Toledo Addendum

to the Lincoln County Multi-Jurisdictional NHMP


Photos courtesy of Travel Oregon

Effective: December 17, 2025 through December 16, 2030

Prepared for
City of Toledo
206 N Main Street
Toledo, OR 97391

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

UNIVERSITY OF OREGON | Institute for Policy Research and Engagement

This Natural Hazard Mitigation Plan was prepared by:

UNIVERSITY OF OREGON | School of Planning, Public Policy and Management | Institute for Policy Research and Engagement

Planning grant funding provided by:

FEMA

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

Additional Support Provided by:

OREGON DEPARTMENT OF EMERGENCY MANAGEMENT OEM

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

130 228th St SW
Bothell, WA 98021

December 17, 2025

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

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

Dear Officer Richardson:

In accordance with 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	

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

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

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

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

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

Sincerely,

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

JG: MB

Attachment**:** Local Mitigation Plan Review Tool

RESOLUTION NO. 1589

A RESOLUTION ADOPTING THE CITY OF TOLEDO REPRESENTATION IN THE UPDATES TO THE LINCOLN COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN

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

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

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

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

WHEREAS, the NHMP is in an on-going cycle of development and revision to improve it's effectiveness; and

WHEREAS, City of Toledo adopts the NHMP and directs the City Manager, Fire Chief, and Public Works Director to develop, approve, and implement the mitigation strategies and any administrative changes to the NHMP.

NOW, THEREFORE, THE CITY OF TOLEDO RESOLVES AS FOLLOWS:

1. That the City of Toledo adopts *the Lincoln County Multi-Jurisdictional Natural*

Hazards Mitigation Plan as an official plan; and

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

PASSED by the City Council on this 5th day of November, 2025.

APPROVED:

Mayor Rod Cross

APPROVED by the Mayor on this 5th day of November, 2025.

ATTEST:

City Recorder Paul Johnson

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Introduction

Purpose and Adoption

This is an update of the City of Toledo 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 II (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).

The City of Toledo'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 Toledo adopted their addendum to the Lincoln County Multi-jurisdictional NHMP on November 5, 2025. FEMA Region X approved the Lincoln County NHMP and the city's addendum on December 17, 2025. With approval of this NHMP the district is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through December 16, 2030.

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 Toledo 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 Toledo Planner (contract) 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 Toledo 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 Toledo Steering Committee was comprised of the following representatives:

- Convener, Justin Peterson, Contract Planner
- Arlene Inukai, Planning Assistant
- Brian Lorimor, Public Works Director
- Larry Robeson, Deputy Fire Chief

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.

Capability Assessment

The Capability Assessment identifies and describes the ability of Toledo 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.

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 Toledo 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 Toledo Comprehensive Plan (2023) implements Statewide Planning Goal 7 in Article 7, Natural Hazards (p. 39). This article outline goals and policies the city has to prepare for and respond to disasters. There are goals and policies for the general welfare of the city, floodplains, tsunamis, geologic hazards, windstorms, wildfire, and drought. Examples of the goals and policies include integrating information from the NHMP with other city plans, access federal grants to implement risk reducing actions, and maintain Special Flood Hazard Area (SFHA) regulations in order to continue participation in the National Flood Insurance Program (NFIP).

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 Toledo Municipal Code is the city's zoning ordinance. There is no flood hazard area zone section of Title 17. All flood hazard ordinances are in Title 15, Buildings and Construction.

Regarding the FEMA Pre-Implementation Compliance Measures (PICM) in response to the National Marine Fisheries Service Biologic Opinion (BiOp), Toledo decided to permit regulation in flood zones on a case-by-case basis. The purpose of the PICM is 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 Toledo Rural Fire Protection 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.

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

Flood Hazard Protection rules for the city are found in Chapter 15.16 of the Toledo Municipal Code. The purpose of this ordinance is to promote public health, safety, general welfare, and minimal public and private loss due to flooding. Subchapter 15.16.040 details methods for reducing flood losses in the city. Subchapter 15.16.210 outlines the general standards for flood hazard reduction, which includes requirements for anchoring, materials, water systems, and watercourse alterations. Subchapter 15.16.220 says the city's freeboard requirements for residential construction is one (1) foot above the base flood elevation.

Policies and Programs

City Plans

The Toledo Transportation System Plan (2013) guides the management and development of the city's comprehensive multimodal transportation system for a 20-year period. One goal of the TSP is to minimize adverse social and environmental impacts when constructing or maintaining transportation systems. This aligns with one of the development objectives, which is to maintain fire breaks and evacuation routes for each property in the community.

The Yaquina Bay Estuary Management Plan (2023) is an updated portion of the original Lincoln County Estuary Management Plan that was published in 1982. This update governs estuarine resource conservation and development decisions for the Yaquina Bay area. The City of Toledo and Port of Toledo served on the steering committee for the update. The plan identifies multiple climate vulnerabilities that Toledo is subject to. Sea level rise will risk the structural integrity of submerged infrastructure, increase the frequency and extent of storm surge flooding, and increase shoreline erosion. The plans policies to address these concerns are to keep non-water related uses out of estuarine areas and minimize adverse impacts of development on natural resources.

The Toledo Water System Master Plan (2017) investigates the needs within the current UGB plus areas encompassing the raw water supply and transmission facilities for a 20-year period into the future, ending in the year 2036. Section 7, Water System Needs and Alternatives, outlines what major infrastructure components need attention. These components are divided into four categories, which are water supply, water treatment, water storage, and distribution. Section 8, Capital Improvement Plan, provides a summary of projects by type and prioritization for the city to plan for regarding its water system. Table 8.1 is a summary of project by type, and tables 8.2 and 8.3 summarize the projects by increased to decreased priority.

National Flood Insurance Program (NFIP)

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

Toledo 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, Toledo has one highway that is considered a seismic lifeline. Highway 20 is a tier 2 lifeline. 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 Mayor and six-member City Council is the policy making body for Toledo. As the elected legislative body in Toledo, the City Council has overall responsibility for the scope, direction and financing of city services. Council members serve four-year terms, the Mayor also serves on the council and serves two-year terms. Additional departments within the city include the following:

Administration Department: The Administration Department is located at City Hall and is responsible for the day-to-day general administration and financial management of the city. The city manager, appointed by the mayor and City Council, is the administrative head of the City of Toledo. The department also includes the city attorney, city recorder, treasurer, utility billing clerk, accounting clerk, planning assistant, and contract planner. The Administrative Department is responsible for the city's comprehensive plan, implementing ordinances, building permits, grant administration and special projects.

Public Works Department: The City of Toledo Public Works Department is responsible for maintaining the potable water distribution system, the wastewater collection system, the stormwater system, roadside signage, fleet and equipment, and streets. Currently Public Works has the following employees: a Public Works Director, Public Works Operations Supervisor, Administrative Secretary, five Maintenance Workers, one Mechanical Tech, two Water Plant Operators, two Wastewater Treatment Plant Operators. The Property Maintenance team is also included in the Public Works Department. The Property Maintenance Department provides maintenance to city buildings and facilities. This includes city hall, police, fire, library, parks, and various landscape islands and parking lots. The department consists of a two Property Maintenance Workers and one custodian.

Police Department: The Toledo Police Department is responsible for the overall law enforcement, code enforcement, and crime prevention programs for the City of Toledo. Currently the Police Department has nine employees: a Police Chief, a Police Sergeant, six officers, and evidence assistant.

Fire Department: The Toledo Fire and Rescue Department is responsible for emergency response to fires, medical services and disaster management for the City of Toledo. The department consists of two city employees and approximately 15 volunteers.

Library: The Public Library is located at 173 NW 7th Street and has about 35,000 items available for borrowing. It has access to 250,000 items through its membership in the Chinook Library Network, a cooperative including public and community college libraries.

Recreation: The City of Toledo offers resources for recreation activities of all kinds. The city has several park facilities, tennis courts, and ball fields among other resources.

Mitigation Successes

This is a list of funding Toledo has received to make improvements to city infrastructure.

- The Arcadia School was refurbished using ignition resistant materials using FEMA's Hazard Mitigation Grant Program.
- Added additional tsunami signage in impacted areas.
- Relocating police station outside the tsunami zone (Action Item #10).

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. Within the City of Toledo, specific hazard objectives are listed within the city's Comprehensive Plan (dated 2023):

Overall Objectives:

1. Identify potential natural hazard areas where development may occur when appropriate safeguards can minimize the impact of hazards upon development and impacts of new development upon adjoining properties.
2. Identify and preserve known natural hazard areas best retained for open space, yards, natural resource areas, wildlife habitats, recreation, or other non-structural uses.
3. Maintain an inventory of areas subject to natural disasters and hazards. The inventory shall be used to determine the suitability of a location for development and, if necessary, be used to limit the development to a level consistent with the degree of a hazard, the disaster potential and the environmental protection policies in the Comprehensive Plan.
    a. The city shall utilize the Soil Survey of Lincoln County Area, Oregon July, 1997 (and later editions), the Environmental Geology of Lincoln County Oregon - Bulletin 81 (Department of Geology and Mineral Industries, 1973), the Environmental Hazard Inventory Coastal Lincoln County (RNKR Associates, 1977), the All Hazard Mitigation Plan: Lane, Lincoln, and Linn Counties, Oregon (G & E Engineering Systems, Inc. 1998) and other appropriate materials as guides for developing policies and regulations to minimize damages from developing in hazardous areas.
4. Develop comprehensive and effective safeguards for developments within known natural hazard areas by requiring the use of special design and construction features to reduce potential risks/damages in accordance with state building codes, other state codes, federal regulations, and local codes.

Mitigation Strategy

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

Toledo follows 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 TA-1). For additional information see Attachment B.

The steering committee opted to not include mitigation strategies for low vulnerability and low probability hazards including: Crustal earthquake, coastal flood, distant tsunami, volcanic event, and tornado. The steering committee will study these hazard 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 TA-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 TA-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	Develop and implement a community-wide education and outreach program focused on preparedness for wildfires, winter storms, earthquakes, tsunamis, windstorms, and landslides. This includes public service announcements, seasonal materials distributed with water bills, school-based safety education, and public meetings in Toledo. Educational displays will be placed in libraries, and residents will receive guidance on power outage safety, generator use, and evacuation planning. A neighbor assistance program will also be established to support individuals with medical needs during emergencies.	X		X	X	X	X	X	X	X	X	X	X	Local funding resources, OEM, DLCD, OSU Extension	Fire Department	Ongoing	L
2	Conduct a comprehensive structural integrity evaluation of the Olalla Reservoir Dam (owned/operated by Georgia Pacific) and the Mill Creek Reservoir Dam to identify and address any deficiencies. Develop and implement a formal Emergency Action Plan (EAP) for each dam, detailing potential emergency conditions, response procedures, and communication protocols, including early warning systems for downstream communities. Coordinate with state and county emergency management agencies to confirm the dams' hazard classifications (e.g., high-hazard or significant-hazard potential). Assess downstream flood risk, identifying vulnerable assets such as recreational facilities, campgrounds, and residential areas. Launch a public education campaign to inform residents about flood response actions, including evacuation procedures, securing property, and safely managing utilities. This action will enhance community resilience and reduce the risk of loss of life and property damage in the event of dam failure.				X		X							Local funding resources, HMA	Public Works/OWRD	S	M to H
3	Develop and implement a comprehensive seismic risk reduction program to enhance the resilience of community infrastructure and facilities. Begin by conducting a detailed inventory of public buildings, critical infrastructure, and lifelines to identify structures most vulnerable to earthquake damage. Prioritize schools, emergency response facilities, and essential public buildings for assessment. Based on findings, pursue structural and non-structural retrofit				X									Local funding resources, Business Oregon IFA Seismic Rehabilitation Grant Program	Public Works	S	M to 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
	options and seek funding through federal, state, and local sources to support retrofitting or rebuilding efforts. Establish a local rehabilitation and retrofit program to guide and incentivize upgrades to existing buildings, ensuring compliance with current seismic safety standards. This action will significantly reduce potential loss of life, property damage, and service disruption during seismic events.																
4	Integrate and implement the specific hazard mitigation objectives outlined in Article 7 of Toledo's Comprehensive Plan by identifying and inventorying natural hazard areas, preserving high-risk zones for non-structural uses, and enforcing development safeguards. This includes requiring hazard-specific design and construction standards in flood, tsunami, earthquake, landslide, weak soil, high groundwater, windstorm, and wildfire-prone areas. The city will utilize established geological and environmental data sources to guide land use decisions and ensure that all development aligns with state and federal regulations. This action supports compliance with the Disaster Mitigation Act of 2000 by embedding hazard mitigation strategies into the city's broader planning framework.				X		X	X	X		X	X	X	Local funding resources, DLCD Technical assistance grant	Planning	Ongoing	M to H
5	Maintain and enhance the city's compliance with the National Flood Insurance Program (NFIP) by actively participating in Community Assistance Visits with DLCD and FEMA, regularly assessing and updating floodplain ordinances to reflect current flood risks and exploring updates to the FEMA Flood Insurance Rate Map. The city will also evaluate participation in the NFIP's Community Rating System (CRS) to further reduce flood insurance premiums for residents. Public education initiatives will be implemented to inform residents about flood risks and promote individual mitigation actions. These efforts aim to reduce future flood damage, support continued access to federally backed flood insurance, and strengthen the city's overall flood resilience.						X							Local funding resources, DLCD TA	Planning	Ongoing	L
6	Identify and address the community's vulnerability to natural gas explosions following seismic events by developing a comprehensive Disaster Fuel Plan. This plan should include coordination with NW Natural to map natural gas service areas within the city, enabling				X		X	X	X		X	X	X	Local funding resources, ODE	Public Works	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
	targeted emergency management planning. Recognizing that a gas explosion could significantly disrupt emergency response efforts, this action aims to mitigate risk by improving situational awareness and preparedness in high-risk zones.																
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. Encourage construction, site location and design that can be applied to steep slopes to reduce the potential threat of landslides. Use the 2019 Landslide Hazards Land Use Guide to inform policy language and development review procedures.							X						Local funding resources, HMA, DLCD TA	Planning/ Public Works	S	M to H
8	Collaborate with property owners in flood-prone areas of Toledo—particularly along Yaquina Bay Road, Business Hwy 20, and the A Street area—to assess and implement cost-effective flood mitigation strategies such as elevation, relocation, or acquisition. Prioritize structures within the Special Flood Hazard Area, including critical facilities like the police station, city library, and Head Start program, with a focus on pre-FIRM buildings. Utilize FEMA programs and local flood hazard codes to elevate structures at least one foot above base flood elevation, reducing future flood risk in areas with a high probability of recurring flood events.						X							Local funding resources, HMA (FMA)	Planning / Floodplain Manager	L	H
9	Relocate the Toledo Police Department from its current location at 250 W Hwy 20, which lies within the tsunami inundation and floodplain zone, to a safer site outside the hazard area. Concurrently, establish a resilient police communications system that remains operational during and after a disaster event. This action aims to ensure uninterrupted emergency response capabilities in the event of a tsunami and other hazards, which could otherwise result in power outages, infrastructure damage, and communication failures.				X			X	X		X	X	X	Local funding resources, HMA	Police	S	H
10	Relocate the Toledo Public Works facility from its current location within the floodplain and tsunami inundation zone to a site outside of identified hazard areas, as defined by DOGAMI's updated tsunami mapping. This relocation is critical to ensure the continuity of						X		X					Local funding resources, HMA	Public Works	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
	essential services and infrastructure maintenance following a major tsunami event, which could otherwise result in power loss, water contamination, communication failures, and significant debris and traffic disruptions. This action will enhance the city's resilience by safeguarding critical operations and enabling a more effective disaster response.																
11	Improve, maintain, and obtain resources and equipment essential for mitigating the impacts of disasters. (e.g., procure funding and purchase Sat Runners/COWS, satellite phones/Starlink, create a generator master plan, create a debris removal plan, procure funding to address communication, power, and security equipment gaps)	X			X	X	X	X	X		X	X	X	Local funding resources, HMA (FMA), OREM, PIER	Public Works	M	M-H
12	In alignment with the Lincoln County CWPP, develop and implement comprehensive fire and wildfire mitigation strategies specifically tailored to city-owned facilities. This includes conducting facility-specific risk assessments, creating defensible space through vegetation management, upgrading infrastructure with fire-resistant materials, and coordinating with local fire departments and emergency services. Mitigation actions will prioritize high-risk areas to reduce the likelihood of ignition and minimize potential damage from wildfires, thereby enhancing the resilience and safety of municipal operations and assets.										X			Local funding resources, HMA	Fire Department	S	L-M
13	Develop and implement a comprehensive wind and straight-line windstorm mitigation plan aimed at reducing structural and infrastructural vulnerabilities in high-risk areas. This includes conducting a detailed risk assessment to identify susceptible buildings and critical infrastructure, promoting the use of wind-resistant construction materials and retrofitting techniques, enhancing community awareness through education and preparedness programs, and coordinating with emergency management agencies to establish rapid response protocols. The plan will prioritize actions based on risk severity and cost-effectiveness, ensuring long-term resilience against frequent and damaging wind events.											X		Local funding resources, HMA	Public Works	S	L-M

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
14	Develop and implement a comprehensive urban forestry risk management program aimed at reducing the threat of tree-related hazards to lives, property, and public infrastructure during severe weather events such as windstorms and winter storms. This program will include regular tree health assessments, strategic pruning and removal of high-risk trees, public education campaigns on tree maintenance, and the integration of resilient tree species in urban planning. Coordination with utility companies and emergency services will ensure rapid response protocols are in place to address fallen trees and minimize service disruptions.											X	X	Local funding resources	Public Works	S	L-H

Source: 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), S=Short (1-4 years), M=Medium (4-10 years), L=Long (10 or more years)
Priority Actions: Identified with orange highlight
* - the windstorm hazard includes tornadoes (water spouts)
Dark Grey highlight indicates that the hazard does not impact the jurisdiction.

Risk Assessment

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

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

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

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

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

Hazard Analysis

The 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 TA-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.

Landslide, windstorm, winter storm (snow/ice), riverine flood, and Cascadia Subduction Zone earthquake are the high hazard threats to the city. Local tsunami, drought, wildfire, air quality/smoke, and extreme heat events are the moderate hazard threats. Crustal earthquake, coastal flood, distant tsunami, volcanic events, and tornado are the low hazard threats.

The city is not affected by coastal erosion, as such the hazard is not profiled and not included in their hazard analysis.

Table TA-2 Hazard Analysis Matrix

Hazard	History	Vulnerability	Maximum Threat	Probability	Total Threat Score	Hazard Rank	Hazard Tiers
Landslide	20	50	100	70	240	#1	Top Tier
Windstorm	20	50	100	70	240	#2	
Winter Storm	18	35	90	70	213	#3	
Flood (Riverine)	20	35	80	70	205	#4	
Earthquake (Cascadia)	2	50	100	49	201	#5	
Local Tsunami	2	40	90	49	181	#6	Middle Tier
Drought	16	35	50	56	157	#7	
Wildfire	10	30	80	35	155	#8	
Air Quality/Smoke	10	10	70	56	146	#9	
Extreme Heat Event	12	20	50	49	131	#10	
Earthquake (Crustal)	8	30	70	21	129	#11	Bottom Tier
Flood (Coastal)	10	15	50	35	110	#12	
Distant Tsunami	8	5	30	49	92	#13	
Volcanic Event	2	5	40	7	54	#15	
Tornado	2	10	10	7	29	#16	

Source: City of Toledo NHMP Steering Committee (2025)

Community Characteristics

Table TA-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

Toledo sits seven miles inland from the Central Oregon coastline, and development spans a total of 2.3 square miles. The city is situated on a bend of the Yaquina River and is surrounded by wooded hills seven miles inland from the Central Oregon Coast. Toledo is the only inland coastal community with a deep-water channel. The city's topography is very hilly. Nearby bodies of water include the Pacific Ocean and Yaquina River.

The climate in Toledo is moderate. Average monthly temperatures range from lows of 39-42° F (November through April) to highs of 65° F (July through September) degrees. The driest months are July and August (average about 0.8 inches of precipitation per month) the wettest months are November through January (average 10-11 inches of precipitation per

month). Toledo has an average annual precipitation of approximately 67.5 inches (71%, 47.6 inches fall November through March).

Population, housing, and development

About 15% of the city's population is over 65 years old, while 21% is under the age of 15. Between 2019 and 2023 the city grew by 132 people (4%). According to the State's official coordinated population forecast (preliminary), between 2023 and 2045 the city's population is forecast to grow by 13% to 4,082. The city has an educated population with 87% of residents 25 years and older holding a high school degree, and 28% have a bachelor's degree or higher. As of 2023-24, Toledo High School and the Lincoln County School District have 82% graduation rates.[1]

Since 2020 no large subdivision have been built. There has been an 11-unit apartment building built near slopes and that building had a geotechnical study done on it to identify any landslide risk for the building.

Economy

About 62% of the resident population 16 and over is in the labor force (1,730 people) and 15% are unemployed. Top occupations include production, transportation, and material moving (28%), service (26%), management, professional, and related (23%), sale and office (13%), construction, extraction, and maintenance (8%), and farming, fishing, and forestry (3%), occupations.

The median household income in the city is $46,477, a 19% decrease since 2017.

Most workers residing in the city (85%, 1,437 people) travel outside of the city for work primarily to Newport.[2] A significant population of people travel to the city for work, (77% of the workforce, 856 people) primarily from Newport and Corvallis.

[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 (2002-2022). Longitudinal-Employer Household Dynamics Program, accessed on May 29, 2025 at https://onthemap.ces.census.gov.

Table TA-3 Community Characteristics

Population Characteristics		Population Growth
2019 Population Estimate	3,490	
2023 Population Estimate	3,622	4%
2045 Population Forecast*	4,082	13%
Race		
American Indian and Alaska Native		1%
Asian		0%
Black/ African American		0%
Native Hawaiian and Other Pacific Islander		0%
White		80%
Some Other Race		0%
Two or More Races		6%
Hispanic or Latino/a (of any race)		13%
Limited or No English Spoken	0	0%
Vulnerable Age Groups		
Less than 5 Years	260	7%
Less than 15 Years	735	21%
65 Years and Older	538	15%
85 Years and Older	74	2%
Age Dependency Ratio		0.56
Disability Status (Percent age cohort)		
Total Disabled Population	866	24%
Children (Under 18)	23	1%
Working Age (18 to 64)	679	19%
Seniors (65 and older)	164	30%

Household Characteristics		
Housing Units		
Single-Family (includes duplexes)	1,079	66%
Multi-Family	453	28%
Mobile Homes (includes RV, Van, etc.)	96	6%
Household Type		
Family Household	344	23%
Married couple (w/ children)	128	8%
Single (w/ children)	216	14%
Living Alone 65+	158	10%
Year Structure Built		
Pre-1970	1,120	69%
1970-1989	360	22%
1990-2009	137	8%
2010 or later	11	1%
Housing Tenure and Vacancy		
Owner-occupied	790	49%
Renter-occupied	735	45%
Seasonal	45	3%
Vacant	103	6%
Vehicles Available (Occupied Units)		
No Vehicle (owner occupied)	117	8%
Two+ vehicles (owner occupied)	782	51%
No Vehicle (renter occupied)	41	6%
Two+ vehicles (renter occupied)	210	29%

Income Characteristics		
Households by Income Category		
Less than $15,000	130	10%
$15,000-$29,999	267	20%
$30,000-$44,999	145	11%
$45,000-$59,999	165	12%
$60,000-$74,999	160	12%
$75,000-$99,999	215	16%
$100,000-$199,999	195	15%
$200,000 or more	69	5%
Median Household Income		$46,477
Gini Index of Income Inequality		0.46
Poverty Rates (Percent age cohort)		
Total Population	949	27%
Children (Under 18)	254	31%
Working Age (18 to 64)	670	31%
Seniors (65 and older)	25	5%
Housing Cost Burden (Cost > 30% of household income)		
Owners with a Mortgage		25%
Owners without a Mortgage		2%
Renters		4%

Employment Characteristics		
Labor Force (Population 16+)		
In labor Force (% Total Population)	1,730	62%
Unemployed (% Labor Force)	256	15%
Occupation (Top 5) (Employed 16+)		
Product., Transport., & Material	417	28%
Service	377	26%
Management, Professional, and	337	23%
Sales and Office	189	13%
Constr., Extraction, and Maintenance	117	8%
Health Insurance		
No Health Insurance	535	15%
Public Health Insurance	1,766	50%
Private Health Insurance	1,730	49%
Transportation to Work (Workers 16+)		
Drove Alone	1,121	80%
Carpooled	188	13%
Public Transit	33	2%
Motorcycle	0	0%
Bicycle/Walk	22	2%
Worked at Home	46	3%

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 (cite 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.

Toledo has the following critical facilities (**bold** indicates facility was included in the Risk Report (DOGAMI, O-20-11):

- **Police department**, 250 W Highway 20, vulnerable to flood and tsunami
- **Fire department/ EMS facility**, 285 NE Burgess Road
- Public works shop facility, 415 NW Industrial Park Way, vulnerable to local tsunami and flood
- City hall, 206 N Main Street, vulnerable to earthquake and heavy snow
- Water treatment plant, 860 NE Reservoir Lane, vulnerable to landslide/ earthquake
- Four water storage reservoir tanks:
    - Ammon Road – 1 MG
    - Graham Street – 0.4 MG
    - Clearwell Storage – 0.85 MG
    - Skyline Drive Storage – 1.9 MG
- Wastewater treatment plant, 1105 SE Fir Street, vulnerable to flood, tsunami, and earthquake
- **Elementary school**, 600 SE Sturdevant Road, vulnerable to earthquake
- **Junior/ Senior high school**, 1800 NE Sturdevant Road, vulnerable to earthquake
- **Samaritan Toledo Medical Clinic**, 199 Hwy 20
- **Port of Toledo**, 496 NE Hwy 20

Transportation

Mobility plays an important role in Toledo, and the daily experience of its residents, and businesses. Motor vehicles represent the dominant mode of travel through, and within the city. Toledo is also served by Lincoln County Transit Route 493 with service running six days a week with stops in Toledo. The Coast to Valley Express provides public transit service between Newport and Corvallis and includes stops in Toledo.

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]

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.

Highway 20 (Tier III) and Business 20 are important arterials in and near the city and Highway 20 is a major east-west transportation routes connecting the coast to the Willamette Valley. Highway 101 (Tier I), to the west, is the major north-south transportation route connecting Toledo to other coastal cities (ODOT Map).

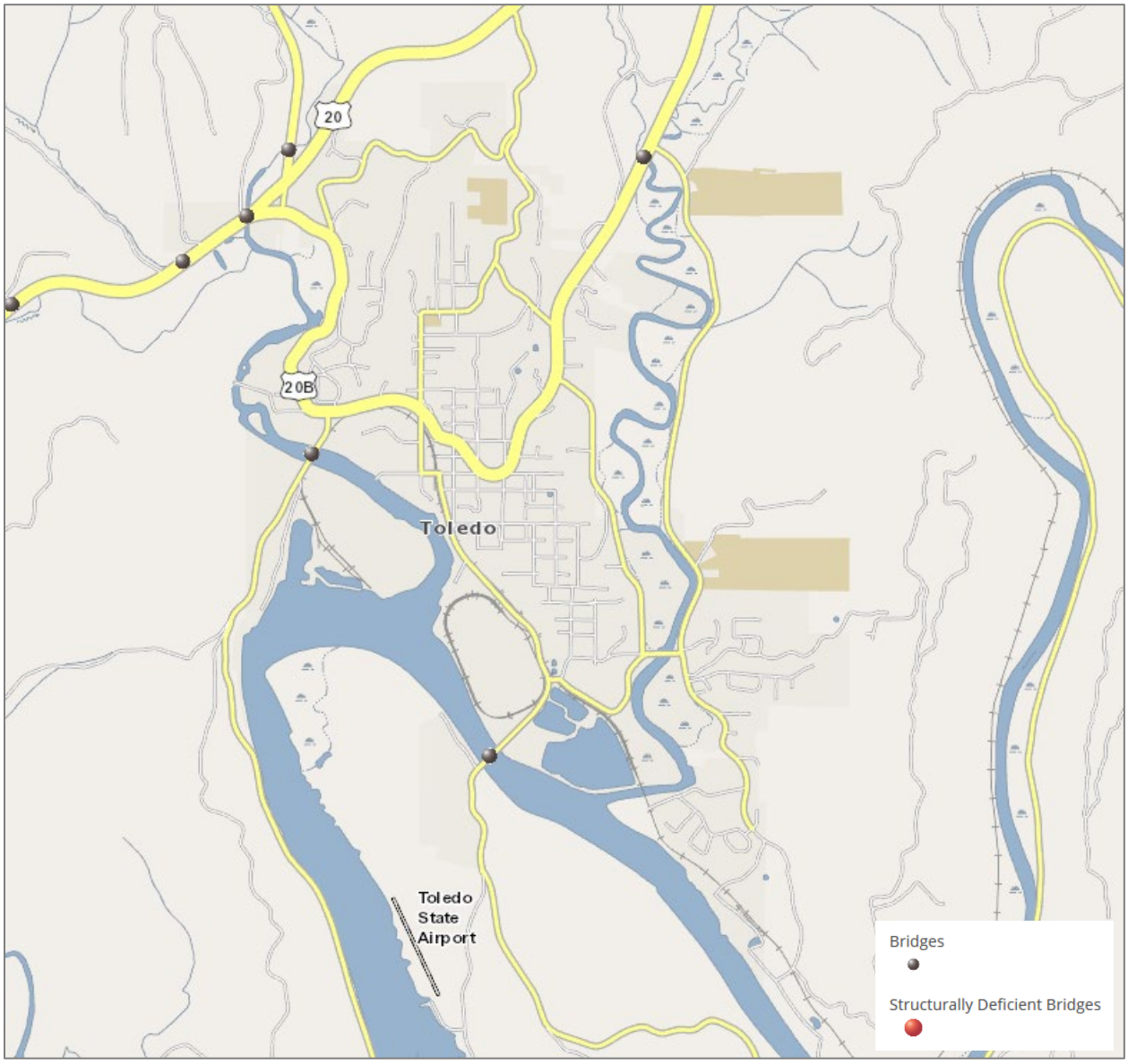
Bridges

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

- Depot Slough, Yaquina Bay Rd (1962), (Bridge ID 12131A)
- Yaquina River, Butler Bridge Rd (1956), (Bridge ID 12132A)
- West Olalla Slough, US 20 at MP F8.17 (1936), (Bridge ID 02275)

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

Map TA-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

Railroads are major providers of regional and national cargo and trade flows. Railroads run through the Willamette Valley region and provide a vital transportation link to the City of Toledo. The Portland & Western Railroad (PNWR) provides freight service to/from the city. There is no passenger rail service in the city.

Rails are sensitive to icing from the winter storms that can occur in the region. For industries in the region that utilize rail transport, these disruptions in service can result in economic losses. The potential for rail accidents caused by natural hazards can also have serious implications for the local communities if hazardous materials are involved.

Airports
The Toledo State Airport is located south of the city on the east side of the Yaquina River. The Newport Municipal Airport is approximately 12 miles southwest in the South Beach area of Newport. The city has no commercial service airports. The nearest commercial airports are in Eugene and Portland.

Ports

The Port of Toledo accommodates a wide variety of users to retain and create jobs and increase economic development. The Port district covers 443 square miles including the cities of Siletz and Toledo and unincorporated Lincoln County located along the Yaquina River. The Port includes the Toledo Shipyard, industrial leases, and recreational facilities.

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 Central Lincoln PUD (see their addendum for more information). 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 stormwater (culvert) systems include the following:

Water Infrastructure

- Water Treatment Plant (ca. 1976): 860 NE Reservoir Ln
- Reservoirs: Mill Creek Reservoir (ca. 1967, 250 acre-feet)
    - Storage Tank: Ammon Road – 1 MG (ca. 1970)
    - Storage Tank: Graham Street – 0.45 MG (ca. 1968)
    - Storage Tank: Clearwell Storage – 0.85 MG
    - Storage Tank: Skyline Drive Storage – 1.9 MG (ca. 2014)
- Pump stations:
    - Mill Creek Raw Water Pump Station (ca. 1968): 1132 SE River Road
    - Siletz River Intake/Pump Station (ca. 2015): 24772 Siletz Hwy/east side of City of Siletz
    - Seal Rock Finished Water Pump Station (provides water for the Seal Rock Water District, see addendum for more information): 1621 S Bay Road
    - Wagon Road Water Pump Station: 1209 NE Wagon Road

Wastewater Infrastructure

- Wastewater (Sewage) Treatment Plant: 1105 SE Fir St
- Wastewater pump stations:
    - Lincoln Way = 1615 NW Lincoln Way

    - High School = 1660 NE Hwy 20
    - A Street = 200 NW 1st Street
    - Ammon Road = 1298 SE Sturdevant Road
    - Butler Bridge = 675 SE Butler Bridge Road
- Stormwater Infrastructure (e.g. Culverts)
    - Tidegate/stormwater station: 440 NW 1st Street

Cultural and Historic Resources

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:[4]

The following list includes the four properties that are listed on the National Register of Historic Places:

- Chitwood Bridge, Yaquina River, 1926
- Pacific Spruce Saw Mill Tenant Houses, 146-192 NE 6th Street, 1920
- The Ahnkuti Site (35-LNC-76), Address Restricted
- St John's Episcopal Church, 110 NE Alder Street

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 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.

In addition, community recreational amenities include Toledo's Municipal Pool, kayaking, fishing, bowling, bird-watching, the city library, and city parks. Seasonal attractions include the Summer Festival and Fireworks in July, the Art, Oysters, and Brews and Wooden Boat Festival in August, the Art Walk in September and Hometown Holiday in December.

[4] Oregon Historic Sites Database, http://heritagedata.prd.state.or.us/historic/, accessed July 17, 2020.

Lincoln County School District

The Lincoln County School District has three schools in Toledo including Toledo Elementary and Toledo Jr/Sr High (outside city limits). For more information on School District assets see their addendum in Volume III.

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.

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.

Coastal Erosion

The City of Toledo does not border the Pacific Ocean; as such, coastal erosion is not considered to be a hazard within the community.

Drought

The Steering Committee rated the city's **probability of occurrence for drought 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 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.

The Siletz River is Toledo's primary water supply during the summer months, and Mill Creek, its dam and its reservoir (circa 1967, 65 feet tall with a permitted storage capacity of 250 acre-feet) is the primary water source during the winter months.[5] The city owns about 400 acres of the Mill Creek Watershed above the reservoir and the remainder is owned by the U.S. Forest Service. Storage capacity is limited, and the city's steering committee believes that increased storage capacity may assist in mitigating the impact of a severe drought event. The Toledo Steering Committee additionally noted that emergency shut-off valves may increase the amount of water that the city's able to supply in the aftermath of a high magnitude earthquake event.

Water from the city reservoirs is treated at the water treatment facility that can treat up to 3.0 million gallons per day (mgd) or 2,080 gallons per minute (gpm); current typical flows range from 850 to 1,200 gpm. Following treatment water flows via 12 to 16-inch water transmission mains to four water storage tanks (combined over 3.35 million gallons capacity) provides enough water supply for about 3.7 days under current demand.[6] The city has about 35 miles of piping and is separated into three pressure zones. 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.

[5] City of Toledo, Water System Master Plan, 2017.

[6] City of Toledo, Water Management and Conservation Plan, 2017.

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, a quantitative risk assessment or exposure analysis for this hazard cannot currently be performed. 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 the City of Toledo's local economy such as fishing and the timber industry 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. The city has a Water Management and Conservation Plan that includes water curtailment measures 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).

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.

The city faces several earthquake-related risks, including soft soil and liquefaction hazards (link to Map DA-2) and a moderate to very high probability over the next 50 years of experiencing shaking strong enough to damage weak buildings (link to Map DA-3).

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

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.

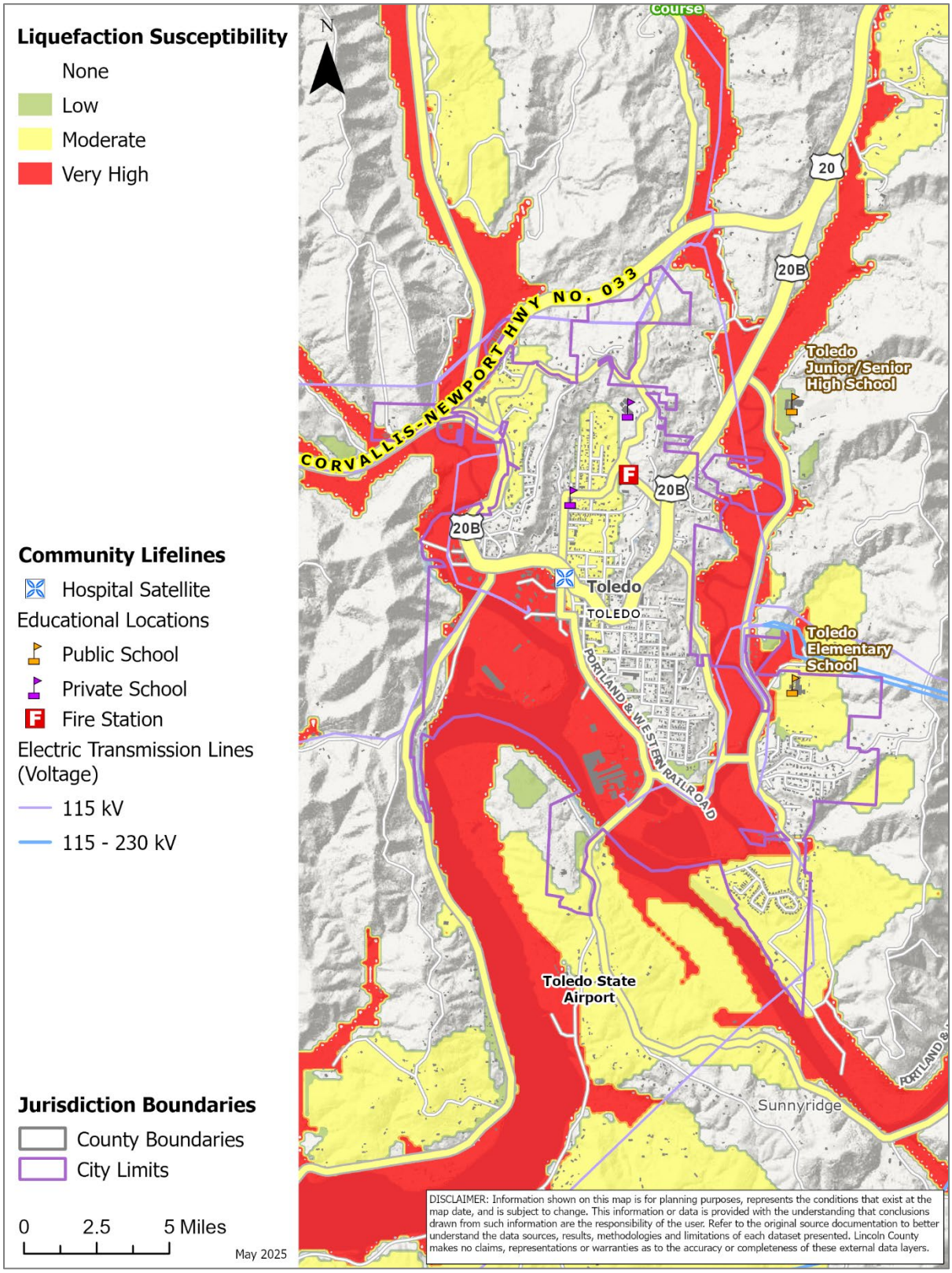
No development or population changes affected the jurisdiction's overall vulnerability to this hazard. In addition, development and population forecasts are not expected to increase or decrease the impact of this hazard.

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, , 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 Toledo.

To help communities better prepare for earthquakes, DOGAMI released the Oregon Seismic Hazard Database in 2021.[7] This resource includes maps showing where earthquake-related hazards like ground shaking and ground movement are most likely. The data includes representations of the strongest shaking and damage that could happen in rare (1-in-2,475-year event) but severe earthquakes (Map TA-4), expected shaking and damage from large Cascadia subduction zone earthquakes (Map TA-5), and the chance of experiencing shaking strong enough to damage buildings (Map TA-3).

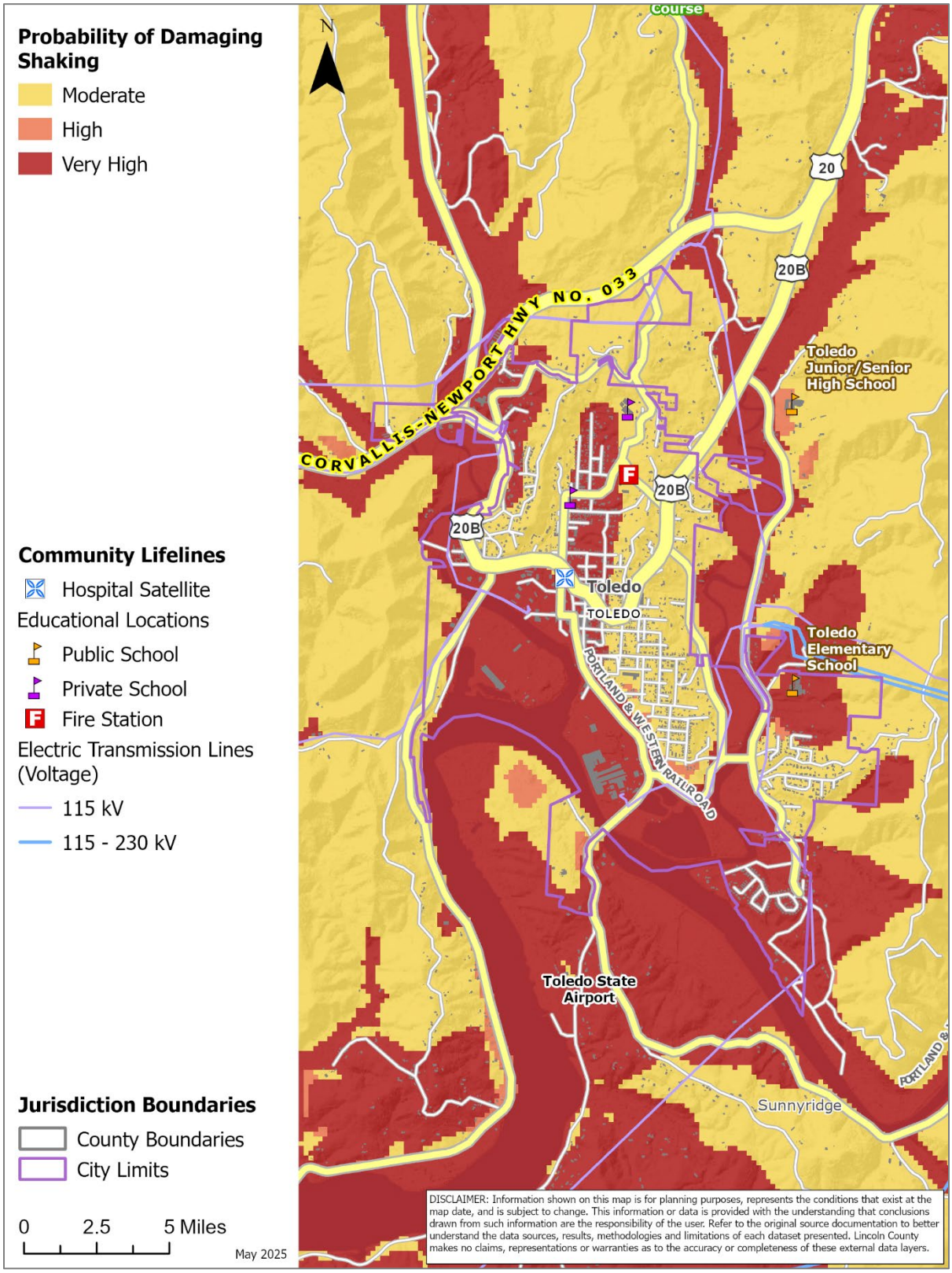
[7]Oregon Department of Geology and Mineral Industries (DOGAMI). (2021). Oregon Seismic Hazard Database, Release 1.0 (OSHD-1). By Ian P. Madin, Jon J. Franczyk, John M. Bauer, and Carlie J.M. Azzopardi. Available at: https://pubs.oregon.gov/dogami/dds/p-OSHD-1.htm

Map TA-2 Earthquake Liquefaction (Soft Soil) Hazard and Active Faults



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

Map TA-3 Probability of Damaging Shaking



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

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 TA-3), approximately 91% 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.

The city's steering committee additionally identified the following earthquake-related vulnerabilities:

- The city's topography is [likely] prone to earthquake-induced landslides;
- In the event of a magnitude (M) 9 earthquake event, the city will likely be isolated from larger cities in the Willamette Valley, as well as coastal communities. Post-disaster self-reliance is essential;
- Post-disaster communication may be hindered; the acquisition of satellite phones may be a beneficial emergency-response related investment;
- Access to hospitals will be difficult;
- The city will likely need to accommodate a large section of Newport's population post-earthquake and/or tsunami. Currently, the city is not equipped to house and/or provide services for an influx of residents;
- The Olalla Reservoir Dam may breach and cause severe flooding;
- The Mill Creek Reservoir Dam may breach and cause severe flooding;
- Toledo City Hall is comprised of unreinforced masonry and may collapse in the event of a high magnitude earthquake; and
- The city's Georgia Pacific Paper Mill may be hazardous in the event of an earthquake. Further study is needed.

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[8] the School District has retrofitted at risk schools in the city through local resources (see the Lincoln County School District addendum for more information).

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 Toledo.

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 Toledo may be impacted by the profiled earthquake scenarios (Table TA-4). *Note: Due to the simultaneous nature of a CSZ earthquake and tsunami, loss estimates have been separated in the following tables to avoid double*

[8] 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.

counting. Building losses within the tsunami zone are considered total. See the tsunami section for additional information. [9]

Approximately 26% of the city's population (902 people) may be displaced by a magnitude 9.0 CSZ earthquake and tsunami event. Of those, approximately less than 1% 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 810 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 $125.6 million.

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 43% to 37% ($17.9 million decrease in loss) when all buildings are upgraded to at least moderate code level.[10] *Note: earthquake vulnerability retrofit benefits are minimized in areas of liquefaction and landslide where additional geotechnical mitigation would be needed.*

[9] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-22.

[10] Ibid. Table B-2.

Table TA-4 Potentially Displaced Residents and Exposed Buildings, Earthquake

Community Overview: Toledo						
Population		Buildings		Critical Facilities	Total Building Value ($)	
3,465		1,954		7	288,238,000	
Exposure Analysis: Earthquake CSZ M9.0 (Deterministic) Scenario						
Potentially Displaced Residents		Damaged Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Loss Estimate ($)	Loss Ratio
898	25.9%	770	39.4%	6	123,401,000	42.8%
Exposure Analysis (within Tsunami Zone - Medium)						
4	0.1%	40	2.0%	0	2,234,000	0.8%
Total Exposure						
902	26.0%	810	41.5%	6	125,635,000	43.6%

Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-22. Note: city population based on the 2010 Census population.

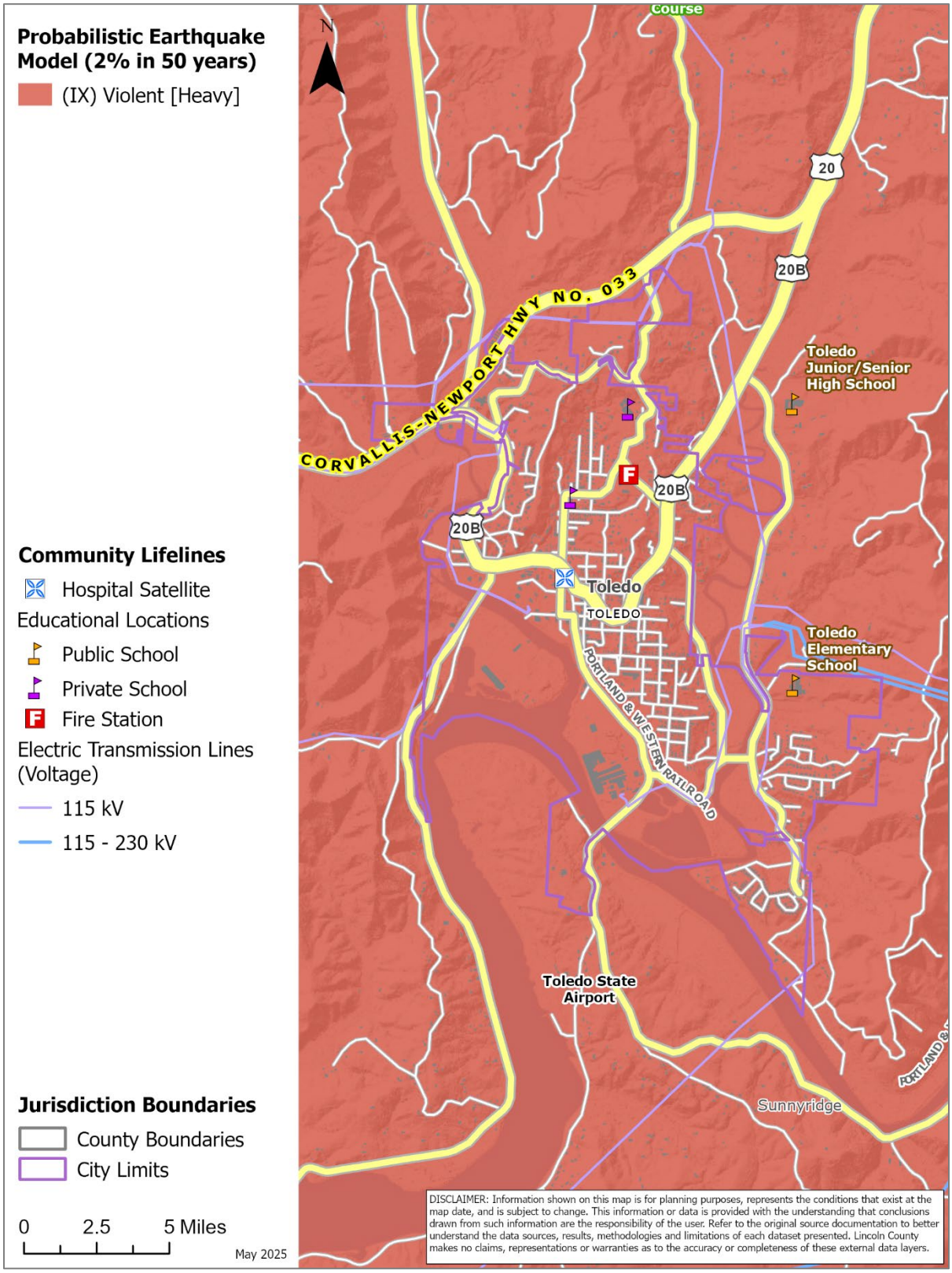
Critical Facility Vulnerability[11]

- Toledo Fire and Rescue Station 41 (City)
- Toledo Police Department (City)
- Olalla Center for Children and Families (non-profit)
- Arcadia School: District Offices (Lincoln County School District)
- Toledo Elementary School (Lincoln County School District)
- Toledo Jr/Sr High School (Outside City) (Lincoln County School District)
- Port of Toledo (Port)

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

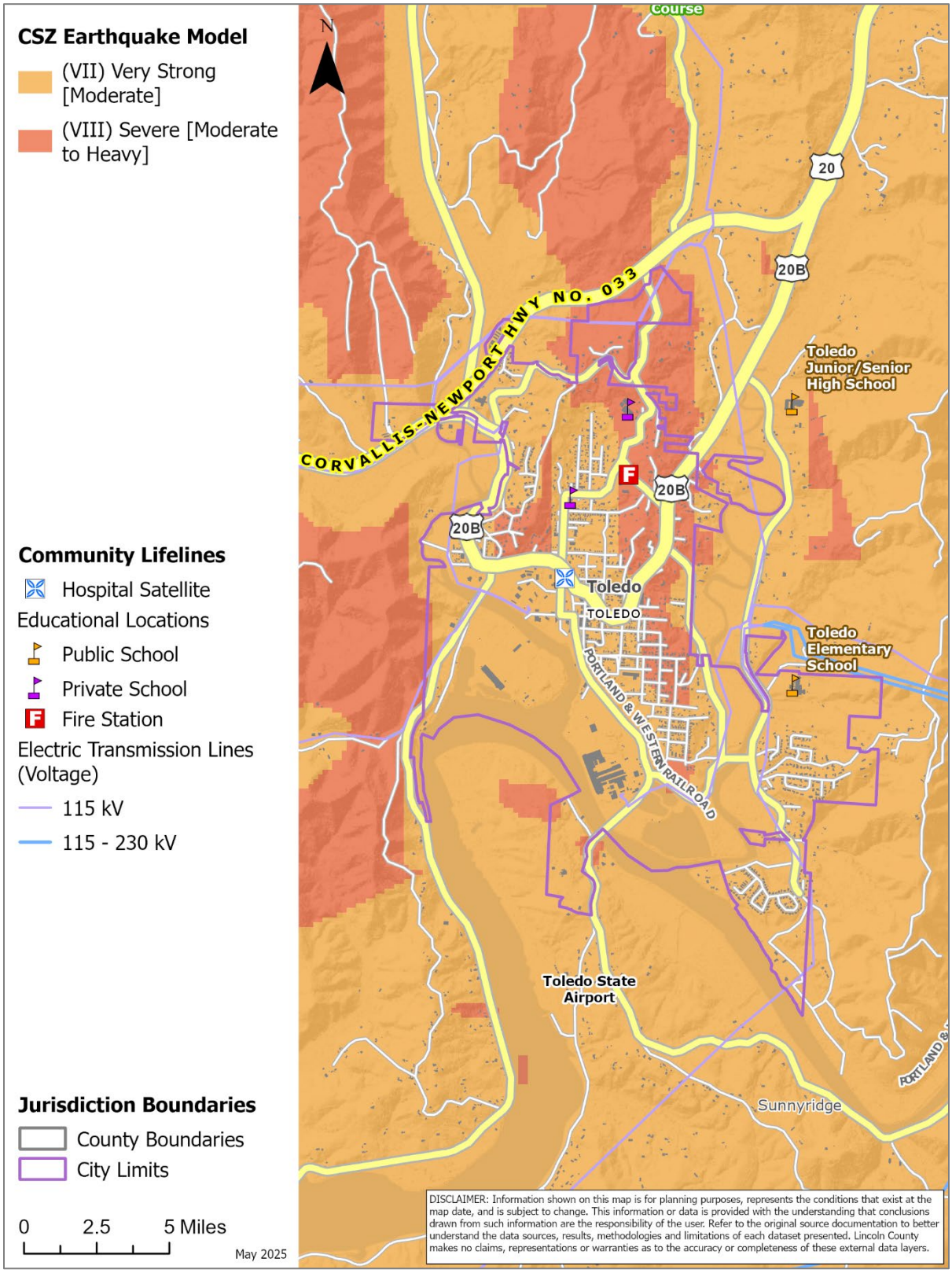
[11] Ibid, Table A-23.

Map TA-4 Perceived Shaking & Damage Potential, Probabilistic Earthquake Model



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

Map TA-5 Cascadia Earthquake Expected Shaking



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 "moderate"**. *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).[12] 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

[12] Oregon Natural Hazard Mitigation Plan. Department of Land Conservation and Development. 2015

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

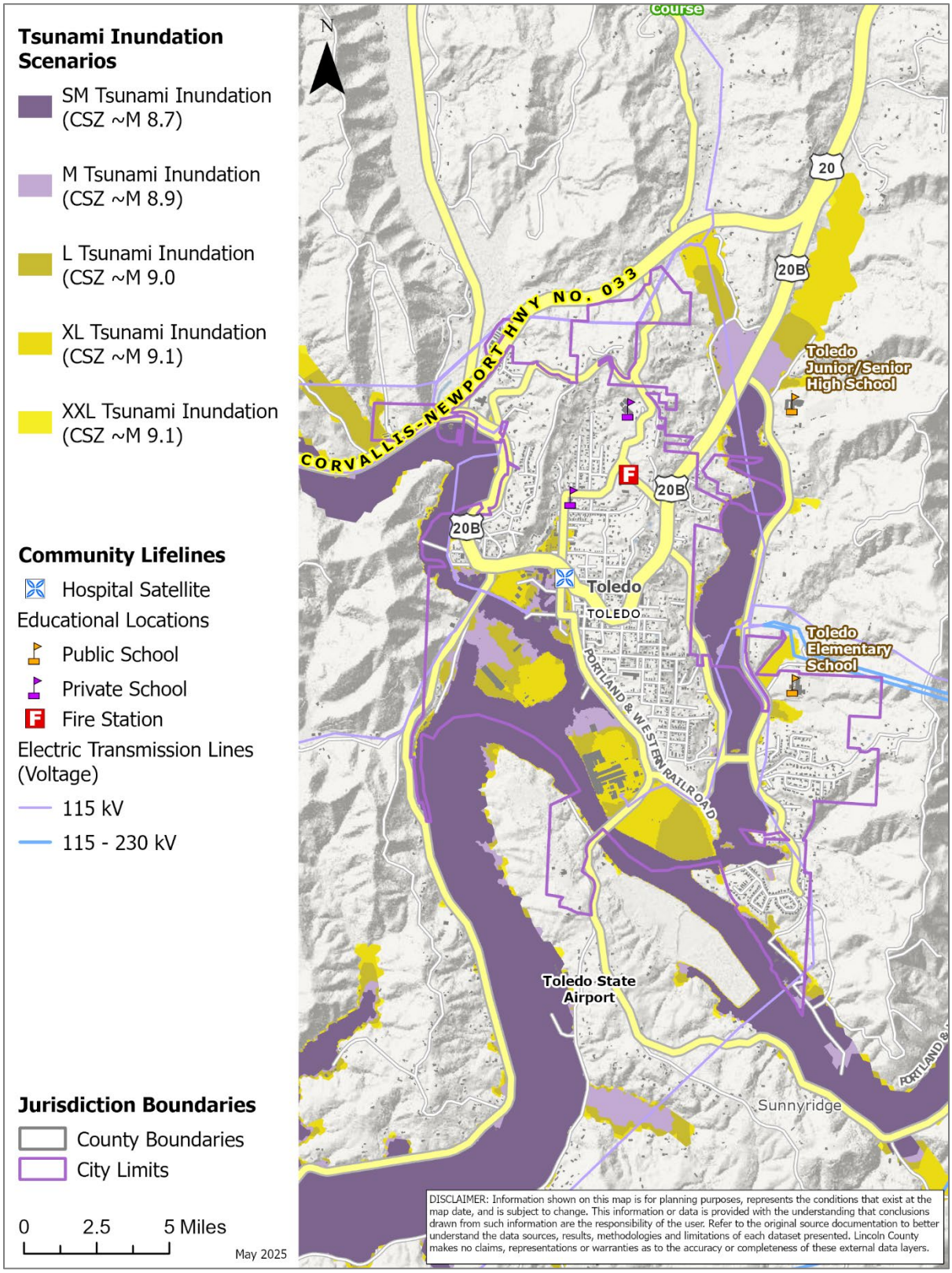
In 1995, the Department of Geology and Mineral Industries (DOGAMI) conducted an analysis resulting in extensive mapping along the Oregon Coast. The maps depict the expected inundation for tsunamis produced by a magnitude 8.8 to 8.9 undersea earthquake. The tsunami maps were produced to help implement 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. It should be noted that the updated tsunami inundation maps show an increased vulnerability in many areas. 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).[13]

Toledo has put forth much effort to educate and inform citizens of tsunami hazards found within the city. Much of the city is outside of the expected tsunami inundation zone, however, damage is expected to occur on various properties, roads, bridges, communication systems, and critical infrastructure within Toledo, among other assets described in the county's plan. Toledo 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 TA-6). 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.

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

Map TA-6 Tsunami Inundation Scenarios



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

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

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.

Although Toledo has relatively few developed properties within the tsunami inundation zones, the city expects to see an influx of Newport residents following a large tsunami event. Likely, this will be the city's greatest tsunami-related impact. Toledo is currently unprepared for such an increase, and will be unable to house, feed, and care for a much larger population. The city's steering committee noted that the city may want to increase its capacity to handle such a population surge, and that the Emergency Response Plan should account for such a scenario.

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 Toledo. Some damage is also may occur in a large distant source tsunami event (such as the 2011 Tohoku tsunami) particularly to the low-lying areas of town including the Port of Toledo. The City of Toledo 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 TA-3 there are about 96 manufactured housing units (mobile homes) in Toledo. 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.

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.[14] 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 Toledo) 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.

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 Toledo.

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 Toledo may be impacted by the profiled tsunami scenario (Table TA-5).

Less than one percent (1%) of the city's population (15 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 more people than those exposed within the Senate Bill 379 line (10 people). Building damage (loss) estimates are reported for buildings expected to be damaged by the tsunami inundation zone (medium-sized and SB 379). All 60 buildings exposed *inside* the tsunami inundation area are considered "damaged" (complete, uninhabitable); the number of buildings damaged is lower under the SB 379 scenario (22 buildings). No critical facilities are expected to be damaged under the CSZ M9.0 scenario or the SB 379 scenario.

[14] 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.

Table TA-5 Potentially Displaced Residents and Exposed Buildings, Tsunami

Community Overview: Toledo						
Population		Buildings		Critical Facilities	Total Building Value ($)	
3,465		1,954		7	288,238,000	
Exposure Analysis: Tsunami CSZ M9.0 (Deterministic) Scenario						
Potentially Displaced Residents		Exposed Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Value ($)	Percent
15	0.4%	60	3.1%	0	5,754,000	2.0%
Exposure Analysis: Tsunami SB 379 Regulatory Line						
10	0.3%	22	1.1%	0	1,277,000	0.4%

Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-22. Note: city population based on the 2010 Census population.

Critical Facility Vulnerability[15]

- Toledo State Airport
- Toledo Police Department

Note: 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 Toledo by sea and air will be necessary.

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:

[15] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-22.

Table TA-6 Earthquake and Tsunami Impact Analysis

Resident Population (Total)	3,694		
Temporary Population (Total)*	943		
	M1	L1	XXL1
Earthquake Injuries:	60	60	60
Tsunami injuries (Permanent + Temporary):			
Tsunami fatalities (Permanent):			
Tsunami fatalities (Temporary @ 100% occupancy):			
Displaced population (P):	270	330	420
Displaced population (P+T):	450	510	630
Numbers of buildings in tsunami zone	65	126	215
Building replacement cost (millions)	$23	$49	$114.5
Debris weight (tons)	2,557	5,427	12,507

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 "moderate" and their vulnerability as "low"**. *These ratings have not changes since the previous NHMP.*

Coastal flood "VE" zones do not occur in Toledo; however, the Yaquina River is tidally influenced and coastal backwater flooding compounds riverine flooding within the city.

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. Flooding typically occurs within the city when storm drains back up and/or pumps fail to work. The Yaquina River borders the City of Toledo, but riverine flooding is typically not an issue. The extent of flooding varies depending on rainfall, and/or precipitation levels throughout the year. Toledo's most significant flood events occurred in 1964 and 1996, and heavy rain in 1999 caused flooding along A Street. Three landslides additionally affected city residents during that same event. Landslides are the most common flood-related impacts within the community.

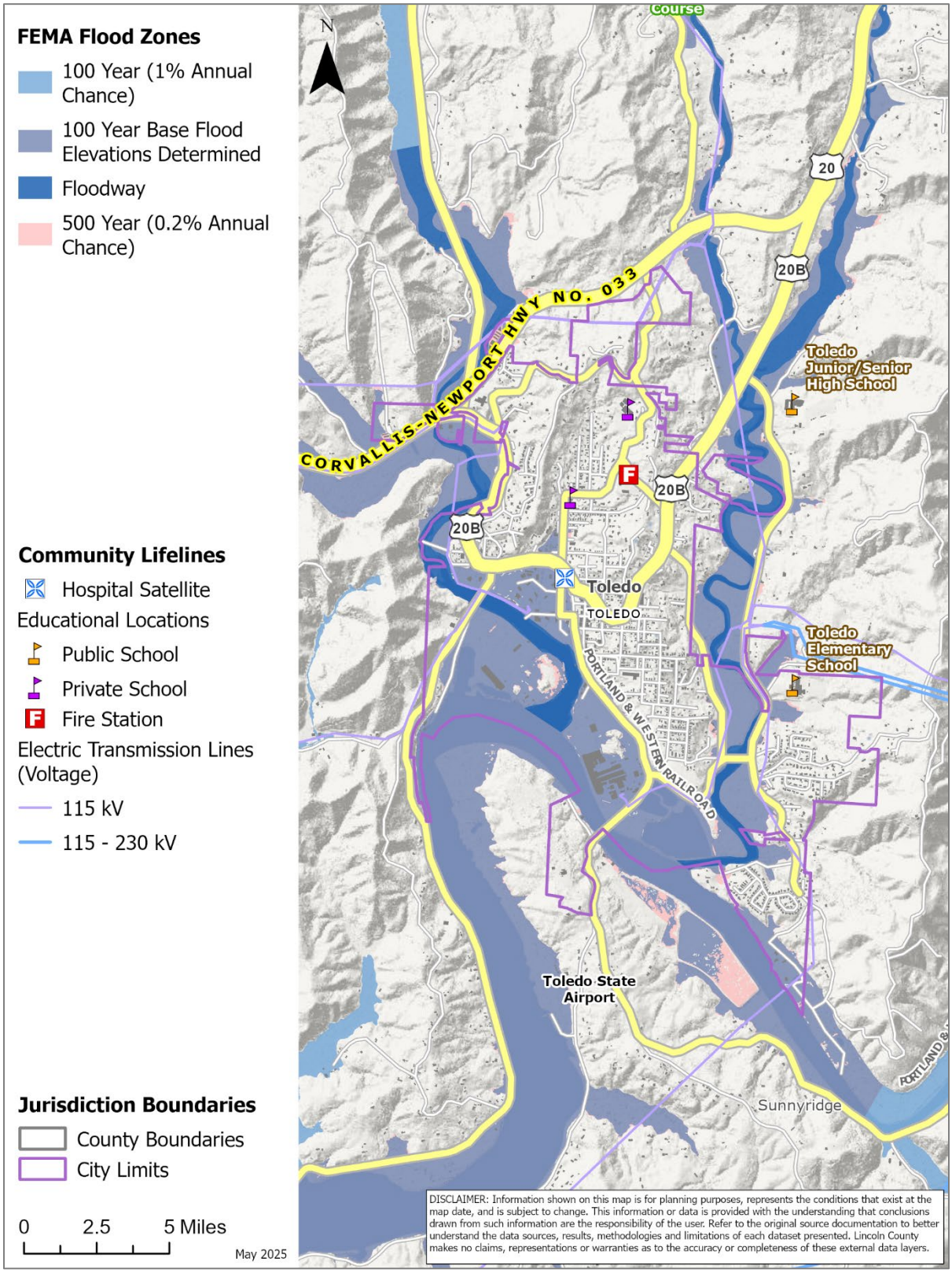
Additional information can be found on the Lincoln County website:
https://www.co.lincoln.or.us/757/Hazards-Flooding-River-Levels

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 TA-7). 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 34% of the city is within the 100-year floodplain, and less than 1% is within the 500-year floodplain.

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.

Map TA-7 Flood Hazard Zones (100- and 500-year floodplains)



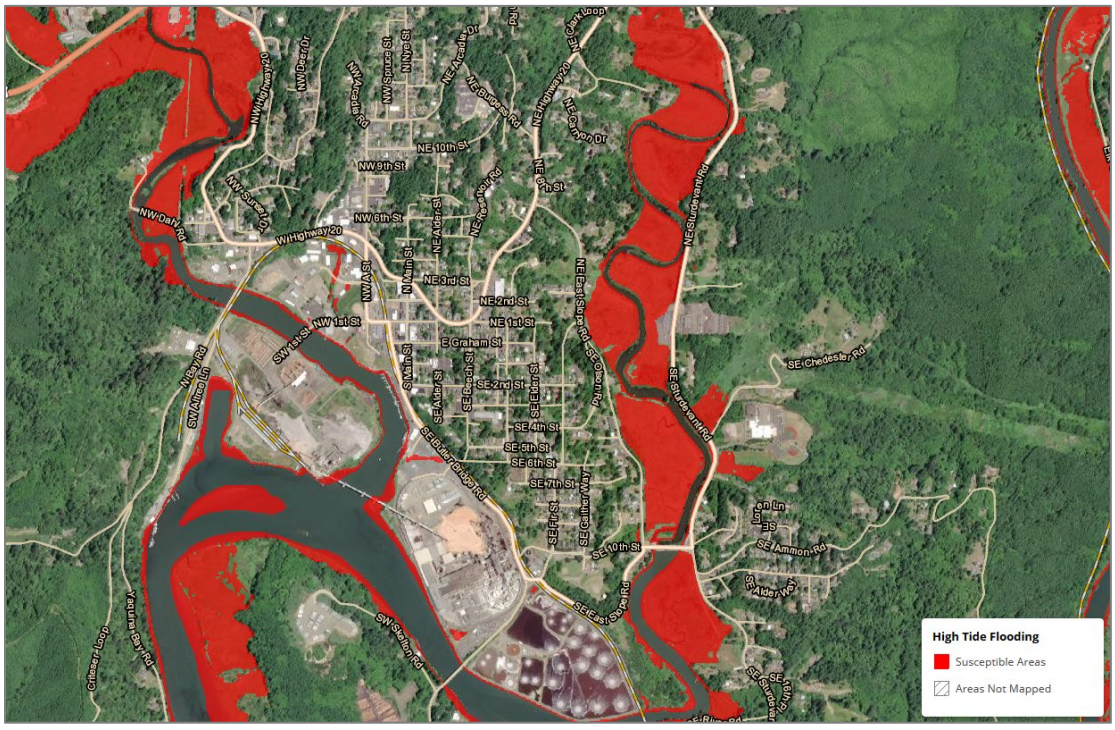
Source: Oregon Explorer: Map Viewer – To view map detail click hyperlink to left

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. The city is most vulnerable within the Special Flood Hazard Area which includes low lying areas surrounding A Street and the Port of Toledo, including the Georgia Pacific manufacturing facility. Note: The city considers riverine flooding to be the primary concern but recognizes that tidally influenced flooding (backwater flooding) may compound riverine flooding within the city. Map TA-8 shows areas of concern for tidally influenced flooding (coastal flooding) in the city. Areas around NW A Street, near Hwy 20 (Business) and the railroad, and Dahl Road, where it travels over Depot Slough, among other low-lying areas are of concern. The Risk Report does not include analysis for coastal flooding within Toledo, however, coastal flooding (including backwater flooding) is studied for portions of the Yaquina River near Newport (for more information see DOGAMI Open-file Report O-15-06).

Map TA-8 High Tide Flooding



Source: NOAA Coast Flood Exposure Mapper – To explore and 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 flood. The Risk Report provides a distinct profile for Toledo.

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 Toledo may be impacted by the profiled flood scenario (Table TA-7).

Just under three percent (3%) of the city's population (87 people) may be displaced by flooding. These people are expected to have mobility or access issues due to surrounding water. About eight percent (8%) of the city's buildings (151 buildings) are exposed to the flood hazard and may be damaged. The loss estimate for exposed buildings is $23.3 million (about eight percent of total building value). The Police Department is vulnerable to flood.

Table TA-7 Potentially Displaced Residents and Exposed Buildings, Flood

Community Overview: Toledo						
Population		Buildings		Critical Facilities	Total Building Value ($)	
3,465		1,954		7	288,238,000	
Exposure Analysis: Flood (1% Annual Chance)						
Potentially Displaced Residents		Damaged Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Loss Estimate ($)	Loss Ratio
87	2.5%	151	7.7%	1	23,272,000	8.1%

Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-18. Note: city population based on the 2010 Census population.

Critical Facility Vulnerability[16]

- Toledo Police Department

[16] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-19.

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 10 National Flood Insurance Program (NFIP) policies in force, representing almost $2.3 million in coverage. The Community Repetitive Loss record for the city identifies zero (0) Repetitive Loss Properties[17] and zero (0) Severe Repetitive Loss Properties[18].

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.

[17] 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.

[18] 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.

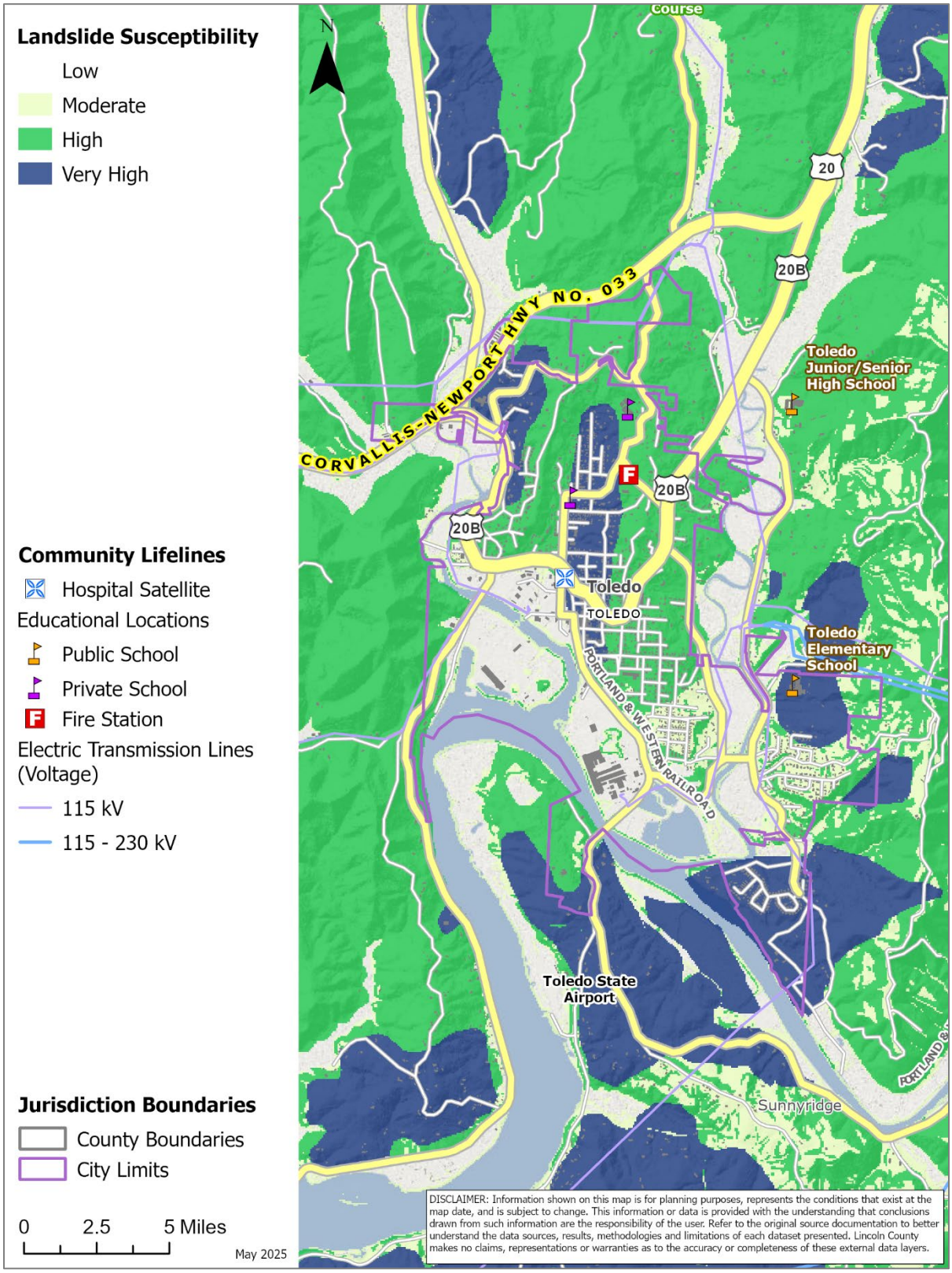
Landslide susceptibility exposure for Toledo is shown in Map TA-9. Approximately 60% of the city has very high or high, and 14% moderate, landslide susceptibility exposure.[19] In general, the areas of greater risk are located adjacent to rivers and creeks and indicate potential areas of erosion. *Note 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.

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

Map TA-9 Landslide Susceptibility Exposure



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

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.

Toledo has very steep slopes, and a long history of logging practices increase the probability that landslides will occur. Homes on Nye Street suffered landslide-related damages following Oregon's 1996 storms, and slides accompanied storms in 1966 and 1999.

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, Toledo is vulnerable to isolation for an extended period.

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 Toledo.

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 TA-8).

Table TA-8 Potentially Displaced Residents and Exposed Buildings, Landslide

Community Overview: Toledo						
Population		Buildings		Critical Facilities	Total Building Value ($)	
3,465		1,954		7	288,238,000	
Exposure Analysis: Landslide High & Very High Susceptibility						
Potentially Displaced Residents		Exposed Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Value ($)	Percent
2739	79.0%	1528	78.2%	7	113,948,000	39.5%

Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-18. Note: city population based on the 2010 Census population.

Approximately 79% of the city's population (2,739 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 78% of all buildings (1,528 buildings) within the city are exposed to the High or Very High landslide susceptibility zones (Map TA-9). The value of exposed buildings is just under $114 million (about 40% of total building value). All seven identified critical facilities are vulnerable to landslide.

Critical Facility Vulnerability[20]

- Toledo Fire and Rescue Station 41 (City)
- Toledo Police Department (City)
- Olalla Center for Children and Families (non-profit)
- Arcadia School: District Offices (Lincoln County School District)
- Toledo Elementary School (Lincoln County School District)
- Toledo Jr/Sr High School (Outside City) (Lincoln County School District)
- Port of Toledo (Port)
- Samaritan Toledo Clinic (Hospital)

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.[21] 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.[22] 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.

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.[23]

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

[20] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-19.

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

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

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

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 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.

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"**. *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 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, a quantitative risk assessment or exposure analysis for this hazard cannot currently be performed. In Toledo, power outages are the greatest concern during windstorms. Building codes require new developments to place power lines below ground. Without power, communication is lost, and fuel and food stores shut down. Toledo experiences sporadic power failures all winter long, and trees frequently block roads. Typically, however, residents are prepared for power outages. The city's steering committee discussed the need for assisting residents with medical vulnerabilities during power-outages; Toledo's fastest growing age group is the elderly population, and medical isolation will continue to be an issue unless mitigated.

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, a quantitative risk assessment or exposure analysis for this hazard cannot currently be performed. Major winter storms can and have occurred in the Toledo 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 Toledo 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, a quantitative risk assessment or exposure analysis for this hazard cannot currently be performed. Toledo 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 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. The burn probability and wildfire history (1992-2022) for the city is shown in Map TA-10. The city has mostly low, with some moderate, overall wildfire risk. 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). 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.

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 TA-11Map TA-10). 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 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. However, the forested areas have the potential for large wildfires and a wildfire within the watershed could impact the city's water supply and quality.

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 Toledo.

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 TA-9).

About five percent of the city's population (169 people) may be displaced by wildfires. These individuals may face mobility or access challenges, or have homes affected by wildfire, other

impacts from smoke and traffic are not included in this analysis. It is important to note that impact from wildfires may vary by location. The value of exposed buildings (120 buildings) is just under $9 million (about three percent of total building value).

Table TA-9 Potentially Displaced Residents and Exposed Buildings, Wildfire

Community Overview: Toledo						
Population		Buildings		Critical Facilities	Total Building Value ($)	
3,465		1,954		7	288,238,000	
Exposure Analysis: Wildfire High-Hazard						
Potentially Displaced Residents		Exposed Buildings			Exposed Building Value	
Number	Percent	Number	Percent	Critical Facilities	Value ($)	Percent
169	4.9%	120	6.1%	0	8,976,000	3.1%

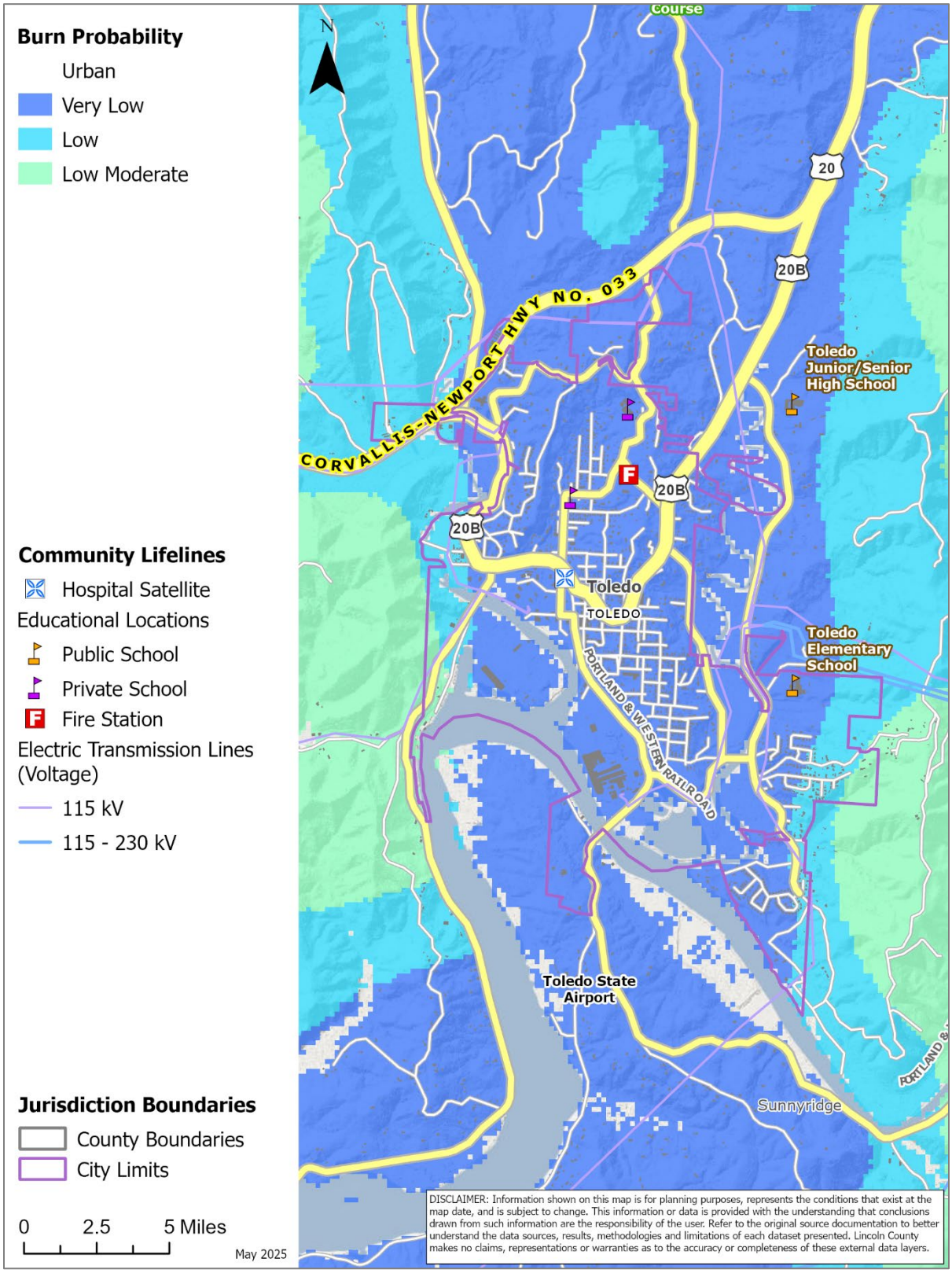
Source: IPRE. Data adapted from DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-18. Note: city population based on the 2010 Census population.

Critical Facility Vulnerability[24]

- There are no critical facilities exposed to the profiled wildfire scenario.

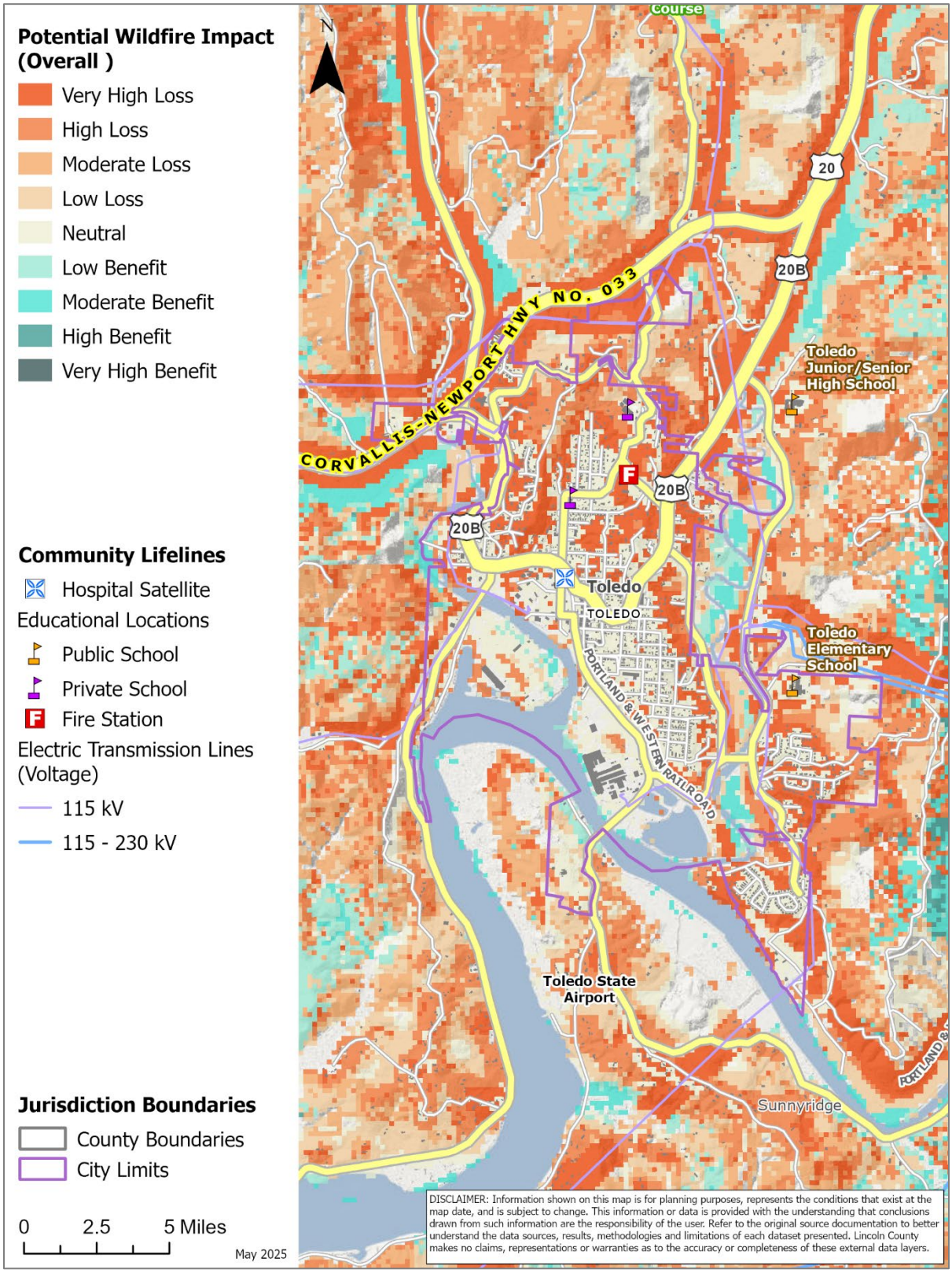
[24] DOGAMI, Open-File Report O-20-11, Lincoln County Natural Hazard Risk Report (2020), Table A-19.

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



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

Map TA-11 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 TA-10 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 TA-1).

Previous NHMP Actions that are Complete:
None.

Previous NHMP Actions that are Not Complete and No Longer Relevant:
Toledo #6: *Obtain lidar collection data from DOGAMI.* Not an activity that the city will initiate. Broader coordination addressed as part of the County's Mitigation Strategy.

Table TA-10 Status of All Hazard Mitigation Actions in the Previous Plan

2020 Action Item	2025 Action Item	Status	Still Relevant? (Yes/No)
Toledo #1	Toledo #1	Not Complete	Yes
Toledo #2	Toledo #2	Not Complete	Yes
Toledo #3	Toledo #3	Not Complete	Yes
Toledo #4	Toledo #4	Not Complete	Yes
Toledo #5	Toledo #5	Not Complete	Yes
Toledo #6	-	Not Complete	No
Toledo #7	Toledo #6	Not Complete	Yes
Toledo #8	Toledo #7	Not Complete	Yes
Toledo #9	Toledo #8	Not Complete	Yes
Toledo #10	Toledo #9	Not Complete	Yes
Toledo #11	Toledo #10	Not Complete	Yes
-	Toledo #11	New	-
-	Toledo #12	New	-
-	Toledo #13	New	-
-	Toledo #14	New	-

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: March 19, 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, Justin Peterson, Contract Planner
- Arlene Inukai, Planning Technician/ Assistant Planner
- Brian Lorimor, Public Works Director
- Larry Robeson, Toledo Fire Chief
- Sue Graves, Safety Coordinator, Lincoln County School District