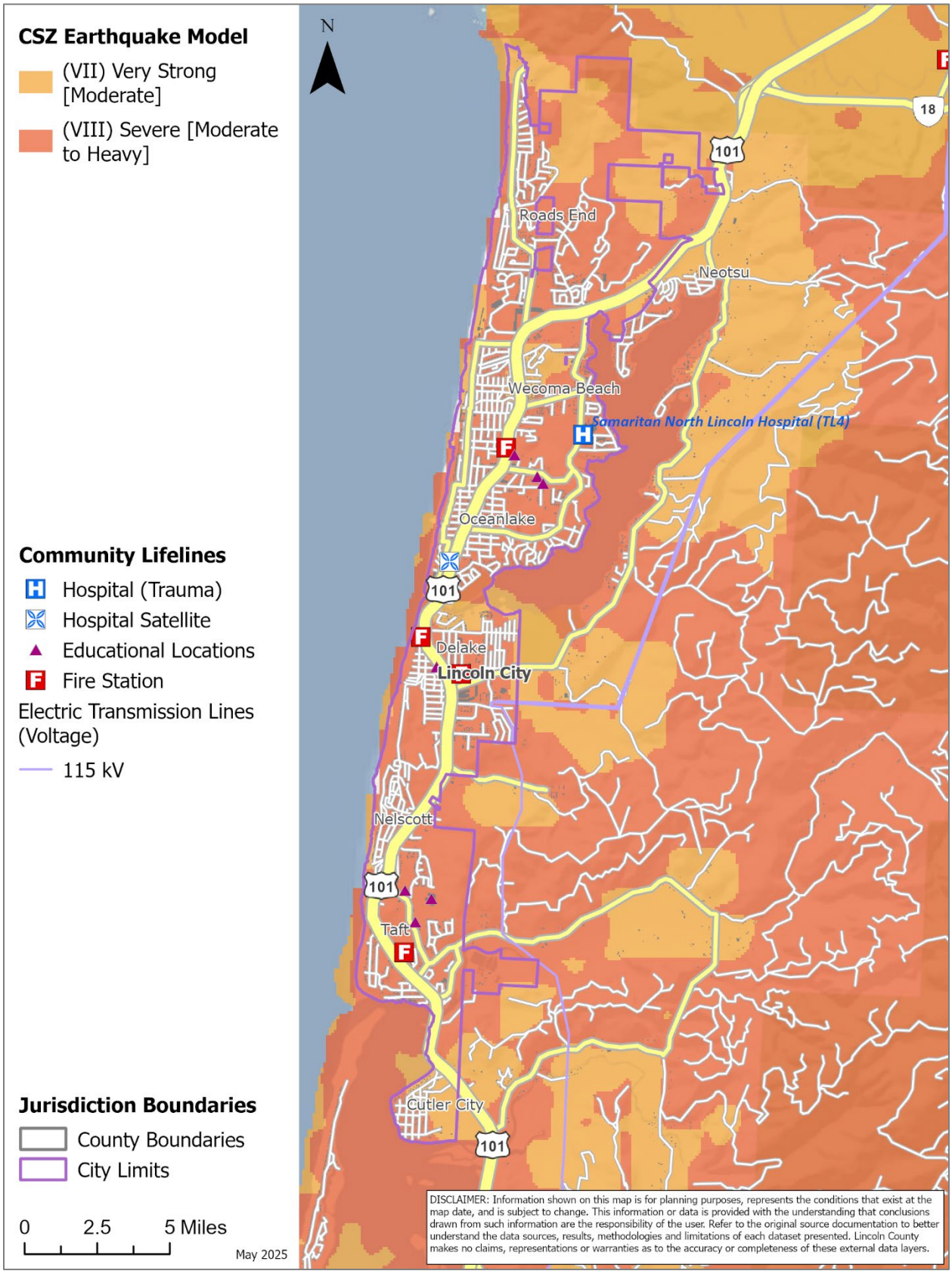
- Analysis of earthquake and tsunami impacts for people and structures inside the tsunami zone for five Oregon coastal communities: Gearhart, Rockaway Beach, Lincoln City, Newport, and Port Orford (2020, O-20-03)
- Oregon Coastal Hospital Resilience Project (2020, O-20-02)
- Earthquake and tsunami impact analysis for coastal Lincoln County, Oregon (2021, O-21-02)
- Earthquake and tsunami impact analysis for the Oregon coast (2025, O-25-01)

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



Source: Oregon Explorer: Map Viewer – To view map detail click hyperlink to left

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



Source: Oregon Explorer: Map Viewer – To view map detail click hyperlink to left.

Tsunami

The Steering Committee rated the city's **probability of occurrence for a local tsunami events as "moderate" and their vulnerability as "high"**. *These ratings have not changed since the previous NHMP.*

The Steering Committee rated the city's **probability of occurrence for distant tsunami events as "moderate" and their vulnerability as "low"**. *These ratings have not changed since the previous NHMP.*

Volume I, Section 2 of Lincoln County's NHMP adequately describes the causes and characteristics of tsunami hazards, as well as the history, location, extent, and probability of a potential event. The Pacific Northwest experienced a subduction zone earthquake estimated at magnitude 9 on January 26, 1700. The earthquake generated a tsunami that caused damage as far away as Japan. Cascadia subduction zone earthquakes and associated tsunamis have occurred on average every 500 years over the last 3,500 years in the Pacific Northwest. The time between events has been as short as 100 to 200 years and as long as 1,000 years. The geologic record indicates that over the last 10,000 years approximately 42 tsunamis have been generated off the Oregon Coast in connection to ruptures of the CSZ (19 of the events were full-margin ruptures and arrived approximately 15-20 minutes after the earthquake).[13] Distant tsunamis happen more regularly that CSZ related local tsunamis.

Additional information can be found on the Lincoln County website: https://www.co.lincoln.or.us/772/Hazards-Tsunamis

It is difficult to predict when the next tsunami will occur. According to the Oregon NHMP the coast has experienced 25 distant tsunamis in the last 145 years with only three causing measurable damage. Thus, the average recurrence interval for tsunamis on the Oregon coast from distant sources would be about six (6) years. However, the time interval between events has been as little as one year and as much as 73 years. Since only a few tsunamis caused measurable damage, a recurrence interval for distant tsunamis does not have much meaning for the city.

A 9.0 magnitude earthquake originating from Japan caused approximately $7.1 million worth of damages along the Oregon Coast. Particularly, there was extensive damage to the Port of Brookings (Curry County; $6.7 million), as well as the Port of Depoe Bay (Lincoln County; $182,000), and Charleston Harbor (Coos County; $200,000); Salmon Harbor on Winchester Bay (Douglas County) and the South Beach Marina in Newport (Lincoln County) were also affected. On March 15, 2011 Governor Kitzhaber declared a State of Emergency was declared by Executive Order in Curry County. Approximately 40% of all docks at the Port of Brookings were destroyed or rendered unusable (including a dock leased by the U.S. Coast Guard) compromising commercial fishing and U.S. Coast Guard operations. Along the Oregon Coast local official activated the Emergency Alert System and sirens, implemented "reverse 9-1-1" and conducted door-to-door notices in order to evacuate people form the tsunami inundation zone. Local

[13] Oregon Natural Hazard Mitigation Plan. Department of Land Conservation and Development. 2020

governments activate their Emergency Operations Centers and the state activated its Emergency Coordination Center. For more information view Volume I, Section 2.

In 1995, the Department of Geology and Mineral Industries (DOGAMI) conducted an analysis resulting in extensive mapping along the Oregon Coast. The maps depict the expected inundation for tsunamis produced by a magnitude 8.8 to 8.9 undersea earthquake. The tsunami maps were produced to help implement Senate Bill 379 (SB 379); digitized in 2014 (O-14-09). SB 379, implemented as Oregon Revised Statutes (ORS) 455.446 and 455.447, and Oregon Administrative Rules (OAR) 632-005, limit construction of new essential facilities and special occupancy structures in tsunami flooding zones. [link to map] shows the expected tsunami inundation indicating that much of the residential development west of Highway 101 and areas adjacent to the ocean are vulnerable to tsunami. It should be noted that the updated tsunami inundation maps (described below) show an increased vulnerability in many areas [link to map]. Note: HB 3309 (2019) effective January 1, 2020 repealed the ban on building "new essential facilities, hazardous facilities, major structures, and special occupancy structures" inside the tsunami inundation zone (SB 379 line):[14]

Lincoln City has put forth much effort to educate and inform citizens of tsunami hazards found within the city. The city obtained a reverse 911 system; hotels are encouraged to post evacuation signs in private rooms; evacuation signs are posted throughout the city; evacuation maps are posted on the city's website; and a fire station and school were moved away from the inundation zone two years ago. In the event of a tsunami, the hospital may be at risk; currently it's just outside the tsunami inundation zone. Severe damage is expected to occur on various properties, roads, bridges, communication systems, and critical infrastructure within Lincoln City, among other assets described in the county's plan. Lincoln City recognizes the importance of continuing education and outreach, especially to the transient populations (i.e., tourists), and plans to implement greater outreach in the future.

Tsunami inundation maps were created by the Department of Geology and Mineral Industries (DOGAMI) to be used for emergency response planning for coastal communities. Maps were created for local and distant source tsunami events. The local source tsunami inundation maps display the output of computer modeling showing five tsunami event scenarios shown as "T-shirt" sizes S, M, L, XL, and XXL. Map LC-7 shows the M and XXL tsunami inundation scenarios. The distant source tsunami inundation maps show the potential impacts of tsunamis generated by earthquakes along the "Ring of Fire" (the Circum-Pacific belt, the zone of earthquake activity surrounding the Pacific Ocean). The distant tsunami inundation maps model the 1964 Prince William Sound event (Alaska M9.2 and a hypothetical Alaska Maximum event scenario; only the Alaska Maximum Wet/ Dry Zone is shown within the Oregon Explorer: Map Viewer. Both the local and distant source tsunami inundation maps show simulated wave heights and inundation extents for the various scenarios.

For more information on the regulatory and non-regulatory maps visit the Oregon Tsunami Clearinghouse resource library:

[14] Oregon Legislature. HB 3309 (2019). https://olis.oregonlegislature.gov/liz/2019R1/Downloads/MeasureDocument/HB3309/Enrolled

Regulatory (SB 379) - http://www.oregongeology.org/tsuclearinghouse/pubs-regmaps.htm (Note: HB 3309, effective January 1, 2020, repealed ban on building essential facilities within the tsunami inundation zone, SB 379 line.)

Non-Regulatory Tsunami-Inundation Maps: http://www.oregongeology.org/tsuclearinghouse/pubs-inumaps.htm

Evacuation maps (brochures) are available for the populated areas of Lincoln County. The Department of Geology and Mineral Industries (DOGAMI) developed the evacuation zones in consultation with local officials; local officials developed the routes that were reviewed by the Oregon Department of Emergency Management (OEM). The maps show the worst-case scenario for a local source and distant source tsunami event and are not intended for land-use planning or engineering purposes.

For more information on the evacuation brochures visit the Oregon Tsunami Clearinghouse resource library: http://www.oregongeology.org/tsuclearinghouse/pubs-evacbro.htm

A free application is also available that displays the evacuation routes in coastal areas of Oregon: http://www.nanoos.org/mobile/tsunami_evac_app.php

Vulnerability Assessment

See *Earthquake and tsunami impact analysis for coastal Lincoln County, Oregon* (2021, O-21-02) and *Earthquake and tsunami impact analysis for the Oregon* coast (2025, O-25-01) for additional information.

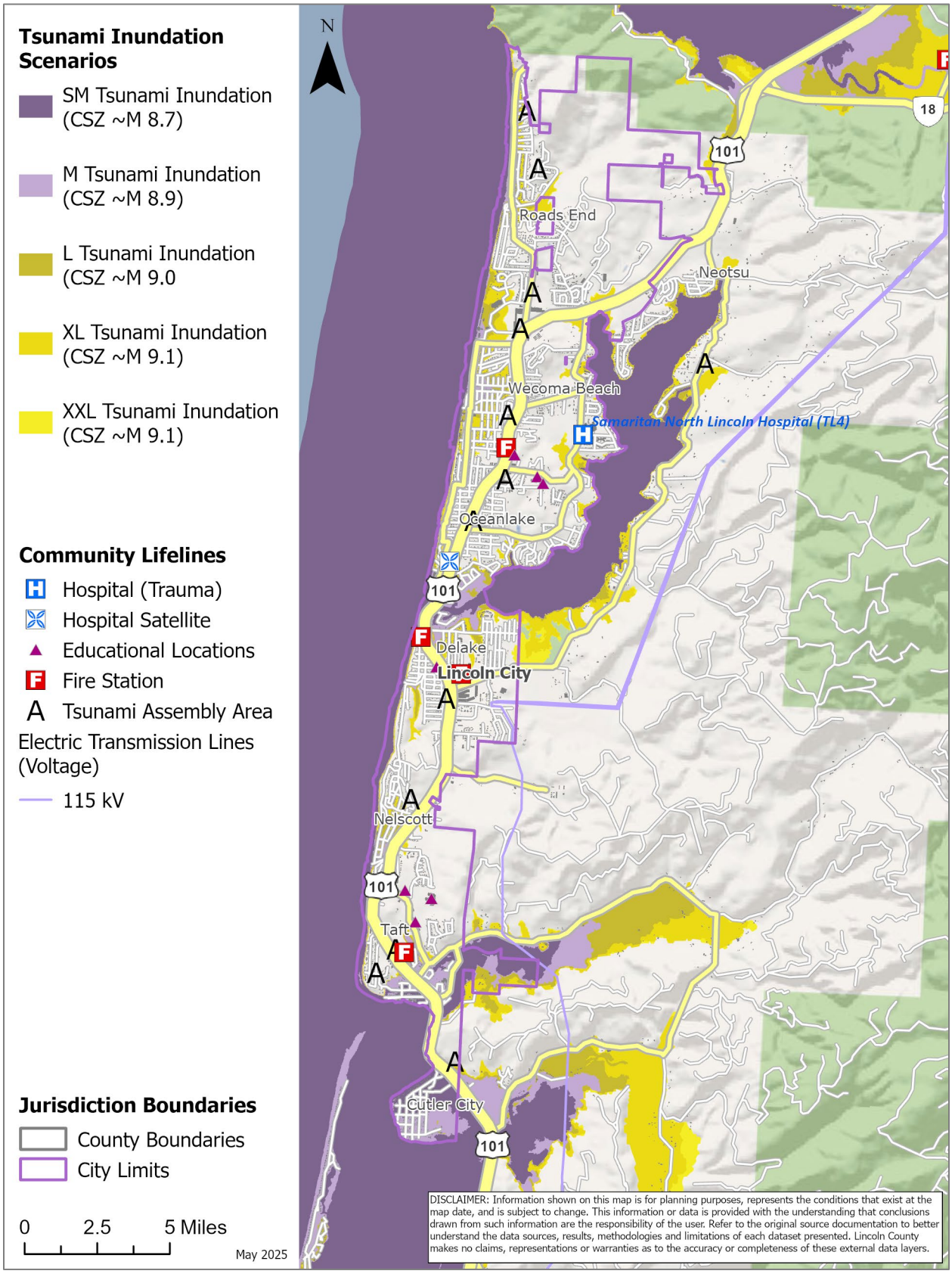
No development or population changes affected the jurisdiction's overall vulnerability to this hazard. In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

In 2013, DOGAMI produced new Tsunami Inundation Maps (TIMs) for the entire Oregon coast. The TIMs identify both local and distant Tsunami Inundation Zones (TIZs) by event size. The maps also tabulate the affected buildings located within the local and distant source tsunami inundation zones. The Risk Report section below provides detailed information on the impact to the city from a CSZ earthquake and medium tsunami.

Severe damage could occur to low-lying areas of the city in a local source tsunami event, including roads, bridges, communication systems, and infrastructure within Lincoln City, particularly surrounding, and including facilities near NW Jetty Ave between NW 26th St and NW 50th St, D River and Devils Lake, and the Siletz Bay including Cutler City and Taft (Map LC-7) among other assets described in the county's plan. Some damage is also expected in a large distant source tsunami event (such as the 2011 Tohoku tsunami). Lincoln City recognizes the importance of continuing education and outreach, especially to the transient populations (i.e., tourists), and plans to implement greater outreach in the future.

As shown in Table LC-3 there are about 439 manufactured housing units (mobile homes) in Lincoln City. Manufactured homes built prior to 2003 are subject to slipping off their foundations potentially compromising the occupants' ability to exit. The compromised egress may hinder timely evacuation.

Map LC-7 Tsunami Inundation Scenarios



Source: Oregon Explorer: Map Viewer – To view map detail click hyperlink to left.

Population vulnerability is characterized in terms of exposure, demographic sensitivity, and short-term resilience of at-risk individuals. Nate Wood, et al. (USGS) performed a cluster analysis of the data for coastal communities in the Pacific Northwest to identify the most vulnerable communities in the region.[15] Wood, et al. conducted a comprehensive analysis to derive overall community clusters based on (1) the number of people and businesses in the tsunami hazard zone, (2) the demographic characteristics of residents in the zone, and (3) the number of people and businesses that may have insufficient time to evacuate based on slow and fast walking speeds. According to the study Lincoln County (including Lincoln City) has relatively low numbers of "residents, employees, or customer-heavy businesses" inside the tsunami hazard zones and will likely have enough time to reach high ground before a tsunami wave arrives.

In 2019, DOGAMI published a tsunami evacuation analysis using the XXL inundation zone which covers the largest CSZ event likely to occur based on the historical record. [16] Safety is reached when evacuees have reached "high ground", or 20 feet beyond the limit of tsunami inundation. An analysis was conducted for the Roads End, Wecoma, Oceanlake, Delake, Nelscott, Taft, and Cutler City neighborhoods within Lincoln City. According to the model the first waves arrive along the open coast 20-22 minutes after the start of earthquake shaking with most of Lincoln City inundated about 4 to 6 minutes later. All of Lincoln City, except for Cutler City, has significant high ground that will accommodate evacuees traveling at a moderate walking speed of 4 feet per second (fps) or less (2.7 mph). Evacuees within the Cutler City neighborhood, particularly in the southwest section near where Drift Creek enters Siletz Bay, will need to move faster in order to beat the wave and make it to high ground (Map LC-8).For details, including neighborhood analysis, see *Tsunami evacuation analysis of Lincoln City and unincorporated Lincoln County: Building community resilience on the Oregon coast* (DOGAMI, 2019, O-19-06).

In 2020, DOGAMI published an analysis of people and structures impacted by a CSZ earthquake and tsunami for the M, L, and XXL event scenarios. This report provides additional information on building damage and impact to residents and tourists (including injury and fatality estimates). The report identifies Cutler City and SE 2nd Court south of Devils Lake, the Taft Trailer Park at SE 52nd St, and residences along SE 52st Ave and SE Lee Ave as areas of concern for tsunami evacuation.[17]

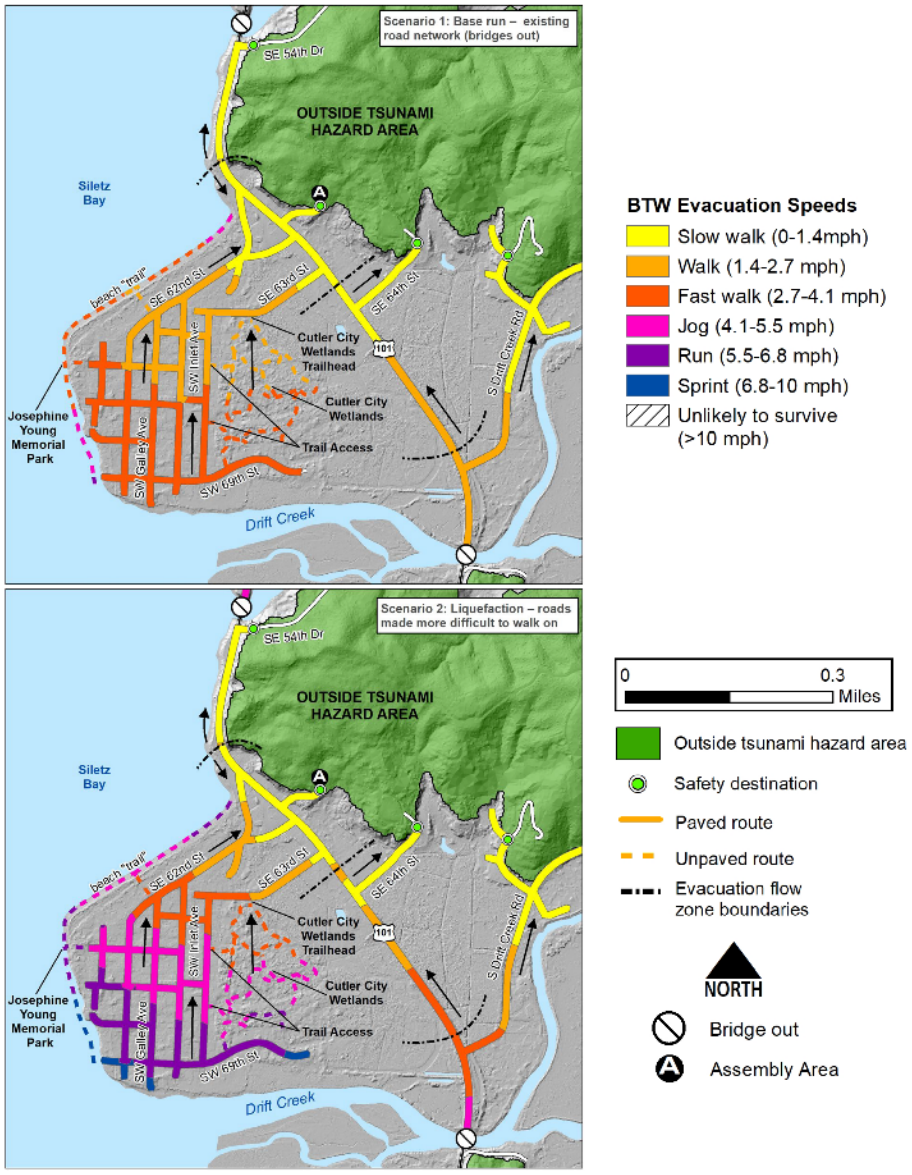
The report includes additional information on earthquake and building damage, injuries and fatalities, and displaced population which are, in part, included in the Risk Report information below. For more information, see *Analysis of Earthquake and Tsunami Impacts for People and Structures inside the Tsunami Zone for Five Coastal Communities* (DOGAMI, 2020, O-20-03).

[15] Nathan J. Wood, Jeanne Jones, Seth Spielman, and Mathew C. Schmidtlein. "Community clusters of tsunami vulnerability in the US Pacific Northwest", PNAS 2015 112 (17) 5354-5359.

[16] DOGAMI, Open-Fire Report O-19-06.

[17] DOGAMI, Open-File Report O-20-03, Section 8.3 Lincoln City.

Map LC-8 Beat the Wave modeling in Cutler City (CSZ earthquake XXL inundation zone)



Source: DOGAMI, Open-File Report O-19-06.

Natural Hazard Risk Report for Lincoln County

The **Risk Report** (DOGAMI, O-20-11) provides hazard analysis summary tables that identify populations and property within Lincoln County that are vulnerable to tsunami. The Risk Report provides a distinct profile for Lincoln City.

The Risk Report performed an analysis of buildings, including critical facilities, to determine exposure for each community. According to the Risk Report the following resident population and property (public and private) within Lincoln City may be impacted by the profiled tsunami scenario (Table LC-6).

Table LC-6 Potentially Displaced Residents and Exposed Buildings, Tsunami

Community Overview: Lincoln City						
Population		Buildings		Critical Facilities	Total Building Value ($)	
7,930		6,687		11	1,086,802,000	
Exposure Analysis: Tsunami CSZ M9.0 (Deterministic) Scenario						
Potentially Displaced Residents		Exposed Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Value ($)	Percent
923	11.6%	899	13.4%	0	128,896,000	11.9%
Exposure Analysis: Tsunami SB 379 Regulatory Line						
1097	13.8%	1121	16.8%	0	176,978,000	16.3%

Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020). Table A-16. Note: City population based on the 2010 Census population.

Just under 12% the city's population (923 people) may be displaced by a magnitude 9.0 CSZ tsunami event (note there are additional people that will be displaced by the earthquake). This is slightly fewer people than those exposed within the Senate Bill 379 line (1,097 people). *Note: The data does not include potentially impacted visitor populations that may be lodging or at a public venue during a CSZ earthquake and tsunami event (for more information on temporary residents see DOGAMI O-25-01 referenced in the previous section).* Building damage (loss) estimates are reported for buildings expected to by damaged by the tsunami inundation zone (medium-sized and SB 379). All 899 buildings exposed *inside* the tsunami inundation area are considered "damaged" (complete, uninhabitable); the number of buildings damaged is slightly higher under the SB 379 scenario (1,121 buildings). No critical facilities are expected to be damaged under the CSZ M9.0 scenario, none are expected to be damaged under the SB 379 scenario.

Critical Facility Vulnerability[18]

- There are no critical facilities exposed to the profiled tsunami scenarios.

Note 1: DOGAMI, Open-Fire Report O-20-03 includes the following key infrastructure facilities in the tsunami zone (XXL): [19]

- Lift Station, SW Anchor Court
- Water Treatment Plant (317 S. Anderson Creek Rd)
- Antenna Structure (3277 NE Devils Lake Rd, includes KBCH AM 1400 radio)

[18] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-17.

[19] DOGAMI, Open-File Report O-20-03. Section 8.3.5.

Note 2: Although critical facilities are not exposed to the profiled tsunami scenarios it is expected that bridges in the area may be impassable by vehicles for over 24 months. As such bringing resources into Lincoln City by sea and air will be necessary.

For more information, see the following DOGAMI reports:

- Analysis of earthquake and tsunami impacts for people and structures inside the tsunami zone for five Oregon coastal communities: Gearhart, Rockaway Beach, Lincoln City, Newport, and Port Orford (2020, O-20-03)
- Oregon Coastal Hospital Resilience Project (2020, O-20-02)
- Tsunami evacuation analysis of Lincoln City and unincorporated Lincoln County: Building community resilience on the Oregon coast (2019, O-19-06)

Earthquake and Tsunami Impact Analysis

DOGAMI developed two Earthquake and Tsunami Impact Analysis for Coastal Lincoln County, Oregon (O-21-02) and Earthquake and Tsunami Impact Analysis for the Oregon Coast (O-25-01) include economic and population impact assessments for the city. The model's results show the following building loss estimates from a Cascadia Subduction Zone (deterministic) magnitude 9.0 earthquake:

Table LC-7 Earthquake and Tsunami Impact Analysis

Resident Population (Total)	10,179		
Temporary Population (Total)*	15,390		
	M1	L1	XXL1
Earthquake Injuries:	290	290	290
Tsunami injuries (Permanent + Temporary):	150	70	100
Tsunami fatalities (Permanent):	50	100	160
Tsunami fatalities (Temporary @ 100% occupancy):	100	200	340
Displaced population (P):	1,200	1,610	2,850
Displaced population (P+T):	5,200	6,810	10,740
Numbers of buildings in tsunami zone	902	1,290	2,317
Building replacement cost (millions)	$317.7	$457.6	$778.1
Debris weight (tons)	50,577	87,883	152,986

Source: IPRE. Data adapted from DOGAMI, Open-File Report O-25-01, Earthquake and Tsunami Impact Analysis for the Oregon Coast (2025). Note: Estimates of the permanent population in the tsunami inundation zone are derived from U.S. Census data collected in 2020 and ACS data maintained by the U.S. Census Bureau .* - Assumes 100% occupancy of second homes, vacation rentals, condominium units, bed and breakfast facilities, hotels, motels, and campgrounds.

Flood

The Steering Committee rated the city's **probability of occurrence for riverine flood events as "high" and their vulnerability as "moderate"**. *The vulnerability rating decreased from the previous NHMP.*

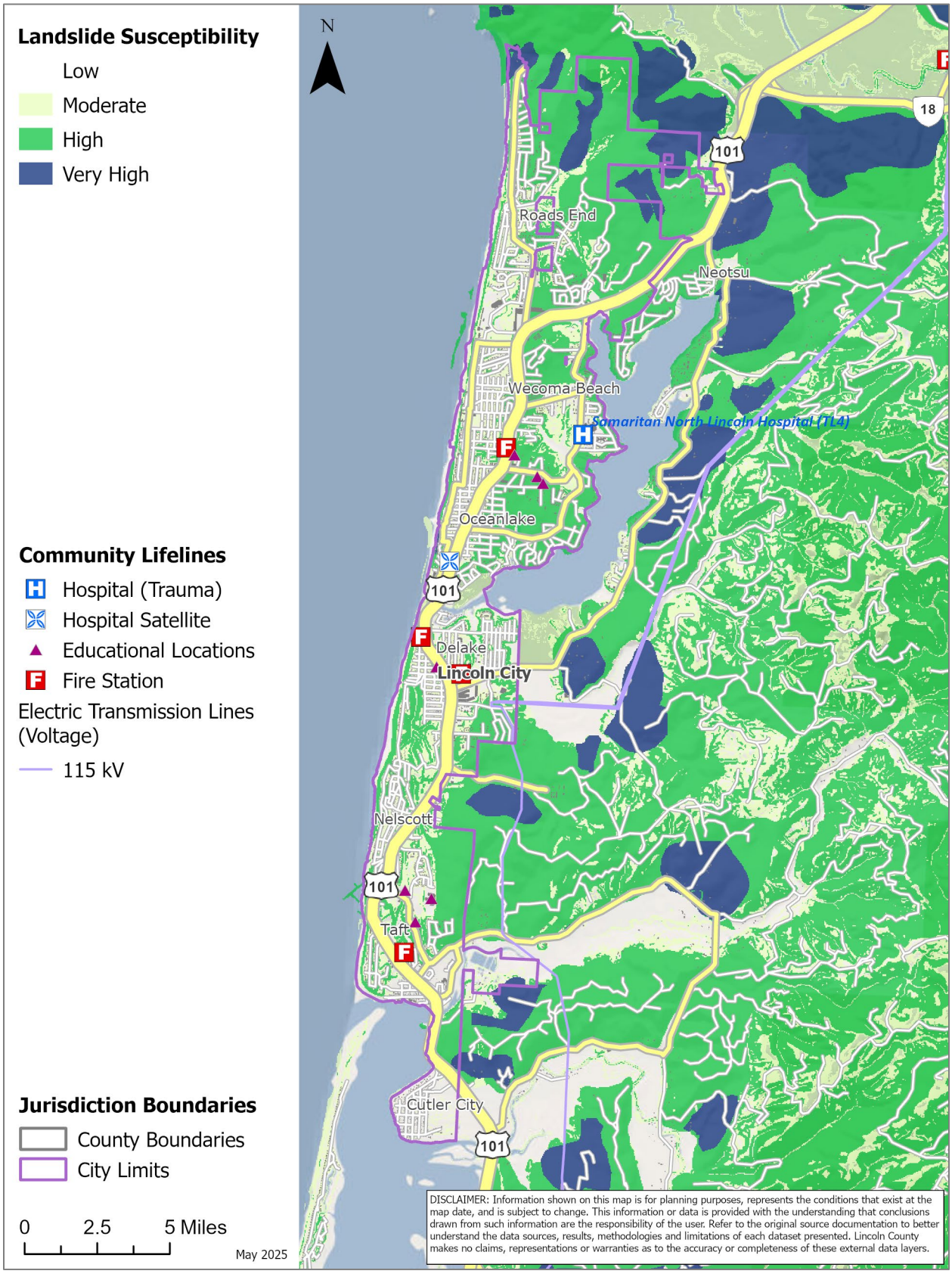
The Steering Committee rated the city's **probability of occurrence for coastal flood events as "high" and their vulnerability as "moderate"** (which is the same as the County's Rating). *The vulnerability rating decreased from the previous NHMP.*

Volume I, Section 2 of Lincoln County's NHMP adequately describes the causes and characteristics of coastal and riverine flood hazards, as well as the history, location, extent, and probability of a potential event. Schooner Creek and Devils Lake are the city's primary sources of flooding– typically due to rain and snowmelt. The extent of flooding varies depending on rainfall, and/or precipitation levels throughout the year. Lincoln City's most significant flood event occurred in November 1999; every road out of town was under water, including East Devils Lake Rd just south of Devils Lake. Road closures are the most common flood-related impacts within the community. East Devils Lake Road floods frequently, and despite efforts to mitigate flood related damages by widening culverts along this road, flooding continues. Almost all of Lincoln City's 31 pump stations are in the floodplain. Areas of concern for the city include the floodgate at Schooner Creek and the modular home parks near 51st street.

Additional information can be found on the Lincoln County website:
https://www.co.lincoln.or.us/757/Hazards-Flooding-River-Levels

FEMA has mapped most of the flood-prone streams in Oregon for 100- and 500-year flood events. A 100-year flood (a flood with a one percent probability of occurring within any given year) is used as the standard for floodplain management in the United States and is referred to as a base flood; also known as the Special Flood Hazard Area (SFHA). The SFHA is the area where the National Flood Insurance Program's (NFIP's) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. Flood Insurance Rate Maps (FIRMs) prepared by FEMA provide the most readily available source of information for 100-year floods (Map LC-9). These maps are used to support the NFIP. FIRMs delineate 100- and 500-year (a flood with a 0.2-percent probability of occurring within any given year) floodplain boundaries for identified flood hazards. These maps represent a snapshot in time, and do not account for later changes which occurred in the floodplains. According to Oregon Explorer about 14% of the city is within the 100-year floodplain. In addition, less than 2% of the city is within the 500-year floodplain.

Map LC-9 Flood Hazard Zones (100- and 500-year floodplains)



Source: Oregon Explorer: Map Viewer – To view map detail click hyperlink to left..

Future Climate Projection:

According to OCCRI report "*Future Climate Projections: Lincoln County*" (Link) the intensity of extreme precipitation is expected to increase as the atmosphere warms. The magnitude of the wettest days and the wettest consecutive five days is expected to increase by about 13% (range 4% to 28%) by the 2050s under the higher emissions scenario relative to historical baselines. The probability of winter flood risk will increase within coastal rain-dominated watersheds (such as the Siletz River) due to projected greater winter precipitation and warmer winter temperatures that will cause precipitation to fall more as rain than snow. There will also be an increase in atmospheric river events. Additionally, coastal flooding is expected to increase due to sea level rise (SLR) and changing wave dynamics. Sea level is projected to rise by 1.7 to 5.7 feet by 2100. Tidal wetlands and estuaries throughout the county are also expected to experience changes to their composition and area, thereby impacting their ability to naturally mitigate flood events.

Vulnerability Assessment

No development or population changes affected the jurisdiction's overall vulnerability to this hazard. In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

A floodplain vulnerability assessment combines the floodplain boundary, generated through hazard identification, with an inventory of the property within the floodplain. Understanding the population and property exposed to natural hazards will assist in reducing risk and preventing loss from future events.

Natural Hazard Risk Report for Lincoln County

The Risk Report (DOGAMI, O-20-11) provides hazard analysis summary tables that identify populations and property within Lincoln County that are vulnerable to flood. The Risk Report provides a distinct profile for Lincoln City.

The Risk Report provides a flood analysis for four flood scenarios (10-, 50-, 100-, and 500-year). The 100-year flood scenario is used for reporting since it is commonly used as a reference level for flooding and is the standard FEMA uses for regulatory purposes. In addition to the riverine flood scenarios coastal flooding information is available for the 100-year flood scenario for the city. The Risk Report only analyzed buildings within a flood zone, or within 500 feet of a flood zone. First-floor building height and presence of basements was also considered. Buildings with a first-floor height above the flood level were not included in the flood loss estimate, however, their assumed building occupants (residents) were counted as potentially displaced. According to the Risk Report the following resident population and property (public and private) within Lincoln City may be impacted by the profiled flood scenario (Table LC-8).

Just over six percent (6%) of the city's population (505 people) may be displaced by flooding. These people are expected to have mobility or access issues due to surrounding water. About four percent (4%) of the city's buildings (249 buildings) are exposed to the flood hazard and may be damaged. The loss estimate for exposed buildings is $3.6 million (less than one percent of total building value).

Table LC-8 Potentially Displaced Residents and Exposed Buildings, Flood

Community Overview: Lincoln City						
Population		Buildings		Critical Facilities	Total Building Value ($)	
7,930		6,687		11	1,086,802,000	
Exposure Analysis: Flood (1% Annual Chance)						
Potentially Displaced Residents		Damaged Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Loss Estimate ($)	Loss Ratio
505	6.4%	249	3.7%	0	3,648,000	0.3%

Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020). Table A-16. Note: city population based on the 2010 Census population..

Critical Facility Vulnerability[20]

There are no critical facilities exposed to the profiled flood scenario.

National Flood Insurance Program Insured Structures (NFIP)

FEMA updated the Flood Insurance Study (FIS) and Flood Insurance Rate Maps (FIRMs) in 2019 (effective October 10, 2019). The city subsequently adopted the applicable FIRMs as part of their floodplain ordinance. The city does not participate in the CRS and, therefore, does not receive discounted flood insurance premiums for residents in a special flood hazard zone.

The city complies with the NFIP through enforcement of their flood damage prevention ordinance and their floodplain management program. Their flood prevention code section is based on the Oregon Model Flood Hazard Prevention code, which includes provisions addressing substantial improvement/substantial damage. After a flood event the Building Official will ensure that construction requirements found in the Floodplain Ordinance for properties that have seen substantial improvement/substantial damage are met when issuing building permits.

The city has 656 National Flood Insurance Program (NFIP) policies in force, representing almost $132.9 million in coverage. The Community Repetitive Loss record for Lincoln City identifies six (6) Repetitive Loss Properties[21], of which two (2) are Severe Repetitive Loss Properties[22]. Five (5)

[20] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-17.

[21] A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

[22] A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP, and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000, and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property. Repetitive Flood Loss information provided by FEMA correspondence on September 10, 2020.

of the repetitive loss properties are single-family residential (one is a severe repetitive loss property) and one is non-residential. Two (2) repetitive loss properties have been mitigated.

Landslide

The Steering Committee rated the city's **probability of occurrence for landslide events as "high" and their vulnerability as "high"**. *These ratings have not changed since the previous NHMP.*

Volume I, Section 2 of Lincoln County's NHMP adequately describes the causes and characteristics of landslide hazards, as well as the history, location, extent, and probability of a potential event.

Additional information can be found on the Lincoln County website:
https://www.co.lincoln.or.us/762/Hazards-Landslides

The severity or extent of landslides is typically a function of geology and the landslide triggering mechanism. Rainfall initiated landslides tend to be smaller and earthquake induced landslides may be very large. Even small slides can cause property damage, result in injuries or take lives. Landslide susceptibility exposure for Lincoln City is shown in Map LC-10. Approximately 53% of the city has very high or high, and 21% moderate, landslide susceptibility exposure.[23] In general, the areas of greater risk are located adjacent to rivers and creeks and indicate potential areas of erosion. *Note that even if a city has a high percentage of area in a high or very high landslide exposure susceptibility zone, this does not mean there is a high risk, because risk is the intersection of hazard and assets.*

Future Climate Projection:

According to OCCRI report "*Future Climate Projections: Lincoln County*" (Link) the intensity of extreme precipitation is expected to increase as the atmosphere warms. The magnitude of the wettest days and the wettest consecutive five days is expected to increase by about 13% (range 4% to 28%) by the 2050s under the higher emissions scenario relative to historical baselines. Landslide risk is not expected to change significantly.

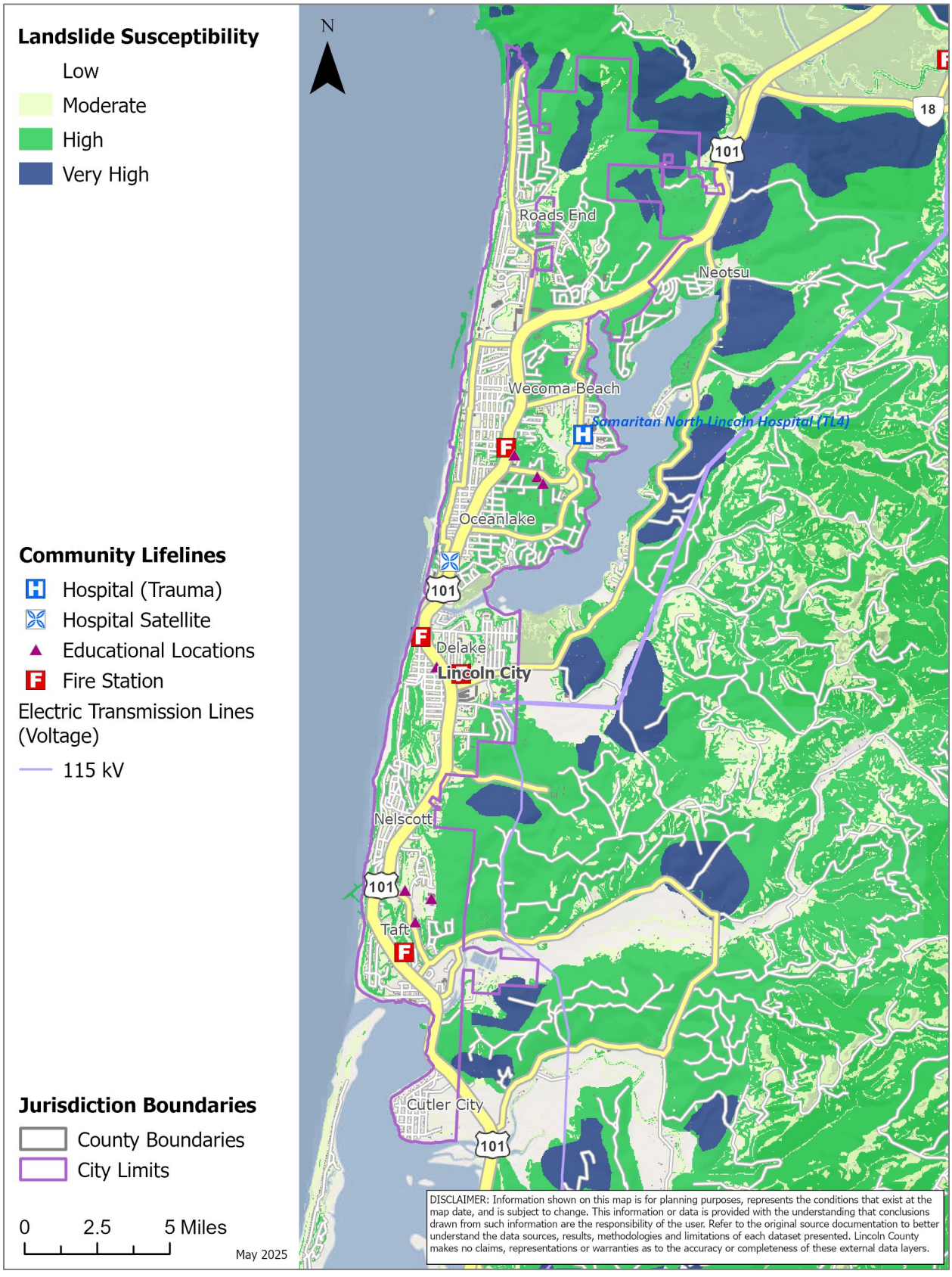
Vulnerability Assessment

Development pressure on steep slopes is an issue that Lincoln City is facing. Also, the road to the city's wastewater treatment plant has occasional slides (last slide was in 1999, the existing Wastewater Master Plan has an action identified for this vulnerability). In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

Potential landslide-related impacts are adequately described within the county's plan, and include infrastructure damages, economic impacts (due to isolation and/or arterial road closures), property damages, and obstruction to evacuation routes. Rain-induced landslides and debris flows can potentially occur during any winter in Lincoln County, and thoroughfares beyond city limits are susceptible to obstruction as well. As such, Lincoln City is vulnerable to isolation for an extended period.

[23] DOGAMI. Open-File Report, O-16-02, *Landslide Susceptibility Overview Map of Oregon* (2016)

Map LC-10 Landslide Susceptibility Exposure



Source: Oregon Explorer: Map Viewer – To view map detail click hyperlink to left.

Natural Hazard Risk Report for Lincoln County

The Risk Report (DOGAMI, O-20-11) provides hazard analysis summary tables that identify populations and property within Lincoln County that are vulnerable to landslide. The Risk Report provides a distinct profile for Lincoln City.

The Risk Report provides an analysis of landslide susceptibility to identify the general level of susceptibility to landslide hazards, primarily shallow and deep landslides. The Risk Report performed an analysis of buildings, including critical facilities, to determine exposure for the city. According to the Risk Report the following resident population and property (public and private) within the city may be impacted by the profiled landslide scenario (Table LC-9).

Approximately 35% of the city's population (2,758 people) may be displaced by landslides. These people are expected to have mobility or access issues and/or may have their residences impacted by a landslide. It is important to note that impact from landslides may vary depending on the specific area that experiences landslides during an event. Properties that are most vulnerable to the landslide hazard are those that are developed in an area of, or at the base of, moderate to steep slopes. Approximately 33% of all buildings (2,180 buildings) within the city are exposed to the High or Very High landslide susceptibility zones (Table LC-9) value of exposed buildings is just over $343 million (about 32% of total building value).

Table LC-9 Potentially Displaced Residents and Exposed Buildings, Landslide

Community Overview: Lincoln City						
Population		Buildings		Critical Facilities	Total Building Value ($)	
7,930		6,687		11	1,086,802,000	
Exposure Analysis: Landslide High & Very High Susceptibility						
Potentially Displaced Residents		Exposed Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Value ($)	Percent
2758	34.8%	2180	32.6%	3	343,400,000	31.6%

Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020). Table A-16. Note: city population based on the 2010 Census population.

Critical Facility Vulnerability[24]

- Lincoln City Police Department (new building built in 2020)
- North Lincoln Fire Station 1400 (new building built in 2020)
- Oceanlake Elementary School

[24] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-17.

Severe Weather

Severe wind events may occur throughout Oregon during all seasons. Often originating in the Pacific Ocean, westerly winds pummel the coast, slowing as they cross the Coastal mountain range and head into the inland valleys.[25] Similarly, severe winter storms consisting of rain, freezing rain, ice, snow, cold temperatures, and wind originate from troughs of low pressure offshore in the Gulf of Alaska or in the central Pacific Ocean that ride along the jet stream during fall, winter, and early spring months. [26] In summer, the most common wind directions are from the west or northwest; in winter, they are from the south and east. Local topography, however, plays a major role in affecting wind direction.

Additional information can be found on the Lincoln County website: https://www.co.lincoln.or.us/765/Hazards-Severe-Weather

Future Climate Projections

Oregon and the Pacific Northwest experience a variety of extreme weather incidents ranging from severe winter storms and floods to drought and dust storms, often resulting in morbidity and mortality among people living in the impacted regions. According to the Oregon Climate Change Research Institute, climate change is expected to increase the frequency and intensity of some weather incidents.[27]

Climate change poses risks for increased injuries, illnesses and deaths from both direct and indirect effects. Incidents of extreme weather (such as floods, droughts, severe storms, heat waves and fires) can directly affect human health as well as cause serious environmental and economic impacts. Indirect impacts can occur when climate change alters or disrupts natural systems.

According to OCCRI report "*Future Climate Projections: Lincoln County"* (Link) windstorm events are not expected to increase, however, air temperatures on the coldest day of the year will increase by about 5°F by the 2050s under the higher emissions scenario relative to historical baselines.

Extreme Heat

The Steering Committee rated the city's **probability of occurrence for extreme heat events as "moderate" and their vulnerability as "low".** *This hazard was not assessed in the previous version of this NHMP.*

Volume I, Section 2 describes the causes and characteristics of extreme heat, as well as the history, location, extent, and probability of a potential event and how it relates to future climate

[25] US Department of Agriculture. http://www.fsa.usda.gov/or/Notice/Flp104.pdf.

[26] Interagency Hazard Mitigation Team. 2000. State Hazard Mitigation Plan. Salem, OR: Oregon Office of Emergency Management.

[27] Oregon Climate Change Research Institute, *Seventh Oregon Climate Assessment,* https://oregonstate.app.box.com/s/ziqc1kisxkup45147phjp526kheugqnb

projections. Areas of the county that are inland, like the city, are more susceptible to extreme heat events. Extreme temperatures are measured as days with a heat index above 90 degrees. Extreme heat events can and have occurred in the city, and while they typically do not cause loss of life, they are becoming more frequent and have the potential to impact on economic activity as well as quality of life and have caused threat to life in some cases.

Additional information can be found on the Lincoln County website: https://www.co.lincoln.or.us/755/Hazards-Extreme-Heat

Vulnerability Assessment

No development or population changes affected the jurisdiction's overall vulnerability to this hazard. The population of adults aged 65 and older is increasing within this jurisdiction. As a result, the impact of this hazard may increase.

Windstorm

The Steering Committee rated the city's **probability of occurrence for windstorm events as "high" and their vulnerability as "high"**. *These ratings have not changed since the previous NHMP.*

The Steering Committee rated the city's **probability of occurrence for tornado events as "low" and their vulnerability as "low"**. *The probability rating decreased since the previous NHMP.*

Volume I, Section 2 of Lincoln County's NHMP adequately describes the causes and characteristics of windstorm hazards, as well as the history, location, extent, and probability of a potential event. Because coastal windstorms typically occur during winter months, ice, freezing rain, flooding, and very rarely, snow sometimes accompany them. More than likely, however, the coast's winter will just be windy, cold, and wet.

Vulnerability Assessment

No development or population changes affected the jurisdiction's overall vulnerability to this hazard. In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

Due to insufficient data and resources, Lincoln City is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. In Lincoln City, power outages are the greatest concern during windstorms. Building codes require new developments to place power lines below ground; currently, however, new construction only accounts for about 5% of the city's total development. Without power, communication is lost, and fuel and food stores shut down. In the December 2007 windstorm, the water treatment plant nearly used up its diesel supply, and the city lost its primary communications route (provided through Telecommunication Utility-owned Fiber Optic routes). Lincoln City patrons were additionally unable to access 911.

Winter Storm (Snow/ Ice)

The Steering Committee rated the city's **probability of occurrence for winter storm events as "high" and their vulnerability as "moderate"**. *These ratings have not changed since the previous NHMP.*

Volume I, Section 2 of Lincoln County's NHMP adequately describes the causes and characteristics of winter storm hazards, as well as the history, location, extent, and probability of a potential event. Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting the city typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from October through March. More than likely, however, the coast's winter will just be windy, cold, and wet.

Vulnerability Assessment

No development or population changes affected the jurisdiction's overall vulnerability to this hazard. In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

Due to insufficient data and resources, Lincoln City is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Major winter storms can and have occurred in the Lincoln City area, and while they typically do not cause significant damage; they are frequent and have the potential to impact economic activity. Road closures on Highway 101, or the passes to the Willamette Valley (Hwy 18 and 20), due to winter weather are an uncommon occurrence, but can interrupt commuter and large truck traffic.

Volcanic Event

The Steering Committee rated the city's **probability of occurrence for volcanic events as "low" and their vulnerability as "low"**. *These ratings have not changed since the previous NHMP.*

Volume I, Section 2 of Lincoln County's NHMP adequately describes the causes and characteristics of volcanic event hazards, as well as the history, location, extent, and probability of a potential event. Generally, an event that affects the county is likely to affect Lincoln City as well.

Vulnerability Assessment

No development or population changes affected the jurisdiction's overall vulnerability to this hazard. In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

Due to insufficient data and resources, Lincoln City is currently unable to perform a quantitative risk assessment, or exposure analysis, for this hazard. Lincoln City is very unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in

1980, the city received small amounts of ashfall, but not enough to cause significant health and/or economic damages.

Wildfire

The Steering Committee rated the city's **probability of occurrence for wildfire events as "moderate" and their vulnerability as "moderate"**. *These ratings have not changed since the previous NHMP.*

The Lincoln County Community Wildfire Protection Plan (CWPP) was last completed in 2024. The CWPP is hereby incorporated into this NHMP addendum by reference, and it will serve to supplement the wildfire section in this addendum.

Volume I, Section 2 of Lincoln County's NHMP adequately describes the causes and characteristics of wildfire hazards, as well as the history, location, extent, and probability of a potential event. The location and extent of a wildfire vary depending on fuel, topography, and weather conditions. Wildfires in 1849 and 1936 were particularly devastating in Lincoln County, but since then, there have been few large events. In 2020, the Echo Mountain Fire Complex burned more than 2,500 acres northeast of the city and impacted hundreds of homes in the Otis, Rose Lodge, Panther Creek area. The burn probability and wildfire history (1992-2022) for the city is shown in Map LC-11. Most of the city has "very low" to "low" burn probability. Due to increased drought conditions, human activity (tourism), and the threat of east-wind conditions, the city elevated the probability of occurrence in their HVA.

Additional information can be found on the Lincoln County website:
https://www.co.lincoln.or.us/770/Hazards-Wildfire

Future Climate Projection:

According to OCCRI report "*Future Climate Projections: Lincoln County*" (Link) wildfire risk is expected to increase as the frequency of higher fire danger days per year increases by 37% by the 2050s under the higher emissions scenario compared with the historical baseline.

Vulnerability Assessment

No development or population changes affected the jurisdiction's overall vulnerability to this hazard. In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

Potential wildfire impact is shown using integrated conditional net value change from the Pacific Northwest Quantitative Wildfire Risk Assessment (2023, Map LC-12).[28] Overall Potential Impact measures the potential consequences of wildfire on valuable assets and resources—such as infrastructure, housing, forests, and wildlife habitat—without considering the likelihood (probability) of fire occurring. It reflects a spectrum from very negative impacts (e.g., damage to structures or sensitive ecosystems) to positive impacts (e.g., ecological benefits like improved

[28] Full documentation of methods for the 2023 update to the Pacific Northwest QWRA can be found here: https://oe.oregonexplorer.info/externalcontent/wildfire/PNW_QWRA_2023Methods.pdf

vegetation or habitat conditions). Not all resources are present everywhere, so the map displays risk only for what's within the mapped area. Most of the city lies within “neutral” to “very high” loss areas.

The forested areas have the potential for large wildfires and a wildfire within the watershed could impact the city’s water supply and quality. Areas of concern include the eastern side of the city (where forestland borders development), and some of the open spaces within the city’s limits. Due to the prevailing wind patterns (i.e., from the north or south), the city’s steering committee felt that the east and south ends of the city might be the most vulnerable. Power, natural gas, and phone lines run through the forest to the east of the city and would be affected in the event of a wildfire. Likewise, active commercial logging occurs just outside the city, and slash burns are a potential wildfire concern.

Property can be damaged or destroyed with one fire as structures, vegetation, and other flammables easily merge to become unpredictable, and hard to manage. Other factors that affect ability to effectively respond to a wildfire include access to the location, and to water, response time from the fire station, availability of personnel, and equipment, and weather (e.g., heat, low humidity, high winds, and drought).

Exposed infrastructure including wastewater main lines, major water lines, natural gas pipeline and fiber optic lines are buried, decreasing their vulnerability to damage from wildfire hazards. However, wildfire conditions could potentially limit or delay access for the purposes of operation or repair.

Natural Hazard Risk Report for Lincoln County

The Risk Report (DOGAMI, O-20-11) provides hazard analysis summary tables that identify populations and property within Lincoln County that are vulnerable to wildfire. The Risk Report provides a distinct profile for Lincoln City.

The Risk Report provides an analysis of the West Wide Wildfire Risk Assessment’s Fire Risk Index (FRI) High Hazard category to identify the general level of susceptibility to the wildfire hazard. The Risk Report performed an analysis of buildings, including critical facilities, to determine exposure for the city. According to the Risk Report the following resident population and property (public and private) within the city may be impacted by the profiled wildfire scenario (Table LC-10).

Approximately one percent of the city’s population (89 people) may be displaced by wildfires. These people are expected to have mobility or access issues and/or may have their residences impacted by a wildfire (more people may also be impacted by smoke and traffic disruptions that are not accounted for within this analysis). It is important to note that impact from wildfires may vary depending on the specific area that experiences a wildfire. The value of exposed buildings (75 buildings) is just over $8 million (less than one percent of total building value).

Table LC-10 Potentially Displaced Residents and Exposed Buildings, Wildfire

Community Overview: Lincoln City						
Population		Buildings		Critical Facilities	Total Building Value ($)	
7,930		6,687		11	1,086,802,000	
Exposure Analysis: Wildfire High-Hazard						
Potentially Displaced Residents		Exposed Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Value ($)	Percent
89	1.1%	75	1.1%	1	8,049,000	0.7%

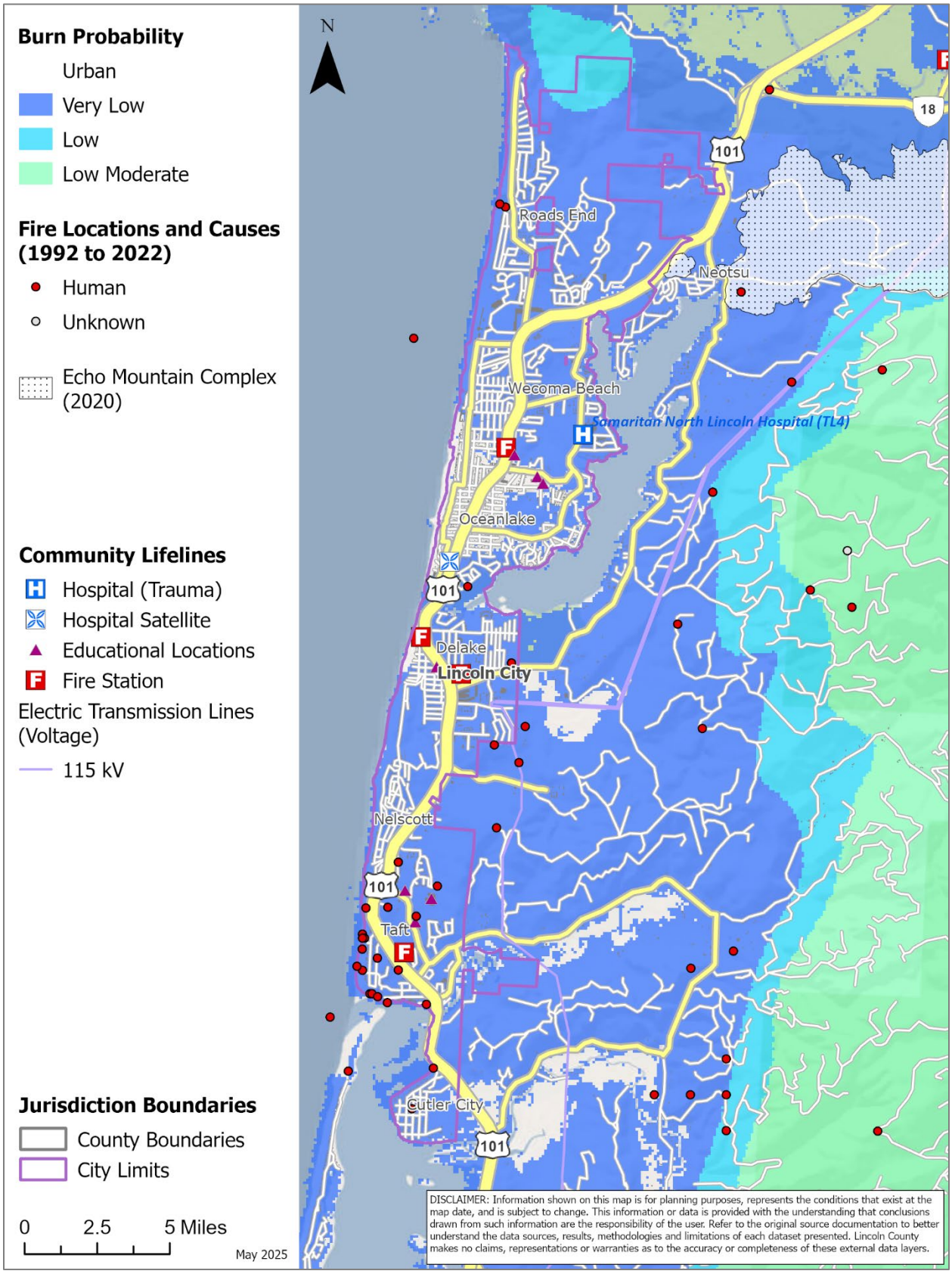
Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020). Table A-16. Note: city population based on the 2010 Census population.

Critical Facility Vulnerability[29]

- Samaritan North Lincoln Hospital (new building built in 2020)

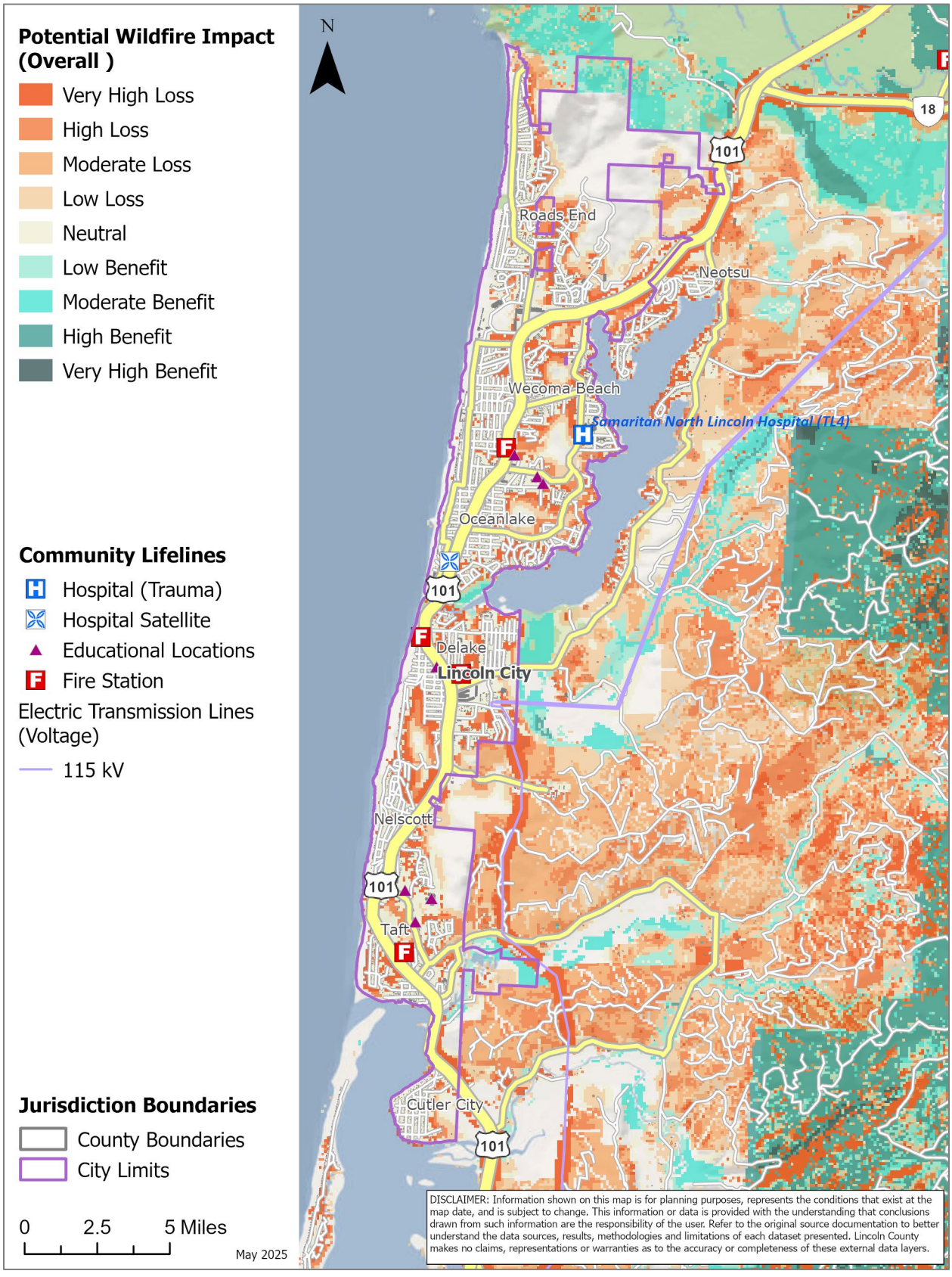
[29] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-17.

Map LC-11 Burn Probability and Fire History (1992-2022)



Source: Oregon Explorer: Map Viewer – To view map detail click hyperlink to left.

Map LC-12 Potential Wildfire Impact (Overall)



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

Attachment A: Action Items

Table LC-11 is an accounting of the status (complete or not complete) and major changes to actions since the previous NHMP. All actions were revised and renumbered in this update to be consistent with other jurisdictions that are participating in the multi-jurisdictional NHMP. Actions identified as still relevant are included in the updated action plan (Table LC-1).

Previous NHMP Actions that are Complete:
Lincoln City #3: *Identify over-water transportation alternatives in the event that bridges collapse in an earthquake and/ or tsunami.* Bridges are hardened over D River and Schooner Creek (ODOT) that includes a pedestrian bridge. Offroad equipment will be used for other situations.

Lincoln City #4: *Continue to educate citizens about earthquake and tsunami preparedness.* Part of normal operations.

Lincoln City #6: *Continue compliance with the National Flood Insurance Program.* Part of normal operations.

Previous NHMP Actions that are Not Complete and No Longer Relevant:
Lincoln City #7: *Explore steps needed to qualify Lincoln City for participation in the National Flood Insurance Program's Community Rating System (CRS).* Not considered cost effective at this time.

Table LC-11 Status of All Hazard Mitigation Actions in the Previous Plan

2020 Action Item	2025 Action Item	Status	Still Relevant? (Yes/No)
Lincoln City #1	Lincoln City #1	Not Complete	Yes
Lincoln City #2	Lincoln City #2	Not Complete	Yes
Lincoln City #3	-	Complete	-
Lincoln City #4	-	Complete	-
Lincoln City #5	Lincoln City #3	Not Complete	Yes
Lincoln City #6	-	Complete	-
Lincoln City #7	-	Not Complete	No
Lincoln City #8	Lincoln City #4	Not Complete	Yes
Lincoln City #9	Lincoln City #5	Not Complete	Yes
Lincoln City #10	Lincoln City #6	Not Complete	Yes
Lincoln City #11	Lincoln City #7	Not Complete	Yes

2020 Action Item	2025 Action Item	Status	Still Relevant? (Yes/No)
Lincoln City #12	Lincoln City #8	Not Complete	Yes
Lincoln City #13	Lincoln City #9	Not Complete	Yes

Attachment B: 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 city. 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 city 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 7, 2025 (virtually via Zoom)
During this meeting, the Steering Committee reviewed the previous NHMP, and were provided updates on hazard mitigation planning, the NHMP update process, and project timeline. The Steering Committee:

- Updated recent history of hazard events in the city.
- 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 update including community vulnerabilities and hazard information.
- Reviewed and updated their existing mitigation strategy (actions).
- Reviewed and updated their implementation and maintenance program.

Meeting Attendees:

- Convener, Cassidy Boyle, Emergency Preparedness Coordinator
- Weston Fritz, Associate Planner