Lane County Oregon
Hazard Mitigation Action Plan

Version 3.0 (October 2014)

Developed by the Lane County Emergency Management Steering Committee, in accordance with PUBLIC LAW 93–288 (Robert T. Stafford Disaster Relief and Emergency Assistance Act), as amended, 42 U.S.C. 5121-5207; PUBLIC LAW 106–390 (Disaster Mitigation Act of 2000); et al.

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CHAPTER 1. INTRODUCTION

1.1 MITIGATION PLANNING BACKGROUND

Lane County is subject to various hazards which pose threats to public safety and property. The impact of hazards both directly and indirectly affect all community members, highlighting the importance of developing a strategy to reduce or eliminate (mitigate) risk and vulnerability, and implementing that strategy over time. This Hazard Mitigation Action Plan is intended as a locally specific, comprehensive guide for risk assessment and mitigation strategy.

The ultimate goal of the Lane County Hazard Mitigation Action Plan (HMAP) is to promote the health, safety, and general well-being of all residents. The following Mission Statement further defines this:

Mission: To promote and implement actions to eliminate or reduce long-term risk to human life and property from the effects of hazards of all types and sources, and to enhance capability to prepare, respond, and recover from such incidents.

The geographic boundaries represented by this Plan are the unincorporated areas of Lane County, hereafter referred to as the 'planning area'. Lane County Oregon is the sole formal participant, but future iterations of this plan may include other jurisdictions.

An approved HMAP is a basic requirement for federal mitigation funds eligibility per section 322 of the Stafford Act, 42 U.S.C. 5165. Detailed requirements are outlined in Code of Federal Regulations (CFR) Title 44, Part 201; Part 206, Subpart N; et al.

The purpose of mitigation planning in general is to take proactive measures to reduce or prevent negative impacts of future events. The concept could be summarized with the saying, 'an ounce of prevention is worth a pound of cure'. FEMA's Mitigation Directorate provides the following definition for mitigation:

"Mitigation is the cornerstone of emergency management. It's the ongoing effort to lessen the impact disasters have on people's lives and property through damage prevention and flood insurance. Through measures such as building safely within the floodplain or removing homes altogether; engineering buildings and infrastructures to withstand earthquakes; and creating and enforcing effective building codes to protect property from floods, hurricanes and other natural hazards, the impact on lives and communities are lessened."

A hazard mitigation action plan is distinguishable from an emergency operations plan or disaster response plan to the extent that it outlines the proactive implementation of mitigation projects and activities prior to a hazard or disaster occurrence. Mitigation projects (i.e. 'action items') can be short-term or long-term activities which reduce a community's vulnerability to hazard impact through various means including avoidance, protection and preparedness. Thus the Lane County Hazard Mitigation Action Plan (HMP, the Plan, or plan) is a blueprint for activities with the goal to protect the public and local assets and reduce the impact of future disasters.

1.2 AUTHORITIES

Federal Authorities

The Lane County Hazard Mitigation Action Plan was developed in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), which is the primary authority for providing federal disaster recovery and hazard mitigation financial assistance to states and local governments. The Stafford Act was amended in 1996, 2000 (Disaster Mitigation Act), and 2007. As previously discussed, basic provisions of these acts are implemented as federal rules in CFR Title 44. Program requirements related to hazard mitigation are included in 44 CFR Parts 9, 10, 13, 14, 78, 201 and 206.

Federal administrative authority for hazard mitigation planning in the northwestern United States resides with FEMA's Region X (10) office in Bothell, WA. This plan was reviewed by FEMA Region X

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and found to meet or exceed all requirements outlined in the FEMA publication *Local Hazard Mitigation Plan Review Crosswalk* circa October 2008. Subsequent updates of this document follow recommended and required processes outlined in FEMA publication *Local Mitigation Plan Review Guide* circa October 2011.

State Authorities
This document was developed in accordance with ORS Chapter 401 — Emergency Management and Services and subordinate administrative rules. State administrative authority for hazard mitigation planning resides with the Oregon Office of Emergency Management, Mitigation and Recovery Services based in Salem.

Local Authorities
Lane County Emergency Management and Lane County Land Management Division were identified in 2006 as the co-conveners to oversee the plan's implementation and maintenance. Although both entities accomplished much in the past five years, it is recognized that the Land Management Division is subject to an annual work plan set by the Board of County Commissioners that does not always include performing a lead role for Plan maintenance. As such, Lane County Emergency Management will serve in this capacity going forward. Lane County Land Management continues to be an integral contributor to the Plan.

Lane County Emergency Management will be responsible for monitoring implementation over time and tracking the status of identified hazard mitigation actions. An annual progress report will be published and posted on-line every October.

1.3 LOCAL ADOPTION

44 CFR requirement 201.6(c)(5):
The local hazard mitigation plan shall include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan. For multi-jurisdictional plans, each jurisdiction requesting approval of the plan must document that it has been formally adopted.

Upon provisional approval of this Plan by the State of Oregon Office of Emergency Management (OEM) and the Federal Emergency Management Agency, governing bodies for each participating jurisdiction will formally adopt the document in public session. Copies of local adoption instruments are included in Appendix A of this document.

1.4 DOCUMENT STRUCTURE

The document is organized into Chapters (1.), Sections (1.1), and Sub-sections (1.1.1). Tables and figures are numbered in order of appearance within each chapter. During the interim planning cycle period when document composition is most fluid, tables and figures are assigned uniform placeholder numbers per chapter, i.e. Figure 3-x.

This document is structured to address mandated elements for hazard mitigation plans under federal and state requirements. It consists of five chapters and various appendices, each of which satisfies a specific grouping of requirements as described in FEMA publications *Local Multi-Hazard Mitigation Planning Guidance* and *Local Mitigation Plan Review Guide*. Code of Federal Regulations (CFR) requirements pertaining to each respective plan section are included directly following each corresponding heading.

Chapter 1 includes prerequisites for hazard mitigation plans and describes the purpose, authorities, process of local adoption, etc., and provides general profiles of the participating jurisdictions.

Chapter 2 describes the process through which this plan was developed, via planning team and public meetings, and the input of citizens and local officials.

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Chapter 3 includes the risk and vulnerability assessments for the County, describing hazards that occur in the western Oregon region, and an inventory of local assets and critical facilities that represent varying degrees of vulnerability to hazard impacts.

Chapter 4 describes the mitigation strategy for the participating jurisdictions, representing this Plan's primary function moving forward. It outlines the Plan's overarching goals, and intended activities and projects the jurisdictions intend to implement.

Chapter 5 describes the approach to plan maintenance, which includes processes for local adoption, monitoring and evaluation criteria, strategy for incorporation with other planning mechanisms, and review and update schedules.

1.5 LANE COUNTY HMAP - VERSION 2.0 – 3.0

This section is under development/transition to Version 3.0.

This document is the FEMA sanctioned version of the Lane County Hazard Mitigation Action Plan (i.e. 'Version 2.0', commonly referred to in subsequent sections as the Lane County Hazard Mitigation Action Plan). It was approved by OEM and FEMA and adopted by the Lane County Board of Commissioners in 2012, and is an update of the initial version of the plan developed circa 2006.

As for development of Version 2.0, after several incremental, ad hoc updates resulting from Steering Committee member contributions and activities, Lane County Emergency Management staff completed a comprehensive review of all sections in 2011. The goal was to evaluate the document's relevance over the long term and to track implementation of activities and demonstrate the overall effectiveness of the plan itself. These planning activities are detailed in Chapter 2 (Planning Process).

1.5.1 LC-HMAP Reformat Project

Following the approval and adoption of Version 2.0, in late 2012 it was determined that substantial re-organization of the Plan would make it more accessible for both subject matter experts and the general public. The reformatted document includes a standardized framework for continuous update, data collection, and to assist mitigation project implementation.

Importantly, the current, reformatted HMAP is structured and maintained to be current at any given time, more or less. HMAP updates are planned at the conclusion of each quarterly meeting of the Hazard Mitigation and Emergency Management Steering Committee (HMEM-SC). Project planning, implementation reports, hazard event summaries and after action reports, evolving priorities, and directives of the HMEMSC, etc. are to be integrated into the HMAP document on an ongoing basis.

Other objectives of the reformatting project include addressing new FEMA planning recommendations and requirements outlined in the *Local Mitigation Planning Handbook* published March 2013, improved integration of the Hazard Mitigation Action Plan with other planning documents, facilitate participation from public and administrative entities, and the addition of risk assessments for dam failure, hazardous material incident, pandemic, and terrorism. The document resulting from the reformatting project was named Version 3.0.

1.5.2 Naming Convention - Subsequent Versions

The major numeric identifier (**1**.0, **2**.0, **3**.0, etc.) denotes the 5-year planning cycle represented by the document. The secondary numeric identifier (2.**1**, 2.**2**, 2.**3**, etc.) distinguishes substantive changes to the document in terms of structure, formatting, or subject matter. Digital file names should include document name, version, and month, day, and year.

As noted above, the current document represents the 3rd planning cycle to span 2012-2017. Whenever necessary the Lane County Emergency Manager will coordinate assignment of secondary numeric identifiers following substantive changes resulting from major disasters, annual meetings, changes in state or federal requirements, jurisdictional participants, etc.

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1.6 PARTICIPATING JURISDICTIONS

General
Per FEMA regulations, formal participation in a FEMA sanctioned hazard mitigation action plan involves participating and undertaking all elements of the planning process, which include planning, public involvement, risk assessment, mitigation strategy, incorporation, implementation, and adoption.

1.6.1 Current HMAP Participants

Lane County Oregon is the formal participating jurisdiction for the Plan, and the planning area is defined by its geographic boundaries, including unincorporated communities. Lane County participated in development of the original version of this hazard mitigation action plan, participated in the process to update this plan, and has adopted this plan by County Board of Commissioners resolution.

1.6.1 Future HMAP Participants

44 CFR Requirement §201.6(a)(3):
Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan.

Incorporated Cities
At the time of this writing no incorporated cities within Lane County are formal participants. Future versions or updates of this Plan are intended to include incorporated cities, transitioning to a multi-jurisdiction planning document.

Utilities
Utilities providers in Lane County are vital to hazard mitigation and coordinated emergency management functions. In the future increased coordination between participants in this Plan and Lane County utility providers may ultimately lead to formal participation by these entities. As such, basic profiles of the local utilities are listed below

Utility	Services	Website	Phone
Blachly Lane Electric Cooperative	Electric	www.blachlylane.coop	(541) 688-8711
Consumers Power, Inc. (CPI)	Electric	www.consumerspower.org	(541) 929-3124
Emerald Peoples Utility District (EPUD)	Electric	www.epud.org	(541) 746-1583
Lane Electric Cooperative	Electric	www.laneelectric.com	(541) 484-1151
Pacific Power	Electric	www.pacificpower.net	(888) 221-7070
Eugene Water and Electric Board (EWEB)	Electric, Water	www.eweb.org	(541) 685-7000
Springfield Utility Board (SUB)	Electric, Water	www.subutil.com	(541) 746-8451
Ferrell Gas	Gas	www.ferrellgas.com	(541) 688-8155
Northwest Natural Gas	Gas	www.nwnatural.com	(541) 342-3661
Suburban Propane	Gas	www.suburbanpropane.com	(541) 344-2283
Rainbow Water (and Fire) District	Water, Fire Resp.	www.rwdonline.net	(541) 746-1676

Special Districts
In conjunction with their core missions, school, fire, and other special districts have played an important role in mitigation planning in Lane County. Continued coordination with these entities is expected in this and future planning cycles, which may ultimately lead to formal participation by these entities.

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1.7 COMMUNITY PROFILE – LANE COUNTY OREGON

The following sub-sections outline characteristics for Lane County, presented in a context for planning and mitigation. Subject matter includes a history of federal (presidential) disaster declarations, demographics and economy, and geography of Lane County.

1.7.1 Federal Disaster Declaration History

Presidential Disaster Declarations for the state of Oregon which included Lane County were authorized in 1962, 1964, 1972, 1974, 1996, 1997, 2002, 2004, 2012, and 2014. In order for a disaster event to qualify for a presidential declaration, federal assistance must be requested by the governor and local disaster impacts must exceed a given threshold according to preliminary damage assessments conducted by local official and FEMA.

The following table summarizes federal disaster declarations for Lane County, nearly all of which involved winter storm impacts and occurred in the months of December, January and February. A complete listing of all federal disaster declarations for the state of Oregon is located in Appendix F.

Table 3-x Presidential Disaster Declaration History, Lane County

FEMA Disaster Number (DR)	Incident Timeframe	FEMA Disaster Reference	Infrastructure Damage and Response Cost (statewide)
4169	February 6-10, 2014	Winter Storm	$6,108,000
4055	January 17-21, 2012	Winter Storm, Flooding, Landslides	$14,100,000
1510	December 26, 2003 - January 14, 2004	Winter Storm	$10,200,000
1405	February 7-8, 2002	Winter Windstorm	$4,800.00
1160	December 25, 1996 - January 6, 1997	Flooding, High Winds, Winter Storms	data unavailable
1107	December 10-12, 1996	Winter Storms, High Winds	data unavailable
413	January 25, 1974	Storms, Snowmelt, Flooding	data unavailable
319	January 21, 1972	Storms, Flooding	data unavailable
184	December 24, 1964	Heavy Rains and Flooding	data unavailable
136	October 16, 1962	Flooding	data unavailable

Source: FEMA; https://www.fema.gov/disasters

1.7.2 Demographics and Economy

The state's Office of Economic Analysis estimates the county's 2009 population at 347,690. This represents an average annual growth rate (AAGR) of 1% from the state's year 2005 estimate of 333,855. Lane County is now the fourth most populous county in Oregon and the third largest Metropolitan Statistical Area (MSA) in the state. The 2009 population reveals a 7.7% increase when compared with 2000 population of 322,959.

In 2000, 69% of Lane County residents were living in incorporated areas, while 31% lived in unincorporated areas. For emergency planning purposes, children, the elderly, the disabled, people living in poverty and people whose primary language is not English are considered special needs populations. This is because these populations in the community struggle disproportionately in their ability to respond to a disaster. Lane County has a substantial number of residents in all of these special needs categories. Almost 8% of the population speaks a language other than English.

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After a history of extreme fluctuations related to lumber and wood products, Lane County's industry mix diversified in the 1990s. After the recession of the early 1990s, Lane County attracted high tech companies such as Datalogic (formerly PSC Scanning) and Symantec. In addition, a homegrown recreational vehicle manufacturing industry expanded towards the end of the decade. With growth in high paying jobs came population increases and income growth. This in turn led to growth in retail and service sectors. The presence of the University of Oregon and a federal courthouse adds to the diversity through generally stable government jobs.

After a period of relative stability, wood products is again going through a major decline, losing 1,595 jobs between 2005 and 2009 for a low of 3,324 jobs. Manufacturing and transportation equipment has been hard hit, dropping 3,684 jobs since 2005 for a low of 772 jobs in 2009. In trade, transportation and utilities, retail trade is the largest component, employing 19,260 in 2008. The industry lost 1,271, or 6.6 percent, in 2009. The information industry lost 343 jobs, or 9.8 percent between 2008 and 2009. Financial industry has continued to lose jobs since peaking in 2005 at 7,109. It lost 341 jobs in 2009 for a low of 6,307 jobs. Business and professional services grew rapidly through the 1990s due to rapid expansion at temporary employee firms and call centers. As another industry adversely affected by the downturn, it lost 1,706 (-10.5%) between 2008 and 2009. Preliminary 2009 data show that Lane County had 71,012 harvested acres and roughly $113.5 million in total farm sales. Sales were down by about $25.1 million compared with 2008, a loss of 18.1 percent.

Lane County has a slightly higher proportion of employment in education and health services than statewide because five hospitals and several private schools are located here. The five hospitals are Sacred Heart Medical Center at River Bend, Sacred Heart Medical Center University District, Cottage Grove Community Hospital, Peace Harbor Hospital and McKenzie Willamette Medical Center. Private higher education schools include Northwest Christian University and New Hope Christian College. Health and social assistance has been one of the industries that continued to grow throughout the most recent recession, adding 1,065 jobs between 2007 and 2009 to reach 20,070. Private education added 145 over the same period. Leisure and hospitality lost 975 jobs between 2008 and 2009, or 6.5 percent.

Lane County is coming out of a deep recessionary period. Construction and manufacturing, especially RV manufacturing, had large job losses early in the recession. The loss of those high paying jobs then affected the more localized economy with losses in retail and services. Estimates show that Lane County's employment dropped by 17,600 jobs, or 11.2 percent, between October 2008 and February 2009. Lane County's seasonally adjusted unemployment rate was essentially unchanged at 11.1 percent in October of 2010. The adjusted unemployment rate for Lane County is higher than both the state (10.5%) and the nation (9.6%).

The Oregon Employment Department anticipates that Lane County will add 15,046 net new jobs for a growth rate of 9.7% from 2008 to 2018. This compares to a statewide growth rate of 9.1%. Although net growth is expected in all major occupational categories except construction and extraction, 75% of net new jobs will be created in four of the twelve categories. Two of those four categories, professional and office and administrative support will grow at a relatively moderate rate. Services, a relatively large category with an above average growth rate, adds the most new jobs. The fourth, health care, is expected to add new jobs due to rapid growth in the demand for health services caused by the aging of the population.

National trends such as population growth outpacing job-creation, lack of jobs or inadequate education or training and the continuing loss of full-time jobs (e.g. jobs in timber-related industries) have had a negative economic impact. Service jobs that are created to replace those in the resource-based or manufacturing sector may result in an overall lower economic standard for many people because the jobs pay less and many jobs are part-time with few, if any, benefits. If housing costs continue to increase but overall income levels do not increase at the same rate due to shifts in the economy, then rent and cost burdens will rise for an increasing number of households

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The 2005-2009 US Census American Community Survey counted 139,593 occupied housing units in the county revealing a 7% increase from the 2000 US Census total of 130,453 households. Lane County's population density in 2000 was 70.9 people per square mile. This figure is estimated at 77 per square mile in 2009.

Table 1. Population and Housing Unit Comparisons 2009 – 2012

Jurisdiction	Estimated Population 2012	Estimated Population 2009	2009-2012 Population Change (%)	Number of Housing Units 2012	Percent Housing Units Occupied 2012
Lane County	351,794	347,690	1.2%	155,815	93.4%
Coburg	942	1,080	-12.8%	403	95.0%
Cottage Grove	9,671	9,485	2.0%	4,108	94.4%
Creswell	4,973	4,790	3.8%	2,078	90.3%
Dunes City	1,475	1,360	8.5%	859	74.9%
Eugene	156,222	157,100	-0.6%	69,828	94.4%
Florence	8,412	9,580	-12.2%	5,207	85.2%
Junction City	5,445	5,460	-0.3%	2,250	91.1%
Lowell	1,045	1,030	1.5%	416	89.7%
Oakridge*	3,211	3,755	-14.5%	1,759	86.1%
Springfield	59,347	58,085	2.2%	25,029	95.8%
Veneta	4,496	4,975	-9.6%	1718	96.7%
Westfir	293	340	-13.8%	115	96.5%
Incorporated Lane County	255,532	257,040	-0.6%	113,770	N/A
Unincorporated Lane County	96,262	90,650	6.2%	42,045	N/A

Source: US Census, 2012 American Community Survey

In addition to the incorporated communities listed in the table above, the following unincorporated communities are located in the jurisdiction of Lane County and comprise approximately 26 percent of the county's overall population.

Figure 1-x Unincorporated Rural Communities, Lane County

- McKenzie Watershed: Marcola, Walterville, Leaburg, Vida, Nimrod, Blue River, Rainbow, McKenzie Bridge.
- Siuslaw Watershed: Glenada, Cushman, Mapleton, Swisshome, Deadwood, Greenleaf, Triangle Lake, Blachly, Walton.
- Long Tom Watershed: Lancaster, Franklin, Cheshire, Alvadore, Elmira, Noti, Crow, Lorane.
- Coast Fork of the Willamette Watershed: Goshen, Saginaw, London, Dorena, Culp Creek.
- Middle Fork of the Willamette Watershed: Pleasant Hill, Jasper, Trent, Fall Creek.

Source: Lane County Rural Comprehensive Plan (June 2009)

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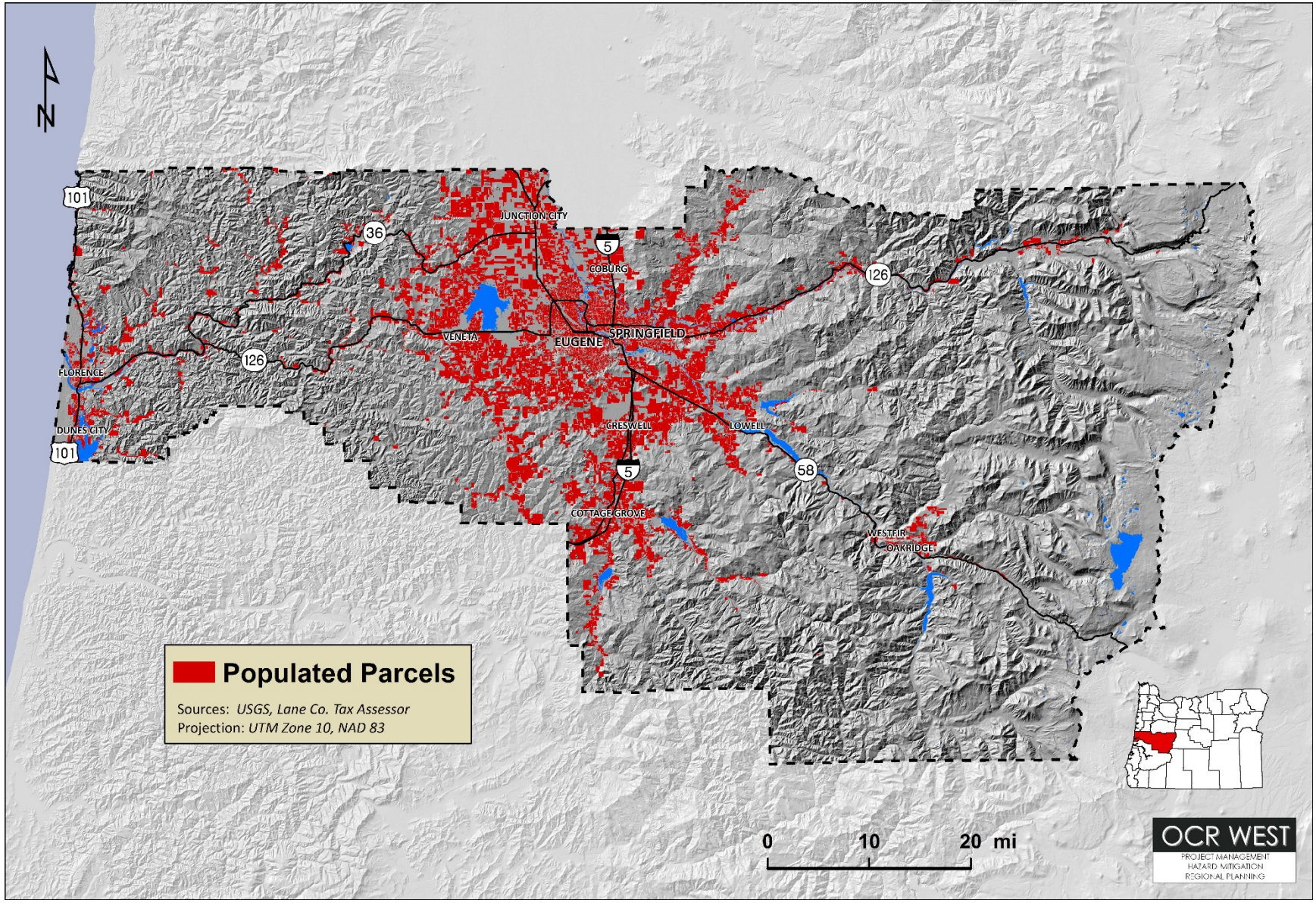
The map below shows general location of populated/developed areas in Lane County. Areas shaded red are properties with improvement values exceeding $20,000. Populated or developed areas are generally concentrated at lower elevations along the Coast, Willamette Valley Floor, or along rivers.

Figure 1-x Populated Areas of Lane County



1.7.2 Geography and Climate Overview

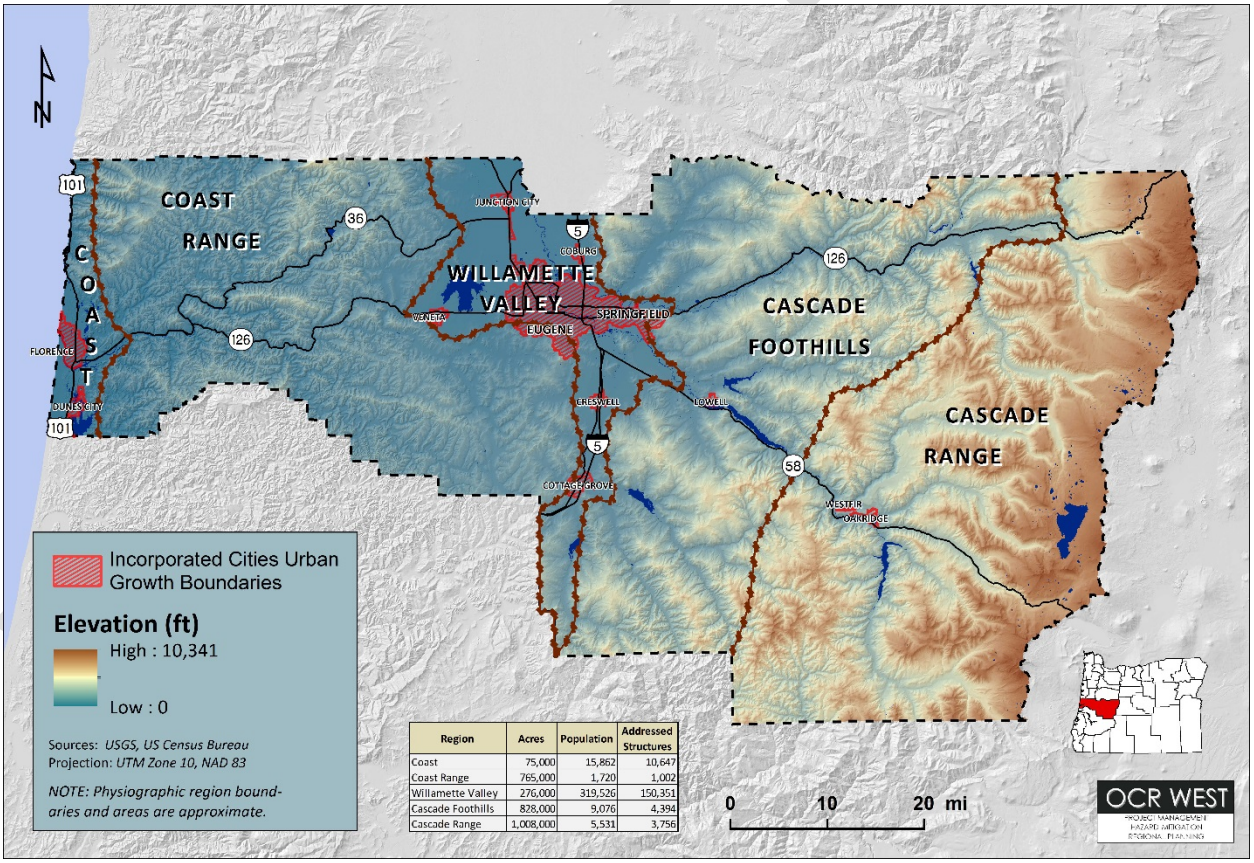
This section provides information for understanding the potential and chronic hazards affecting Lane County in order to identify which hazard risks are most significant and which locations are most adversely affected.

Lane County is one of only two counties in Oregon that reaches from the Pacific Coast to the crest of the Cascades. Lane County is located in western Oregon and covers about 4,554 square miles. The geography, topography, climate, and other natural attributes such as vegetation vary markedly throughout the county. FEMA publications note the topography of Lane County is quite varied relative to other counties across the U.S. The Pacific Ocean and Coast Range represent the western geographic boundary, the crest of the Cascade Range the eastern boundary. Between these features is the Willamette Valley, a broad plain where population is most concentrated.

Most of Lane County has a temperate marine climate, with 24-hour temperatures averaging in from the mid 60°F range in July and mid to low 30°F range in January. Average precipitation ranges from 40" in the Willamette Valley to 85" in the mountains. General soil groups are derived from alluvium, marine sediments, igneous materials and sedimentary rock.

The large size and geographic diversity of Lane County are important factors with regard to hazard mitigation planning. This document considers five main physiographic regions within Lane County, based on nomenclature commonly used by the National Weather Service: Coast, Coast Range, Willamette Valley, Cascade Foothills and Cascade Range. The following map shows the main physiographic regions of Lane County, followed by narrative descriptions.

Figure 1. Primary Physiographic Regions, Lane County



Coast Region. The Coast Region is in the western portion of Lane County and is characterized by rocky beaches, sand dunes and other coastal features. Stretching along Oregon's Pacific border, the coast region is known for wet winters, relatively dry summers and mild temperatures

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throughout the year. This region is the only portion of Lane County subject to coastal hazards such as storm surge and tsunamis. Strong winds strike the area, usually in advance of winter storms. Wind speeds can exceed hurricane force, and in rare cases have caused significant damage to structures or vegetation. Damage is most likely to occur at exposed coastal locations, but it may extend into inland valleys as well. Such events are typically short-lived, lasting less than one day.

Annual precipitation typically ranges from 65 to 90 inches. Precipitation is relatively frequent throughout all seasons when compared to other physiographic regions, and highest in winter months. Freezing temperatures at the coast are rare. Notably, average summer temperatures are only about 15 degrees above the coldest month, January. Land ownership and coverage patterns are a relatively mixed distribution of public and private, developed and undeveloped.

Coast Range. Stretching the full length of the state, the Coast Range is a heavily forested area with peaks ranging from 1,200 to 4,097 feet above sea level. The area experiences heavy rainfall as a result of moist air masses moving off the Pacific Ocean onto land, especially during the winter months. Western slopes of the coast range may get over 100 inches of rain annually.

Snowfall in the Coast Range of Lane County is minimal, usually only one to three inches annually. Heavily wooded and generally remote, land ownership is primarily public and private forestland with isolated pockets of residential and rural land use.

Willamette Valley. The defining feature of the Willamette Valley is the remarkably broad and level floodplain of the Willamette River. The Willamette Valley begins near Cottage Grove and runs northward approximately 110 miles to the urbanized areas and foothills south of Portland. Along its course the valley averages 15-30 miles in width. Lane County is located in the southern portion of the Willamette Valley with cool, wet winters and warm, dry summers. Average annual precipitation is less than 40 inches.

Extreme temperatures in the valley are rare. Days with a maximum temperature above 90°F degrees occur only 5-15 times per year on average and, days with below zero temperatures occur only about once every 25 years. Although snow falls every few years on the South Willamette Valley floor, typical depth is less than 6 inches, though it is more frequent and deeper at higher elevations in the foothills. Ice storms occasionally occur and high winds typically occur several times per year in association with major weather systems.

Cascade Foothills. The moderate elevation area comprising the lower western slopes of the Cascades are referred to as the Cascade Foothills. This region receives abundant rainfall and low to moderate snowfall.

This region is heavily forested and moderately populated in places. Contains highest concentration of structures in Land ownership is predominantly private forestland, wildland-urban interface residential, and O&C lands managed by the BLM.

Cascade Range. The dominant terrain feature in Oregon is the Cascade Range, stretching the entire length of the state from the California border to Washington. In eastern Lane County, the Cascade Range is characterized by heavily forested slopes with elevations ranging from an average of 4,000 feet to over 10,000 feet (western slopes of Three Sisters Peaks). This area experiences moderately heavy rainfalls as well as extreme winter conditions with heavy snowfalls. The area has a relatively low population.

Monthly mean snowfall totals vary significantly according to elevation. Since precipitation tends to increase with increasing elevation, more potential moisture for snowfall occurs at higher elevations. Most of the precipitation in the Cascade Range occurs during the winter months with November through March accounting for more than 75 percent of the total annual precipitation. Spring rains, summer thunderstorms and autumn snow contribute to the annual precipitation total, but the majority of precipitation occurs in winter.

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The following map shows land cover classifications for Lane County. The general pattern is forestland on slopes and higher elevations, and urban development and agriculture at lower elevations.

Figure 3-x Land Cover Types, Lane County Oregon (Initial Draft)

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CHAPTER 2. PLANNING PROCESS

44 CFR Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process* ***shall*** *include:*
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and non-profit interests to be involved in the planning process;
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
Requirement §201.6(c) (1): *[The plan* ***shall*** *document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

Update of the Hazard Mitigation Action Plan for Lane County and the participating cities marked the completion of the first full planning cycle. A status report on mitigation projects identified in the original plan is provided in Addendum 2. During the first planning cycle 2006-2011, numerous mitigation projects were successfully implemented despite many natural hazard occurrences including a Presidential Disaster Declaration resulting from winter storms, flooding and landslides in January 2012.

The process to update the Plan followed a four-step outline prescribed in FEMA publication, *Local Multi-Hazard Mitigation Planning Guidance*:

1) Organize resources
2) Assess risks
3) Develop the mitigation plan
4) Implement the plan and monitor progress

The first step (organize resources) was addressed by assembling the Hazard Mitigation Steering Committee (HMSC) as coordinated by the Lane County Office of Emergency Management. In keeping with the goal of including multiple stakeholders - neighboring communities, agencies, businesses, academia, non-profits, and other interested parties - were invited to review the plan document and participate in the planning process.

The second step (assess risks) was conducted via the hazard mitigation steering committee's review and consideration of the original version of the hazard mitigation plan, existing technical reports, studies and planning documents and input from various data sources brought forth by the HMSC members during meetings. A detailed listing of data sources for risk assessment is found in Section 3.1.2 (Data Sources and Limitations).

The third step (develop the mitigation plan) included input from the HMSC and data sources referred to in Step 2. Mitigation project development and prioritization for the Plan emphasized a review of costs vs. benefits and the social, technical, administrative, political, legal, economic, and environmental considerations of mitigation related projects. Plan update involved preparing a public review draft and a public comment period to solicit input from the public and interested parties. Comments and recommendations from these sources were incorporated into the final version of the Hazard Mitigation Action Plan submitted to the State and FEMA and ultimately adopted by the County.

The fourth step (plan implementation and monitoring) will occur on an ongoing and annual basis prior to and following State and FEMA approval. Adoption of the approved plan is the first step toward implementing the plan. Feasibility study and scoping of mitigation projects are secondary steps, followed by grant writing coordinated through OEM to secure funding and ultimately the implement the projects. Other mitigation projects that do not require outside

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funding will be enacted on an ongoing basis. Monitoring will also occur on an ongoing basis as action items are implemented, following major disaster events, and during semi-annual meetings of the Hazard Mitigation Steering Committee.

Throughout the last five years various approaches were used for updating the plan and implementing projects, including those initially outlined in the 2006 Plan. Over time it became apparent that the breadth of the initial HMAP was too unwieldy for a single committee to oversee. Additionally, we found interest in the HMAP gradually decline as plan reviewers were asked to focus on the entire document regardless of their specific area of interest or expertise. Although plan reviewers were well intentioned and interesting conversations ensued, key decision makers and subject matter experts were oftentimes not present to help advance projects. Consequently, a new approach was needed for keeping the Hazard Mitigation Action Plan alive.

Adjustments to implementation and review processes were made over time. Reviews were conducted on a project-by-project basis which proved to generate more enthusiasm, improved results and ultimately engaged more people in the process. Additionally, it was recognized that unforeseen incidents and situations will inevitably emerge, therefore the HMAP is purposely designed to be flexible enough to address new projects and evolving priorities relevant to hazard mitigation.

In the chapter that follows, the Hazard Mitigation Steering Committee is profiled in ***Section 2.1 (Hazard Mitigation Steering Committee)***. ***Section 2.2 (Committee Meetings-Public Involvement)*** provides a recap of HMSC meetings and primary agenda points for each, describes the process for updating the previous version of this plan, molding it into its current form while addressing new requirements and gathering public input.

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2.1 HAZARD MITIGATION STEERING COMMITTEE

Members of the Hazard Mitigation Steering Committee (HMSC) include participants in previous mitigation plan processes as well as new members. The HMSC is a mutually inclusive subcommittee of the Hazard Mitigation-Emergency Management Steering Committee (HM-EM-SC).

The HMSC is comprised of representatives from various departments of local government, the public, local and regional stakeholders. The HMSC is also supported by several agency affiliated contributors. Professional fields represented by the HMSC include:

- Administration
- Emergency Response and Management
- Land Use Planning/Community Development
- Public Works, Infrastructure, Utilities, Facilities
- Law Enforcement
- Geographic Information Systems
- Public Health
- Structural Engineering
- Forestry/Natural Resources
- Floodplain Administration
- Information Technology
- Risk Management
- Local Media
- General Public and Interested Stakeholders

Hazard Mitigation Steering Committee
Listed below is the convener and members of the Lane County Hazard Mitigation Steering Committee. The following list includes all persons (current and former) with involvement in hazard mitigation at the county level to date.

Name	Agency/Title
Linda Cook	Lane County Emergency Manager, Steering Committee Convener
Mike Finch	Lane County, Information Technology
Melissa Crane	Lane County Public Works, GIS Division Supervisor
Brian Craner	Lane County, Capitol Projects
Matt Dapkus	Lane County, Facilities
Christopher Doyle	Lane County Sheriff's Office. Law Enforcement
Joanna Hill	Lane County, Public Safety, Communications
Selene Jaramillo	Lane County, Public Health
Michael Johns	Lane County Public Works, Fleet
Lisa Lacey	Lane County, Risk Management
Gary Luke	Lane County Public Works, GIS
Keir Miller	Lane County Land Management Division, Senior Planner
Oren Schumacher	Lane County Public Works, Roads Maintenance Planner
Greg J. Wobbe	OCR West, Mitigation Contractor
Pete Zugelder	Lane County, Continuity of Government

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Reviewers and Contributors (Version 2.0)

Information and data contributions, document review feedback, and general input to this Plan was received from many planning process participants. Individuals and agencies that provided such contributions are listed in the tables that follow.

Name	Agency
Dustin Bengston	U.S. Army Corps of Engineers
Roger Kline	Eugene Water and Electric Board
Todd Simmons	Eugene Water and Electric Board
Karl Morgenstern	Eugene Water and Electric Board
Mike Russell	Lane County Public Works, Roads
Jeff Bishop	Lane County Waste Management
Brian Johnson	Lane County Public Health
Robin Hawks	Contractor, Technical Editor

Survey Respondents (Version 2.0)

Local Utility Service Providers

All utilities operating in Lane County were invited to participate in a survey for purposes of assisting with the Plan Update. The following utilities participated.

Agency
Blachly Lane Electric Cooperative
Emerald People's Utility District
Eugene Water and Electric Board

Lane County Fire Defense Board (Version 2.0)

Seventeen members of the Lane County Fire Defense Board participated in a survey that was specifically designed to provide essential facility data to HAZUS and to assist with the Plan Update. Many of the responses were incorporated into the Plan Update as appropriate and applicable.

Agency
Coburg Fire District
Dexter Rural Fire Protection District
Eugene Fire & EMS Department
Goshen Fire District
Hazeldell Fire District
Junction City Rural Fire Protection District
Lane County Fire District #1
Lane Rural Fire & Rescue
Lowell Rural Fire Protection District
McKenzie Fire & Rescue
Oakridge Fire & EMS
Pleasant Hill Rural Fire Protection District
Santa Clara Fire District
South Lane County Fire & Rescue
Springfield Fire & Life Safety
Siuslaw Valley Fire & Rescue
Upper McKenzie Rural Fire Protection District

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2.2 MEETINGS, MITIGATION ACTIVITIES

44 CFR Requirement 201.6(b)
An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process. (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

Outlined below are the annual highlights of HMEMSC meetings and general mitigation activities undertaken during the previous planning cycle. These activities demonstrate the diverse involvement of neighboring communities, local government, regional agencies, the public, and various stakeholders. All activities listed helped inform the plan update process.

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2.2.2 Planning Process: 2012-2016 Cycle

Outlined by year below is a summary of mitigation activities from the 2012-2016 planning cycle. In keeping with guiding principles set forth in the original plan formation, these activities demonstrate diverse involvement of neighboring communities, local government, regional agencies, infrastructure/utilities, the public, and various stakeholders. Note: Appendix C contains comprehensive meeting notes and outlines for the planning cycle.

2012

General: Implementation of the approved and adopted plan began in 2012. Lane County Emergency Management engaged with emergency management peers, subject matter experts county staff and to construct a framework for completing the action items set forth in the HMAP and documenting activities on a continuous basis. Additional notes below.

Activity: Oregon Emergency Management Conference

Date: September 17-20, 2012

Location: Gleneden Beach, Oregon

Agenda/Outline: Hazard mitigation and emergency management, general.

2013

General: Following FEMA approval of the Hazard Mitigation Action Plan update in 2012 and the official completion of planning cycle 1, the following activities occurred during 2013, the first year of the second planning cycle.

- reformatted plan document to make it adaptable to new FEMA mitigation planning standards released in 2013
- updated/expanded risk assessments for earthquake, flood, landslide, tsunami, windstorm
- developed initial risk assessment framework for dam failure, haz mat incident, pandemic
- analysis of related planning documents, opportunities for plan coordination and integration
- a detailed document review and editing project
- posted a digital version of the current HMAP document on the county emergency management website and HM-EM Steering Committee Sharepoint site
- Hazard Mitigation & Emergency Management Steering Committee (HMEMSC) formed.

Activity: Lane County HMEM-SC Meeting

Date: July 10, 2013

Location: Lane County Public Works, N. Delta Hwy

Meeting Agenda/Outline: unofficial formation of Hazard Mitigation and Emergency Management Steering Committee (HMEM-SC) by consensus. Defined responsibilitiies and expectations. Plan document reformatting overview, new material and processes. Goals review and discussion. Action item implementation, progress reports.

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Activity: Work Session, Hazard Mitigation Mapping

Date: September 16, 2013

Location: Lane County Public Works, North Delta Hwy

Meeting Agenda/Outline: Identify data sources and cartographic methods for hazards mapping, various types. Prioritization of mapping projects. Inventory of existing maps and analysis.

Activity: Lane County HMEM-SC Meeting

Date: October 24, 2013

Location: Lane County Sheriff's Office, EOC

Meeting Agenda/Outline: Mission statement, goals review. Similarities, differences and interrelationships of HMAP, EOP, EAP, and COOP. Engaging stakeholders, 'whole community approach' to planning. Mitigation action item discussion: various project types. Discussion per department of mitigation actions completed or proposed. Recent policy changes, FEMA mitigation and the NFIP. Ongoing mapping and hazards analysis. Sharepoint site for Hazard Mitigation-Emergency Management Steering Committee.

2014

Activity: Lane County HMEM-SC Meeting

Date: January 23, 2014

Location: Lane County Sheriff's Office, EOC

Meeting Agenda/Outline: Departmental updates. Mitigation actions completed, proposed, and highest priorities. Reviewed Goals and Consider Revision (adopted by consensus, updated goals Section 4.2). Steering, Establishing Milestones, Road Ahead (highlights: transition to multi-jurisdiction document by including incorporated cities not covered by an HMAP, pursue grant funding to implement projects). Overview of USACE Rehabilitation and Inspection Program, potential mitigation opportunities. Established standardized meeting schedule for Hazard Mitigation and Emergency Management Steering Committee (HMEMSC), fourth Thursday of every 3rd month, time/location to TBA.

Activity: DR-4169 Severe Winter Storm OEM/FEMA Public Assistance and HMGP applicant briefing

Date: April 16, 2014

Location: Lane County Public Works, N. Delta Hwy

Meeting Agenda/Outline: Disaster declaration update, severe winter storms February 6-10, 2014. Overview of the Public Assistance Program. The State Hazard Mitigation Officer provided overview of Hazard Mitigation Grant Program (HMGP) and priorities for this disaster. HMGP pre-application was made available during the briefing. Technical assistance on project feasibility, environmental considerations and benefit-cost analysis provided.

Activity: Lane County HMEM-SC Meeting

Meeting Date: April 24, 2014

Location: Lane County Sheriff's Office

Meeting Agenda/Outline: Federal Disaster Declaration 4169 Oregon Winter Storms. Discussed ideas for improved emergency/incident management. Methods for real-time information exchange between EOC, public works, 1st responders and repair crews. Suggestion: During

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emergency, activate centralized call center, dispatch, and real-time web-based mapping interface specific to field operations with all 6 utilities in Lane County. Both radio and cell phone capability. Operators on standby for field reports, 2-way info sharing.

Mapping element, need for real-time overview of regional situation. Google Earth type solution suggested, ability to edit and upload web-based map in real-time showing: 1) road blockage, 2) power/communications outages, 3) repair priority, 4) dangerous conditions, 5) work crew status. Also discussed outward facing map interface, public access to report/edit information. Action Item 1: Research off the shelf solutions, prepare Draft 2 to propose to utilities. Incorporate into Hazard Mitigation Action Plan (HMAP).

Briefing on USACE Major Flood / Inundation Maps. Map viewing meetings, public information campaign. Current status, data availability, limitations, security. Map review, areas of interest, evacuation planning. Multi-Jurisdiction HMAP, HMGP application.

Activity: Work Session, Repetitive Flood Claim Mitigation

Meeting Date: June 3, 2014

Location: McKenzie River Trust Office, Eugene

Meeting Agenda/Outline: Discussed mitigation options for Repetitive Flood Claim property. Annual grant opportunity, mitigation funding, project viability.

Activity: Lane County HMEM-SC Meeting

Meeting Date: July 24, 2014

Location: Lane County Sheriff's Office

Meeting Agenda/Outline: Discussed coordination cell concept for management of moderate scale emergencies. Hazard mapping, description of new applications for emergency management. Departmental updates. Mitigation actions completed, proposed, and highest priorities. Update on HMGP application for DR-4169.

2015

Meeting Date:

Location:

Meeting Agenda/Outline:

Agencies Represented:

Minutes/Notes:

2016

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Meeting Date:

Location:

Meeting Agenda/Outline:

Agencies Represented:

Minutes/Notes:

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2.3 PUBLIC INVOLVEMENT IN THE PLANNING PROCESS

44 CFR Requirement 201.6(b):
An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include: (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process. (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

The goal over the past five years has been to more broadly instill a shared understanding of the importance of hazard mitigation and what the Plan is expected to accomplish. Expectations of the mitigation coordinating committee, reviewers and contributors were kept simple and manageable: "participate in mitigation projects and contribute to the Plan document in areas relevant to your area of expertise". The net was cast wide to create interest and garner participation in the Plan.

Public input was obtained through several concurrent means, including:

- Contact with committee members and their organizations
- As part of Public Education and Outreach events in which committee members participated and Plan elements were discussed
- An internet web page located at www.lanecounty.org/prepare
- A public meeting was held on March 1, 2012 to receive public comments on the draft plan

Additionally, the plan is open for comment at all times on the Lane County Emergency Management website. The public can view or download the Plan update and submit comments online by clicking on the appropriate link.

http://www.lanecounty.org/Departments/Sheriff/Office/Emermgmt/Documents/EMComment.pdf

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CHAPTER 3. RISK ASSESSMENT

44 CFR Requirement §201.6(c) (2)
[The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

The purpose of risk assessment is to identify and describe hazards that affect the planning area and analyze potential losses for human life and material assets. Through better understanding of potential hazards and the degree of risk they pose, more successful mitigation strategies can be developed and implemented.

This risk assessment follows the four-step process described in the FEMA publication 386-2, *Understanding Your Risks: Identifying Hazards and Estimating Losses*, listed as follows:

Step 1: Identify Hazards
Step 2: Profile Hazard Events
Step 3: Inventory Assets
Step 4: Estimate Losses

This chapter is organized into three sections that address the four steps of the risk assessment process.

Section 3.1 Identifying Hazards. Addresses Step 1. Lists the hazards considered during the planning process and those ultimately profiled in the plan. Describes methods, definitions and data sources used for the hazard identification and profile process.

Section 3.2 Hazard Profiles. Addresses Step 2. Presents a detailed outline for each identified hazard. Each hazard profile is addressed as a plan sub-section and includes a general description, affected geographic area, discussion of previous occurrences, probability of future occurrence, magnitude and severity, and assessment of overall vulnerability to each hazard.

Section 3.3 Vulnerability Assessment. Addresses Steps 3 & 4. Provides a countywide overview of risk exposure. It includes sub-sections that inventory potentially vulnerable assets and estimate potential losses in terms of structures and dollar value. Specifically, sub-sections of the Vulnerability Assessment include: National Flood Insurance Program (NFIP) status for the participating jurisdictions, inventories of FEMA/NFIP defined Repetitive Loss Properties, vulnerable populations, critical facilities, vulnerable structures, potential dollar loss estimates, land use and development trends, a multi-jurisdiction risk assessment, an overview of existing planning mechanisms.

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3.1 IDENTIFYING HAZARDS

44 CFR Requirement §201.6(c) (2) (i)
[The risk assessment shall include a] description of the type…of all natural hazards that can affect the jurisdiction.

The Hazard Mitigation Steering Committee (HMSC) reviewed information on hazards required for consideration. The HMSC identified hazards in Table 3-xx below as relevant to the planning area and selected these for detailed profile and mitigation efforts pursuant to the goals of this plan.

Hazard profiles were developed from information provided by the State of Oregon Natural Hazard Mitigation Plan, FEMA, the National Weather Service, the previous version of this Plan, and other referenced sources. Geographic information is provided for each hazard based on information on the impact areas of previous occurrences. For hazards including windstorm, drought, etc., geographic location of impacts is potentially any location in the county, and is noted accordingly.

Many of these hazard types are also identified in the State of Oregon Natural Hazard Mitigation Plan (aka State Plan), though there are differences in the organization and groupings in certain cases. Order of listing is alphabetical and does not imply relative significance.

Table 3-1 Identified/Profiled Hazards

Hazard Type	Method of Identification
Dam Failure	Potential occurrence
Drought	Previous occurrence
Earthquake	Potential occurrence
Flood	Previous occurrences
Hazardous Materials Incident	Potential occurrence
Landslide	Previous occurrences
Pandemic	Potential occurrence
Tsunami	Potential occurrence
Wildfire	Previous occurrences
Windstorm	Previous occurrences
Winter Storm	Previous occurrences
Volcano	Potential occurrence

Source: Lane County Hazard Mitigation Steering Committee

Simultaneous and/or consequential occurrences of hazards, also referred to as cascading events were considered and incorporated into the corresponding hazard profiles as appropriate.

Geologic hazards such as land subsidence, erosion, and expansive soils were not profiled due to lack of data, but may be developed in future iterations of this hazard mitigation plan.

Terrorism is profiled in an official use only was not included as local, state and federal law enforcement control operations and mitigation relating to that subject matter via the Joint Terrorism Task Force (JTTF).

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3.1.1 Methods, Definitions, Hazard Analysis Scoring (Quantification)

44 CFR Requirement §201.6(c) (2) (i):
[The risk assessment shall include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Note: Method for analysis and quantification of risk per probability, potential severity, etc. is under discussion/development per Hazard Mitigation Steering Committee feedback.

A scoring method is used to assist with prioritizing hazards and understanding risk. It doesn't predict the occurrence of a particular hazard, but it does "quantify" the risk of one hazard compared with another. By doing this analysis, planning can first be focused where the risk is greatest. Among other things, this hazard analysis can:

- help establish priorities for planning, capability development, and hazard mitigation;
- serve as a tool in the identification of hazard mitigation measures;
- be one tool in conducting a hazard-based needs analysis;
- serve to educate the public and public officials about hazards and vulnerabilities;
- help communities make objective judgments about acceptable risk.

For Lane County, this analysis allows comparison of the same hazard across various local jurisdictions; for example, the score for the windstorm or earthquake in central Lane County will differ from the score in coastal Lane County. Therefore, two hazard analyses are produced for Lane County due to the diversity of Lane County's geography.

The methodology was first developed by the Federal Emergency Management Agency (FEMA) circa 1983, and gradually refined by Oregon Emergency Management (OEM) over the years. The methodology produces scores that range from 24 (lowest possible) to 240 (highest possible). By applying one order of magnitude from lowest to highest, a hazard with a score of 240 is considered ten times more severe than a hazard with a rating of 24.

Vulnerability and probability are the two key components of the methodology. Vulnerability examines both typical and maximum credible events, and probability endeavors to reflect how physical changes in the jurisdiction and scientific research modify the historical record for each hazard. Vulnerability accounts for approximately 60% of the total score, and probability approximately 40%.

In connection with Emergency Management Performance Grant funding administered by OEM, there is a requirement that hazard analyses must be current and updated within the past ten years, and include a written synopsis (narrative) of the most credible events possible to occur within a jurisdiction. Having a current local hazard analysis is also one element in meeting Oregon Progress Board Benchmark #67, "Emergency Preparedness."

Hazard Quantification Categories

For the purpose of hazard quantification for the following four categories were developed:

1) History (previous occurrences, primarily within last century)

2) Vulnerability (number, degree or extent of people or assets at risk per hazard)

3) Maximum threat (credible worst-case scenario),

4) Probability (calculated likelihood of future occurrence)

Weight Factors, Scoring Guidelines

Weighting factors were developed for each of the four hazard quantification categories. This is done to emphasize certain categories over others in terms of risk assessment. Scoring guidelines are also developed as a method of standardizing assessment and to minimize subjectivity.

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History (weight factor for category = 2). History is the record of previous occurrences. Events to include in assessing history of a hazard event for which the following types of activities were required:

- The EOC or alternate EOC was activated;
- Three or more EOP functions were implemented, e.g., alert & warning, evacuation, shelter, etc.
- An extraordinary multi-jurisdictional response was required; and/or
- A "Local Emergency" was declared.

LOW – score at 1 to 3 points based on… 0 - 1 event past 100 years

MEDIUM – score at 4 to 7 points based on… 2 - 3 events past100 years

HIGH – score at 8 to 10 points based on… 4 + events past100 years

Vulnerability (weight factor for category = 5)

Vulnerability is the percentage of population and property likely to be affected under an "average" occurrence of the hazard.

LOW – score at 1 to 3 points based on… < 1% affected

MEDIUM – score at 4 to 7 points based on… 1 - 10% affected

HIGH – score at 8 to 10 points based on… > 10% affected

Maximum Threat (weight factor for category = 10)

Maximum threat is the highest percentage of population and property that could be impacted under a worst-case scenario.

LOW – score at 1 to 3 points based on… < 5% affected

MEDIUM – score at 4 to 7 points based on… 5 - 25% affected

HIGH – score at 8 to 10 points based on… > 25% affected

Probability (weight factor for category = 7)

Probability is the likelihood of future occurrence within a specified period of time.

LOW – score at 1 to 3 points based on… one incident likely within 75 to 100 years

MEDIUM – score at 4 to 7 points based on… one incident likely within 35 to 75 years

HIGH – score at 8 to 10 points based on… one incident likely within 10 to 35 years

Scores for each category are multiplied by the associated weight factors for each category to create a 'sub-score'. Adding the sub-scores for history, vulnerability, maximum threat, and probability for each hazard produces a 'total score' for each hazard. Note, a total score in itself is not as important as how it compares with the total scores for other hazards in Lane County. By comparing scores, we can determine priorities: Which hazards should the jurisdiction be most concerned about? Which ones less so?

The following table summarizes the quantified Hazard Analysis Score for each hazard.

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Table 3-x Lane County – Overall Hazard Analysis Scoring (Quantification)

Hazard / Weight Factor (WF)	History WF x 2	Vulnerability WF x 5	Maximum Threat WF x 10	Probability WF x 7	TOTAL SCORE
Winter Storm	10 x 2 = 20	6 x 5 = 30	6 x 10 = 60	8 x 7 = 56	**166**
Wildfire	10 x 2 = 20	6 x 5 = 30	6 x 10 = 60	8 x 7 = 56	**166**
Flood	10 x 2 = 20	6 x 5 = 30	6 x 10 = 60	8 x 7 = 56	**166**
Dam Failure	0 x 2 = 0	8 x 5 = 40	10 x 10 = 100	2 x 7 = 14	**154**
Pandemic	2 x 2 = 4	8 x 5 = 40	8 x 10 = 80	2 x 7 = 14	**142**
Windstorm	6 x 2 = 12	8 x 5 = 40	6 x 10 = 60	4 x 7 = 28	**140**
Haz Mat Incident	10 x 2 = 20	4 x 5 = 20	4 x 10 = 40	8 x 7 = 56	**136**
Tsunami	4 x 2 = 8	6 x 5 = 30	8 x 10 = 80	2 x 7 = 14	**132**
Earthquake	2 x 2 = 4	6 x 5 = 30	6 x 10 = 60	4 x 7 = 28	**122**
Landslide	8 x 2 = 16	4 x 5 = 20	2 x 10 = 20	8 x 7 = 56	**112**
Drought	4 x 2 = 8	2 x 5 = 10	6 x 10 = 60	4 x 7 = 28	**106**
Volcano	2 x 2 = 4	2 x 5 = 10	4 x 10 = 40	2 x 7 = 14	**68**

Source: Lane County HMEMSC

3.1.2 Data Sources and Data Limitations

Data Sources

Since the original hazard mitigation plan for Lane County was developed (2005-2006), there have been significant advances in the availability of data relevant to risk and vulnerability assessment. In addition to information reported in the original version of hazard mitigation plan, the majority of information contained in the Hazard Profiles and Vulnerability Assessment sections came from the following agencies, plans, technical documents and data sources:

Agency Sources:

- Federal Emergency Management Agency (FEMA)
- Oregon Office of Emergency Management (OEM)
- National Flood Insurance Program (NFIP)
- National Weather Service (NWS)
- National Oceanic and Atmospheric Administration (NOAA)
- National Climatic Data Center (NCDC)
- National Severe Storms Laboratory (NSSL)
- U.S. Geological Survey (USGS)
- Oregon Department of Geology and Mineral Industries (DOGAMI)
- Natural Resources Conservation Service (NRCS); SNOTEL
- Local, regional media and web encyclopedia sources
- Participating jurisdictions

Technical Documents and Plans:

- Code of Federal Regulations
- Federal Emergency Management Agency (FEMA). Publication 386-2, *Understanding Your Risks: Identifying Hazards and Estimating Losses*;
- FEMA *Local Mitigation Plan Review Guide*. October 2011.
- FEMA Flood Insurance Study: Lane County Oregon
- State of Oregon Natural Hazard Mitigation Plan (2012 Edition)

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- Oregon Department of Geology and Mineral Industries (DOGAMI) *Interpretive Map Series, IMS-24, Geologic Hazards, Earthquake and Landslide Hazard Maps, and Future Earthquake Damage Estimates.*
- *DOGAMI Open-File Report O-12-07 Lidar data and landslide inventory maps of the North Fork Siuslaw River and Big Elk Creek watersheds, Lane, Lincoln, and Benton Counties, Oregon;* 12-12-2012; (Burns, Duplantis, Jones, English)
- U.S. Geological Survey Open-File Report 03-440; *De-aggregation of U.S. Seismic Hazard Sources: The 2002 Update* (Harmsen, Frankel, Peterson).
- U.S. Geological Survey Professional Paper 1661–F; *Turbidite event history—Methods and implications for Holocene paleoseismicity of the Cascadia subduction zone.* 2012. (Goldfinger, Nelson, Morey, Johnson, Patton, Karabanov, Gutiérrez-Pastor, Eriksson, Gràcia, Dunhill, Enkin, Dallimore, Vallier)

Software and Analysis Tools:

- FEMA 'D-FIRM' Flood Insurance Rate Map Shapefile
- FEMA HAZUS Multi-Hazard Loss Estimation Software, Version MR3
- ArcInfo Geographic Information System (GIS) Software, Spatial Analyst

Data Limitations

Quality and availability of source data improved markedly since the original hazard mitigation plan was developed, though many limitations remain. Over time it is expected that hazard related information will continue to improve and will be included in future updates.

Notably, the use of FEMA's HAZUS Loss Estimation software involves analysis of data derived from the U.S. Census Bureau at the Census Block level. Default data and inputs will be updated on ongoing basis as availability of information improves.

National Climatic Data Center (NCDC) information is used extensively as a reporting mechanism for hazard events of various types. It should be noted however that damage descriptions and totals provided by this source is not necessarily a full accounting of local impacts, and further, damage totals for certain hazard events may cover multi-county regions which may or may not accurately reflect direct impacts in the planning area. Also, prior to 2011 the NCDC Storm Events Database

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3.2 HAZARD PROFILES

44 CFR Requirement §201.6(c) (2) (i):
Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.
[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazard described in paragraph (c) (2) (i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

Hazard profiles that follow are those that were deemed relevant to the planning area by the Hazard Mitigation Steering Committee. Information is presented in the most objective manner possible, with data sources and limitations of available information noted as appropriate.

Each profile includes a general description of the hazard, the geographic area affected, information regarding previous occurrences, and assessments of probability of future occurrence, potential magnitude and severity, and overall vulnerability. Hazard profiles are organized alphabetically for ease of reference and order should not infer relative importance.

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3.2.1 Dam Failure

Hazard Description
Dams are diversion structures that impound water in reservoirs. Dam failure is a breach or overtopping of the structure.

Dam failure can result in serious public safety impacts and catastrophic damages. Dams often serve multiple purposes such as hydroelectric generation, flood control and recreation. Dams are usually engineered to withstand a flood with a calculated risk of occurrence. Severe rainfall can increase potential of dam failure as a result of physical force of flood waters and/or overtopping. Failed dams can create catastrophic floods due to the tremendous energy of the released water.

Dam failure can be caused by simple structural failure, or a combination of the following factors:

- earthquake
- flood conditions leading to overtopping
- internal erosion
- inadequate spillway capacity
- arson
- failure of upstream dams

Warning time for dam failure varies widely and depends on the causal factors. Dam failure can occur in as little as a few minutes or slowly over the course of months. Catastrophic failure of a large dam would result in short evacuation times for locations directly downstream. Topography and floodplain characteristics determine warning time for locations further downstream.

Geographic Location
There are 33 dams listed in the National Inventory of Dams (NID) database for the planning area. A dam is listed in the NID database if it meets one or more of the following criteria:

1) It has High Hazard classification – loss of one human life is likely if the dam fails,
2) It has Significant hazard classification – possible lost of human life and likely significant property or environmental destruction,
3) Equal or exceed 25 feet in height and exceed 15 acre-feet in storage,
4) Equal or exceed 50 acre-feet storage and exceed 6 feet in height.

Table 3-xx on the following page outlines the dams listed by the NID for Lane County.

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Table 3-xx Dams of Lane County

Name	Inspection Date	Owner Type	Owner	Height (Feet)	Storage (acre feet)	Type
LOOKOUT POINT	6/3/2009	Federal	USACE WILLAMETTE PROJ.	276	477,700	Earth
HILLS CREEK	6/18/2009	Federal	USACE WILLAMETTE PROJ.	341	356,000	Earth
COUGAR	7/11/2012	Federal	USACE WILLAMETTE PROJ.	519	219,000	Rockfill
DORENA	6/6/2012	Federal	USACE WILLAMETTE PROJ.	154	131,000	Earth
FALL CREEK	6/18/2009	Federal	USACE WILLAMETTE PROJ.	205	125,000	Rockfill
FERN RIDGE	6/17/2010	Federal	USACE WILLAMETTE PROJ.	49	121,000	Earth
BLUE RIVER	7/20/2011	Federal	USACE WILLAMETTE PROJ.	270	89,000	Earth
COTTAGE GROVE	6/6/2012	Federal	USACE WILLAMETTE PROJ.	103	50,000	Earth
DEXTER	6/4/2009	Federal	USACE WILLAMETTE PROJ.	117	29,900	Earth
SILTCOOS LAKE	2/16/2012	Private	INTERNATIONAL PAPER CO.	12	15,070	Gravity
WEYERHAEUSER EAST BASIN, CELL 1 & 2	10/19/2005	Private	INTERNATIONAL PAPER CO.	16	585	Earth
LEABURG DAM	8/25/1999	Public Utility	CITY OF EUGENE	15	459	-
LEABURG CANAL AND FOREBAY	5/29/2012	Public Utility	EWEB	15	459	-
WALTERVILLE PUMPED S. POND	12/2/1997	Public Utility	EWEB	12	390	Earth
OAKRIDGE MILL LOG POND	10/7/2005	Private	CITY OF OAKRIDGE	13	380	Earth
CARROLL RESERVOIR	10/6/2005	Private	JEFF & CHRISTINA KNIGHT	25	355	Earth
WALTERVILLE FOREBAY	5/29/2012	Public Utility	EWEB	24*	275	-
METROPOLITAN WASTEWATER LAGOON	11/22/2010	Local Gov't	MWMC	15	224	Earth
SPRINGFIELD LOG POND	10/19/2005	Private	-	7	215	Earth
CRESWELL LAGOON	1/1/1985	Local Gov't	CITY OF CRESWELL	7	210	Earth
NORMAN STADELI	-	Private	NORMAN STADELI	23	167	Earth
METROPOLITAN SLUDGE PONDS (LAGOON)	11/22/2010	Local Gov't	MWMC	15	160	Earth
BOOTH KELLY LUMBER POND (LAGOON)	11/16/2010	Private	WEYERHAEUSER	10	144	Earth
VAUGHN LOG POND	11/10/2010	Private	ROSBORO LLC	12	132	Earth
FARNAM CREEK RES	4/11/2012	Private	LINDE KESTER	32	132	Earth
FORCIA & LARSEN LOG POND	11/1/2010	Private	PEGGY KRAFT, DON MERKLE	19	90	Other
ABE EDIGER	-	Private	G. COOPER-DIAMOND ROCK	18	85	Earth
SNELLSTROM-EUGENE LOG POND	2/1/1987	Private	SNELLSTROM LUMBER CO.	9	85	Earth
S. JETTY RESERVOIR A	-	Federal	USFS - SIUSLAW	8	70	-
SANTA CLARA	4/11/2012	Public Utility	EWEB	17	64	Earth
FORD FARMS RESERVOIR	11/1/2010	Private	FORD FARMS, INC.	22	60	Earth
KONYN DAIRY LAGOON	11/10/2010	Not Listed	-	10	50	Earth
SCHWARTZ RESERVOIR	10/4/2005	Private	JOHN INDA	20	20	Earth

Source: National Inventory of Dams

Note: Walterville Forebay height calculated foot to pool elevation of Walterville Storage Pond

Figure 3-4 Dams, Lane County
Map under development

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Previous Occurrences
There are no reported previous occurrences of dam failure in Lane County.

Probability of Future Occurrence
Due to the lack of data regarding previous occurrences, probability of future occurrence is based on speculative forecasts rather than recurrence intervals. Estimated future probability of a major occurrence of dam failure is less than 1.0 percent over a 100-year timeframe.

Magnitude/Severity/Extent
Considering the worst case scenario and in the absence of mitigation measures, magnitude and severity for dam failure is considered **Level-4 Catastrophic,** with potential for widespread severe property damage on a regional scale; extended shutdown of critical facilities, utilities and infrastructure; injuries and fatalities. Detailed analysis of populations and structures potentially impacted are developed in Section 3.3.3 (Vulnerable Populations and Structures).

Dam Failure Overall Vulnerability
Vulnerability to dam failure is classified as **High Vulnerability**. Due to a lack of previous occurrences from which to draw data, this assessment is based on speculative estimates that factor location of dams in relation to population centers and critical facilities, probability of occurrence, and potential magnitude and severity of an event occurrence, and classifications defined in Section 3.1.1.

WORKING DRAFT

3.2.2 Drought

Hazard Description

As defined by the National Weather Service, drought is "a period of abnormally dry weather sufficiently prolonged for the lack of water to cause serious hydrologic imbalance in the affected area." More simply, drought is a period of unusually persistent dry weather lasting long enough to cause serious problems such as crop damage and/or water supply shortages. Severity of drought depends upon the degree of moisture deficiency, duration, and size of affected area.

Short term effects of drought include excessively dry soil causing stress for plants and trees and increased potential for wildfire. When rainfall is less than normal for longer periods the following may occur: stream and river flows decline, water levels in lakes and reservoirs fall; the water table drops, i.e. the depth to reach groundwater in water wells increases.

Drought is a unique hazard because it is not a specific event but rather the cumulative result of a persistent period of below average precipitation. In the U.S. drought occurrence generally does not require evacuation nor does it constitute an immediate threat to life or property. The effects of drought may not be noticed immediately but only become apparent after weeks or months. The effect to the water table may take up to a year or more to be realized.

Drought Mitigation Center at the University of Nebraska- Lincoln tracks drought conditions across the country and provides situation maps at the county level. The Drought Monitor is an attempt to synthesize multiple drought related indices and impacts which represents a consensus of federal and academic scientists. Some of those indices include: the Palmer Drought Severity Index, the Climatic Prediction Center's Soil Moisture Model, the USGS weekly stream flow map (based on an average of daily stream flow), the National Climatic Data Center's Standardized Precipitation Index and the NOAA/NESDIC Vegetation Heath Index.

Table 3-x outlines the Drought Monitor's rating system including a matrix of the five indices which comprise the overall drought severity classification.

Table 3-6 Drought Monitor: Drought Severity Classification

Description	Possible Impacts	Palmer Drought Index	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Satellite Vegetation Health Index
Abnormally Dry	Going into drought, short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought; some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9	21-30	21-30	-0.5 to -0.7	36-45
Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing or imminent, voluntary water use restrictions requested.	-2.0 to -2.9	11-20	11-20	-0.8 to -1.2	26-35
Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.	-3.0 to -3.9	6-10	6-10	-1.3 to -1.5	16-25
Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread shortages or restrictions	-4.0 to -4.9	3-5	3-5	-1.6 to -1.9	6-15
Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams and wells, creating water emergencies.	-5.0 or less	0-2	0-2	-2.0 or less	1-5

Source: Drought Monitor http://drought.unl.edu

DRAFT

Geographic Location

Drought is a normal part of virtually all-climatic regimes, including areas with high and low average rainfall. While Lane County is located in a temperate region where precipitation is generally adequate, it is not immune from the occurrence or effects of drought. In general, drought impacts are recorded more frequently in the Willamette Valley and Cascade foothills (central planning area), and somewhat less frequently and severely at the coast (western planning area) and upper elevation Cascades (eastern planning area).

Previous Occurrences

Out of 17 drought emergency proclamations in the state of Oregon from 2003-2013, none have involved Lane County. Drought emergency proclamations reflect more serious conditions where impacts are generally widespread with the affected area.

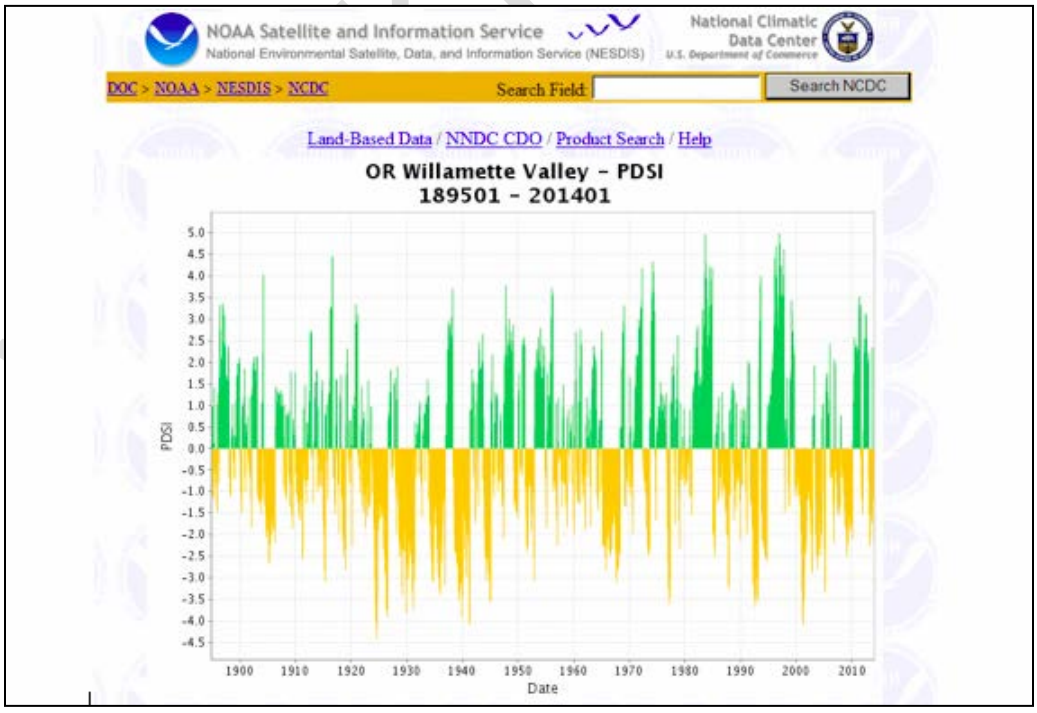
However, according to the National Drought Mitigation Center Drought Reporter, there have been over 100 reports of drought impacts in Lane County for the period 2003-2013. These reports typically involve impacts on a relatively local level, and specify type. In Lane County agricultural impacts are the most prevalent type, followed by emergency shortage/water use restrictions, and public health, respectively.

Table 3-x Reported Drought Impacts by Category: Lane County 2003 - 2013

Agriculture	49
Relief, Response & Restrictions	15
Society & Public Health	14
Business & Industry	8
Fire	7
Plants & Wildlife	6
Water Supply & Quality	6
Tourism & Recreation	3
Total	**108**

Source: National Drought Mitigation Center; Drought Reporter; http://droughtreporter.unl.edu/

The following chart indicates long term patterns of precipitation abundance or scarcity relative to the baseline average for the 115-year period.



Source: National Climatic Data Center

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Tracking drought is challenging due to the numerous definitions and measurement protocols. The online website *Drought Monitor*; a partnership between Federal agencies and the National

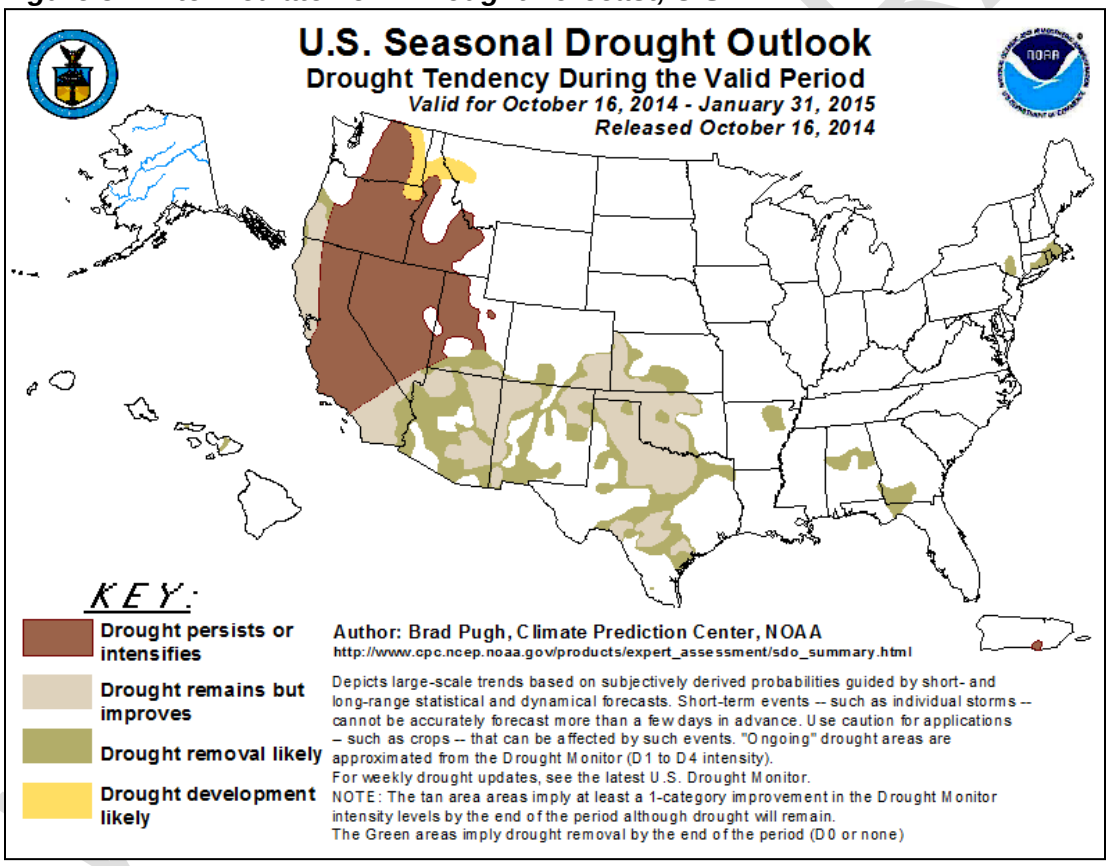
The Palmer Drought Severity Index (PDSI) is a commonly used measure for moisture depletion or abundance on a regional scale. For 2000-2009, PDSI values for Lane County typically dropped below -2.0 at some point during the summer months. The year 2001 stands out as having the longest and most pronounced drought conditions. For a 10 month period from January through November, PDSI values equated either moderate or severe drought across the planning area.

PDSI values for 2010-2013 indicate less frequent drought conditions in the summer months. Though the rainfall statistics for western Oregon in the winter months of 2013 were notably low, this did not equate to severe drought or widespread impacts.

Probability of Future Occurrence

Future drought forecasting is typically generated via analysis of ocean current and temperature patterns relative to current and recent conditions. The seasonal drought outlook for the period October 2014 through January 2015 predicts improving water abundance conditions for the region of Oregon which includes Lane County.

Figure 3-x Intermediate Term Drought Forecast, U.S.



Source: NOAA, Climate Prediction Center

DRAFT

3.2.3 Earthquake

Hazard Description

An earthquake is motion or trembling of the earth caused by an abrupt release of stored energy in the rocks beneath the earth's surface. The energy released results in vibrations known as seismic waves that are responsible for the trembling and shaking of the ground during an earthquake. Tsunamis are a directly related element of earthquake activity for Lane County, for more information see Tsunami profile in Section 3.2.8.

Earthquakes are commonly described in terms of magnitude and intensity. The traditional measurement for the amount of seismic energy released by an earthquake is the Richter scale. Intensity, or how strong the shock was felt at a particular location, is measured by the Modified Mercalli Intensity (MMI) scale. The MMI scale quantifies effects on humans, objects of nature and man-made structures. A third method for measurement of ground motion is expressed as peak ground acceleration (PGA), defined as peak change in speed of ground surface horizontal motion. PGA is expressed as a percent of gravity or "g", with higher PGA values indicating of a more violent event. Table 3-xx below is a combined earthquake PGA, Magnitude/Richter, and MMI comparison from the United States Geological Survey (USGS).

Table 3-4 Earthquake Magnitude / Intensity Comparison

PGA (% g)	Magnitude (Richter)	Intensity (MMI) & Label	MMI Description
< 0.17	1.0 – 3.0	I. Instrumental	**I.** Motion only noticed by humans in favorable conditions.
0.17 – 1.4	3.0 – 3.9	II. – III. Feeble/Slight	**II.** Felt only by a few persons at rest, especially on building upper floors. **III.** Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibrations similar to the passing of a truck.
1.4 – 9.2	4.0 – 4.9	IV. – V. Moderate/Rather Strong	**IV.** Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Parked cars rock noticeably. **V.** Felt by nearly everyone: many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
9.2 – 34	5.0 – 5.9	VI – VII Strong/Very Strong	**VI.** Felt by all. Some heavy furniture moved. Damage slight. **VII.** Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built of badly designed structures; some chimneys broken.
34 – 124	6.0 – 6.9	VIII – IX Destructive/Ruinous	**VIII.** Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Major damage to poorly built structures. Chimneys, factory stacks, columns, monuments, and walls collapse. Heavy furniture overturned. **IX.** Considerable damage to specially designed structures; well-designed frame structures thrown out of plumb. Major damage to substantial buildings, with partial collapse. Buildings shifted off foundations.
> 124	7.0 and higher	X, XI and XII Disastrous/Very Disastrous/ Catastrophic	**X.** Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. **XI.** Few structures remain standing. Bridges destroyed. **XII.** Damage total. Line of sight & level distorted. Objects thrown in the air.

Source: USGS, Earthquake Hazards Program. http://earthquake.usgs.gov

Geographic Location

In 2008 the Oregon Department of Geology and Mineral Industries (DOGAMI) published an extensive study on the primary geologic hazards of Yamhill, Marion, Polk, Benton, Linn and Lane Counties. Included in this report are earthquake and landslide hazard maps for each county along with future earthquake damage estimates. This study is called *Interpretive Map*

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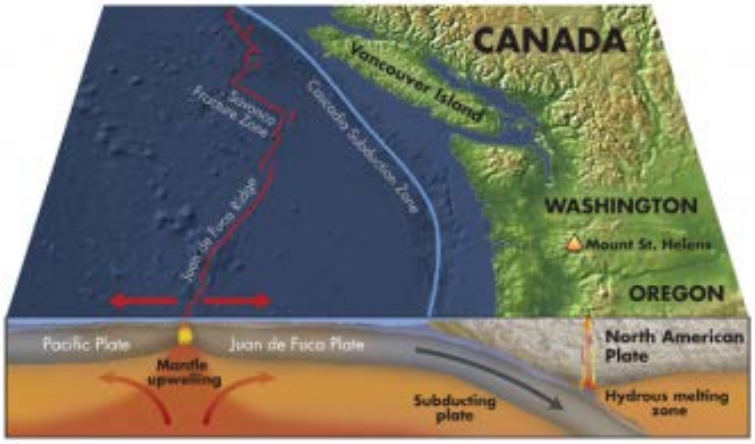
Series, IMS-24, Geologic Hazards, Earthquake and Landslide Hazard Maps, and Future Earthquake Damage Estimates. Appendix C of the DOGAMI report is specific to Lane County and is therefore included in its entirety as an Addendum to this document.

In more general terms, the potential for earthquake impacts is present for all portions of Lane County, though coastline areas possess higher probability of occurrence and/or higher vulnerabilities.

Notably, the Cascadia Subduction Zone (CSZ) is a region of the ocean floor off the coast of Oregon and Washington where the North American, Pacific, Juan de Fuca, and Gorda Plates meet. Subduction refers to the Pacific Plate sinking below the North American Plate. The North American Plate is moving in a general southwest direction, overriding the Pacific and Juan de Fuca Plates. The CSZ extends approximately 600 miles north to south, and creates somewhat higher vulnerability to western portions of the planning area that are closest to likely epicenters, and the related effects of tsunamis.

Figure 3-xx Cascadia Subduction Zone (CSZ)



Source: American Geosciences Institute

Previous Occurrences

Based on paleo-seismologic study published by researchers at Oregon State University and the USGS, 19 major Cascadia Subduction Zone (CSZ) earthquakes have occurred during the last 10,000 years with magnitudes ranging from 8.7 to 9.2. As outlined in the Earthquake Magnitude/Intensity Comparison table, earthquakes with this magnitude are characterized as disastrous/catastrophic. Because the epicenter of these earthquakes is below the ocean surface, its assumed that tsunamis accompanied each of these events.

Information regarding CSZ earthquakes occurring since 1180 BCE is listed in table 3-xx. The most recent of these was a 9.0 Magnitude quake which occurred at 9pm on January 26, 1700.

Table 3-xx Major Cascadia Subduction Zone Earthquakes: 1180 BCE to Present

Approximate Year	Recurrence Interval (Years)
1700 CE	312
920 CE	780
650 CE	270
280 CE	370
530 BCE	790
840 BCE	310
1180 BCE	340

Notes, sources: Years of occurrence listed above are approximated from the mid-point of ranges reported in the following journal article: "Earthquake Recurrence Inferred from Paleoseismology" (2003). *Developments in Quaternary Science*. Atwater; Tuttle, Schweig, Rubin, Yamaguchi, Hemphill-Haley.
CE = current era (0 AD to present); BCE = before current era

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No earthquake activity has caused major damage in the planning area in the last decade, though seismic activity has occurred in Oregon and in the CSZ in recent years. A selection of these events are listed below.

- September 21, 1993: 6.0 Magnitude, near Klamath Falls. Caused two deaths and $7.5 million in damage. One person was killed when the car he was driving was crushed by a boulder in an earthquake-induced rockfall and another person died of a heart attack. More than 1,000 homes and commercial buildings were damaged. Maximum Intensity VII in downtown Klamath Falls and the Oregon Institute of Technology about 2 miles north of downtown. Three highways leading to Klamath Falls were temporarily closed because of rockfalls or concern about possible damage to bridges. Rockfalls and rockslides occurred in roadcuts and on steep slopes throughout the epicenter region. Ground cracks in fill material were observed at several locations in the area. Felt in southern Oregon as far north as Eugene and in northern California as far south as Redding.
- July 12, 2004: 4.9 Magnitude. Off the coast of Lane County approximately 25 miles northwest of Florence. No damage reported.
- November 19, 2007: 5.8 Magnitude. Blanco Fracture Zone off Oregon Coast, approximately 180 miles west-southwest of Florence. No damage reported.

Probability of Future Occurrence

Research published by Oregon State University and the USGS in 2012 calculates a 40 percent chance for a major CSZ earthquake during the next 50 years. This equates to slightly less than a 1 percent probability of occurrence in a given year, and a **Low Probability** of occurrence classification according to the definitions set forth in Section 3.1.1 (Methods and Definitions).

Magnitude/Severity/Extent

As indicated by the map in Figure 3-xx potential earthquake intensity is highest in western portions of Lane County along the coast and coast range, and somewhat lower along the valley floor, Cascade foothills, and high Cascades. PGA ranges for western Lane County are 0.6 to 0.8 as a percent of gravity, and 0.2 to 0.3 as a percent of gravity for eastern portions of the County. This would indicate significantly higher intensity of shaking, in addition to higher probability of impacts from tsunami.

Based on assumptions for most probable worst case scenarios and the impacts of previous earthquakes, a **Level 4 – Catastrophic** magnitude/severity classification is assigned for earthquake.

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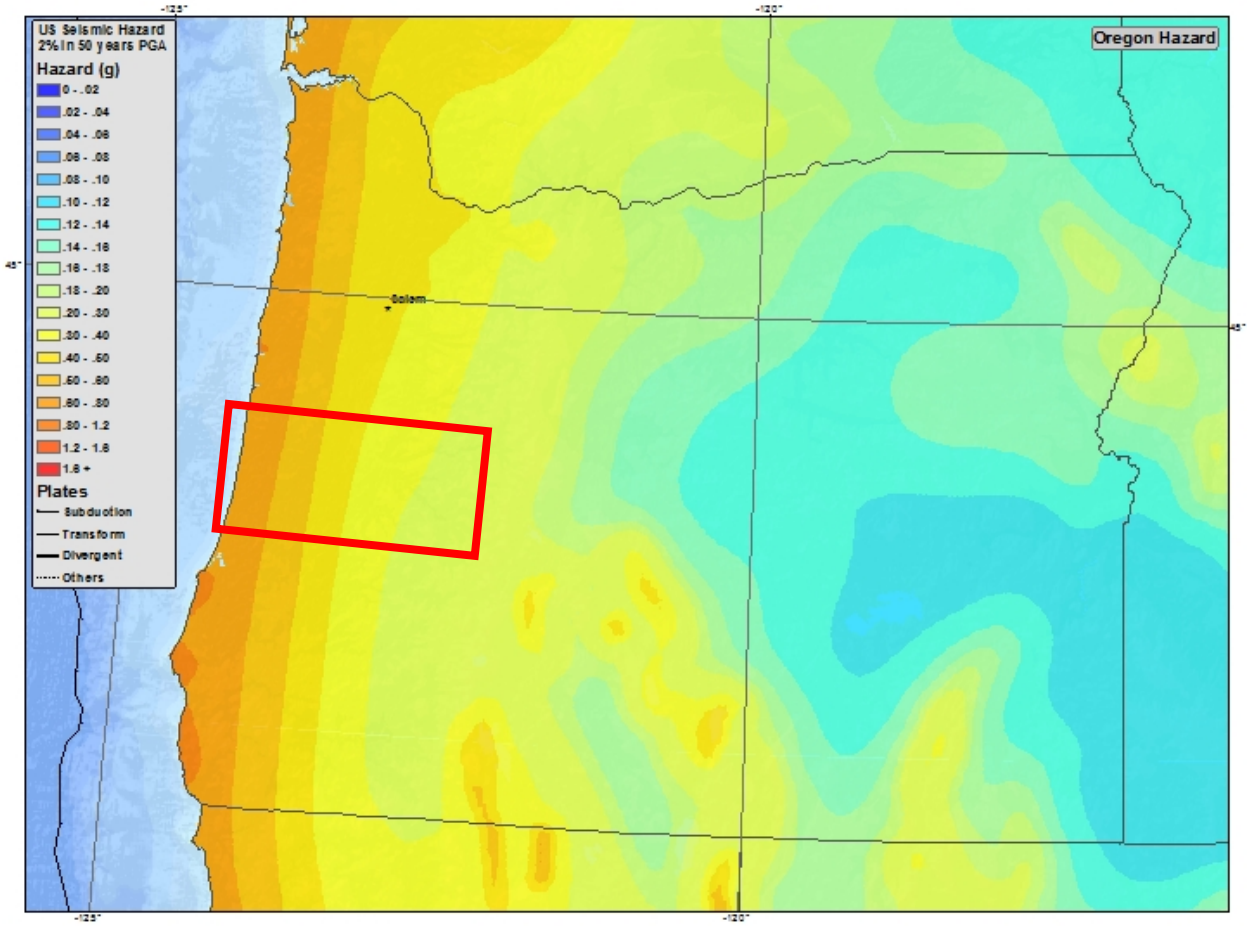
Figure 3-13 Peak Ground Acceleration: 2% Probability of Exceedence in 50 Years



Source: USGS; 2008 analysis
Note: Approximate boundaries of Lane County indicated by red rectangle

Earthquake Overall Vulnerability

Based on the potentially catastrophic impacts, tempered by forecasts of relatively low probability, a **High Vulnerability** classification is assigned for earthquake.

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3.2.4 Flood

Hazard Description

A flood is defined as the inundation of land by the rise and overflow of a body of water. Floods most commonly occur as a result of heavy rainfall causing a river system or stream to exceed its normal carrying capacity. In Oregon flooding situations can be worsened by "rain on snow" events that cause rapid snowmelt.

Flooding potential is most common from October through April when storms from the Pacific Ocean bring steady and occasionally intense rainfall, and soil saturation remains high. Flooding can be aggravated when streams are altered by human activity, such as through channelization of streams or loss of wetlands. Many types of flood hazards exist in Oregon, including riverine floods, flash floods (resulting from locally intense thunderstorms, ice jams and dam failures), coastal floods, shallow area and urban flooding and playa flooding.

Riverine flooding is affected by the intensity and distribution of rainfall, soil moisture, seasonal variation in vegetation, and water-resistance of the surface areas caused by urbanization. Flash flooding is a localized flood that results from a short duration of intense rainfall across a limited geographic area. During extended periods of intense rainfall, storm water conveyance systems can be overwhelmed and flooding of surrounding neighborhoods can result.

Flood hazards can cause severe property damage and loss of life, and is one of the most pervasive natural hazard threats in Lane County, with public safety, housing, property, and infrastructure all potentially impacted.

Definitions for National Weather Service flood announcements and warnings are listed below:

Riverine Flooding	
Flood Potential Outlook (FPO):	Announcement to alert the public of potentially heavy rainfall that could send rivers and streams into flood or aggravate an existing flood.
Flood Watch:	Announcement to inform the public that current or developing conditions indicate a threat of flooding, but occurrence is neither certain nor imminent.
Flood Warning:	An announcement by the NWS to inform the public of flooding along larger streams in which there is a serious threat to life or property. A flood warning will usually contain river stage forecasts.
Flood Statement:	A statement issued by the NWS to inform the public of flooding along major streams in which there is not a serious threat to life or property. It may also follow a flood warning to give later information.
Flash Floods	
Flash Flood Watch:	Announcement that current or developing conditions indicate potential flash flooding in the watch area, but occurrence is neither certain nor imminent.
Flash Flood Warning:	Issued to inform the public that flash flooding is in progress, imminent, or highly likely.
Flash Flood Statement:	A statement by the NWS which provides follow-up information on flash flood watches and warnings.

Source: National Weather Service

Geographic Location

Lane County spans a wide range of climatic and geologic regions from the Pacific coast to the high Cascades. This diversity results in considerable variation in precipitation. The average annual precipitation ranges from less than 40 inches in the Willamette Valley to over 100 inches in the Coast Range and along the west slope of the Cascades.

FEMA's definition for a floodplain, or Special Flood Hazard Area (SFHA), is the area inundated to a 1 foot depth by a flood with 1 percent annual probability of occurrence. According to common usage, this is also referred to as the area inundated by the '100-year flood', 'base-flood', aka most severe flood that can be expected to occur during a 100-year timeframe. It is important to note the geographic boundaries of this area are estimated, based on various data

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inputs which may include topography, hydrology, climatology, and historic records. Flood inundation can and does occur in areas that are not mapped as Special Flood Hazard Areas.

Lane County has more river miles of floodplain than any other county in Oregon. Over 136,000 acres of land is located in Special Flood Hazard Areas, (212 square miles), and more than 11,000 individual parcels are partially or entirely located within SFHAs. Ongoing development along these rivers continues to displace natural areas that have historically functioned to store flood waters.

Lane County features several large rivers, tributaries, streams and creeks that are susceptible to annual flooding events. Flooding along these waterways threatens life and safety and can cause significant property damage. Large rivers include: Willamette River (Main Stem, Middle and Coast Forks); McKenzie River (including the South Fork); Siuslaw River (including the North Fork); Row River; and Lake Creek. Smaller tributaries susceptible to frequent flooding include the Mohawk River, Long Tom River, Fall Creek, Little Fall Creek, Camp Creek, Horse Creek, Coyote Creek, Mosby Creek, Poodle Creek, Siltcoos River and Tenmile River.

The U.S. Army Corps of Engineers (USACE) operates 13 multi-purpose water projects in the Willamette River Basin (commonly referred to as dams or impoundment structures). Nine (9) of those USACE projects are situated in Lane County, all constructed between 1941 and 1968. The primary purpose of these dams is flood control, although they only control flooding on 50 percent of the tributaries in the Willamette Basin. Reservoirs behind the dams are drained throughout the summer and fall months to create storage capacity for water from heavy winter and spring rains. Therefore, most flooding in Lane County occurs along waterways with no flood control devices, such as the Siuslaw River and Mohawk River.

The map on the following page represents flood hazard areas as defined on currently adopted FEMA Flood Insurance Rate Maps (FIRMs) for Lane County. The maps delineate Special Flood Hazard Areas (area assumed to be inundated to at least 1 foot depth by a flood with 1% annual chance of occurrence, aka 100-year floodplain). Also mapped is the area assumed to be inundated to at least 1 foot depth by a flood with 0.2 percent annual chance occurrence, aka 500-year floodplain. Note: FIRMs for Lane County are currently being revised and updated, and therefore information contained on the referenced map is subject to change.

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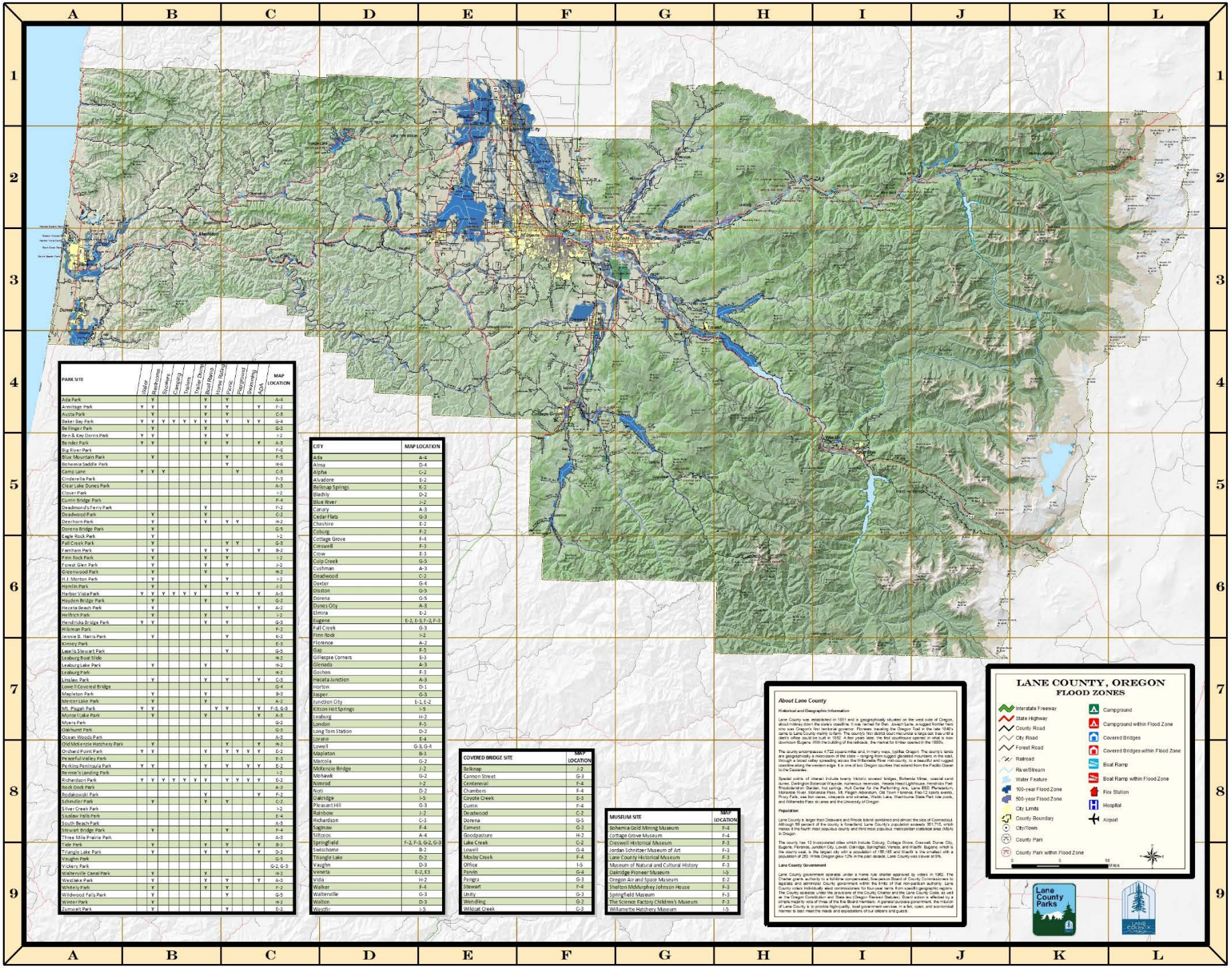

PARK SITE	Water	Restrooms	Showers	Camping	Trailers	Trailer Dump	Boat Ramp	Horse Riding	Picnic	Playground	Swimming	ADA	MAP LOCATION
Ada Park		Y					Y		Y				A-4
Armitage Park	Y	Y					Y		Y			Y	F-2
Ayuta Park		Y					Y		Y				C-5
Baker Bay Park	Y	Y	Y	Y	Y	Y	Y		Y		Y	Y	G-4
Bellinger Park		Y					Y						G-3
Ben & Kay Dorris Park	Y	Y					Y		Y				J-2
Bender Park	Y	Y					Y		Y			Y	A-3
Big River Park													F-5
Blue Mountain Park		Y							Y				F-5
Bohemia Saddle Park									Y				H-6
Camp Lane	Y	Y	Y							Y			C-3
Cinderella Park													F-3
Clear Lake Dunes Park													A-5
Clover Park													J-2
Cumin Bridge Park													F-4
Deadmond's Ferry Park						Y							F-2
Deadwood Park		Y				Y							C-2
Deerhorn Park		Y				Y			Y	Y			H-2
Dorena Bridge Park		Y											G-5
Eagle Rock Park		Y											J-2
Fall Creek Park		Y							Y	Y			G-3
Fernham Park		Y					Y		Y			Y	B-2
Finn Rock Park		Y					Y		Y				J-2
Forest Glen Park		Y					Y		Y				J-2
Greenwood Park		Y					Y						H-2
H.J. Morton Park		Y							Y				J-2
Hamlin Park		Y					Y						J-2
Harbor Vista Park	Y	Y	Y	Y	Y	Y	Y		Y	Y		Y	A-3
Hayden Bridge Park		Y					Y						G-2
Heceta Beach Park		Y							Y			Y	A-2
Helfrich Park		Y					Y						J-2
Hendricks Bridge Park	Y	Y					Y		Y				G-3
Hileman Park													F-3
Jennie B. Harris Park		Y							Y				K-2
Kinney Park													E-3
Lasells Stewart Park									Y				G-5
Leaburg Boat Slide													H-2
Leaburg Lake Park		Y					Y						H-2
Leaburg Park													H-2
Linsley Park		Y					Y		Y			Y	C-3
Lowe II Covered Bridge													G-4
Mapleton Park		Y					Y						B-3
Mercer Lake Park		Y					Y						A-3
Mt. Pisgah Park	Y	Y						Y	Y			Y	F-3, G-3
Munsel Lake Park		Y					Y					Y	A-3
Myers Park													G-2
Oakhurst Park													G-3
Ocean Woods Park													A-3
Old McKenzie Hatchery Park		Y							Y			Y	H-2
Orchard Point Park	Y	Y					Y		Y	Y	Y	Y	E-2
Peaceful Valley Park													E-3
Perkins Peninsula Park	Y	Y					Y		Y		Y	Y	E-2
Rennie's Landing Park													I-2
Richardson Park	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	E-2
Rock Dock Park													A-3
Rodakowski Park							Y					Y	F-3
Schindler Park		Y					Y		Y				C-2
Silver Creek Park													J-2
Siuslaw Falls Park													E-4
South Beach Park													A-3
Stewart Bridge Park		Y							Y				F-4
Three Mile Prairie Park													A-3
Tide Park		Y					Y		Y			Y	B-2
Triangle Lake Park		Y					Y		Y			Y	D-2
Vaughn Park													G-5
Vickery Park													G-2, G-3
Walterville Canal Park		Y					Y						H-2
Westlake Park		Y					Y		Y			Y	A-2
Whitely Park		Y					Y		Y				F-2
Wildwood Falls Park		Y							Y				G-5
Winter Park		Y											H-2
Dumont Park		Y							Y				E-2

CITY	MAP LOCATION
Ada	A-4
Alma	D-4
Alpha	C-2
Alvadore	E-2
Belknap Springs	K-2
Blachly	D-2
Blue River	J-2
Canary	A-3
Cedar Flats	G-3
Cheshire	E-2
Coburg	F-2
Cottage Grove	F-4
Creswell	F-3
Crow	E-3
Culp Creek	G-5
Cushman	A-3
Deadwood	C-2
Dexter	G-4
Disston	G-5
Dorena	G-5
Dunes City	A-3
Elmira	E-2
Eugene	E-2, E-3, F-2, F-3
Fall Creek	G-3
Finn Rock	I-2
Florence	A-2
Gap	F-5
Gillespie Corners	E-3
Glenada	A-3
Goshen	F-3
Heceta Junction	A-3
Horton	D-1
Jasper	G-3
Junction City	E-1, E-2
Kitson Hot Springs	I-5
Leaburg	H-2
London	F-5
Long Tom Station	D-2
Loraine	E-4
Lowell	G-3, G-4
Mapleton	B-3
Marcola	G-2
McKenzie Bridge	J-2
Mohawk	G-2
Nimrod	I-2
Noti	D-2
Oakridge	I-5
Pleasant Hill	G-3
Rainbow	J-2
Richardson	C-3
Saginaw	F-4
Siltcoos	A-4
Springfield	F-2, F-3, G-2, G-3
Swisshome	B-2
Triangle Lake	D-2
Vaughn	D-3
Veneta	E-2, E3
Vida	H-2
Walker	F-4
Walterville	G-3
Walton	D-3
Westfir	I-5

COVERED BRIDGE SITE	MAP LOCATION
Belknap	J-2
Cannon Street	G-3
Centennial	F-4
Chambers	F-4
Coyote Creek	E-3
Cumin	F-4
Deadwood	C-2
Dorena	G-5
Earnest	G-2
Goodpasture	H-2
Lake Creek	C-2
Lowell	G-4
Mosby Creek	F-4
Office	I-5
Parvin	G-4
Pengra	G-3
Stewart	F-4
Unity	G-3
Wendling	G-2
Wildcat Creek	C-3

MUSEUM SITE	MAP LOCATION
Bohemia Gold Mining Museum	F-4
Cottage Grove Museum	F-4
Creswell Historical Museum	F-3
Jordan Schnitzer Museum of Art	F-3
Lane County Historical Museum	F-3
Museum of Natural and Cultural History	F-3
Oakridge Pioneer Museum	I-5
Oregon Air and Space Museum	E-2
Shelton McMurphey Johnson House	F-3
Springfield Museum	F-3
The Science Factory Children's Museum	F-3
Willamette Hatchery Museum	I-5

About Lane County

Historical and Geographic Information

Lane County was established in 1851 and is geographically situated on the west side of Oregon, about midway down the state's coastline. It was named for Gen. Joseph Lane, a rugged frontier hero who was Oregon's first territorial governor. Pioneers traveling the Oregon Trail in the late 1840's came to Lane County mainly to farm. The county's first district court met under a large oak tree until a clerk's office could be built in 1852. A few years later, the first courthouse opened in what is now downtown Eugene. With the building of the railroads, the market for timber opened in the 1880's.

The county encompasses 4722 square miles and, in many ways, typifies Oregon. The county's lands are geographically a microcosm of the state – ranging from rugged glaciated mountains in the east, through a broad valley spreading across the Willamette River mid-county, to a beautiful and rugged coastline along the western edge. It is one of two Oregon counties that extend from the Pacific Ocean to the Cascades.

Special points of interest include twenty historic covered bridges, Bohemia Mine, coastal sand dunes, Darlingtonia Botanical Wayside, numerous reservoirs, Heceta Head Lighthouse, Honeyman State Park, Rhododendron Garden, hot springs, Hult Center for the Performing Arts, Lane 850 Planetarium, Mohawk River, Mohawk Pass, Mt. Pisgah Arboretum, Old Town Florence, Pisto 12 sports events, Proxy Falls, sea lion caves, vineyards and wineries, Waldo Lake, Warthburne State Park tide pools, and Willamette Pass ski areas and the University of Oregon.

Population

Lane County is larger than Delaware and Rhode Island combined and almost the size of Connecticut. Although 99 percent of the county is forestland, Lane County's population exceeds 351,715, which makes it the fourth most populous county and third most populous metropolitan statistical area (MSA) in Oregon.

The county has 12 incorporated cities which include Coburg, Cottage Grove, Creswell, Dunes City, Eugene, Florence, Junction City, Lowell, Oakridge, Springfield, Veneta, and Westfir. Eugene, which is the county seat, is the largest city with a population of 156,185 and Westfir is the smallest with a population of 253. While Oregon grew 12% in the past decade, Lane County was slower at 9%.

Lane County Government

Lane County government operates under a home rule charter approved by voters in 1962. The Charter grants authority to a full-time commissioned, five-person Board of County Commissioners to legislate and administer County government within the limits of that non-partisan authority. Lane County voters individually elect commissioners for four-year terms from specific geographic regions. The County operates under the provisions of the County Charter and the Lane County Code, as well as the Oregon Constitution and State law (Oregon Revised Statutes). Board action is effected by a simple majority vote of three of the five Board members. A general purpose government, the mission of Lane County is to provide high-quality, local government services in a fair, open, and economical manner to best meet the needs and expectations of our citizens and guests.

LANE COUNTY, OREGON
FLOOD ZONES

- Interstate Freeway
- State Highway
- County Road
- City Road
- Forest Road
- Railroad
- River/Stream
- Water Feature
- 100-year Flood Zone
- 500-year Flood Zone
- City Limits
- County Boundary
- City/Town
- County Park
- County Park within Flood Zone
- Campground
- Campground within Flood Zone
- Covered Bridges
- Covered Bridges within Flood Zone
- Boat Ramp
- Boat Ramp within Flood Zone
- Fire Station
- Hospital
- Airport

0 5 10 Miles

Lane County Parks

Previous Occurrences (since 2006)

A Presidential Disaster Declaration (DR-4055-OR) was announced as a result of flooding, winter storms, and landslides which impacted Lane County and other jurisdictions throughout western Oregon in January 2012. The NWS reported certain areas of the Coast Range in Lincoln and Lane counties received between 10 and 15 inches of rain during a 24-hour period January 18-19, 2012. Homes, businesses, and roadways were flooded; high winds downed trees knocking out power and landslides closed roadways.

January 19, 2012 the Siuslaw was at 28.1 feet, 10 feet above flood stage according to the National Weather Service. The record, set in 1996, was 30.2 feet. The Siletz River was at 23.3 feet, six above flood stage. The Marys River set a record, at 21.4 feet. The Alsea hit 22.7 feet, nearly 5 above flood stage. The Luckiamute reached 33.9 feet, nearly 7 feet above flood stage. Numerous houses from the Willamette Valley to the west side of the Coast Range were inundated. Landslides, mudslides and downed trees closed highways intermittently, trapping people either trying to escape the rising water or get back home to safety. Lane County officials evacuated residents in Mapleton. The Mohawk Valley Fire District evacuated three families from their homes in the Sunderman Road area near the Mohawk River. Close to 2,000 Eugene Water & Electric Board customers lost power due to the storm. Wind and rain knocked a tree across a power line in Eugene, cutting power to about 990 customers near Laurelwood Golf Course. About 860 EWEB customers in the Leaburg area lost power when a tree branch fell across a power line and caused a substation lock-out. Lane County-area roads were hammered with downed trees and mudslides including Highway 36, between Mapleton and Junction City.

The following table notes flooding events for Lane County from 2006-2012, as reported by NOAA's National Climatic Data Center, followed by narrative accounts by the same agency.

Figure 3-xx Flooding Events as Reported by NCDC, Lane County, 2006-2012

General Location	Date	Property Damage Reported
MAPLETON	November 7, 2006	Not available
MAPLETON	December 14, 2006	Not available
MAPLETON	December 3, 2007	Not available
MAPLETON	January 18, 2012	$2.0 million
MARCOLA	January 19, 2012	$1.0 million
MAPLETON	March 30, 2012	Not available
Totals:		$3.0 million

Source: National Climatic Data Center (NCDC), Storm Events Database

Figure 3-xx NCDC Narrative Flooding Descriptions, Lane County, 2006-2011

November 19, 2012: Heavy rain caused the Siuslaw River near Mapleton to overflow its banks, causing flooding to surrounding areas. The Siuslaw River crested at 18.3 feet on January 19th at 11 pm PST, 0.3 feet above flood stage.

March 30, 2012: Heavy rain caused the Siuslaw River near Mapleton to overflow its banks, causing flooding to surrounding areas. The Siuslaw River crested at 20.4 feet on March 30th at 6 pm PST, 2.4 feet above flood stage.

January 19, 2012: Heavy rain caused the Mohawk River near Springfield to overflow its banks and flood low lying areas. The Mohawk River crested at 17.9 feet on January 19th at 7 pm PST, 2.9 feet above flood stage. $1 million in property damage documented.

January 18, 2012: Heavy rain caused the Siuslaw River near Mapleton to overflow its banks, causing major flooding to surrounding areas. The Siuslaw River crested at 28.1 feet on January 19th at 3 pm PST, 10.1 feet above flood stage. $2 million in property damage documented.

December 3, 2007: Two very powerful storms brought hazardous weather to the Pacific Northwest. The entire forecast area experienced heavy rainfall for an extended period of time, leading to widespread flooding, with the worst hit areas in the Coast Range and areas draining from the Coast Range to the

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Pacific Ocean. Five rivers in northwest Oregon surpassed major flood stages, fueling the extensive flood damage across the region. The Siuslaw River flooded near Mapleton, causing minor lowland flooding. 3.1" of rain fell at Florence, 4.9" at Vaughn, 7.7" at Horton over a 48 hour period.

December 14, 2006: The Siuslaw River near Mapleton crested above flood stage at 18.3 feet.

November 7, 2006: The Siuslaw River near Mapleton crested at 18.8 feet with flood stage at 18.0 feet.

January 17, 2006: A strong, moisture-laden storm brought heavy rains and flooding to Oregon. The Siuslaw River at Mapleton flooded during the event. Flooding affected widespread low-lying areas and agricultural lands. Flooding was also the cause of multiple road closures around the area.

January 14, 2006: A series of wet Pacific storms brought heavy rains to the area, causing flooding and damage. The Mohawk River near Springfield flooded and Oregon Governor Ted Kulongoski declared a state of emergency in 24 of Oregon's 36 counties.

Source: National Climatic Data Center (NCDC), Storm Events Database

Previous Occurrences (prior to 2006)

The Lane County Land Management Division, Floodplain Administration Office maintains detailed information on previous flooding, including major events in 1996 and 1964. In February 1996, prolonged precipitation accompanied by early snowmelt caused by a warm-weather pattern known as a "Pineapple Express," caused many waterways in Oregon to rise to 100-year flood levels. In Lane County flooding was particularly severe along the Siuslaw and Mohawk Rivers. The Eugene/Springfield metropolitan wastewater system was forced to flush millions of gallons of raw sewage into the Willamette River when rainwater overwhelmed pipes and pumps leading to the treatment plant. If the effluent had not been released, sewage would have backed up into buildings and low areas. About 40 residents and businesses reported sewage backups during the storm. (Pittman, 1996)

Damage to Lane County businesses, residences and infrastructure was estimated to be roughly $19 million dollars for the 1996 flood. The following is a list federal disaster relief amounts by category for DR-1099-OR: Public Assistance (PA, public sector response cost and infrastructure damage) $564,608; Individual Assistance (IA, disaster housing for displaced citizens) $720,706; Individual & Family Grant (IFG, displacement costs) $220,564. Small Business Administration loans (SBA) equaled the following: $1.75 million for home loans, $926,500 for business physical loans and $119,700 for economic injury loans.

Later in the year, on November 17 and 18, a moist southwest flow aloft produced moderate to heavy rain and strong winds over southwest Oregon. Storm total rainfall ranged from 8 to 12 inches on the coast with 3 to 7 inches inland. The rainfall amount and rate produced numerous landslides impacting residences and closing highways. Strong winds of 40 – 70 mph were reported on the coast and many trees and power lines were downed across southwest Oregon.

President Clinton declared the state a major disaster area (FEMA, 1997, January 23) after this storm citing damage from severe storms, high winds, flooding and land and mud slides. Although the floods of 1996 represented a large-scale disaster, they are not unprecedented within the recent past. The Christmas Flood of 1964 caused $157 million in damage statewide, and 20 Oregonians lost their lives.

In addition to the 1996 and 1964 floods, Lane County has experienced several other significant floods since records have been kept. In 1972, flooding along the Siuslaw River caused extensive damage within the community of Mapleton. The floods of 1945, 1942 and 1927 caused severe damage to the City of Eugene and the surrounding areas. Early records indicate that the Southern Willamette Valley flooded often in the mid to and late 1800's, with major flooding occurring in 1850-51, 1861, 1881 and 1890. While the 1996 events were devastating to the entire region, the floods of 1861, 1890, and 1964 exceeded the 1996 event in terms of velocity and volume of water. All three floods are estimated to have exceed the so-called "100-year flood," or Base Flood in Lane County, and all within a time frame of about 100 years.

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Probability of Future Occurrence

Based on historical flooding occurrence as reported by federal sources, there are six (6) flooding events noted by the NCDC during the most recent 6-year period. This equates to a one event per year average, and a **High Probability** classification according to terms and definitions set forth in Section 3.1.1. The following river gauge records are additional data sources supporting future probability analysis.

USGS Gauge: ***Siuslaw River near Mapleton*** Lat: 44.063333° N, Long: -123.882778° W,

General Flood Categories (in feet)

Major Flood Stage:	28
Moderate Flood Stage:	22
Flood Stage:	18
Action Stage:	15

Typical Impacts per Gauge Height

28 feet	ABOVE 28 FT...EXPECT MAJOR FLOODING OF THE RIVERVIEW AVENUE AREA AND NUMEROUS HOMES AND BUSINESSES IN THE TOWN OF MAPLETON. FLOODING OF ROADS ADJACENT TO THE SIUSLAW RIVER IN THE VICINITY OF MAPLETON IS LIKELY. FLOODING OF HIGHWAYS 126 AND 36 WILL BE SIGNIFICANT.
25 feet	ABOVE 25 FT...EXPECT WIDESPREAD FLOODING...INCLUDING SEVERAL HOMES AND STRUCTURES IN LOW AREAS OF MAPLETON. MANY SECTIONS OF HWY 126 FROM TIERNAN TO MAPLETON...AND HWY 36 NORTH OF MAPLETON BEGIN TO FLOOD. FLOODING MAY BE EXACERBATED DURING HIGH TIDE.
22 feet	ABOVE 22 FT...EXPECT WIDESPREAD FLOODING OF LOW-LYING LAND. SEVERAL HOMES AND STRUCTURES IN LOW AREAS OF MAPLETON START TO FLOOD. NUMEROUS RURAL ROADS ALONG AND NEAR THE SIUSLAW RIVER WILL LIKELY BE FLOODED...AND WATER BEGINS TO COVER THE LOWER SECTIONS OF HWY 126 AT THIS STAGE. FLOODING MAY BE EXACERBATED DURING HIGH TIDE.
20 feet	ABOVE 20 FEET...EXPECT WATER OVER EAST MAPLETON ROAD. FLOODING OF SOME LOW-LYING HOMES AND STRUCTURES BEGINS. FLOODING MAY BE EXACERBATED BY HIGH TIDE.
18 feet	ABOVE 18 FT...EXPECT MINOR FLOODING OF LOW LYING DAIRY LAND ALONG WITH SOME STRUCTURES RIGHT ALONG THE BANKS OF THE SIUSLAW RIVER IN THE VICINITY OF MAPLETON

Historical Crests for Siuslaw River near Mapleton: Gauge Height and Date

(1) 30.21 ft on 02/07/1996
(2) 28.45 ft on 01/21/1972
(3) 28.28 ft on 01/16/1974
(4) 28.07 ft on 01/20/2012
(5) 28.00 ft on 12/16/1964
(6) 25.79 ft on 12/28/1998
(7) 25.73 ft on 12/25/1980
(8) 23.99 ft on 12/13/1977
(9) 23.98 ft on 12/31/2005
(10) 23.67 ft on 12/06/1981
(11) 23.58 ft on 01/08/1976
(12) 23.01 ft on 02/23/1986
(13) 22.93 ft on 01/27/1970
(14) 22.75 ft on 12/16/1982
(15) 22.70 ft on 01/06/1978
(16) 22.69 ft on 01/11/2006

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USGS Gauge: ***Willamette River at Harrisburg***; Lat: 44.271389° N, Long: -123.173889° W

General Flood Categories (in feet)

Major Flood Stage:	17
Flood Stage:	14
Action Stage:	10.8

Typical Impacts per Gauge Height

20 feet	ABOVE 20.0 FT...EXPECT WIDESPREAD AND MAJOR FLOODING FROM NORTH OF EUGENE TO HARRISBURG. NUMEROUS SMALL COMMUNITES AND DEVELOPED AREAS HISTORICALLY FLOOD NEAR THIS LEVEL.
18 feet	ABOVE 18.0 FT...EXPECT FLOODING OF SOME HOMES AND WIDESPREAD LOWLAND FLOODING. HWY 99E MAY BE FLOODED AND CLOSED IN NUMEROUS LOCATIONS AT THIS LEVEL.
17 feet	ABOVE 17.0 FEET...MAJOR FLOOD STAGE...EXPECT WIDESPREAD FLOODING ALONG THE WILLAMETTE BETWEEN EUGENE AND ALBANY...INCLUDING SEVERAL STRETCHES OF HWY 99E IN THE VICINITY OF HARRISBURG.
16 feet	ABOVE 16.0 FT...EXPECT WIDESPREAD LOW LAND FLOODING MAINLY WEST OF THE RIVER. PORTIONS OF HWY 99E MAY BE FLOODED. HISTORICALLY...FLOODING NEAR THE HARRISBURG BRIDGE HAS OCCURRED AT THIS AND HIGHER STAGES.
15 feet	ABOVE 15.0 FT...LOW PARTS OF STATE HWY 99E HAVE HISTORICALLY BEGUN TO FLOOD AT THIS POINT. EXPECT WIDESPREAD LOW LAND FLOODING ALONG THE WILLAMETTE RIVER IN THE HARRISBURG VICINITY.
14 feet	ABOVE 14.0 FT...EXPECT MINOR FLOODING ALONG THE WILLAMETTE RIVER... MAINLY CONCENTRATED ALONG THE WESTERN BANKS.
12 feet	ABOVE 12.0 FT...SLOUGHS IN THE HARRISBURG VICINITY BEGIN TO FILL.

Historical Crests for Willamette River near Harrisburg: Gauge Height and Date

(1) 23.00 ft on 12/04/1861
(2) 21.10 ft on 01/01/1943
(3) 19.69 ft on 12/29/1945
(4) 18.75 ft on 01/07/1948
(5) 18.40 ft on 12/31/1942
(6) 18.03 ft on 10/30/1950
(7) 18.00 ft on 01/19/1953
(8) 18.00 ft on 03/19/1932
(9) 17.90 ft on 12/15/1946
(10) 17.57 ft on 02/11/1961
(11) 17.25 ft on 12/23/1964
(12) 17.00 ft on 04/01/1931
(13) 16.25 ft on 12/26/1955
(14) 15.56 ft on 11/19/1996
(15) 15.00 ft on 01/18/1951
(16) 14.99 ft on 12/07/1981
(17) 14.71 ft on 01/21/1972
(18) 14.70 ft on 02/08/1996
(19) 14.55 ft on 01/18/2006
(20) 14.35 ft on 02/23/1986
(21) 14.19 ft on 01/01/2006

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USGS Gauge: ***Mohawk River at Springfield***; Lat: 44.092778° N, Long: -122.956667° W

General Flood Categories (in feet)

Major Flood Stage:	25
Moderate Flood Stage:	22
Flood Stage:	15
Action Stage:	12.5

Typical Impacts per Gauge Height

22 feet	ABOVE 22 FT...EXPECT MAJOR WIDESPRESD FLOODING OF FARMLAND AND ROADS. DAMAGE AND IMPACTS SIMILAR TO THE FEB 1996 AND DEC 1964 FLOODS CAN BE EXPECTED WITH SIGNIFICANT FLOODING IN MARCOLA.
18 feet	ABOVE 18 FT...EXPECT EXTENSIVE FLOODING OF FARMLAND AND LOCAL ROADS FROM THE CONFLUENCE WITH THE MCKENZIE RIVER UPSTREAM TO THE MARCOLA AREA. ALSO EXPECT NUMERIOUS ROAD CLOSURES.
15 feet	ABOVE 15 FT...EXPECT FLOODING OF LOW AREAS AND SOME RURAL ROADS NEAR THE RIVER.
12.5 feet	ABOVE 12.5 FT...THE RIVER IS AT BANKFUL LEVEL IN THE SPRINGFIELD VICINITY. THERE MAY BE AREAS WHERE WATER IS FLOWING OVER THE BANKS OF THE RIVER.

Historical Crests for Mohawk River near Springfield: Gauge Height and Date

(1) 24.30 ft on 11/01/1960
(2) 23.11 ft on 02/07/1996
(3) 22.90 ft on 12/22/1955
(4) 22.60 ft on 12/22/1964
(5) 22.10 ft on 12/28/1945
(6) 21.30 ft on 01/01/1943
(7) 21.26 ft on 01/21/1972
(8) 20.77 ft on 11/19/1996
(9) 20.21 ft on 02/13/1984
(10) 19.73 ft on 01/29/1965
(11) 19.70 ft on 01/08/1976
(12) 18.76 ft on 01/16/1974
(13) 18.62 ft on 12/06/1981
(14) 18.17 ft on 02/23/1986
(15) 18.03 ft on 12/31/2005
(16) 17.86 ft on 01/20/2012
(17) 17.81 ft on 11/26/1999
(18) 17.69 ft on 01/18/2006
(19) 17.55 ft on 12/26/1996
(20) 17.40 ft on 12/28/1998

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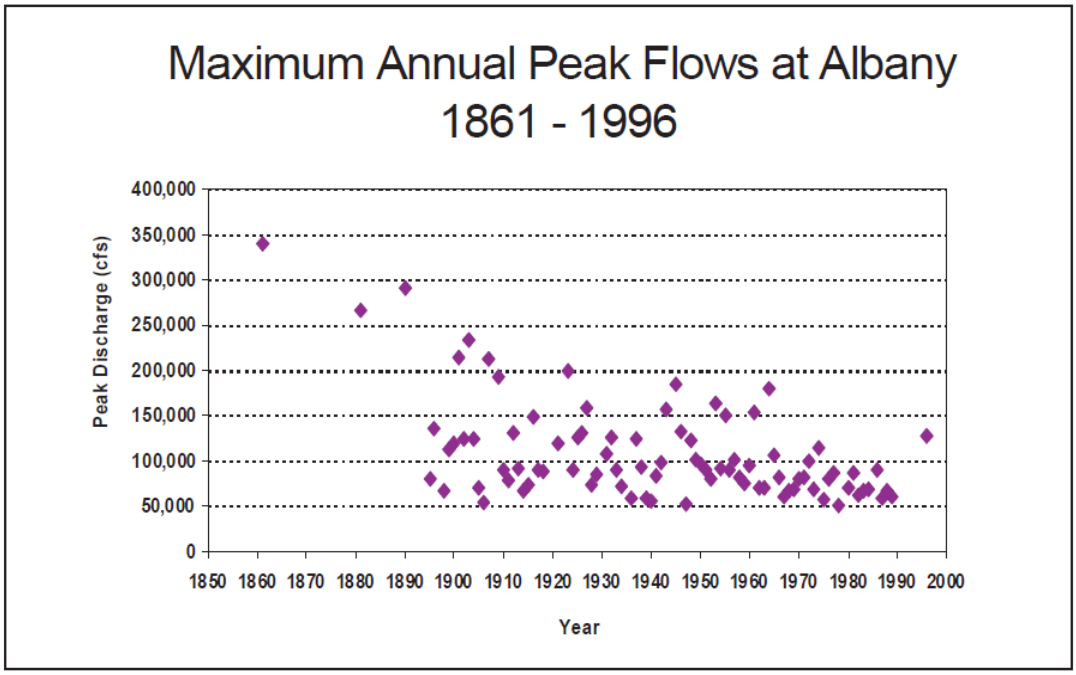
Magnitude/Severity/Extent

While some type of seasonal flood-related damage occurs nearly every year, the flooding and associated landslide events of February and November 1996 represent the most significant flooding in the recent past (at the time of this writing, damages for flooding in January 2012 are still being calculated). Therefore, data from the 1996 flooding event is considered representative for a 'severe flood' in Lane County, but should not be considered the 'credible worst case scenario'.

Research conducted by the PNW Ecosystem Research Consortium at Oregon State University advises estimations of a credible worst case scenario for flooding in the south Willamette Valley. The following chart shows the historic record of floods along the Willamette River over a 130 year timeframe. As indicated, flood conditions exceeded the 1964 and 1996 events in at least six years during the 20th century. Three years during the 19th century (1861, 1882, and 1891), flow volume of the Willamette River more than doubled water volume of the 1996 flood event.

Figure 3-xx Annual Peak Flow (Discharge), Willamette River at Albany Gauge, 1861-1996



Source: *Flood Inundations/FEMA Floodplains* (Ashkenas, Wildman), PNW Ecosystem Research Consortium, Oregon State University; USGS.

Note: Only floods greater than 50,000 cfs and only the largest flows in a given year are plotted.

Regarding acreage inundated, the following table compares floods from 1861, 1945, 1964, and 1996. Notable is the fact that the area inundated by the 1861 event more than double the extent of the 1964 flood. Comprehensive data regarding the depth of flooding and water velocity is not yet available, but is assumed to be much more severe for the flood of 1861.

Table 3-xx Area of The Willamette Valley Inundated by Major Floods

Year	1861	1945	1964	1996
Acres Inundated	320,337	149,797	152,789	194,533

Source: *Flood Inundations/FEMA Floodplains* (Ashkenas, Wildman), PNW Ecosystem Research Consortium, Oregon State University; USGS.

Note: Inundation areas for 1861 may include areas from 1890, inundation areas for 1945 may include areas from 1943.

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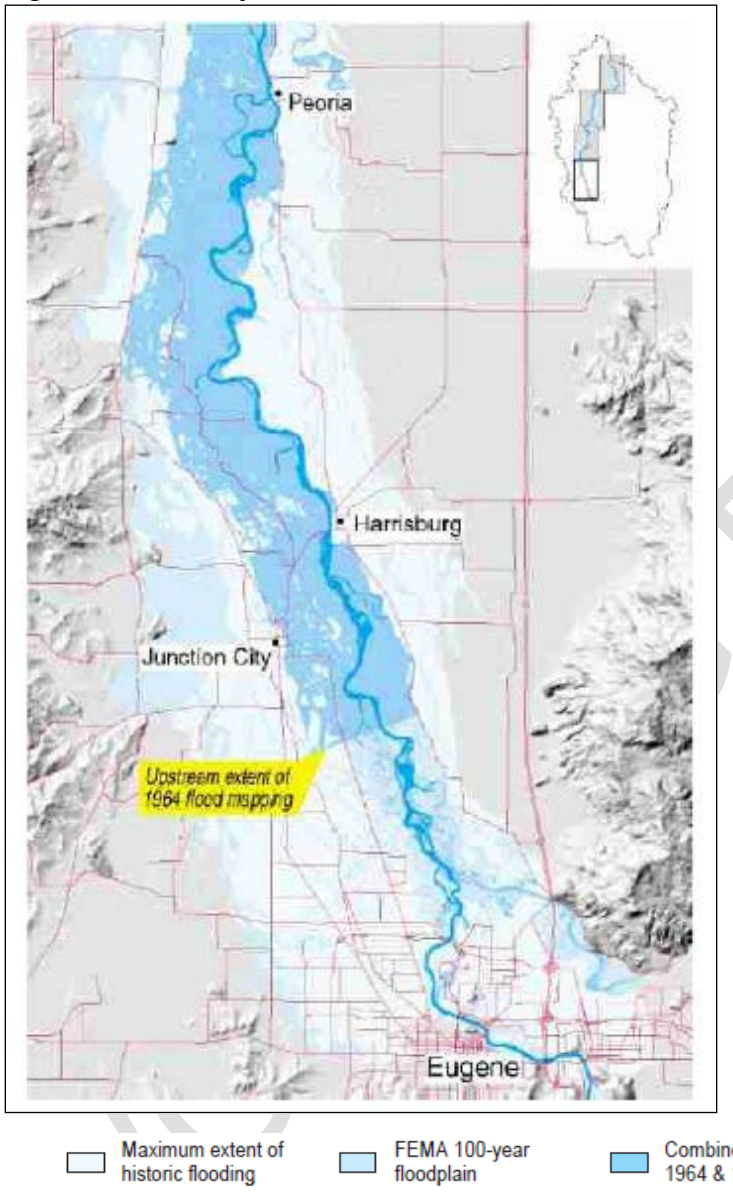
The map below compares the extent of flooding for various historic events as mapped by the US Army Corps of Engineers. As indicated, a vast area north of Eugene has been inundated by historic floods and approximates the current Special Flood Hazard Area as defined on FEMA Flood Insurance Rate Maps. Note, the extent of mapping for the 1964 flood ends just south of Junction City, therefore results for points southward (upstream, toward Eugene) must be interpreted from the available data.

Figure 3-xx Comparative Extent, Historic Flood Events, Willamette River



Sources: *Flood Inundations/FEMA Floodplains* (Ashkenas, Wildman), PNW Ecosystem Research Consortium, Oregon State University; USGS; US Army Corps of Engineers

A credible worst case scenario would involve conditions which exceed the 1861 flood by 25 percent or more. Considering population and value of development within areas likely inundated by a major flood in Lane County, a **Level 4 – Catastrophic** magnitude/severity classification is assigned.

Flood Overall Vulnerability

Based on potentially catastrophic impacts, high long term probability, and presence of populations, infrastructure and development in floodprone areas, a **High Vulnerability** classification is assigned for flood.

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3.2.5 Hazardous Materials Incidents

Hazard Description
The following description for hazardous materials is provided by the Federal Emergency Management Agency (FEMA):

Chemicals are found everywhere. They purify drinking water, are used in agriculture and industrial production, fuel our vehicles and machines, and simplify household chores. But chemicals also can be hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use, or disposal. The community is at risk if a chemical is used unsafely or released in harmful amounts.

Hazardous materials in various forms can cause fatalities, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines.

Chemical manufacturers are one source of hazardous materials, but there are many others, including service stations, hospitals, and hazardous materials waste sites.

Varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States--from major industrial plants to local dry cleaning establishments or gardening supply stores.

Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released as a result of transportation accidents or because of chemical accidents in plants.

Hazardous material incidents are technological (meaning non-natural hazards created or influenced by humans) events that involve large-scale releases of chemical, biological or radiological materials. Hazardous materials incidents generally involve releases at fixed-site facilities that manufacture, store, process or otherwise handle hazardous materials or along transportation routes such as major highways, railways, navigable waterways and pipelines.

The Environmental Protection Agency (EPA) is the federal agency authorized to protect the environment and public health. Congress writes the laws and the President signs them into law. The EPA is a regulatory agency with the duty to prepare administrative rules and procedures on how these laws and Presidential Executive Orders will be implemented and enforced.

The U.S. Environmental Protection Agency requires industry to report information on toxic chemical releases and water management activities, through the Toxics Release Inventory (TRI) Program. In the previous decade TRI reporting requirements were lessened; thereby limiting available data on chemical releases and disposal. The federal government in recent years reinstated stricter reporting requirements for industrial and federal facilities that release toxic substances with potential to threaten human health and the environment. Those requirements went into effect in April of 2009 and data from these reports is now available.

The National Response Center (NRS) is a section of the U.S. Coast Guard and is the most comprehensive dataset available on hazardous materials releases and certain industrial accidents. The NRS serves as a national point of contact for reporting all oil, chemical, radiological, biological and etiological discharges into the environment anywhere in the United States and its territories. Notably the NRS focus is data collection, and it is not a monitoring, regulatory, or investigative entity. Also, essentially all plausible reports received by the NRS are included in their database, and thus the type of spill or release information varies from minor to major occurrences of various kinds.

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Geographic Location
Typically railroads, mountain highways, industrial facilities, waterways, and ocean beaches are the most common locations for hazardous materials incidents in Lane County. Notable to geographic location and hazard potential are the following characteristics:

- Roadway, railway intersections
- Pumps, compressor stations, transfer points
- Fixed sites
- Proximity to population, structures, and physical assets

Advanced mapping is in development that will help identify locations where mitigation need is highest. It will incorporate geographic analysis of best available data and cartographic techniques to advise mitigation priorities. Currently mapping analysis focuses on the relationship of rail lines and highways to landslide risk. This relationship has proved relevant on at least one recent occasion whereas a major landslide in the Willamette National Forest closed the Union Pacific rail line southeast of Oakridge for an extended period. While no train derailment or hazardous material release occurred in this incident, such potential was demonstrated.

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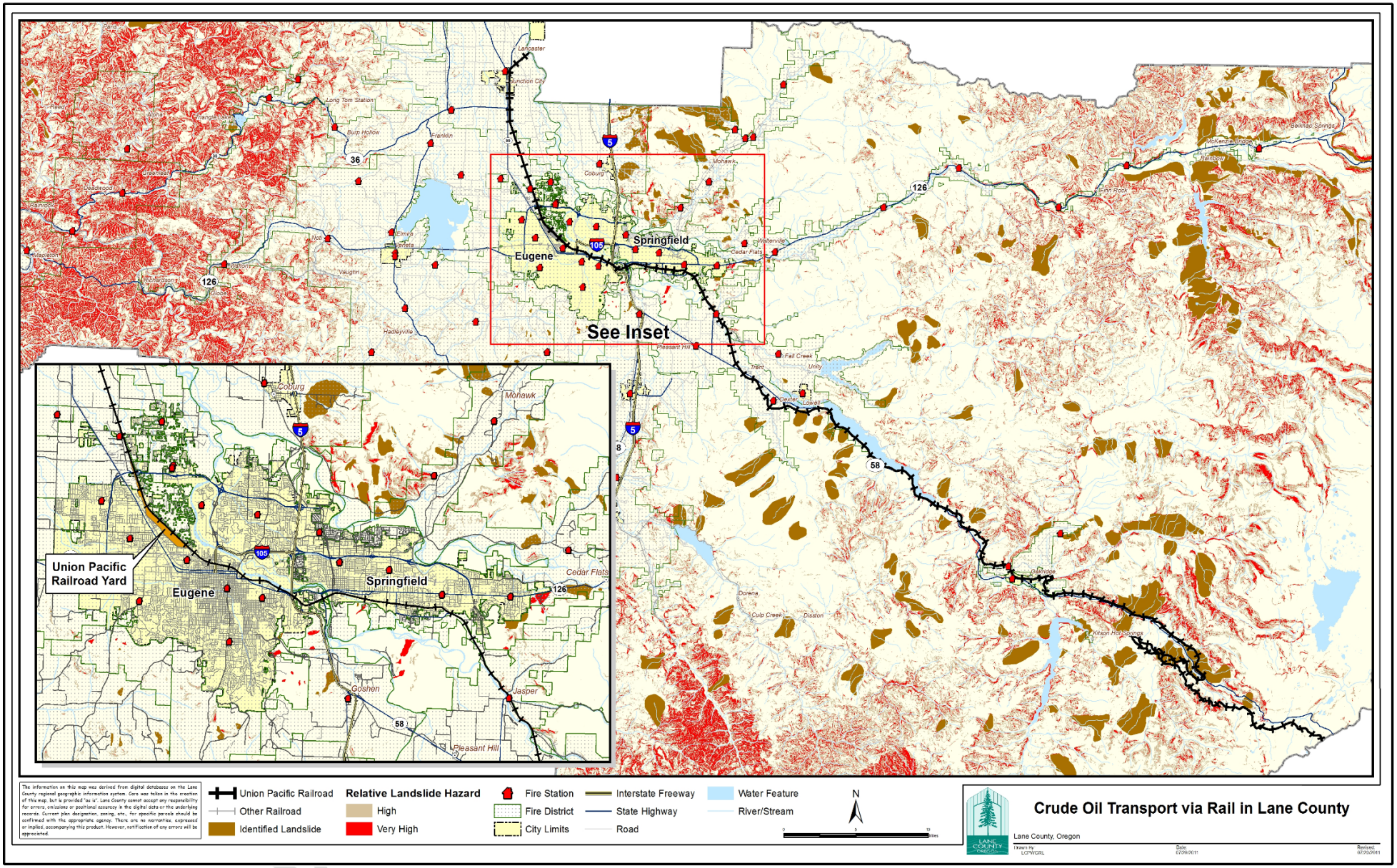
Figure 3-xx Crude Oil Transport by Rail, Landslide Prone Areas: Lane County



Previous Occurrences
According to the National Response Center database there were 85 reports of spill or release of hazardous materials in Lane County from January 2010 to May 2013. A selection of these reports is excerpted in Table 3-xx to illustrate the type and severity of hazardous materials releases which may occur over a given period. Detailed reports which include date, time, incident type, incident cause, suspected responsible entity, medium affected (land, air, water), material name, etc. are available at the NRS website: http://www.nrc.uscg.mil/foia.html.

Probability of Future Occurrence
Based on National Response Center records for Lane County, from January 2010 to May 2013, there were 85 reports of spills of hazardous materials or industrial accidents, an average of 2.07 per month. That equates to a **High Probability** of future occurrence classification according to the definitions set forth in Section 3.1.1.

Magnitude/Severity/Extent
The magnitude and severity of a hazardous material release depends upon the type of material released, the amount of the release and the proximity to populations. As previous hazardous material incidents have shown, release of materials can and does result in fatalities and evacuations of large numbers of people. Accordingly, magnitude and severity of hazardous material release is considered **Level 3- Critical** by the HMSC, with potential public safety risks present and neighborhood scale impacts to property and infrastructure.

A key mitigating element for hazardous material incident along waterways in Lane County is the McKenzie Watershed Emergency Response System (MWERS), coordinated by the Eugene Water and Electric Board (EWEB). According to EWEB, MWERS is part of its Drinking Water Source Protection program, which gathers and distributes mitigation and response information in coordination with 27 federal, state and local agencies.

MWERS is used by incident commanders to quickly gain access to information and dispatch response. Emergency responders use Geographic Information System (GIS) technology to access information on threats, critical resources, spill response strategies, equipment availability and other information needed during an incident involving hazardous materials release. First responders and others are able to use this information to effectively stabilize accidental or intentional chemical releases quickly and safely.

Hazardous Materials Incidents Overall Vulnerability
According to subjective assessments based on frequency, threat to human life, risk of property damage, and environmental and economic impacts, Lane County is considered to have **Moderate Vulnerability** to hazardous material incidents.

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Table 3-xx Selected Hazardous Material Reports Received by National Response System, Lane County 2010 - 2013

Report Received	Description Of Incident	Location	Nearest City	Material Name
7/26/2010	MOTOR VEHICLE ACCIDENT INVOLVING A RADIOACTIVE DEVICE. DRIVER WAS AIRLIFTED TO HOSPITAL WITH SERIOUS INJURIES. LITTLE INFORMATION IS KNOWN ABOUT THE DEVICE OR ANY RELEASE.	HWY 126 AT FISHER ROAD	VENETA	RADIOACTIVE MATERIAL
11/5/2010	CRANE TIPPED OVER ON THE DAM. CAUSED DISCHARGE OF UNKNOWN AMOUNTS OF DIESEL FUEL, HYDRAULIC OIL, AND MOTOR OIL INTO THE DEXTER RESERVOIR. THE CAUSE OF THIS INCIDENT IS UNKNOWN AT THIS TIME. THERE WERE NO INJURIES INVOLVED.	DEXTER DAM	LOWELL	OIL: DIESEL
1/16/2011	FORMALDEHYDE (53%) RELEASED FROM THE CONDENSER LINE ON THE REACTOR DUE TO A PRESSURE BUILD UP.	470 SOUTH 2ND.	SPRINGF'D	FORMALDEHYDE (50% OR MORE), METH
2/2/2011	MINERAL OIL (NON-PCB) DISCHARGED FROM A UNDERGROUND TRANSFORMER DUE TO UNKNOWN CAUSES. CALLER STATED WHILE DOING ROUTINE MAINTENANCE OIL WAS DISCOVERED IN THE SUMP. THE OIL HAS REACHED AT CATCH BASIN BUT NO VISIBLE SHEEN YET.	INTERSECTION 11TH AND OLIVE	EUGENE	OIL, MISC: MINERAL
2/19/2011	A ABCO TRUCK (R&L CARRIERS) PUNCTURED A SADDLE TANK ON A CURB AT THE TRAVEL CENTER LOCATED OFF OF I-5 EXIT 199 IN EUGENE, OREGON. THE PUNCTURED FUEL TANK RELEASED APPROXIMATELY 70 GALLONS OF DIESEL FUEL ONTO THE ASPHALT, SOIL, AND A NEARBY CATCH BASIN. THE FUEL APPEARS TO BE CONTAINED WITHIN THE CATCH BASIN AT THIS TIME.	TRAVEL CENTERS 32910 E. PEARL ST.	EUGENE	DIESEL FUEL
3/10/2011	RELEASE OF 15 GALLONS OF TRANSFORMER OIL FROM A POLE MOUNTED TRANSFORMER; THE CAUSE WAS DUE TO THE TRANSFORMER BLOWING.	1328 WEST SECOND	EUGENE	OIL, MISC: TRANSFORMER
10/19/2011	80 GALLON DIESEL SPILL FROM A FIRE TRUCK. FIRE TRUCK WAS FILLED ON MAY 2011 AND IT WAS DISCOVERED TO BE COMPLETELY EMPTY TODAY. CAUSE SUSPECTED IS FUEL LINE FAILURE.	BEHIND TRUCK STOP 785 42ND ST.	SPRINGF'D	OIL: DIESEL
11/25/2011	CALLER IS REPORTING A DERAILMENT OF A TANK CAR DUE TO THE AXLE THAT CAME OFF THE TRACK.	MP 570.94 SUBD CASCADE	OAKRIDGE	
1/1/2012	LOCOMOTIVE UP5442 RELEASED DIESEL FUEL INTO A BELLY PAN. THIS WAS DUE TO A BROKEN FUEL INJECTION PUMP.	RAILYARD 1035 BETHEL DRIVE	EUGENE	OIL: DIESEL
2/16/2012	MOLTEN PHENOL (POSSIBLY NEAR THE 1000 LBS RQ) RELEASED FROM RAILCAR WITHIN THE FACILITY DUE TO UNKNOWN CAUSES.	2665 HWY 99 NORTH	EUGENE	MOLTEN PHENOL
3/12/2012	TANKER TRUCK OVERTURNED HEADED EAST ON HIGHWAY 58. 1,700 GALLONS OF GASOLINE (UN1203) WAS RELEASED FROM THE TANK. THE GASOLINE HAS NOT YET REACHED ANY WATERWAYS BUT PRECAUTIONARY MEASURES HAVE BEEN TAKEN.	HWY 58, MILE POST 31	OAKRIDGE	GASOLINE: AUTOMOTIVE (UNLEADED)
3/21/2012	TRAIN DERAILMENT CAUSED BY A MUDSLIDE. THERE WAS 2 TO 4 INCHES ON TOP OF THE RAIL FOR 100 FEET. THE BAGGAGE CAR WAS THE ONLY CAR THAT DERAILED. THERE WAS 246 PASSENGERS AND 15 CREW MEMBERS. PASSENGERS WERE TRANSFERRED BY BUS. NO INJURIES REPORTED.	MP 571 .94 CASCADE, NR SQUAW BUTTE JCT	OAKRIDGE	
4/19/2012	DISCHARGE OF NON-PCB MINERAL OIL ONTO THE GROUND. CALLER STATED THAT THERE WAS AN EXPLOSION OF A BREAKER AND A SUBSEQUENT FIRE.	WILLAGILLESPIE & CLINTON DR.	EUGENE	OIL, MISC: MINERAL
11/12/2012	DRUNKEN MOTORCYCLIST STRUCK 4 INCH PLUG VALVE WITH TEST RISERS, CAUSING A RELEASE OF NATURAL GAS.	36581 JASPER RD	JASPER	NATURAL GAS

Source: U.S. Coast Guard, National Reporting System, http://www.nrc.uscg.mil/foia.html

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3.2.6 Landslide

Landslide is a geologic phenomenon which includes a wide range of ground movement, such as rockfalls, deep failure of slopes and shallow debris flows, which can occur in offshore, coastal and onshore environments. Although gravity is the primary force for a landslide to occur, there are generally other contributing factors affecting slope stability. A change in the stability of a slope can be caused by a number of factors, acting together or alone. Natural causes of landslides include:

- groundwater pressure acting to destabilize the slope
- loss or absence of vegetation, root structure, soil structure
- erosion or undercutting by river or ocean waves
- heavy rain or snowmelt
- freeze/thaw cycles
- earthquakes
- volcanic eruptions

Landslides can also be caused or aggravated by human activities including the following:

- deforestation, cultivation, and road construction
- vibrations from machinery or traffic
- blasting
- earthwork which alters the shape of a slope, or imposes new loads on an existing slope
- removal of deep-rooted vegetation that binds colluvium to bedrock
- construction, agricultural or forestry activities which increase or concentrate amount of water infiltration into soil.

Categories of impacts include threat to public safety, particularly on roadways; economic impacts created by traffic delays and detours; and environmental impacts related to increased sediment pollution of waterways, etc.

Geographic Location

In general, landslides typically occur in areas with steep slopes. In Lane County these topographic conditions are concentrated in the Coast and Cascade Ranges (western and eastern planning area) and the foothills of these ranges.

The most commonly affected state highway is Hwy 126. Sections of Hwy 126 that pass through mountainous areas are blocked due to landslides typically on an annual basis. Hwy 58 from Lowell to Willamette Pass is also susceptible, as is U.S. Hwy 101 between Florence and Cape Perpetua. Numerous other roadways are also affected.

Regarding more detailed analysis, in 2008 the Oregon Department of Geology and Mineral Industries (DOGAMI) published an extensive study on the primary geologic hazards of Yamhill, Marion, Polk, Benton, Linn and Lane Counties. Included in this report are earthquake and landslide hazard maps for each county along with future earthquake damage estimates. This study is called *Interpretive Map Series, IMS-24, Geologic Hazards, Earthquake and Landslide Hazard Maps, and Future Earthquake Damage Estimates.* Appendix C of the DOGAMI report is specific to Lane County and is therefore included in its entirety as an Addendum to this Natural Hazards Mitigation Plan Update.

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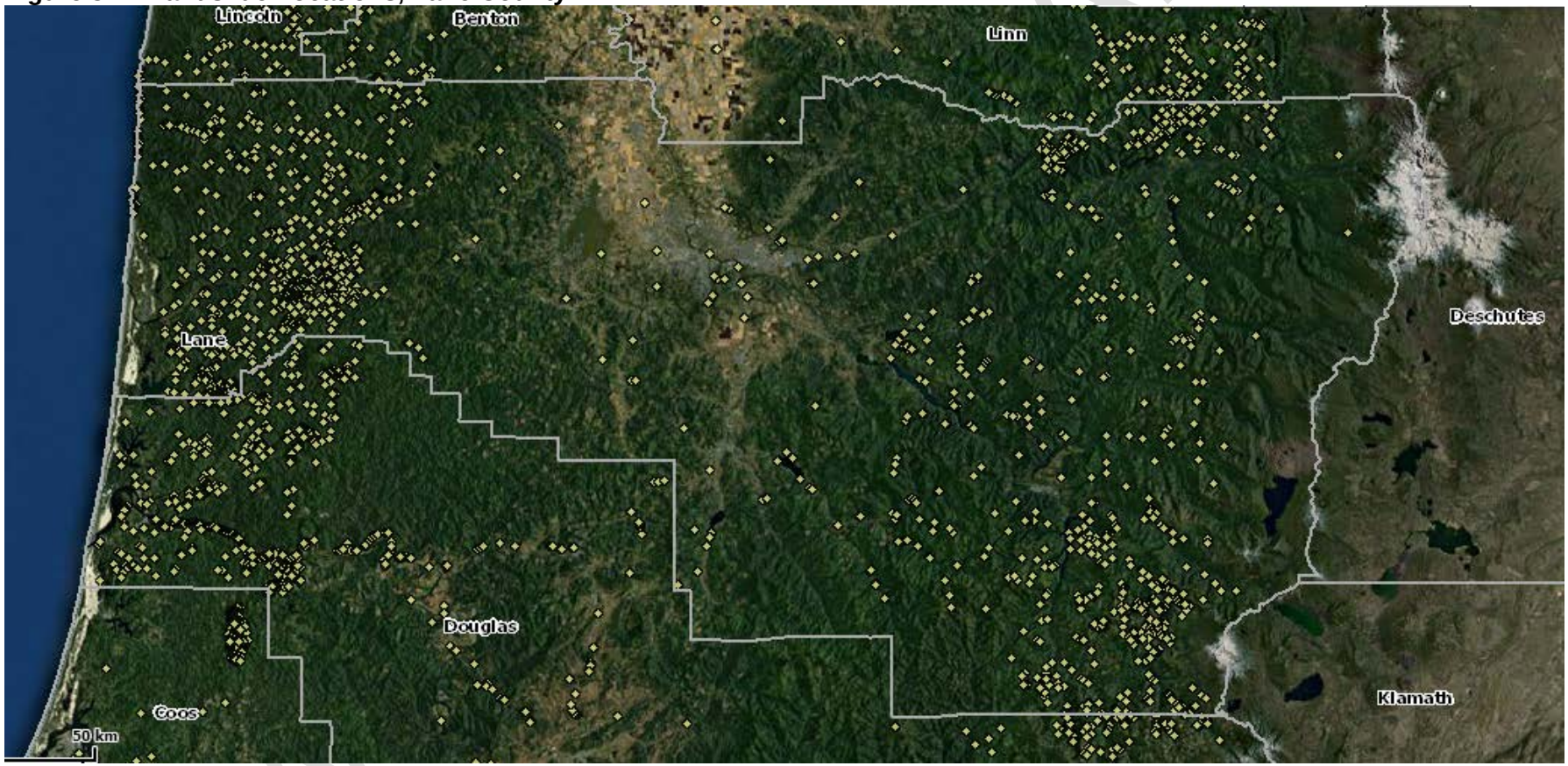
Previous Occurrences

Based on extrapolations from data presented by DOGAMI in December 2012, the estimated number of landslides detectible by aerial topographic analysis in Lane County exceeds 3,000.

The following map is produced from DOGAMI's interactive landslide map viewer, SLIDO. Landslide locations shown as yellow points on the map of Lane County below were compiled from many data sources, and thus the spatial reliability may be variable. For these and other reasons DOGAMI recommends use of SLIDO as a general planning and preparedness tool, and is not a substitute for site-specific investigations by qualified practitioners. Analysis of this mapped data indicates concentrations of landslides in the Coast Range east of Mapleton, and the Cascades southeast of Hills Creek Reservoir and northeast of Blue River.

Figure 3-xx Landslide Locations, Lane County



Source: Oregon Department of Geology and Mineral Industries (DOGAMI); http://www.oregongeology.org/slido/index.html

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In many parts of Lane County, weathering and the decomposition of geologic materials produces conditions conducive to landslides. Although landslides are a natural geologic process, the incidence of landslides and their impacts on people can be exacerbated by human activities. Grading for road construction and development can increase slope steepness, decrease the stability of a hill slope (by adding weight to the top of the slope and removing support at the base of the slope), and increasing water content. For these reasons, landslides periodically affect county roadways, and response (debris removal), as well as slope stabilization are part of Lane County Public Work's routine work. Development coupled with natural processes such as heavy rainfall or rapid snowmelt can cause landslides or re-activate historical landslide sites.

Probability of Future Occurrence

Landslide information provided by DOGAMI notes that as population growth continues to expand and development into landslide susceptible terrain occurs, greater losses are likely to result. In order to begin reducing losses from landslides, widespread endeavors are necessary at all community levels from state government to individual family homes. One successful way to reduce losses from landslides is through pre-disaster mitigation, which can be performed on various scales from statewide to local.

To begin pre-disaster mitigation, the landslide hazard must be located. Once the hazard is located, the population and infrastructure vulnerable to the hazard can be identified and the risk mitigated. Although much can be said generally about landslides in Lane County, a risk and vulnerability assessment needs to be formally conducted, documented and published to better understand the true nature of the hazard specific to Lane County.

Proceeding with a probability based on the best available data and as noted in the Previous Occurrence section, the approximate total number of active or geologically recent landslides in Lane County exceeds 3,000. Using an assumption that the great majority of these occurred during the last 30 years, an average of 100 landslides have occurred per year in recent decades. It should be noted the great majority of these are located in remote areas and forest lands. A very rough estimate of landslides which immediately impact transportation routes or structures would be 1-3 in a given year. This equates to a **High Probability** classification according to definitions for this document.

Magnitude/Severity/Extent

Landslides and rockfalls by definition happen abruptly with little or no warning, and therefore are very dangerous in terms of public safety. Vehicular travel on roadways is one element of public safety risk, and another is structures situated close to the base of slopes where a landslide could occur. According to DOGAMI Open-File Report O-02-05, average annual repair costs for landslides in Oregon exceed $10 million, not including other direct and indirect economic impacts. Based on a credible worst case scenario, magnitude/severity of landslides are characterized as **Level 3 – Critical**, with potential for injuries/fatalities and temporary to extended disruption of infrastructure.

Landslide Overall Vulnerability

A **High Vulnerability** classification is assigned to landslide, based on subjective assessment of probability, severity, relative proximity of people and infrastructure, and typical warning period.

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3.2.7 Pandemic

Hazard Description
A pandemic is a global disease outbreak that can originate from any of a number of bacterial or viral infections, and spread person-to-person or by means of various environmental vectors. Historically the most common pandemic occurrences have related to influenza of various types; though cholera, smallpox, measles, HIV/AIDS, typhus, tuberculosis, leprosy, malaria, yellow fever, and Ebola virus are all acknowledged historic or potential pandemic sources.

An especially severe pandemic could lead to widespread illness, death, social disruption, and economic loss. Impacts range from school and business closings to interruption of basic services such as public transportation, health care, food and essential medicines.

Geographic Location
Pandemics are by definition potentially global in geographic scale. Ever increasing mobility of populations and transfer of goods worldwide create the possibility of disease reaching anywhere on earth. In addition to early and accurate recognition of pandemic occurrence and public information, a critical component of pandemic planning are protocols for travel alerts and quarantine as needed to limit geographic spread.

Previous Occurrences
There are no noted pandemic occurrences in Lane County in recent decades, though Native American tribes in what is now Lane County were heavily impacted by diseases spread during the period of initial contact with European settlers prior to the 20th century. Also, the Oregon State Board of Health reported 48,146 cases of flu and 3,675 deaths statewide from October 1918 through September 1920. The following subsections outline pandemic occurrence at various locations in the world, categorized by period.

Recent:

- In 2014 an Ebola virus outbreak in western Africa involved 4,995 laboratory confirmed cases and 2,729 deaths as of October 2014. The corresponding case fatality rate (CFR, or contractions resulting in fatality) is 71 percent. One fatality and three total cases are confirmed in the United States.
- In 2009-2010 concerns regarding the spread of a swine flu outbreak (H1N1) originating in Mexico resulted in travel alerts and public recommendations for hygiene and prophylactic measures. Swine Influenza (swine flu) is a respiratory disease of pigs caused by type A influenza virus that regularly causes outbreaks of influenza in pigs. Swine flu viruses cause high levels of illness and low death rates in pigs. Swine influenza viruses may circulate among swine throughout the year, but most outbreaks occur during the late fall and winter months similar to outbreaks in humans. The classical swine flu virus (an influenza type A H1N1 virus) was first isolated from a pig in 1930, and mutated versions have emerged at various times and places in the intervening decades.
- Health professionals were also concerned by the possibility of an avian (or bird) flu pandemic associated with a highly pathogenic avian H5N1 virus. During the period 2003-2007, avian influenza was spreading through Asia. A growing number of human H5N1 cases contracted directly from handling infected poultry were reported in Asia, Europe, and Africa, and more than half the infected people have died. There has been no sustained human-to-human transmission of the disease, but the still relevant concern is that H5N1 will evolve into a virus capable of human-to-human transmission.
- In 2003, there were concerns that Severe Acute Respiratory Syndrome (SARS), a new and highly contagious form of atypical pneumonia, might become pandemic. It is caused by a coronavirus dubbed SARS-CoV. Rapid action by national and international health authorities such as the World Health Organization helped to slow transmission and eventually broke the chain of transmission. That ended the localized epidemics before they could become a

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pandemic. However, the disease has not been eradicated. It could re-emerge. This warrants monitoring and reporting of suspicious cases of atypical pneumonia.

19th and 20th century pandemics:

- 'Third Pandemic', started in China in the middle of the 19th century, spreading plague to all inhabited continents and killing 10 million people in India alone. During this pandemic, the United States saw its first case of plague in 1900 in San Francisco. Today, isolated cases of plague are still found in the western United States.
- The "Asiatic Flu", 1889–1890, was first reported in May 1889 in Bukhara, Uzbekistan. By October, it had reached Tomsk and the Caucasus. It rapidly spread west and hit North America in December 1889, South America in February–April 1890, India in February–March 1890, and Australia in March–April 1890. It was purportedly caused by the H2N8 type of flu virus. It had a very high attack and mortality rate. About 1 million people died in this pandemic."
- 1918-19 Spanish flu (H1N1)—This flu is estimated to have sickened 20-40 percent of the world's population. Over 20 million people lost their lives. Between September 1918 and April 1919, 500,000 Americans died. The flu spread rapidly; many died within a few days of infection, others from secondary complications. The attack rate and mortality was highest among adults 20-50 years old; the reasons for this are uncertain.
- 1957-58 Asian flu (H2N2)—This virus was quickly identified due to advances in technology, and a vaccine was produced. Infection rates were highest among school children, young adults, and pregnant women. The elderly had the highest rates of death. A second wave developed in 1958. In total, there were about 70,000 deaths in the United States. Worldwide deaths were estimated between 1 and 2 million.
- 1968-69 Hong Kong flu (H3N2)—This strain caused approximately 34,000 deaths in the United States and more than 700,000 deaths worldwide. It was first detected in Hong Kong in early 1968 and spread to the United States later that year. Those over age 65 were most likely to die. This virus returned in 1970 and 1972 and still circulates today.

Period of Exploration and Colonization:

- Encounters between European explorers and populations in the rest of the world often introduced local epidemics of extraordinary virulence. Disease killed the entire native (Guanches) population of the Canary Islands in the 16th century. Half the native population of Hispaniola in 1518 was killed by smallpox. Smallpox also ravaged Mexico in the 1520s, killing 150,000 in Tenochtitlán alone, including the emperor, and Peru in the 1530s, aiding the European conquerors. Measles killed a further two million Mexican natives in the 17th century. In 1618–1619, smallpox wiped out 90% of the Massachusetts Bay Native Americans. During the 1770s, smallpox killed at least 30% of the Pacific Northwest Native Americans. Smallpox epidemics in 1780–1782 and 1837–1838 brought devastation and drastic depopulation among the Plains Indians. Some believe that the death of up to 95% of the Native American population of the New World was caused by Old World diseases such as smallpox, measles, and influenza. Over the centuries, the Europeans had developed high degrees of immunity to these diseases, while the indigenous peoples had no such immunity.
- Smallpox devastated the native population of Australia, killing around 50% of Indigenous Australians in the early years of British colonization. It also killed many New Zealand Māori. As late as 1848–49, as many as 40,000 out of 150,000 Hawaiians died of measles, whooping cough and influenza. Introduced diseases, notably smallpox, nearly wiped out the native population of Easter Island. In 1875, measles killed over 40,000 Fijians, approximately one-third of the population. The disease devastated the Andamanese population.
- Ainu population decreased drastically in the 19th century, due in large part to infectious diseases brought by Japanese settlers pouring into Hokkaido.

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Historical Epidemics: The following list of historic plagues and pandemics is provides an overview of patterns and severity of previous occurrences:

- Plague of Athens, 430 BC. Typhoid fever killed a quarter of the Athenian troops, and a quarter of the population over four years. This disease fatally weakened the dominance of Athens, but the sheer virulence of the disease prevented its wider spread; i.e. it killed off its hosts at a rate faster than they could spread it. The exact cause of the plague was unknown for many years. In January 2006, researchers from the University of Athens analyzed teeth recovered from a mass grave underneath the city, and confirmed the presence of bacteria responsible for typhoid.
- Antonine Plague, 165–180. Possibly smallpox brought to the Italian peninsula by soldiers returning from the Near East; it killed a quarter of those infected, and up to five million in all. At the height of a second outbreak, the Plague of Cyprian (251–266), which may have been the same disease, 5,000 people a day were said to be dying in Rome.
- Plague of Justinian, from 541 to 750, was the first recorded outbreak of the bubonic plague. It started in Egypt, and reached Constantinople the following spring, killing 10,000/day at its height, and perhaps 40% of the city's inhabitants. The plague went on to eliminate a quarter to a half of the human population that it struck throughout the known world. It caused Europe's population to drop by around 50% between 550 and 700.
- Black Death, started 14th century. The total number of deaths worldwide is estimated at 75 million people. Eight hundred years after the last outbreak, the plague returned to Europe. Starting in Asia, the disease reached Mediterranean and western Europe in 1348 (possibly from Italian merchants fleeing fighting in the Crimea), and killed an estimated 20 to 30 million Europeans in six years; a third of the total population and up to a half in the worst-affected urban areas. It was the first of a cycle of European plague epidemics that continued until the 18th century. During this period, more than 100 plague epidemics swept across Europe. In England, for example, epidemics would continue in two to five-year cycles from 1361 to 1480. By the 1370s, England's population was reduced by 50%. The Great Plague of London of 1665–66 was the last major outbreak of the plague in England. The disease killed approximately 100,000 people, 20% of London's population.

Probability of Future Occurrence
Severe global pandemic outbreaks that involve fatalities in exceeding 700,000 have occurred three times since 1918, relating to a 31 year recurrence interval and a 3 to 4 percent chance of occurrence in a given year. This frequency relates to a **Low Probability** of occurrence.

Magnitude/Severity/Extent
Considering a worst case scenario, pandemic could be **Level-4 Catastrophic** in impact to Lane County, primarily relating to illness and fatalities, and economic effects.

Pandemic Overall Vulnerability
Evaluated based on probability of occurrence, weighted against potential impacts, overall vulnerability is classified as **Moderate Vulnerability** for the planning area. Generally, special needs populations are at greatest risk.

Hazard Analysis Scoring (Quantification) per Physiographic Zone

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3.2.8 Tsunami

Hazard Description

The National Oceanic and Atmospheric Administration (NOAA) describes a tsunami as a series of ocean waves generated by sudden displacements in the sea floor, landslides, volcanic activity or other large, abrupt disturbance of the sea-surface. Tsunamis have reached heights of more than 100 feet. As the waves approach shallow coastal waters, they appear normal and the speed decreases. If the disturbance is close to the coastline, tsunamis can demolish coastal communities within minutes, and a large disturbance can cause inundation and destruction thousands of miles away from its epicenter. The following figure was developed by the Oregon Department of Geology and Mineral Industries, showing how tectonic plate movement in a marine environment can causes a tsunami.

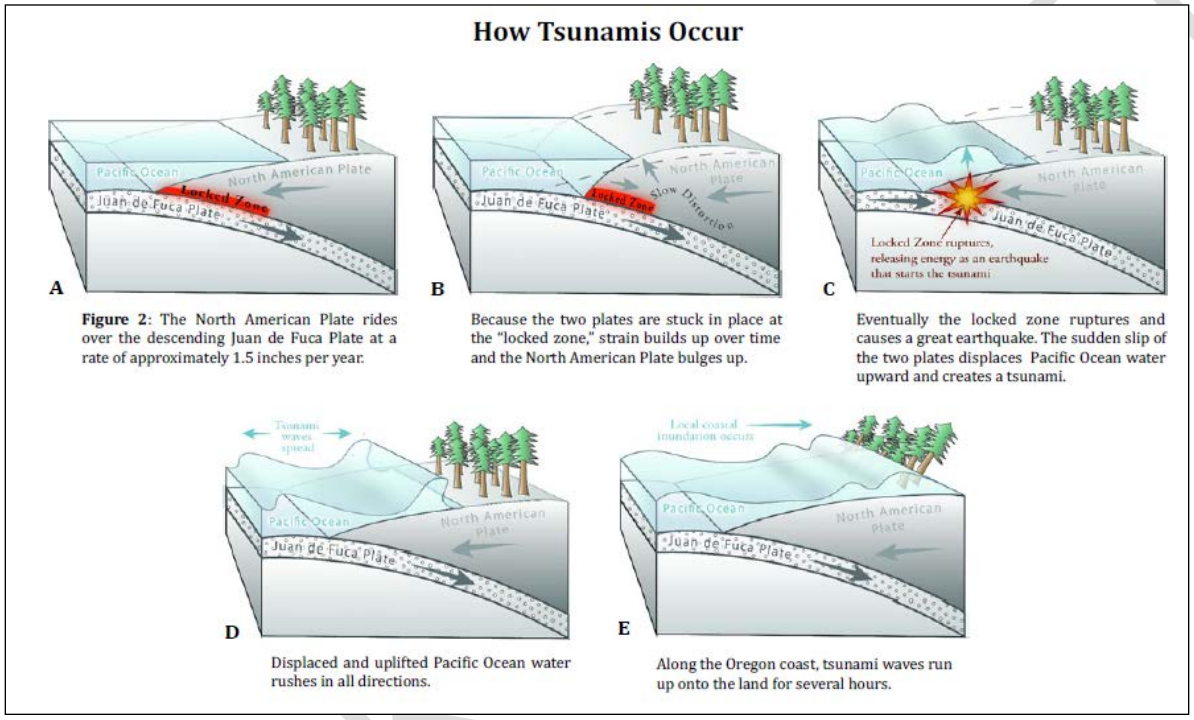

Figure 2: The North American Plate rides over the descending Juan de Fuca Plate at a rate of approximately 1.5 inches per year.

Because the two plates are stuck in place at the "locked zone," strain builds up over time and the North American Plate bulges up.

Eventually the locked zone ruptures and causes a great earthquake. The sudden slip of the two plates displaces Pacific Ocean water upward and creates a tsunami.

Displaced and uplifted Pacific Ocean water rushes in all directions.

Along the Oregon coast, tsunami waves run up onto the land for several hours.

Recent research suggests that tsunamis have struck the Oregon coast on a regular basis. They can occur any time of day or night. Typical wave heights from tsunamis occurring in the Pacific Ocean over the last 500 years have been 20 – 65 feet at the shoreline. However, because of local conditions a few waves may have been much higher – as much as 100 feet.

A local tsunami can come onshore within 15 to 20 minutes after the earthquake whereas a distant tsunami can take several hours. The worst case scenario for a distant tsunami for Lane County is one generated from Alaska.

Geographic Location

Tsunamis are generated by earthquakes in marine and coastal regions. Location of the seismic event which triggers a tsunami is a key indicator for severity and warning time. Regarding a local seismic event, the following figure shows the location of the Cascadia Subduction Zone in relation to the Pacific Coast of North America, indicating western Lane County is clearly susceptible to tsunami impacts.

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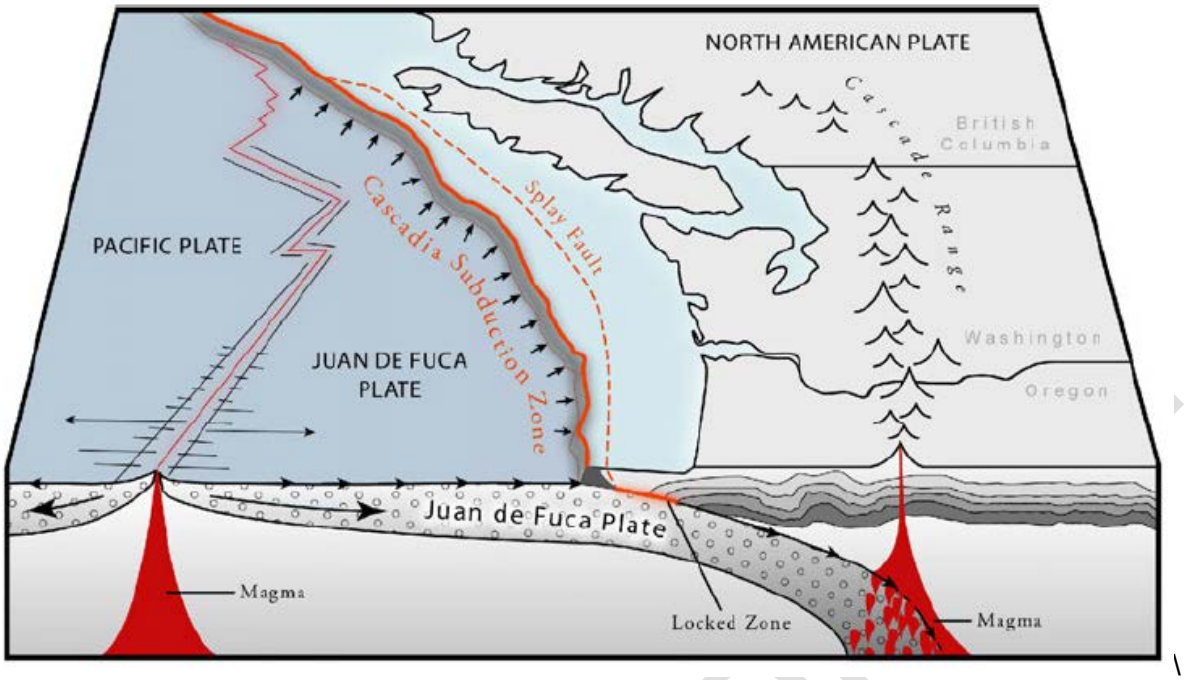
Figure 8. Cascadia Subduction Zone Setting



Source: DOGAMI

Produced by the Department of Geologic and Mineral Industries (DOGAMI) in 2007, the map on the following page shows areas in the Florence – Siuslaw River vicinity potentially affected by a tsunami.

More recent analysis in 2013 by DOGAMI led to publication of a series of Tsunami Inundation Maps (TIMs) for the entire Oregon coastline. Web links to maps for Lane County's coastline are listed below. High resolution versions of these maps are incorporated into Sub-section 3.3.3 Vulnerable Populations and Structures and Appendix F. (Data Collection – Hazard Analysis).

http://www.oregongeology.org/pubs/tim/p-TIM-Lane-01.htm (Neptune, north Lane County coast)

http://www.oregongeology.org/pubs/tim/p-TIM-Lane-02.htm (Heceta Head)

http://www.oregongeology.org/pubs/tim/p-TIM-Lane-03.htm (Mercer Lake, north Florence)

http://www.oregongeology.org/pubs/tim/p-TIM-Lane-04.htm (Florence and mouth of Siuslaw)

http://www.oregongeology.org/pubs/tim/p-TIM-Lane-05.htm (Siuslaw, Cushman)

http://www.oregongeology.org/pubs/tim/p-TIM-Lane-06.htm (Siuslaw, Mapleton)

http://www.oregongeology.org/pubs/tim/p-TIM-Lane-07.htm (Dunes City)

http://www.oregongeology.org/pubs/tim/p-TIM-Lane-08.htm (Siltcoos Lake)

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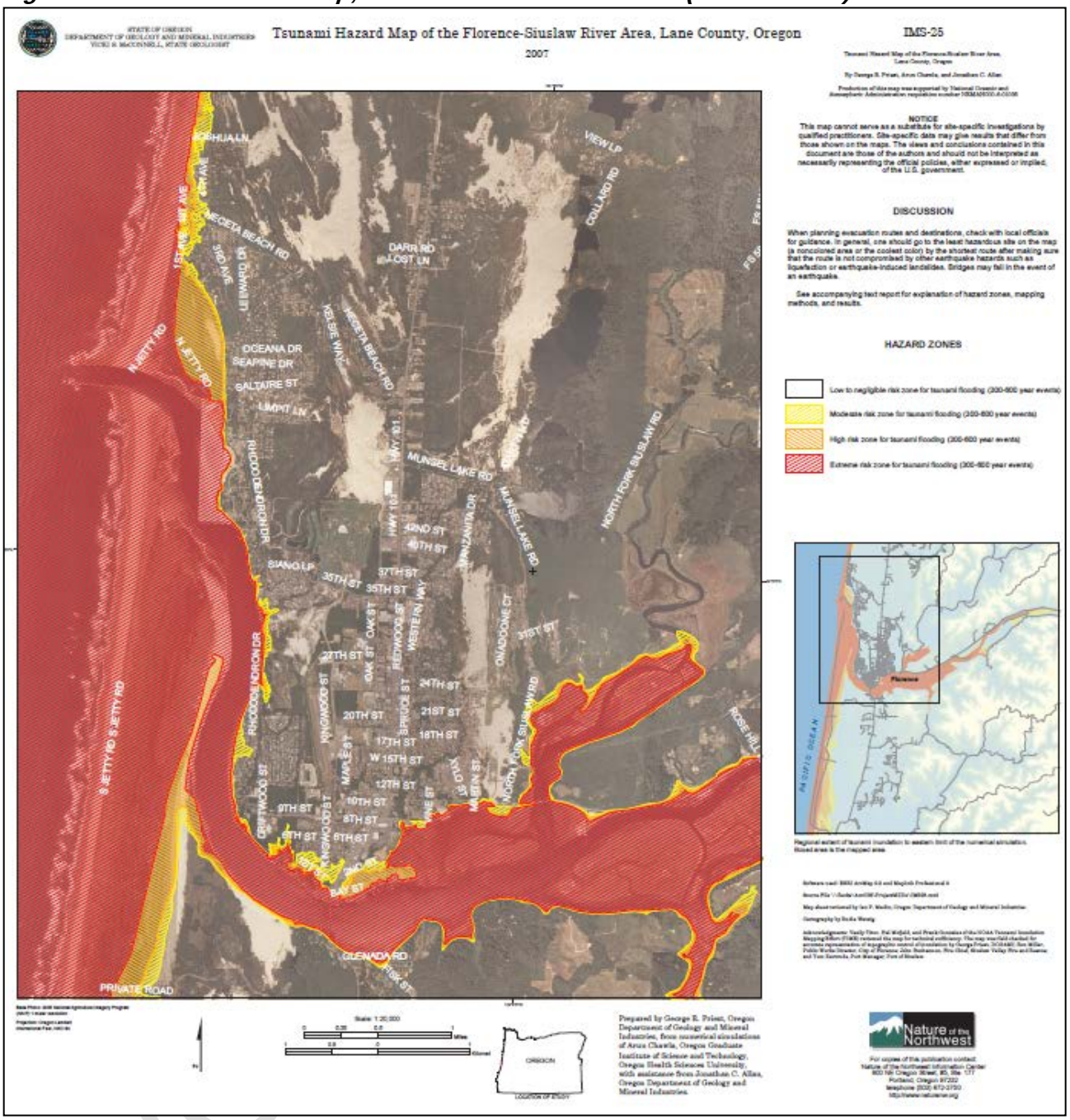
Figure 9. Tsunami Hazard Map, Florence and Siuslaw River (2007 Version)



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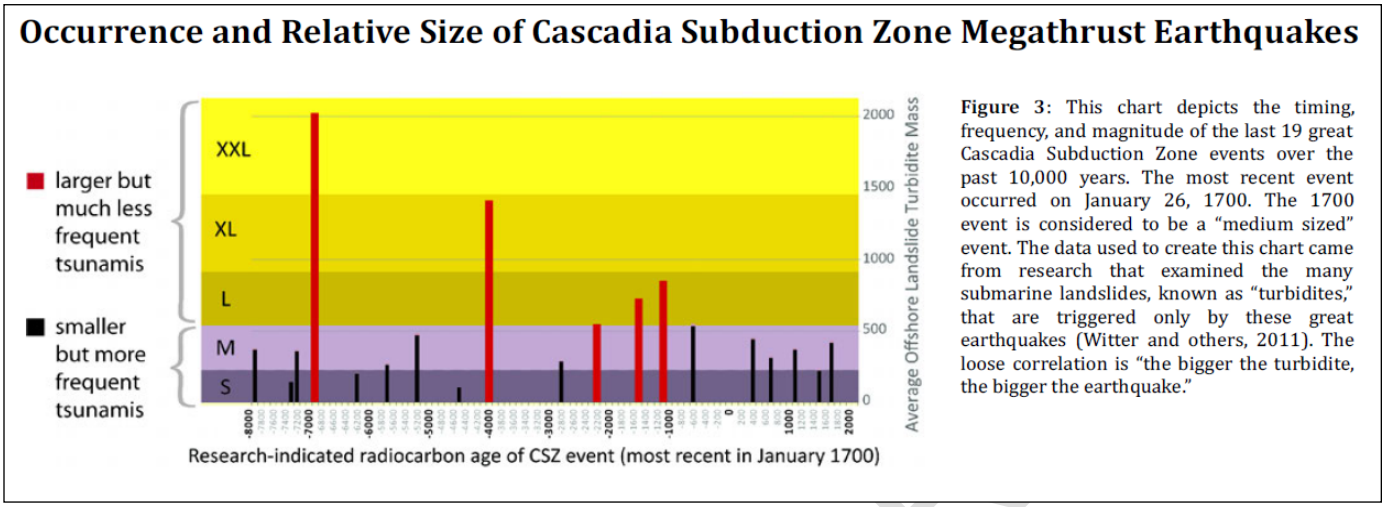
Previous Occurrences
The figure below shows the 19 Cascadia Subduction Zone (CSZ) earthquake occurrences over the past 10,000 years, and the corresponding magnitude of tsunami they caused. The chart shows CSZ activity only, additional tsunamis caused by earthquakes in other regions of the world have occurred more frequently.



Source: Oregon Department of Geology and Mineral Industries

Combining both local and distant earthquake sources, tsunamis from locations across the Pacific basin and CSZ off the Pacific Northwest Coast have hit coastal communities in 930, 1700, 1890, 1944, 1949, 1953, 1960, 1964, 1980 and 2011. The most recent tsunami was caused by a devastating M9 earthquake off the coast of Japan March 11, 2011. West Lane Emergency Operations Center (EOC) in Florence and Lane County Sheriff's Office EOC in Eugene were activated, and evacuation of the tsunami inundation zone in Lane County. At Heceta Beach water receded and subsequently surged 50 - 150 feet at 7:30 AM, 8:00 AM and 9:30 AM. No other impacts were recorded in Lane County, but a federal disaster was declared for Curry, Coos, and Lincoln Counties with damages estimated at over $5 million.

Probability of Future Occurrence
It is useful in evaluating tsunami probability to discount minor occurrences and focus on potential for major destructive events. As noted in the earthquake hazard profile, the USGS calculates a 40 percent chance for a major Cascadia Subduction Zone earthquake during the next 50 years. This equates to slightly less than a 1 percent probability of earthquake occurrence in a given year, and a slightly lower annual probability for a subsequent tsunami which strikes the coastline of Lane County. Thus, a **Low Probability** of occurrence classification is assigned according to the definitions set forth in Section 3.1.1 (Methods and Definitions).

Magnitude/Severity
Considering a worse case scenario, the magnitude and severity of a massive tsunami impact to the coastline of Lane County could be **Level 4-Catastrophic**, with severe property damage on a regional scale, and multiple injuries and fatalities. A tsunami with a similar magnitude occurred approximately 9,000 years ago. Estimated impacts if such a tsunami were to occur today

Tsunami Overall Vulnerability
To the credit of many, tsunami detection, warning, and evacuation strategy has advanced significantly in recent decades. The result is a reduced (though still present) risk to public safety. Development in tsunami inundation areas remains at risk. Overall vulnerability to tsunami is classified as **Moderate Vulnerability**, assigned by balancing the forecast probability of occurrence, numbers of people and evacuation strategy, and amount of development and infrastructure in potentially impacted areas.

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3.2.9 Wildfire

Hazard Description

A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. Wildfires often begin unnoticed, spread quickly, and are usually signaled by dense smoke that fills the area for miles around. Causes include both human actions such as arson or careless accidents, as well as natural occurrences such as lightning. Wildfire danger is exacerbated by dry weather conditions and excessive heat. The wildland-urban interface is an area in which development meets wildland vegetation. Both vegetation and the built environment provide fuel for fires. Table 3-17 below lists fire danger rating classifications as defined by the U.S. Forest Service.

Table 3-17 U.S. Forest Service, Fire Danger Adjective Class Rating

Danger Rating	Basic Description	Detailed Description
Low	fires not easily started	Fuels do not ignite readily from small firebrands. Fires in open grassland may burn freely a few hours after rain, but wood fires spread slowly by smoldering and burn in irregular fingers. Low danger of spotting.
Moderate	fires start easily and spread at a moderate rate	Fires can start from most accidental causes. Fires in open cured grassland will burn briskly and spread rapidly on windy days. Forest fires will spread at slow to moderate speed. The average fire is of moderate intensity, although heavy concentrations of fuel may burn hot. Short-distance spotting may occur. Fires are not likely to become serious and control is relatively easy.
High	fires start easily and spread at a rapid rate	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High intensity burning may develop on slopes or in concentrations of fuel. Fires may become serious and their control difficult, unless they are hit hard and fast while small.
Very High	fires start very easily and spread at a very fast rate	Fires start easily from all causes and immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high-intensity characteristics - such as long-distance spotting - and fire whirlwinds, when they burn into heavier fuels. Direct attack at the head of such fires is rarely possible after they have been burning more than a few minutes.
Extreme	fire situation is explosive and can result in extensive property damage	Fires start quickly, spread furiously and burn intensely. All fires are potentially serious. Development into high-intensity burning will usually be faster and occur from smaller fires than in the Very High Danger class (4). Direct attack is rarely possible and may be dangerous, except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions, the only effective and safe control action is on the flanks, until the weather changes or the fuel supply lessens.

Source: U.S. Forest Service, Wildland Fire Assessment System

Geographic Location

Wildfire can occur in essentially any physiographic region of the county, though risk of damage from wildfire is highest in the wildland-urban interface of the Coast and Cascade Range foothills. The wildland-urban interface is generally described as an area where development meets dense forest. Fires burning in the wildland urban interface are hard to contain, require concentrated fire fighting resources, and are a primary concern from a mitigation standpoint.

The Lane County wildland-urban interface is large, approximately 2,269,000 acres (3,543 square miles) and is the result of a dispersed population in close proximity to abundant vegetative fuels. Nearly 90% of Lane County is forestland and nearly 2.5 million of the county's 2.9 million acres are zoned non-impacted forestland. The U.S. Forest Service and the Bureau of Land Management own and manage the majority of the zoned property. These forestlands contain extensive fuels comprised of flammable grasses, brush, slash and timber. Excluding the population of Eugene/Springfield metro area, nearly 100,000 Lane County residents live throughout or adjacent to these forestlands. (Lane County CWPP, 2005).

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Previous Occurrences

Although there have been 13 Fire Management Assistance Declarations in the state of Oregon since 2003 (FEMA, 2011) none of these fires occurred in Lane County. Nonetheless, significant fires either in or near the eastern portion of Lane County occur consistent with the state average of about once every four years. However, in Lane County the cause of fire includes both natural causes such as lightning as well as manmade causes such as arson.

One of the most damaging wildfires in Lane County in recent years was the Deception Complex Fire. As of September 26, 2014 the Deception Complex fires had burned 6,033 acres west of Oakridge and south of Westfir in the Middle Fork Ranger District of the Willamette National Forest. Homes and structures in the cities of Westfir and Oakridge were threatened. The Oregon Team 4 IMT2 identified and mapped 6 zones to strategically facilitate evacuation and citizen readiness protocols. Total fire fight and response cost exceeded $27 million. A map on the following page shows relative scale of the Deception Fire.

Figure 3-xx Notable Wildfire Occurrences, Lane County 1988-2010

2009: The Tumblebug Complex fire located 23 miles southeast of Oakridge in the Willamette National Forest, started as a series of 25 small fires sparked by lightning. Firefighters knocked down all but three of the fires. The remaining three fires grew rapidly, exploding to 500, then 2,000 and then 12,000 acres as 35 mph winds in drought like conditions spread the fire through unseasonably dry forests.

2008: Aug 7: Multiple lightning storms started over 60 fires across a 780 square mile area in the south zone Willamette National Forest near Oakridge. Fifty-two (52) of the fires were confirmed, and over 200 acres in total were burned.

2002: The Office Bridge Fire was held to 140 acres, as cooler September weather arrived to bolster efforts of 357 firefighters and aerial crews working on steep, rocky terrain north of the Middle Fork of the Willamette River. Residents of nearby communities - Hemlock, southwest of the fire, and Westfir, across the river and to the east of the fire – were placed on a three-hour evacuation notice although no structures were threatened. Access to the community of Hemlock was restricted to residents only.

August 17, 2002: The Siuslaw River Fire located 18 miles west of Veneta burned 840 acres. Cause of fire is unknown. Cost of suppression was $1.5 million.

Aug 13, 1998: An accidentally human-caused fire consumed 260 acres of timber on steep ridges along the North Fork of the Willamette River east of Road 19 near Huckleberry Flats in the High Prairie area. There was $100k in crop damage attributed to what was known as the Gorge fire.

1996: A fire occurred in Oakridge two days after someone torched a pickup and spray-painted "Earth Liberation Front" and anti-logging messages on the walls of the Willamette National Forest's Detroit Ranger Station, east of Salem. (The Associated Press, 2000) The fire caused an estimated $9 million in damage to the ranger station.

August 13, 1996: Lightning triggered 37 forest fires in the Willamette National Forest near Oakridge, Oregon. These fires, known as the South Zone Complex, burned 3700 acres and smoldered for 4 weeks before being declared out on September 9.

August 24, 1996: Lightning caused a series of forest fires, known as the Moolack Complex, in the Willamette National Forest east of Oakridge. 11,375 acres burned with $1.7 million in damage to campgrounds and timber. The fire smoldered for almost 2 months before it was declared out on Oct 16.

1991: The Warner Creek Fire was set by an unknown arsonist on October 10, 1991. By the time it was controlled on October 27, it had burned 8,973 acres in the Oakridge Ranger District, at a cost of $10 million. The burned area lies north of Highway 58, about 12 miles east of the City of Oakridge. The entire fire area lay within what was soon (January 1992) to be designated a Habitat Conservation Area (specifically, HCA 0-10), a designated management area primarily for Northern Spotted Owl habitat. It was the first large fire in a Spotted Owl HCA. (US Forest Service, Pacific Northwest Region, 1991)

1988: A wind-whipped forest fire burned out of control in private and federal land southeast of Oakridge. The fire broke out in the Willamette National Forest and grew quickly in 20-40 mph winds. Authorities estimated at least 2,000 acres were blackened. Lane County sheriff's deputies warned residents in the Salt Creek drainage about six miles southeast of Oakridge to be ready to evacuate.

Source: Oregon Department of Forestry, 2010

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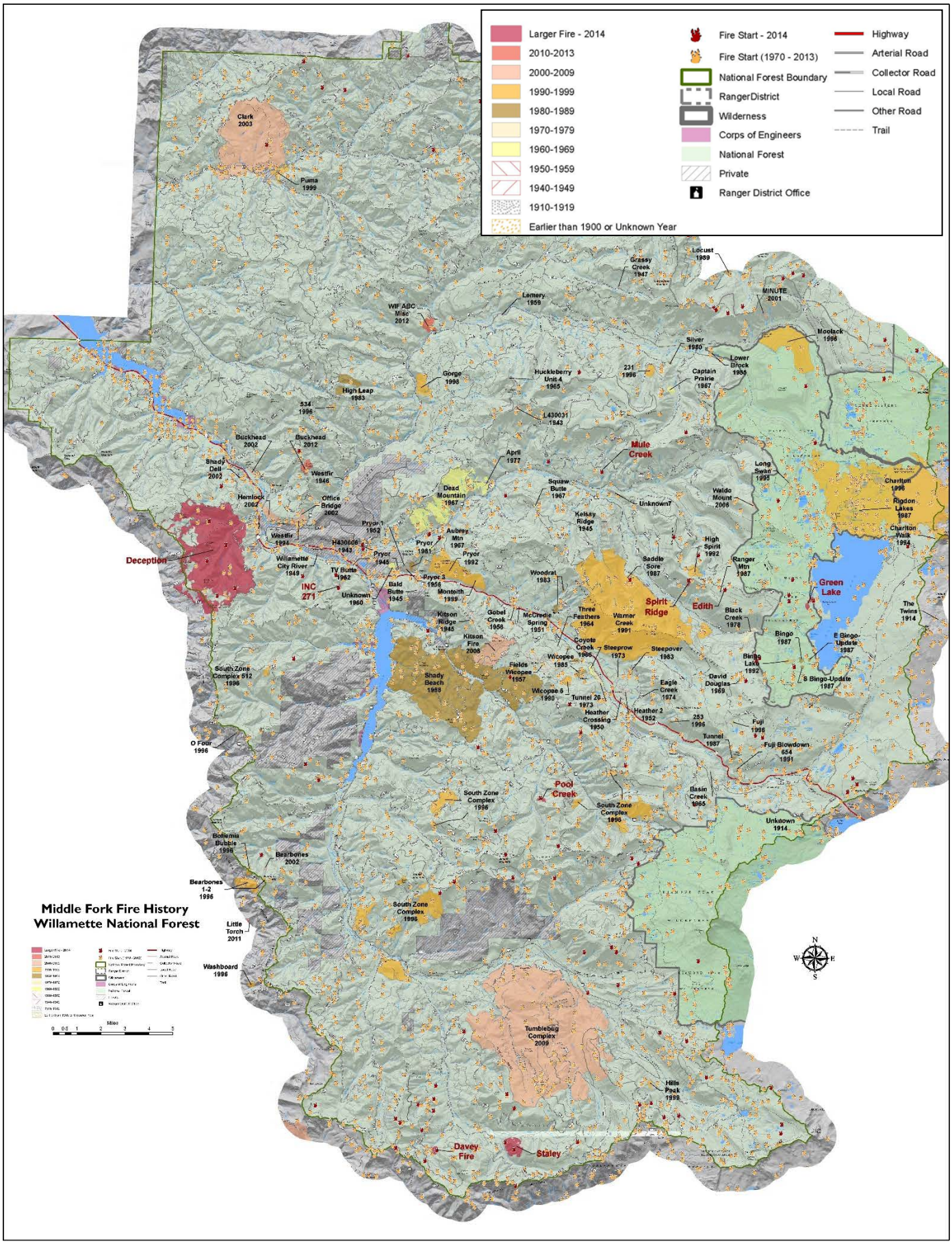
Figure 3-x Fire History: Middle Fork Willamette National Forest



Previous Wildfire Events, early 20th Century

According to descriptions provided by the Oregon Department of Forestry, the Nelson Mountain Fire was one of many large fires in 1910 that burned most areas that are now state forest lands in western Lane County. Large fires burned again in western Lane County in 1917 and 1922. In 1929, a number of large fires burned most of the central Coast Range in Lane County, covering nearly 80,000 acres. With timber depleted, the Great Depression starting, and vast burned areas unsuitable for homesteading, many landowners allowed their land to revert to the county in place of back taxes. Lane County deeded its timberlands to the Board of Forestry in the mid-1940s.

Probability of Future Events

A common method for rating wildfire probability over short timeframes is the Keetch-Byram Drought Index (KBDI). This index predicts the likelihood of wildfire based on soil moisture and other conditions related to drought. KBDI classes range from 0 (no drought) to 800 (extreme drought) and is based on the soil capacity in 8 inches (200 mm) of water. The depth of soil required to hold 8 inches of moisture varies. A prolonged drought (high KBDI) influences fire intensity largely because fuels have lower moisture content. Table 3-20 describes conditions associated with the various KBDI classifications.

Table 3-20 Keetch-Byram Drought Index (KBDI) Classifications

KBDI Class	Description of Conditions
0 – 200 Low Fire Danger	Soil and fuel moisture is high. Most fuels will not readily ignite or burn. However, with sufficient sunlight and wind, cured grasses and some light surface fuels will burn in spots and patches.
200 – 400 Moderate Fire Danger	Fires more readily burn and will carry across an area with no "gaps". Heavier fuels will still not readily ignite and burn. Also, expect smoldering and the resulting smoke to carry into and possibly through the night.
400 - 600 High Fire Danger	Fire intensity begins to significantly increase. Fires will readily burn in all directions exposing mineral soils in some locations. Larger fuels may burn or smolder for several days creating possible smoke and control problems
600 – 800 Extreme Fire Danger	Surface litter and most of organic layer is consumed. 1000 hour fuels contribute to intensity. Stumps will burn to the end of roots underground. Any dead snag will ignite. Spotting from snags is a major problem if close to line. Expect dead limbs on trees to ignite from sparks. Expect extreme intensity on all fires which makes control efforts difficult. With winds above 10 miles per hour, spotting is the rule. Expect increased need for resources for fire suppression. Direct initial attack is almost impossible. Only rapid response time to wildfire with complete mop-up and patrol will prevent a major fire situation from developing.

Source: US Forest Service

The statewide average for Oregon counties experiencing a major wildfire is roughly once every four years. However, a major wildfire occurs somewhere in the state at least once per year. Regarding wildfires of any size, the State of Oregon Natural Hazards Mitigation Plan notes during a typical year, more than 2,500 wildland fires are started on forestlands in Oregon. ODF and USFS estimate 66 percent of these fires are caused by human activity (1,650); the remainder result from lightning (850).

These estimates and averages are in general agreement with data compiled by the National Interagency Coordination Center (NICC), which focuses on the most preventable and easily mitigated, those fires that are human caused. According to the NICC, the southern region of the U.S. records the most human caused fires in the nation. A much lower number of human caused fires occur in the Northwest, less than 2,000 per year on average, and an even smaller number of human caused fires occur in Lane County. Counting both natural and human causes however, it can be assumed that multiple wildfires occur on an annual basis in Lane County and therefore warrant a **High Probability** of future occurrence classification.

A breakdown of numbers of human caused fires and acreage burned is shown in Table 3-xx on the following page.

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Table 3-18 Human Caused Fires: Number and Acreage by U.S. Region

Human Caused Fires (Number)												
Year	Alaska	*Northwest*	Northern California	Southern California	Northern Rockies	Eastern Great Basin	Western Great Basin	Southwest	Rocky Mountains	Eastern Area	Southern Area	Total
2010	359	***1,078***	2,502	3,394	1,107	810	212	1,600	1,962	15,675	36,108	64,807
2009	328	***1,624***	3,677	4,412	1,344	726	209	2,074	1,434	15,719	38,103	69,650
2008	265	***1,365***	3,407	5,208	1,971	826	224	2,013	1,616	11,152	42,043	70,093
2007	247	***2,346***	3,093	5,140	2,005	1,048	425	1,730	1,876	12,453	43,083	73,446
2006	254	***2,666***	3,676	3,166	2,303	943	331	2,511	2,968	14,227	47,175	80,220
2005	296	***1,924***	3,010	3,781	1,183	813	262	3,287	1,940	13,014	28,920	58,430
2004	426	***1,901***	3,613	3,845	1,883	526	173	1,491	704	11,781	27,758	54,101
2003	379	***2,370***	3,795	3,929	1,970	944	227	1,657	4,214	14,851	16,479	50,815
2002	378	***2,148***	3,789	4,060	1,665	730	215	2,668	2,118	12,857	31,394	62,022

Human Caused Fires (Acreage Burned)												
Year	Alaska	*Northwest*	Northern California	Southern California	Northern Rockies	Eastern Great Basin	Western Great Basin	Southwest	Rocky Mountains	Eastern Area	Southern Area	Total
2010	106,759	***70,684***	22,701	67,326	25,574	183,684	3,173	69,860	118,702	128,649	506,337	1,303,449
2009	43,887	***25,592***	57,997	296,429	32,651	16,975	26,046	210,642	76,842	118,230	1,163,455	2,072,746
2008	1,857	***99,706***	91,022	454,249	105,634	120,391	17,769	339,201	117,554	69,396	2,013,212	3,429,991
2007	59,007	***244,335***	153,154	855,978	237,835	288,627	46,057	90,660	85,442	230,750	1,157,515	3,449,360
2006	147,292	***112,098***	146,999	342,864	126,078	278,288	46,947	392,892	209,693	115,171	2,486,522	4,404,844
2005	8,184	***219,012***	37,658	61,728	53,616	187,248	43,811	267,043	48,356	85,589	509,082	1,521,327
2004	17,789	***58,178***	146,720	84,075	23,585	13,636	13,864	63,062	35,346	101,089	407,456	964,800
2003	22,093	***126,381***	96,415	653,016	137,309	182,916	5,161	127,332	87,823	235,391	248,412	1,922,249
2002	427,321	***105,544***	39,560	412,447	65,891	101,986	29,288	772,299	661,679	104,900	356,204	3,077,119

Source: National Interagency Coordination Center

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Magnitude/Severity/Extent
Considering a most credible worst case scenario, magnitude/severity of wildfire impacts in Lane County is classified as **Level 3 - Critical**. Temporary shutdown of facilities can occur, economic and environmental losses are the most common impacts. Injuries and fatalities can occur, most often to wildland firefighters and first responders. A single event could cause structural damage on a neighborhood scale, involving at most a few hundred residences.

Wildfire Overall Vulnerability
A **High Vulnerability** classification is assigned to wildfire, according to subjective assessments and classifications defined in Section 3.1.1. This is primarily due to the frequency of occurrence, and prevalence of development in the wildland-urban interface.

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3.2.10 Windstorm

Hazard Description

In the northwestern region of the U.S., windstorms are a relatively short duration events involving sustained winds and/or gusts in excess of 50 mph. Windstorms can affect the entire state, but have a somewhat higher prevalence along coastal headlands. Windstorms are especially dangerous in areas with significant tree coverage, exposed property, major infrastructure, and above ground utility lines. A windstorm can down trees, power lines, damage structures, and create large volumes of debris.

Wind speed can be measured in either knots, commonly for nautical or aeronautical applications, or miles per hour (mph). The conversation of knots to miles per hour is 1 knot = 1.15 mph. Therefore a 50-knot wind is 57.5 miles per hour and a 100-knot wind is 115 miles per hour. Table 3-12 below shows an appended Beaufort Wind Scale and the relationship of wind speed in knots, miles per hour, and typical effects on land.

Table 3-12 Appended Beaufort Wind Scale

Wind Speed (Knots)	Wind Speed (MPH)	Typical Wind Effects on Land
Less than 1	Less than 1.15	Calm, smoke rises vertically
1 to 4	1.15 to 4	Smoke drift indicates wind direction, still wind vanes
4 to 7	4 to 8	Wind felt on face, leaves rustle, vanes begin to move
7 to 11	8 to 13	Leaves and small twigs constantly moving, light flags extended
11 to 17	13 to 20	Dust, leaves, and loose paper lifted, small tree branches move
17 to 22	20 to 25	Small trees in leaf begin to sway
22 to 28	25 to 32	Larger tree branches moving, whistling in wires
28 to 34	32 to 39	Whole trees moving, resistance felt walking against wind
34 to 41	39 to 47	Whole trees in motion, resistance felt walking against wind
41 to 48	47 to 55	Slight structural damage occurs, slate blows off roofs
48 to 56	55 to 64	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
56 to 64	64 to 74	Substantial structural damage
64+	74+	Major structural damage potential

Source: NOAA

Geographic Location

Severe windstorm potential is highest along the coast and then fairly uniform across the rest of the county. In hilly areas, wind hazard is strongly determined by local conditions of topography and vegetation cover. The Lane Preparedness Coalition notes the most frequent surface winds in Oregon are from the southwest. Strong winds along the coast typically lose strength as they move inland due to the obstruction of the Coastal Range.

It is not uncommon for Oregon to experience several windstorms during the winter months, particularly along the coast. Major damage from these storms is infrequent, but coastal counties typically record 60-100 mph winds at least once per year. Storms with 60-100 mph winds in coastal Lane County typically create 40-60 mph winds in the Willamette Valley.

Major windstorms that can impact large areas of the state, like the Columbus Day windstorm of 1962, are relatively rare. Based upon local hazard analyses, the following counties are considered most vulnerable to windstorms (listed alphabetically): Benton, Clatsop, Coos, Columbia, Curry, Douglas, Gilliam, Hood River, Lane, Lincoln, Linn, Marion, Morrow, Multnomah, Polk, Sherman, Tillamook, and Washington.

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Recent Occurrences (since 2006)
Windstorm occurrences for the period 2006-2012 as recorded by the NCDC are listed below.

March 13, 2011: 60 mph gusts left more than 25,000 people across Lane County without power, toppled trees, damaged homes, closed highways — and caused at least one injury. Damages to public infrastructure Lane County totaled approximately $1.5 million.

December 19, 2007: A potent Pacific storm and associated cold front brought strong 59 mph winds to the coast and heavy snow to the Cascades.

December 3, 2007: The storms on December 2 and 3 produced an extreme long-duration wind event with hurricane-force wind gusts of 129 mph at Bay City on the Oregon Coast. The storm also brought heavy rains and produced widespread record flooding throughout the region, and was blamed for at least 18 deaths. According to data published by the American Society of Civil Engineers, total direct public losses were about $300 million, with $62 million in infrastructure and $94.1 million in housing alone. Timber losses also account for $42 million. Indirect losses are expected to surpass direct losses by a factor of at least 5. In Lane County, peak wind gusts measuring 87 mph were recorded at the Sugarloaf RAWS, about 8 miles west-southwest of Oakridge. The high wind speeds associated with this storm caused widespread damage to the area.

March 7, 2006: A strong Pacific system brought a powerful cold front to northwest Oregon. Strong winds developed ahead of this cold front, and persisted through the event. Florence reported 43 mph. $375,000 in damage was reported.

February 3, 2006: A strong winter storm brought high winds to portions of western Oregon. Many residents experienced power outages due to trees blown down by strong winds. An estimated 3500 residents of Lane County were without power for portions of the night. $300,000 in damage was reported.

Source: NCDC; Register Guard; ASCE

Previous Occurrences (prior to 2006)
Reports of three notable storms from the period prior to 2006 are listed below.

February 7, 2002: Oregon Severe Winter Windstorm with High Winds (DR-1405). Lane County among five other declared counties. $4.8 million in infrastructure damage, response and debris removal costs.

October 12, 1962, The Columbus Day Storm: The peak winds were felt as the storm passed close by on October 12. At Oregon's Cape Blanco, an anemometer that lost one of its cups registered wind gusts in excess of 145 miles per hour; some reports put the peak velocity at 179 miles per hour. At the Mount Hebo Air Force Station in the Oregon Coast Range, the anemometer pegged at its maximum 130 miles per hour for long periods — the level of a Category 3 hurricane; damage to the radar domes suggested wind gusts to at least 170 miles per hour. Dome tiles were thrown down the mountainside; the 200-pound chunks tore through entire trees. At the Naselle Radar Station in the Willapa Hills of southwest Washington, a wind gust of 160 miles per hour was observed. In Salem, a wind gust of 90 miles per hour was observed. At Corvallis, an inland location in the Willamette Valley, one-minute average winds reached 69 miles per hour, with a gust to 127 miles per hour, before the anemometer was destroyed and the observation tower began flying apart, forcing the abandonment of the station. Portland measured wind gusts reached 116 miles per hour at the Morrison Street Bridge. For the Willamette Valley, the lowest peak gust officially measured was 86 miles per hour at Eugene. This value, however, is higher than the maximum peak gust generated by any other Willamette Valley windstorm in the 1948–2010 period. Many anemometers, official and unofficial, within the heavily stricken area of northwestern Oregon and southwest Washington were destroyed before winds attained maximum velocity. For example, the wind gauge atop the downtown Portland studios of KGW radio and TV recorded two gusts of 93 miles per hour, just before flying debris knocked the gauge off-line at about 5 p.m. The following is excerpted from

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a storm report prepared by Wolf Read of the University of Washington: *Columbus Day Storm of 1962: Most powerful windstorm to strike the Pacific Northwest in the 20th century. Undamaged homes were the exception, not the rule. In 1962 dollars, the Columbus Day Storm caused an estimated $170-200 million in damage in Oregon (approx. $1.5 billion in 2012 dollars). In sheer gustiness of wind, as indicated by the ratio of maximum gust speed to sustained wind speed, called the gust factor, the Columbus Day Storm behaved more like a hurricane than a typical mid-latitude cyclone. Over 11 billion board feet of timber downed. The large number of 1,000-year-old plus trees blown down suggests that the Columbus Day Storm may have been the event of the millennium.* Sources: FEMA; U.S. Weather Bureau; University of Washington, (Read)

February 24, 1961: The February 24th gale repeated the ever-familiar broken trees not just at the U of O campus, but throughout Eugene, with specimens down on 13th and Alder, 12th and Ferry and 1665 Lincoln Street. The tree on Alder appears to have brought down a high-tension line during its fall. South Eugene High School lost some roofing. Eugene Water and Electric Board suffered many outages, and downtown lights wavered with each pounding surge of wind.

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Figure 3-xx Peak Gusts, October 12, 1962 (Columbus Day Storm)

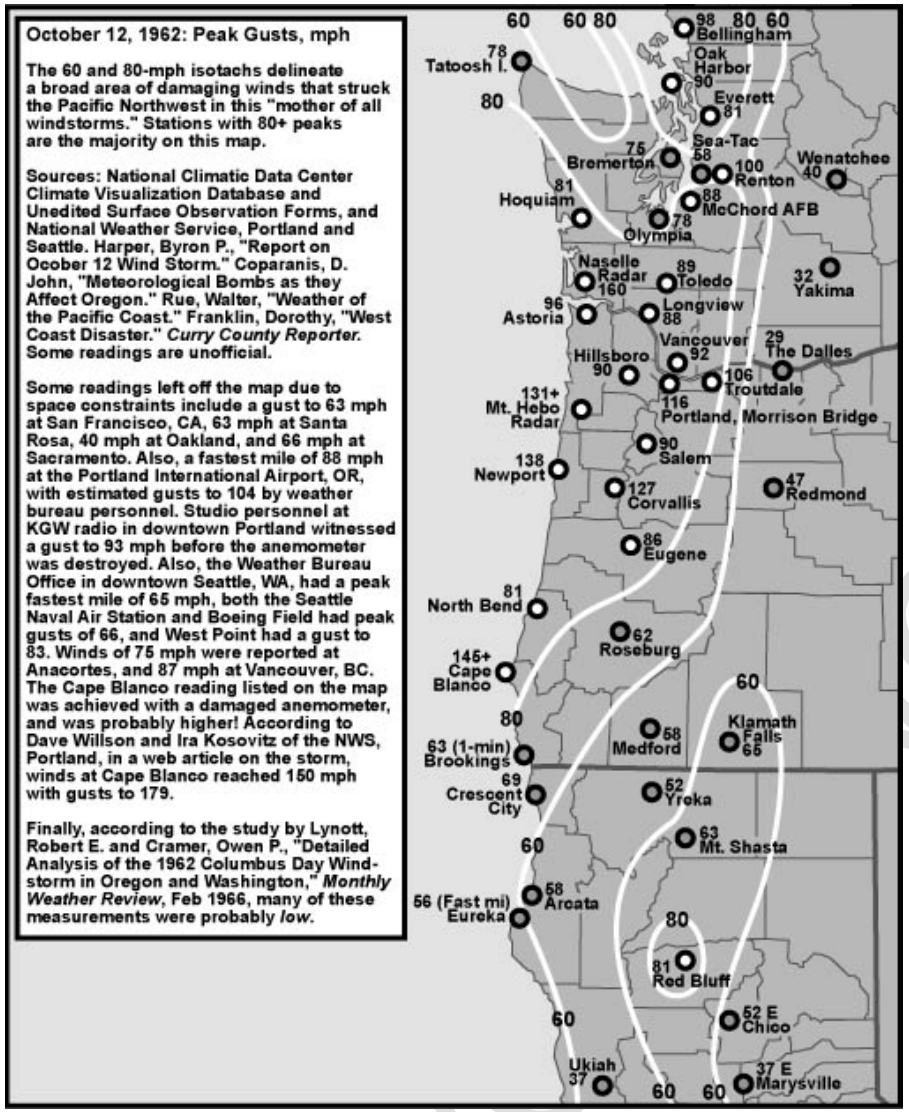
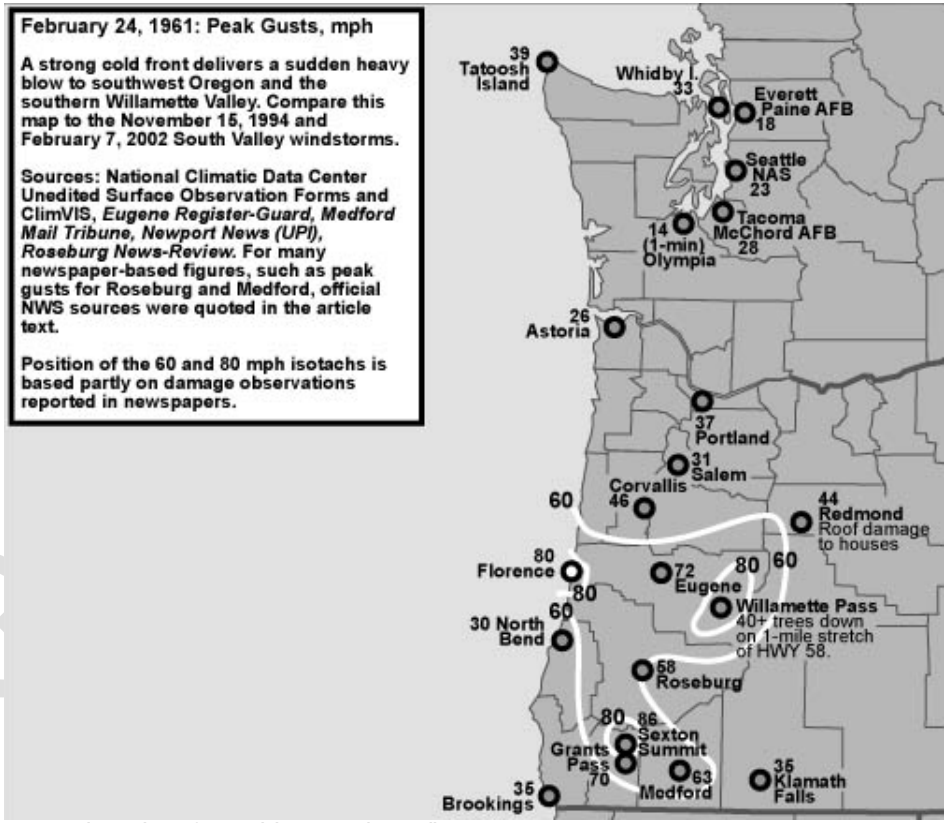


Figure 3-xx Peak Gusts, February 24, 1961



Source: University of Washington, (Read)

Probability of Future Occurrence
Sustained wind speeds with two-year recurrence interval range from about 37 to 47 mph in Lane County. These two-year wind speeds are generally too low to cause widespread substantial wind damage. However, significant local wind damage can occur at sites where local wind speeds are higher or, where there are especially exposed locations, such as at the boundary between clear cut and forested lands.

The 50-year recurrence interval of wind speeds range from about 62 to 75 mph. These wind speeds are high enough to cause widespread wind damage. Damage may be severe at particularly exposed sites. Thus, for most regions of Lane County winter storms with significant direct wind damage are not likely every year or every few years, but perhaps once every decade or so, on average, with major wind storm events happening at intervals averaging a few decades.

Based on historical occurrence, Lane County expects a significant windstorm about once every 10 years. This frequency equates to a **Moderate Probability** classification.

Magnitude/Severity/Extent
A wind storm whipped through Lane County on March 13, 2011 resulting in over $1.5 million in damages to public infrastructure with utilities and school districts being hardest hit. Although multiple Oregon counties are typically impacted by the same severe storm, this storm appeared to cause only pockets of damage statewide and nothing severe or widespread enough to trigger the disaster declaration process at the state or federal level. In order for Lane County to have been eligible for federal assistance separate from other counties damages would have had to meet the state's current threshold of approximately $4.6 million in damages.

The February 7, 2002 wind storm was the strongest to strike western Oregon in several years. Starting at approximately 4:00 PM and increasing in intensity over the next three to four hours, severe winds gusted ranging from 40 to 70 miles per hour in the valley floor resulting in extensive property, vegetation and electric utility damage. Other associated impacts included interruption of critical services, damage to homes and businesses, damaged vehicles, closure of roads and considerable loss of business revenues.

On March 12, 2002, a federal disaster was declared for the State of Oregon. Estimated damage to public infrastructure in Lane County's exceeded $3.5 million.

According to damages related to previous storms, particularly the Columbus Day Storm of 1962, credible worst case scenario impacts from windstorm can be classified as **Level 4 – Catastrophic**. Major damage on a regional scale is possible, with numerous injuries and fatalities and extended disruption of infrastructure and facilities.

Windstorm Overall Vulnerability
Based on assessments of the magnitude of previous occurrences, disruptions of utilities infrastructure and a high future probability, overall vulnerability to thunderstorm impacts is considered **High Vulnerability**, according to subjective assessments and the classifications defined in Section 3.1.1.

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3.2.11 Winter Storm

Hazard Description

Winter storms are characterized by ice accumulation and freezing rain, heavy snowfall, and/or extreme cold and wind chill conditions. Impacts are determined by factors such as the amount and extent of snow or ice, air temperature, wind speed, event duration, day and time. These hazard events typically create disruption of regional systems such as public utilities, telecommunications, and transportation routes.

An ice storm is used to describe occasions when ice accumulations damage trees, above ground utility lines, and affect travel surfaces. Heavy snowfall can cause extended periods of travel disruption and damage structures. Exposure to extreme cold and wind chill associated with winter storms can be life-threatening, and pipes can freeze or burst.

In 2001, the National Weather Service implemented an updated Wind Chill Temperature index. This index, shown as Figure 3-35 below, was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Figure 3-35 National Weather Service Wind Chill Chart

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Calm																		
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes | 10 minutes | 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) Effective 11/01/01

Source: National Weather Service, www.nws.noaa.gov/om/windchill/index.shtml

Geographic Location

Severe winter storms in the western Oregon region are less frequent at lower elevations of western Lane County, and more frequent at higher elevations in the Cascade Range and Cascade Foothills in the eastern portion of the County.

In eastern Lane County, the average annual snowfall for Oakridge is 12.6” and for McKenzie Bridge the average snowfall is 28.7”.

Annual snowfalls impact road conditions. Highway 58 provides a low elevation pass through the Cascades running through the towns of Pleasant Hill, Lowell, Westfir and Oakridge as it passes through to the east Lane County border. Highway 58 closes three to four times per year for several hours at a time. The same is true for Highway 126 East which runs along the McKenzie River through the towns of Walterville, Deerhorn and Blue River.

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Previous Occurrences

In the past five years there have been 2 major disaster declarations related to winter storms, among numerous other events in recent history for Lane County. The following image of ice covered trees and damaged powerlines is a typical impact from the winter storm of February 2014, which was the second major winter storm to impact Lane County in a 3-month period. According to reports from utilities this storm left over 22,000 Lane County residences with electrical power outages. According to post-disaster assessments Lane County was one of four heavily impacted counties, which also included Linn, Benton, and Lincoln Counties. Total damage and response costs exceeded $6.1 million for this disaster.

Figure 3-x Lane County Winter Storm February 2014, Disaster Declaration 4169

Source: FEMA

Table 3-x DR—4169 Electrical Outages per Utility District

Electrical Utility Provider	Homes w/o Power	Notable Affected Areas
Emerald People's Utility District	Over 9,000	Cottage Grove, Dexter-Lowell area, Fall Creek, Lorane, Lost Creek, Pleasant Hill
Springfield Utility Board	Over 2,000	East Springfield and downtown
Eugene Water and Electric Board	Over 5,300	Westmoreland, Barger Drive, Prairie Road, River Road, Irving Road, east Thurston, south Eugene hills, Laurel Hill Valley
Lane Electric	Over 5,700	various

Source: Electric utilities; KMTR

A winter storm in December 2013 brought over 12 inches of snow to Lane County and near record cold, with temperatures falling to -10°F at the Eugene Airport on December 8, 2013.

Figure 3 – xx Snow/Ice Storm Events, Lane County 2006-2014

February 8, 2014 – Major snow event, approximately 12" fell across southern Willamette Valley. Extended travel disruptions, power outages, infrastructure damage. Post-disaster assessments indicate Lane County among the hardest hit areas of the state, preliminary estimate of nearly $1 million in damage and likely federal disaster declaration.

December 6-8, 2013 – Approximately 12" of snow across the southern Willamette Valley was followed by near record cold. NWS Eugene station reported -10° F, the second coldest temperature ever recorded. Major travel disruptions, power outages, significant infrastructure damage.

February 14, 2011 - Heavy snow reported at 31 inches at the McKenzie SNOTEL (Oregon NRCS, 2007-2008) site located in Lane County in the Willamette National Forest.

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February 27, 2011 - A late February heavy snowfall episode extended into March. A resident of Oakridge measured 13 inches of new snow.

November 21, 2010 - A strong low pressure system dropped south out of British Columbia bringing cold air and heavy snow to the Cascades in Lane County.

November 18, 2010 - The McKenzie SNOTEL site measured 13 inches of new snow between during an eight hour period on November 18th.

February 29, 2009 - Snowfall estimates were reported to be 16 to 24 inches at the McKenzie SNOTEL site.

March 14, 2009 - Seventeen inches of new snow was reported at Willamette Pass along Highway 58.

April 2, 2009 - Between 15 and 24 inches of storm total snowfall were reported at the McKenzie SNOTEL site.

December 25, 2007 - A potent Pacific storm brought a substantial snowfall to the Cascades, Cascade Foothills and Coast Range.

March 8, 2006 - A strong Pacific storm and associated cold front brought relatively late winter conditions to northwest Oregon. Snow totals from this event ranged from a tenth of an inch to a few inches at the coast and throughout the Willamette Valley.

Note:
Unless otherwise stated, events listed under Significant Occurrences Since 2006 are from the National Climatic Data Center Storm Event database as retrieved from http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms

Probability of Future Occurrence
According to assessments by the Lane Preparedness Coalition, a severe winter storm affects the planning area approximately once every 3 to 4 years. This frequency of equates to a **Moderate Probability** of future occurrence according to the definitions set forth in Section 3.1.1 Methods and Definitions. Note: the National Climatic Data Center records nine (9) winter storm events of any type (combining major & minor events) since 2006.

Magnitude/Severity/Extent
Impacts from winter storms primarily involve the following: 1) transportation safety and disruptions, 2) electricity and communications disruptions, 3) public safety risk for travelers, commuters, and special needs populations, 4) economic losses due to lost production and wages, increased heating and response costs.

Disruptions are frequent and widespread, repair and response is expensive. Utility line damage is a major concern resulting from winter storms in the planning area. Property damage due to falling trees is common. According to these factors, a **Level 3 – Critical** magnitude/severity classification is assigned for winter storm.

Overall Vulnerability
Special needs populations are particularly vulnerable during winter storms when power and communications are disrupted including the elderly, disabled, or low income persons. The physical layout of infrastructure, i.e. location of roads, power and communications lines in relation to trees and mountainous areas create a notable vulnerability to winter storm events. Probability in general is high based on moderate frequency of severe occurrences, and high frequency of moderate/minor events. According to these factors, a **High Vulnerability** classification is assigned to Winter Storm.

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3.2.12 Volcano

Volcano Profile Under Development, draft stage

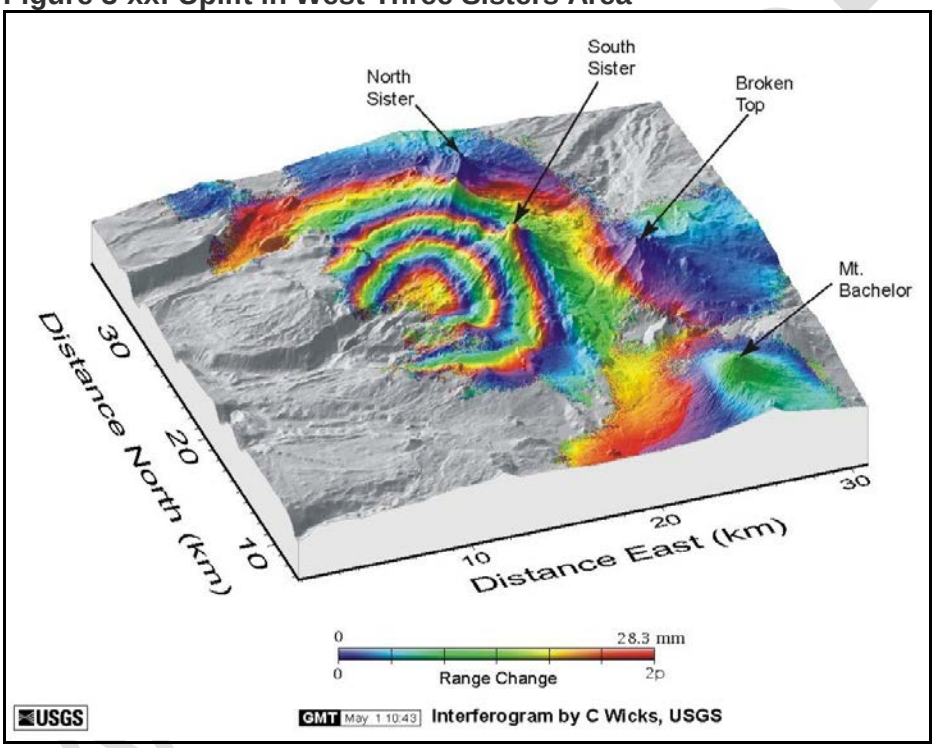
Modern Deformation and Uplift in the Sisters Region

In 2001, scientists discovered that a broad 6 x 12 mile area focused 3– 4 miles west of the summit of South Sister had been rising at an average rate of 1–2 inches per year since late 1997. Rate of uplift decreased to about 0.5 inches per year during 2004–2006, and to less than 0.4 inches per year by 2013. According to these findings as of 2014 total uplift since 1997 totaled approximately 1 foot.

Modeling of the uplift (inflation) suggests that it was caused either by the intrusion of about 26 million cubic yards of magma at about a 3-mile depth, or by rise of a hot, buoyant plume of water and gas to a similar level that caused heating and expansion of surrounding rock.

The USGS considers an eruption unlikely in the near future if current trends continue. Similar inflation episodes have been recognized at many volcanoes around the world, and others probably went unnoticed before the development of modern monitoring techniques.

Figure 3-xx: Uplift in West Three Sisters Area



Source: USGS
Note: Each color band from blue to red represents one inch of upward ground movement.

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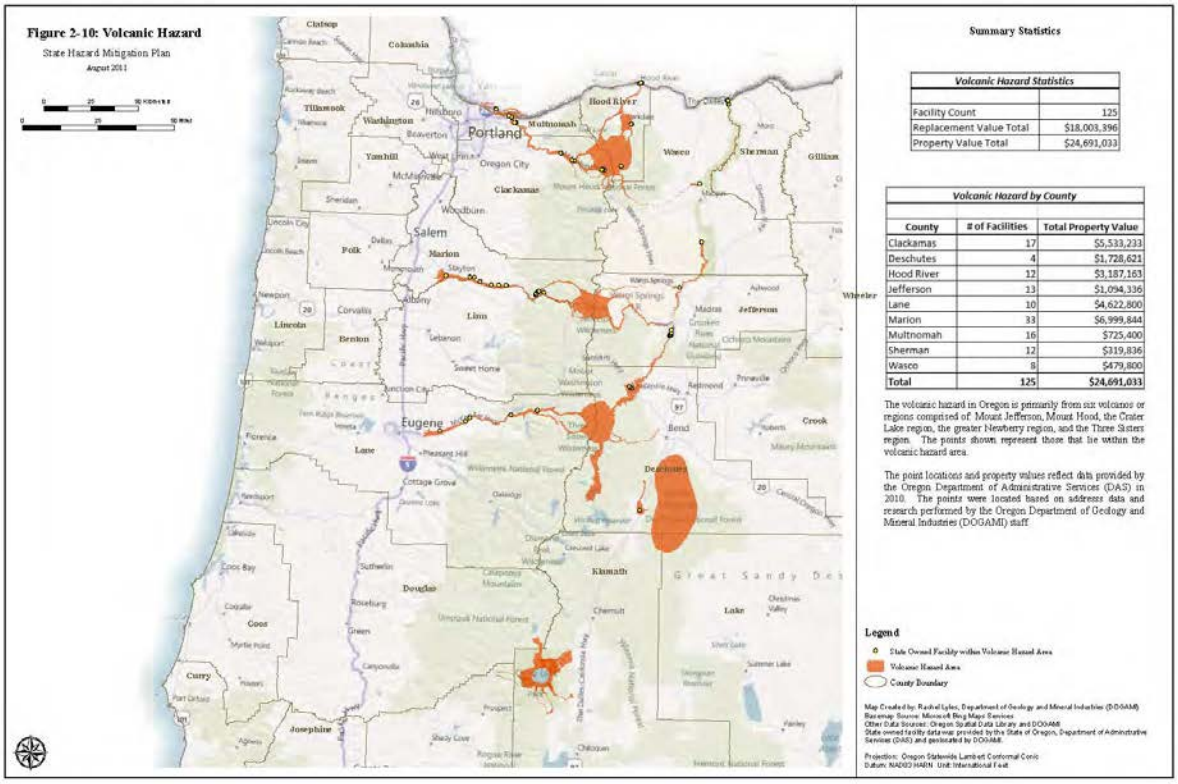

According to information from the State of Oregon Hazard Mitigation Plan, the Three Sisters region has a clear history of eruptions but none noted in at least the last 15,000 years. North Sister has probably been inactive for at least 100,000 years. Middle Sister last erupted between 25,000 and 15,000 years ago. As noted previously, from 1996 to 2003 South Sister had minor but broad uplift of about one inch a year, indicating subsurface magma activity. There is no current indication that the previously active uplift will result in a volcanic eruption, but monitoring continues in order to quickly identify changes in condition.

According to information from the State of Oregon Hazard Mitigation Plan, future eruptions at South Sister (and possibly Middle Sister) are likely to include lava flows, pyroclastic flows, and lahars, though no predictable timeframe for occurrence is available. Lahars could travel many miles down upper river valleys, dependent on snow/ice volume melted by the eruption. Ashfall would be expected to occur within 20 miles of the vent, though extraordinary wind conditions could alter ash plume drift to a moderate extent.

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3.3 VULNERABILITY ASSESSMENT

44 CFR Requirement §201.6(c) (2) (ii): *[The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c) (2) (i) of this section. This description shall include an overall summary of each hazard and its impact on the community.*

3.3.1 Overall Vulnerability per Hazard Type (Subjective)

Overall vulnerability to each hazard was based on assessments of previous and potential occurrences regarding the scale of geographic area affected, future probability, and severity of impact considering a worst case scenario. Factors including risk exposure of special needs populations, medical special needs populations, the location of critical facilities, and key infrastructure were also considered.

Overall vulnerability to natural hazard impacts is substantial for the planning area, though it varies widely according to hazard type.

Based on factors and the definitions established in Subsection 3.1.1 (listed below in the table notes), Table 3-23 below shows the Hazard Mitigation Steering Committee's assessment of overall vulnerability to each of the identified hazards and categories of primary impacts (classified as human, property, infrastructure, economy, and/or environment).

Table 3-22 Subjective Vulnerability and Impact by Hazard Type

HAZARD TYPE	SUBJECTIVE VULNERABILITY	PRIMARY IMPACT CATEGORIES
Dam Failure	High	Public Safety, Property, Infrastructure, Economy
Drought	Low	Economy
Earthquake	High	Public Safety, Property, Infrastructure, Economy
Flood	Moderate	Property, Infrastructure
Hazardous Materials Incident	Moderate	Public Safety
Landslide	Moderate	Public Safety, Infrastructure, Economy
Pandemic	Moderate	Public Safety, Economy
Terrorism	Moderate	Public Safety, Property, Infrastructure
Tsunami	High	Public Safety, Property, Infrastructure
Volcano	Low	Public Safety, Property, Infrastructure
Wildfire	High	Property, Environment
Windstorm	Moderate	Property, Infrastructure
Winter Storm	High	Public Safety, Property, Infrastructure, Economy
Volcano	*TBD*	Environment, Infrastructure

Source: Lane County Hazard Mitigation Steering Committee

Notes: Overall vulnerability classifications are defined as follows:
High— Moderate/high probability of future occurrence and potentially critical severity.
Moderate— Moderate/high probability of future occurrence and limited potential severity.
Low— Low/moderate probability of future occurrence and negligible/limited potential severity

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3.3.2 NFIP & Repetitive Flood Claims

44 CFR Requirement §201.6(c) (2) (ii): *[The risk assessment]* ***must*** *also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.*

National Repetitive Loss Strategy

The National Flood Insurance Program (NFIP) has developed a strategy to mitigate repetitive flood insurance claims on individual properties (Repetitive Loss Properties). A Repetitive Loss (RL) property is defined as any insurable building with two or more paid flood insurance claims exceeding $1,000 within a ten-year period. A RL property may or may not be currently insured by the NFIP.

A Severe Repetitive Loss property (SRL) is defined as having at least 4 paid flood insurance claims each exceeding $5,000, or when there are 2 or more losses where the building payments exceed the property value. Loss history is determined by counting all flood claims paid on an insured property, regardless of any change(s) of ownership, since the building's construction or back to 1978. States or communities may sponsor projects to mitigate flood losses to these properties or may be able to provide technical assistance on mitigation options.

Depending on individual circumstances, appropriate mitigation measures commonly include elevating buildings above the base flood elevation, demolishing buildings, and removing buildings from the Special Flood Hazard Area. Occasionally, mitigation takes the form of a local drainage-improvement project that meets NFIP standards.

National Repetitive Loss Information

According to the Government Accounting Office (GAO), as of 2004, repetitive loss properties receive over 38 percent of NFIP claims dollars paid (approximately $200 million annually) but represent only 1 percent of all NFIP insured properties. FEMA reports that currently there are over 122,000 RL properties nationwide, and approximately 9,000 properties in the U.S. meet the definition of severe repetitive loss properties.

Local Repetitive Loss Information

There are twenty one (21) properties in Lane County which meet the NFIP definition for Repetitive Loss Properties. The general locations of these properties are broken down as follows:

Community	Repetitive Loss Properties (#)	Breakdown by Property Type
Mapleton	12	11 residential, 1 business
Springfield	5	5 residential
Cottage Grove	1	1 residential
Elmira	1	1 residential
Vida	1	1 residential
Walton	1	1 residential
Total	21	20 residential, 1 business

Flood Insurance Claim Information by Community

Unincorporated Lane County ranks 3rd among Oregon counties in total flood insurance claims (350) and 5th among Oregon counties in total flood insurance payments ($3.1 million).

Table 3.xx NFIP Flood Insurance Claim Data

Jurisdiction	Total Claims	Closed	CWOP	Total Claim Payments
Coburg, City of	3	3	0	$7,301
Cottage Grove, City of	11	3	8	$5,068
Eugene, City of	17	10	7	$116,465
Florence, City of	5	2	3	$57,374

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Jurisdiction	Total Claims	Closed	CWOP	Total Claim Payments
Junction City, City of	1	1	0	$1,497
Lane County*	350	257	93	$3,121,674
Springfield, City of	27	22	5	$402,491
Veneta, City of	1	1	0	$24,156
Totals	**415**	**299**	**116**	**$3,736,030**

Source: FEMA, NFIP; http://bsa.nfipstat.fema.gov/reports/1040.htm#41
Note: CWOP = closed without payment

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3.3.3 Vulnerable Populations and Structures

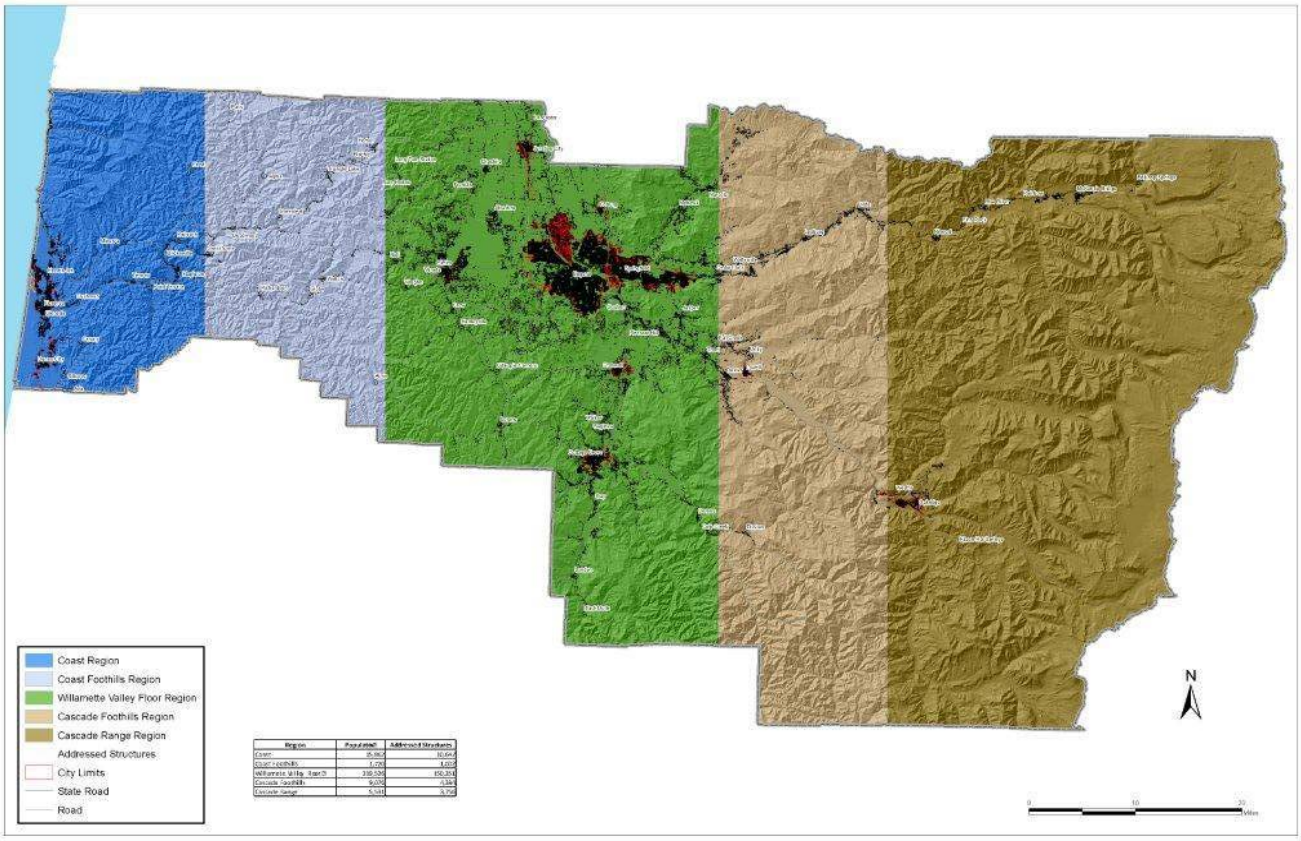
It is important to understand the distribution of population and built structures in each natural hazard area when considering hazard mitigation measures. The following map (Figure 3-xx) shows distribution of population and built structures in each of the five main physiographic regions of Lane County. Table 3-xx below summarizes the corresponding data. The built structures are those with an assigned address by the County and do not necessarily include out buildings such as garages, shops, etc.

Table 3-xx. Population/Residential Structures per Physiographic Region

Region	Population	Addressed Structures
Coast	15,862	10,647
Coast Foothills	1,720	1,002
Willamette Valley Floor	319,526	150,351
Cascade Foothills	9,076	4,394
Cascade Range	5,531	3,756

Source: Lane County

Figure 3-xx Population Density and Built Structures in 5 Physiographic Regions



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Vulnerable Populations and Structures: Tsunami Inundation

In 2008 the Oregon Department of Geology and Mineral Industries (DOGAMI) published an extensive study on the primary geologic hazards of Yamhill, Marion, Polk, Benton, Linn and Lane Counties. Included in this report are earthquake and landslide hazard maps for each county along with future earthquake damage estimates. This study is called *Interpretive Map Series, IMS-24, Geologic Hazards, Earthquake and Landslide Hazard Maps, and Future Earthquake Damage Estimates.* Appendix C of the DOGAMI report is specific to Lane County.

The IMS-24 Maps in the following section show the coastline of Lane County and calculated areas likely to be inundated under various tsunami scenarios. Descriptions of the tsunami modeling methodology, data inputs and parameters are below, excerpted verbatim from map notes prepared by DOGAMI.

Introduction

The Oregon Department of Geology and Mineral Industries (DOGAMI) has been identifying and mapping the tsunami inundation hazard along the Oregon coast since 1994. In Oregon, DOGAMI manages the National Tsunami Hazard Mitigation Program, which has been administered by the National Oceanic and Atmospheric Administration (NOAA) since 1995. DOGAMI's work is designed to help cities, counties, and other sites in coastal areas reduce the potential for disastrous tsunami-related consequences by understanding and mitigating this geologic hazard. Using federal funding awarded by NOAA, DOGAMI has developed a new generation of tsunami inundation maps to help residents and visitors along the entire Oregon coast prepare for the next Cascadia Subduction Zone (CSZ) earthquake and tsunami. The CSZ is the tectonic plate boundary between the North American Plate and the Juan de Fuca Plate (Figure 1). These plates are converging at a rate of about 1.5 inches per year, but the movement is not smooth and continuous. Rather, the plates lock in place, and unreleased energy builds over time. At intervals, this accumulated energy is violently released in the form of a megathrust earthquake rupture, where the North American Plate suddenly slips westward over the Juan de Fuca Plate. This rupture causes a vertical displacement of water that creates a tsunami (Figure 2). Similar rupture processes and tsunamis have occurred elsewhere on the planet where subduction zones exist: for example, offshore Chile in 1960 and 2010, offshore Alaska in 1964, near Sumatra in 2004, and offshore Japan in March 2011.

CSZ Frequency: Comprehensive research of the offshore geologic record indicates that at least 19 major ruptures of the full length of the CSZ have occurred off the Oregon coast over the past 10,000 years (Figure 3). All 19 of these full-rupture CSZ events were likely magnitude 8.9 to 9.2 earthquakes (Witter and others, 2011). The most recent CSZ event happened approximately 300 years ago on January 26, 1700. Sand deposits carried onshore and left by the 1700 event have been found 1.2 miles inland; older tsunami sand deposits have also been discovered in estuaries 6 miles inland. As shown in Figure 3, the range in time between these 19 events varies from 110 to 1,150 years, with a median time interval of 490 years. In 2008 the United States Geological Survey (USGS) released the results of a study announcing that the probability of a magnitude 8-9 CSZ earthquake occurring over the next 30 years is 10% and that such earthquakes occur about every 500 years (WGCEP, 2008).

CSZ Model Specifications: The sizes of the earthquake and its resultant tsunami are primarily driven by the amount and geometry of the slip that takes place when the North American Plate snaps westward over the Juan de Fuca Plate during a CSZ event. DOGAMI has modeled a wide range of earthquake and tsunami sizes that take into account different fault geometries that could amplify the amount of seawater displacement and increase tsunami inundation. Seismic geophysical profiles show that there may be a steep splay fault running nearly parallel to the CSZ but closer to the Oregon coastline (Figure 1). The effect of this splay fault moving during a full-rupture CSZ event would be an increase in the amount of vertical displacement of the Pacific Ocean, resulting in an increase of the tsunami inundation onshore in Oregon. DOGAMI has also incorporated physical evidence that suggests that portions of the coast may drop 4 to 10 feet during the earthquake; this effect is known as subsidence. Detailed

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information on fault geometries, subsidence, computer models, and the methodology used to create the tsunami scenarios presented on this map can be found in DOGAMI Special Papers 41 (Priest and others, 2009) and 43 (Witter and others, 2011).

Map Explanation

This tsunami inundation map displays the output of computer models representing five selected tsunami scenarios, all of which include the earthquake-produced subsidence and the tsunami-amplifying effects of the splay fault. Each scenario assumes that a tsunami occurs at Mean Higher High Water (MHHW) tide; MHHW is defined as the average height of the higher high tides observed over an 18-year period at the Yaquina Bay (Central Coast Model) tide gauge. To make it easier to understand this scientific material and to enhance the educational aspects of hazard mitigation and response, the five scenarios are labeled as "T-shirt sizes" ranging from Small, Medium, Large, Extra Large, to Extra Extra Large (S, M, L, XL, XXL). The map legend depicts the respective amounts of slip, the frequency of occurrence, and the earthquake magnitude for these five scenarios. Figure 4 shows the cumulative number of buildings inundated within the map area.

The computer simulation model output is provided to DOGAMI as millions of points with values that indicate whether the location of each point is wet or dry. These points are converted to wet and dry contour lines that form the extent of inundation. The transition area between the wet and dry contour lines is termed the Wet/Dry Zone, which equates to the amount of error in the model when determining the maximum inundation for each scenario. Only the XXL Wet/Dry Zone is shown on this map. This map also shows the regulatory tsunami inundation line (Oregon Revised Statutes 455.446 and 455.447), commonly known as the Senate Bill 379 line. Senate Bill 379 (1995) instructed DOGAMI to establish the area of expected tsunami inundation based on scientific evidence and tsunami modeling in order to prohibit the construction of new essential and special occupancy structures in this tsunami inundation zone (Priest, 1995).

Time Series Graphs and Wave Elevation Profiles: In addition to the tsunami scenarios, the computer model produces time series data for "gauge" locations in the area. These points are simulated gauge stations that record the time, in seconds, of the tsunami wave arrival and the wave height observed. It is especially noteworthy that the greatest wave height and velocity observed are not necessarily associated with the first tsunami wave to arrive onshore. Therefore evacuees should not assume that the tsunami event is over until the proper authorities have sounded the all-clear signal at the end of the evacuation. Figure 5 depicts the tsunami waves as they arrive at a simulated gauge station. Figure 6 depicts the overall wave height and inundation extent for all five scenarios at the profile locations shown on this map.

Data References/Sources

This map is based on hydrodynamic tsunami modeling by Joseph Zhang, Oregon Health and Science University, Portland, Oregon. Model data input were created by John T. English and George R. Priest, Department of Geology and Mineral Industries (DOGAMI), Portland, Oregon. Hydrology data, contours, critical facilities, and building footprints were created by DOGAMI. Senate Bill 379 line data were redigitized by Rachel L. Smith and Sean G. Pickner, DOGAMI, in 2011 (GIS file set, in press, 2012). Urban growth boundaries (2011) were provided by the Oregon Department of Land Conservation and Development (DLCD). Transportation data (2010 and 2007) provided by Lane and Lincoln Counties were edited by DOGAMI to improve the spatial accuracy of the features or to add newly constructed roads not present in the original data layer. Lidar data are from DOGAMI Lidar Data Quadrangles LDQ-2011-44124-B1-Heceta Head and LDQ-2011-44124-C1-Yachats.

Datum, Projection, Coordinate System

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Coordinate System: Oregon Statewide Lambert Conformal Conic, Unit: International Feet, Horizontal Datum: NAD 1983 HARN, Vertical Datum: NAVD 1988. Graticule shown with geographic coordinates (latitude/longitude).

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Software: Esri ArcGIS® 10.1, Microsoft® Excel®, and Adobe® Illustrator®

Funding: This map was funded under award #NA09NW54670014 by the National Oceanic and Atmospheric Administration (NOAA) through the National Tsunami Hazard Mitigation Program.

Map Data Creation/Development: *Tsunami Inundation Scenarios*: George R. Priest, Laura L. Stimely, Daniel E. Coe, Paul A. Ferro, Sean G. Pickner, Rachel L. Smith *Basemap Data*: Kaleena L.B. Hughes, Sean G. Pickner

Map Production

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Text: Don W.T. Lewis, Rachel L. Smith

Editing: Don W.T. Lewis, Rachel L. Smith

Publication: Deborah A. Schueller

Map Date: 03/04/2013

Figures

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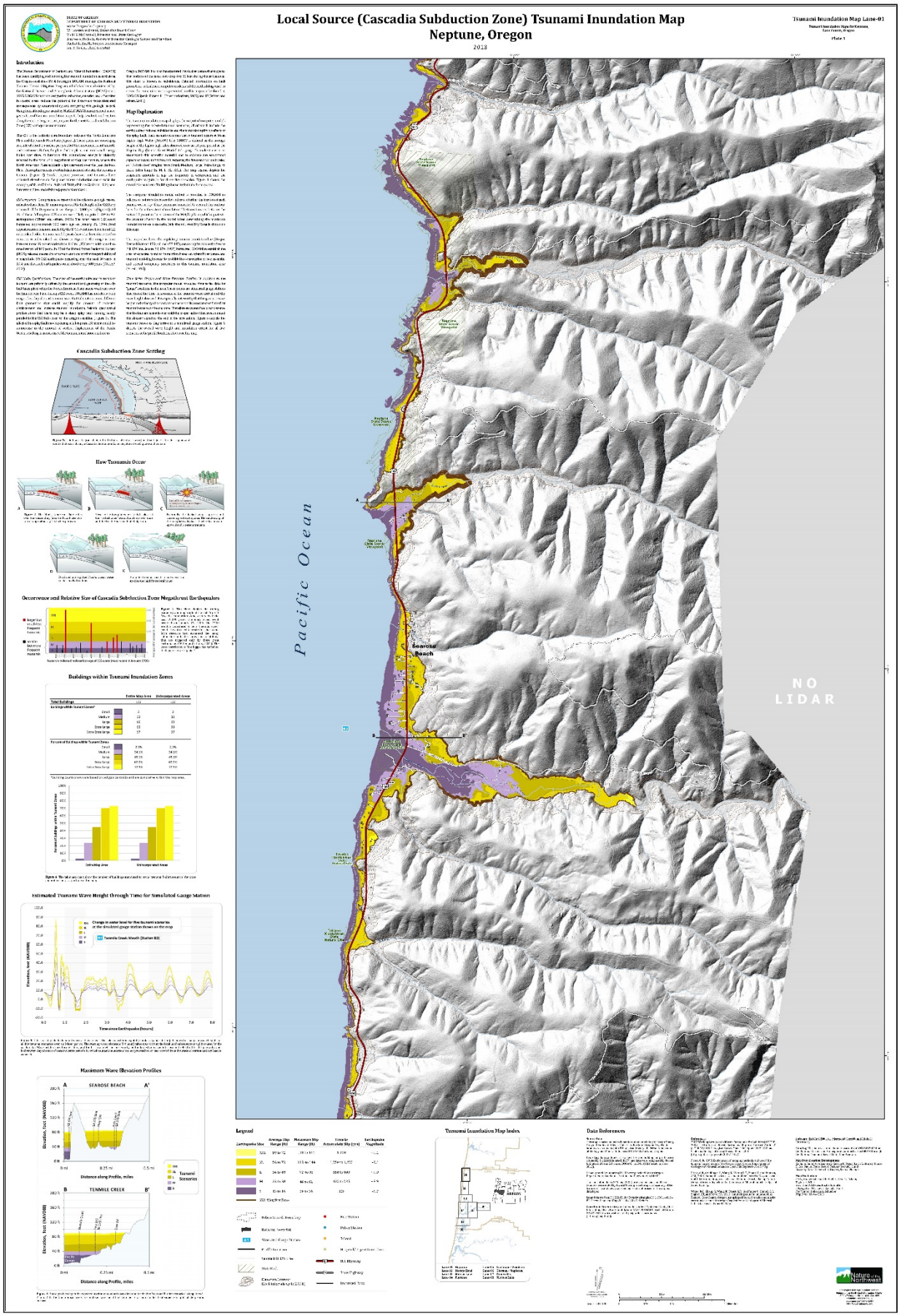
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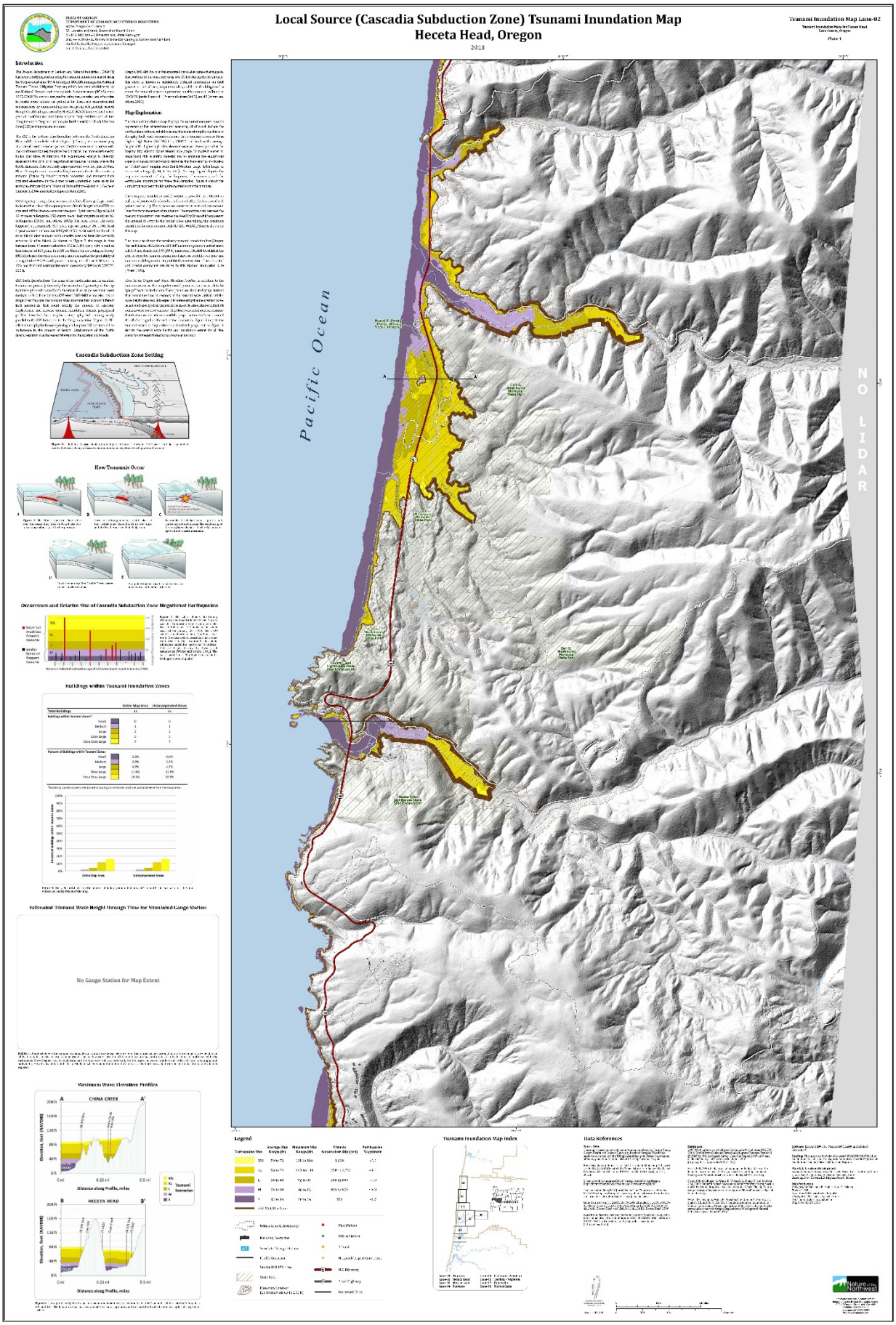
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Pacific Ocean
NO LIDAR
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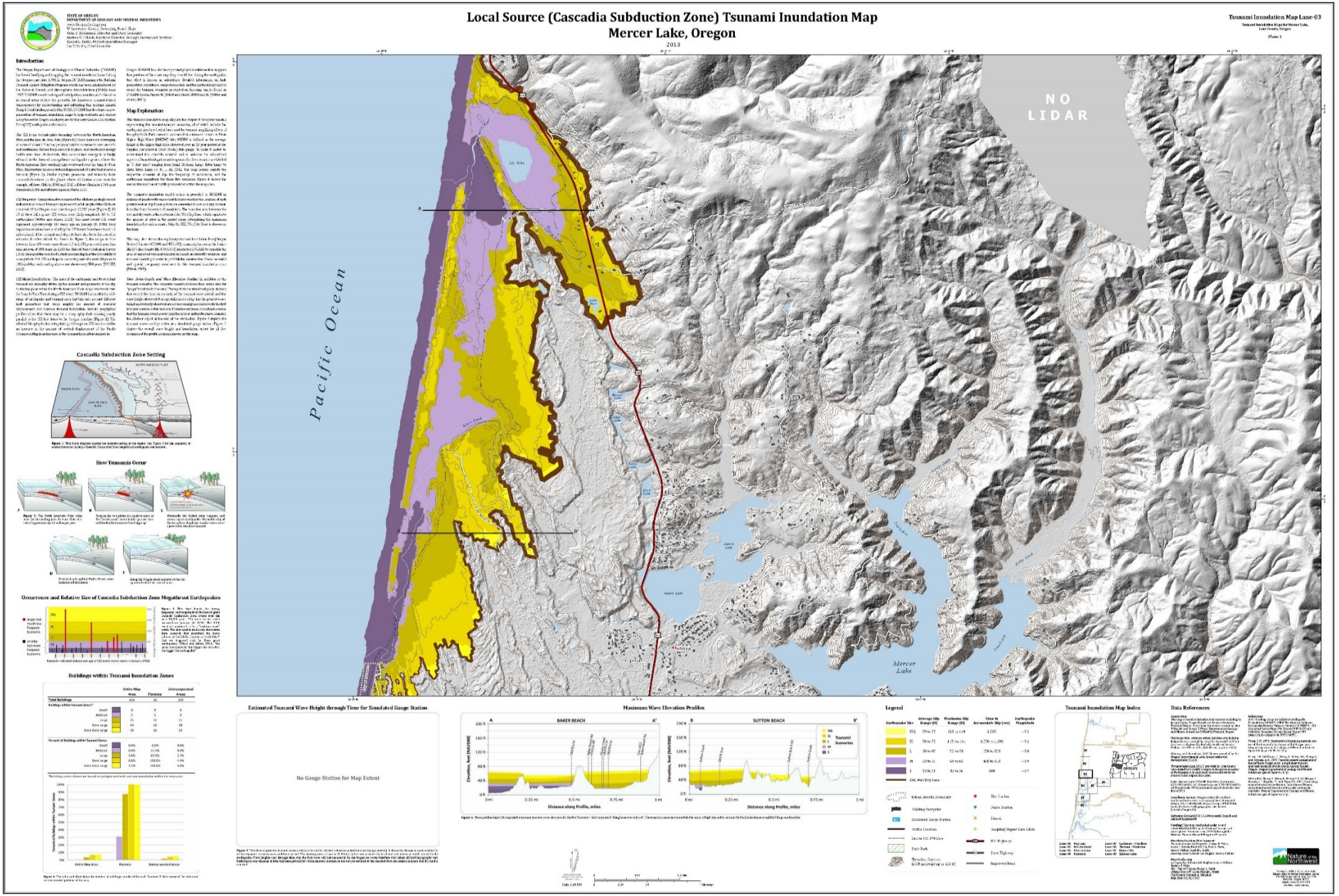
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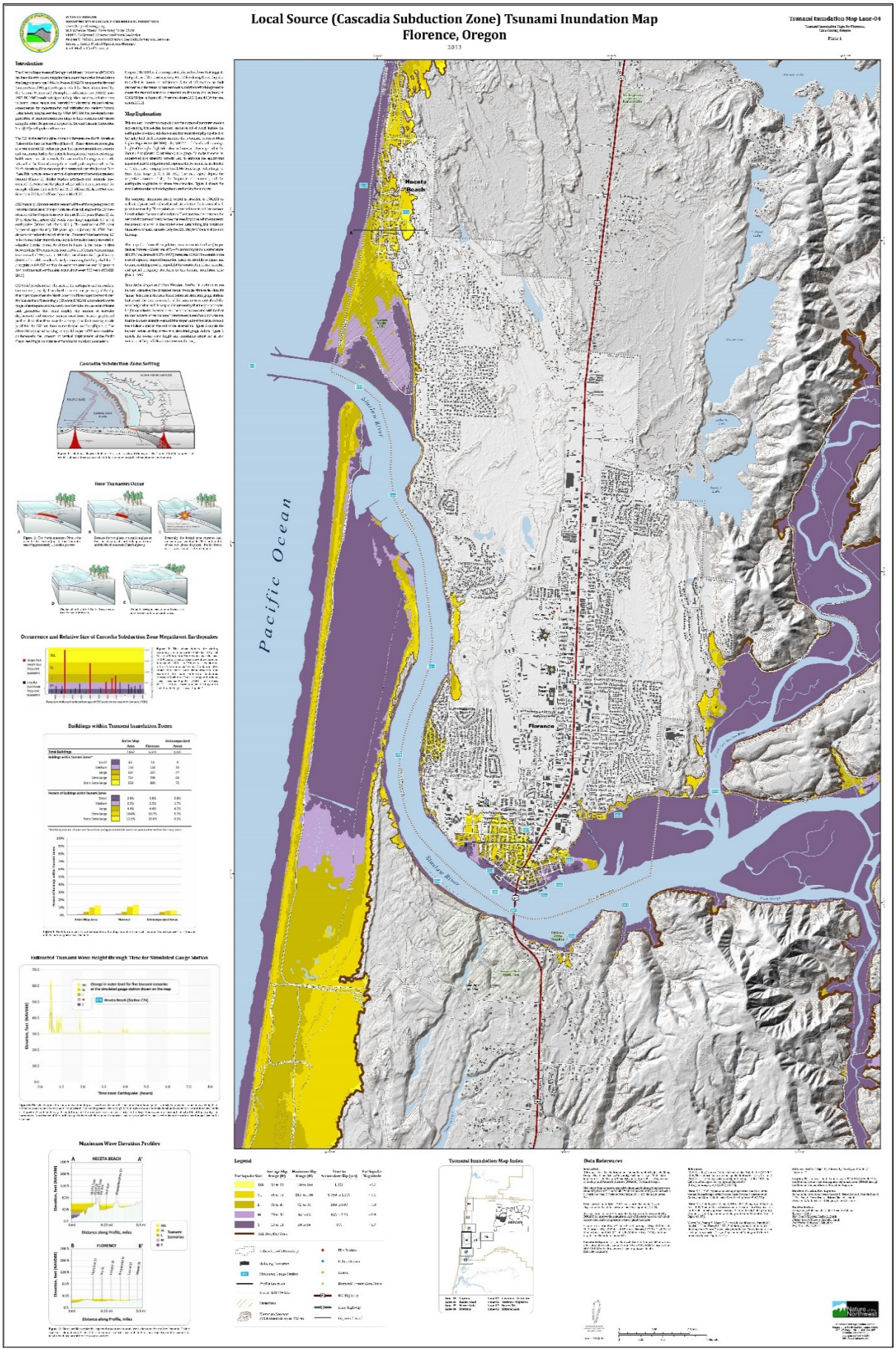
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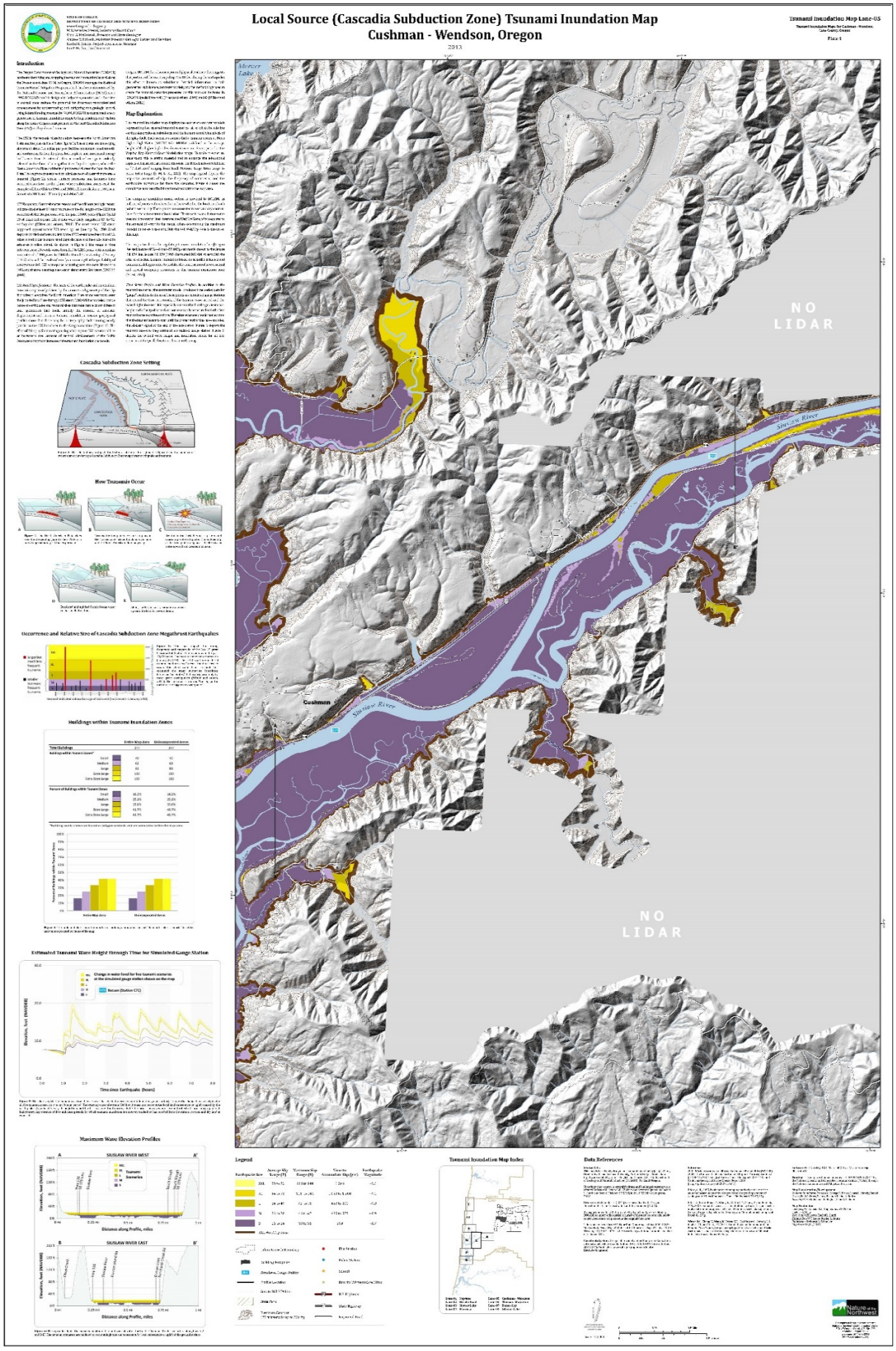
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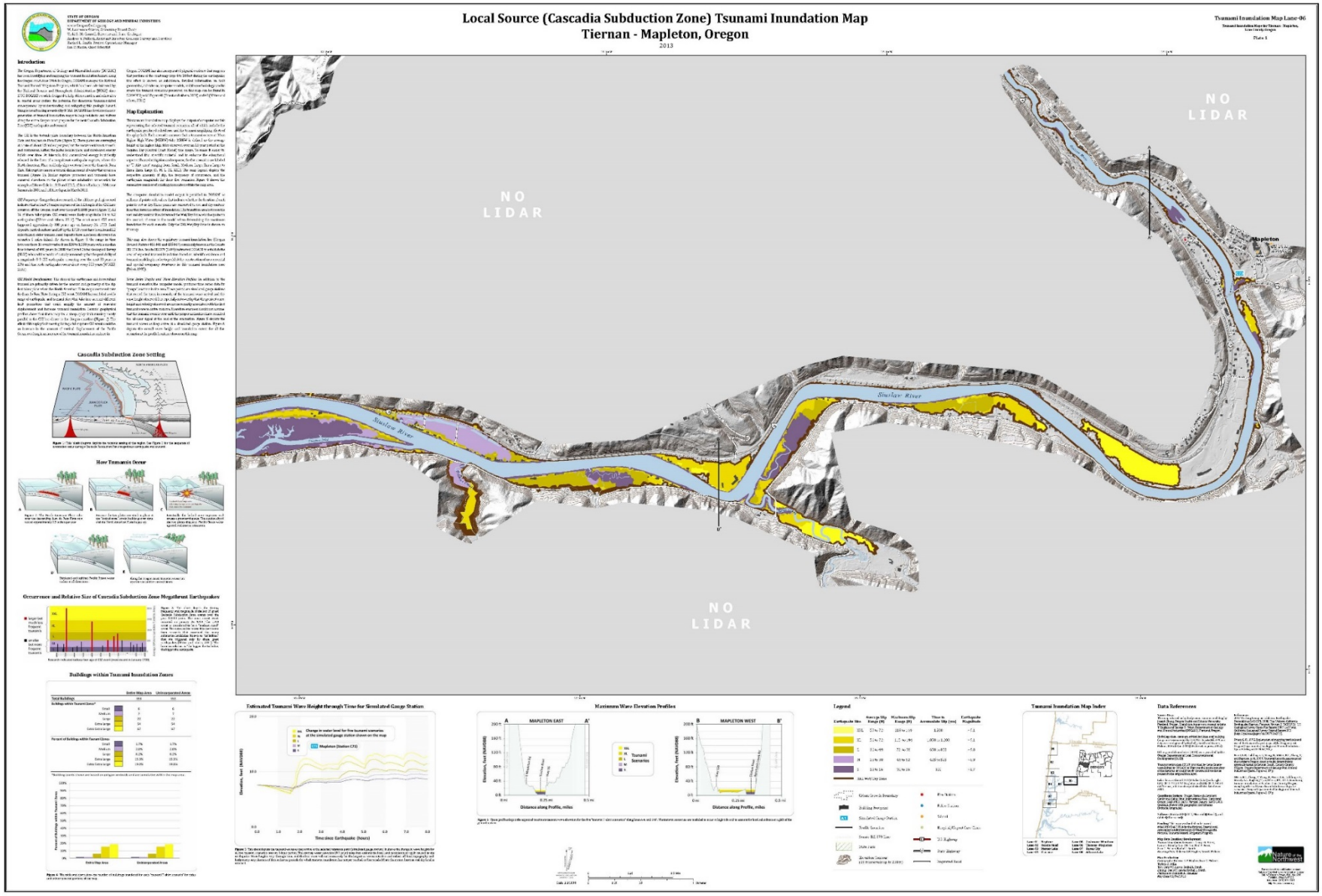
Local Source (Cascadia Subduction Zone) Tsunami Inundation Map
Tiernan - Mapleton, Oregon
2013
Tsunami Inundation Map Lane-06
NO LIDAR
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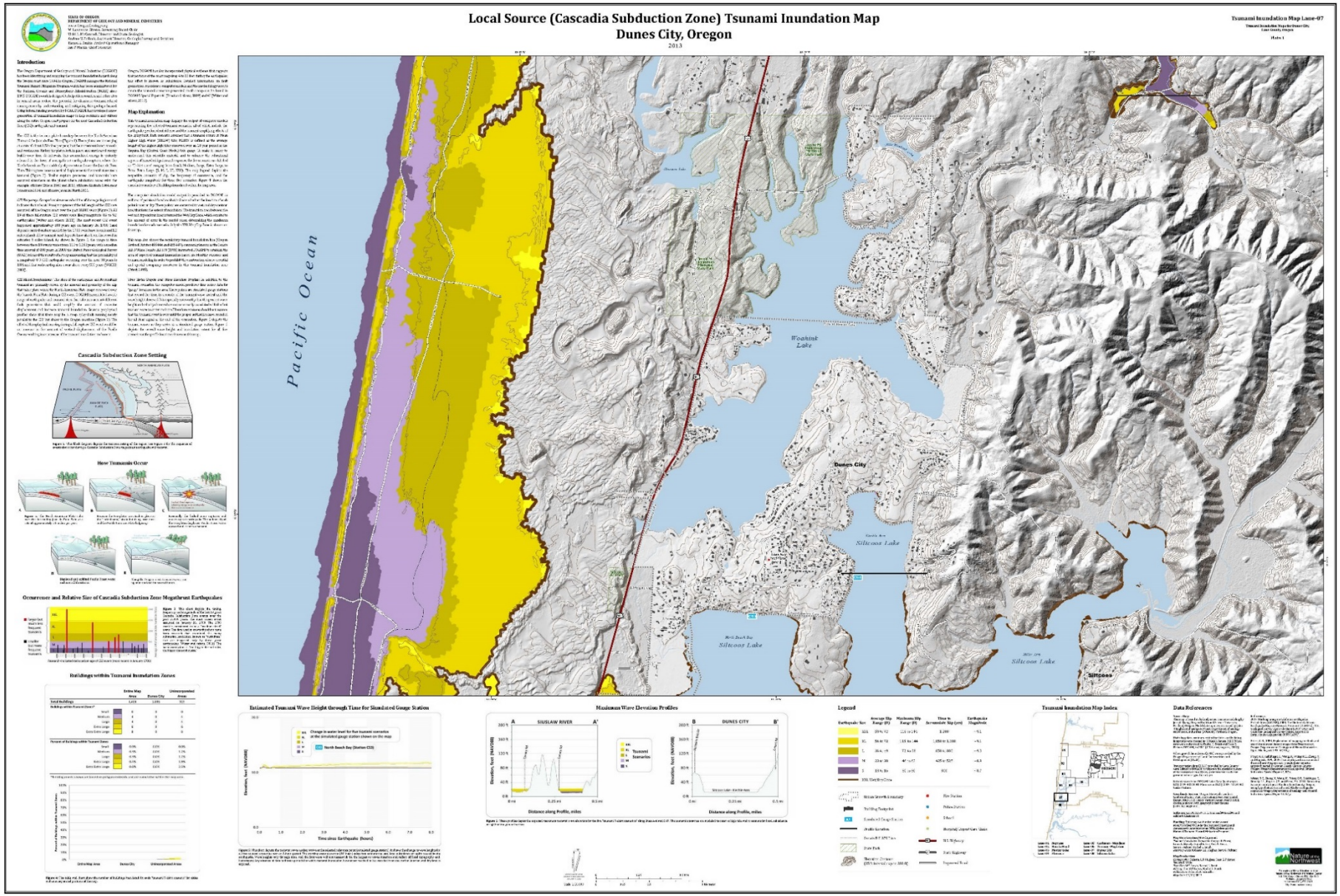
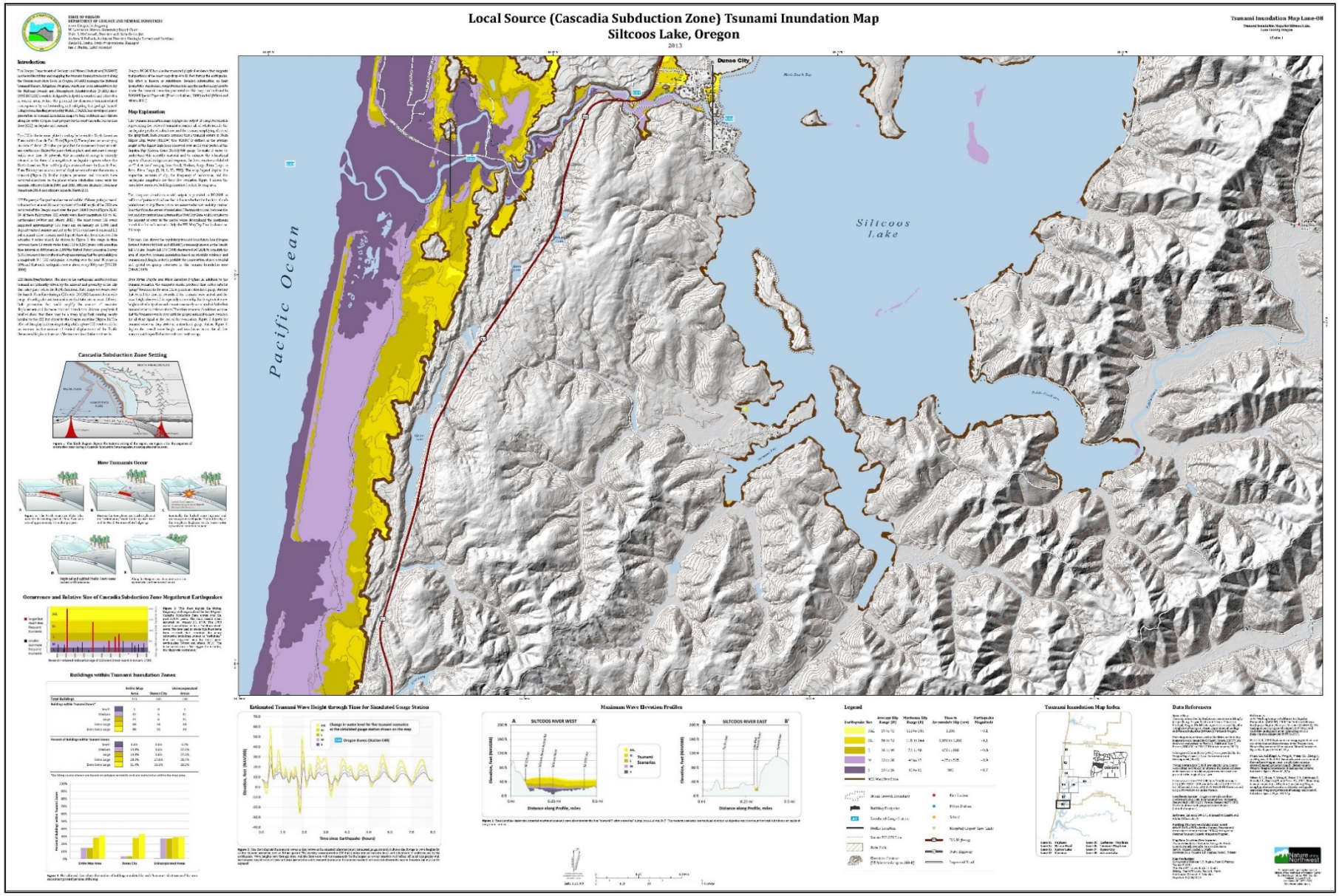
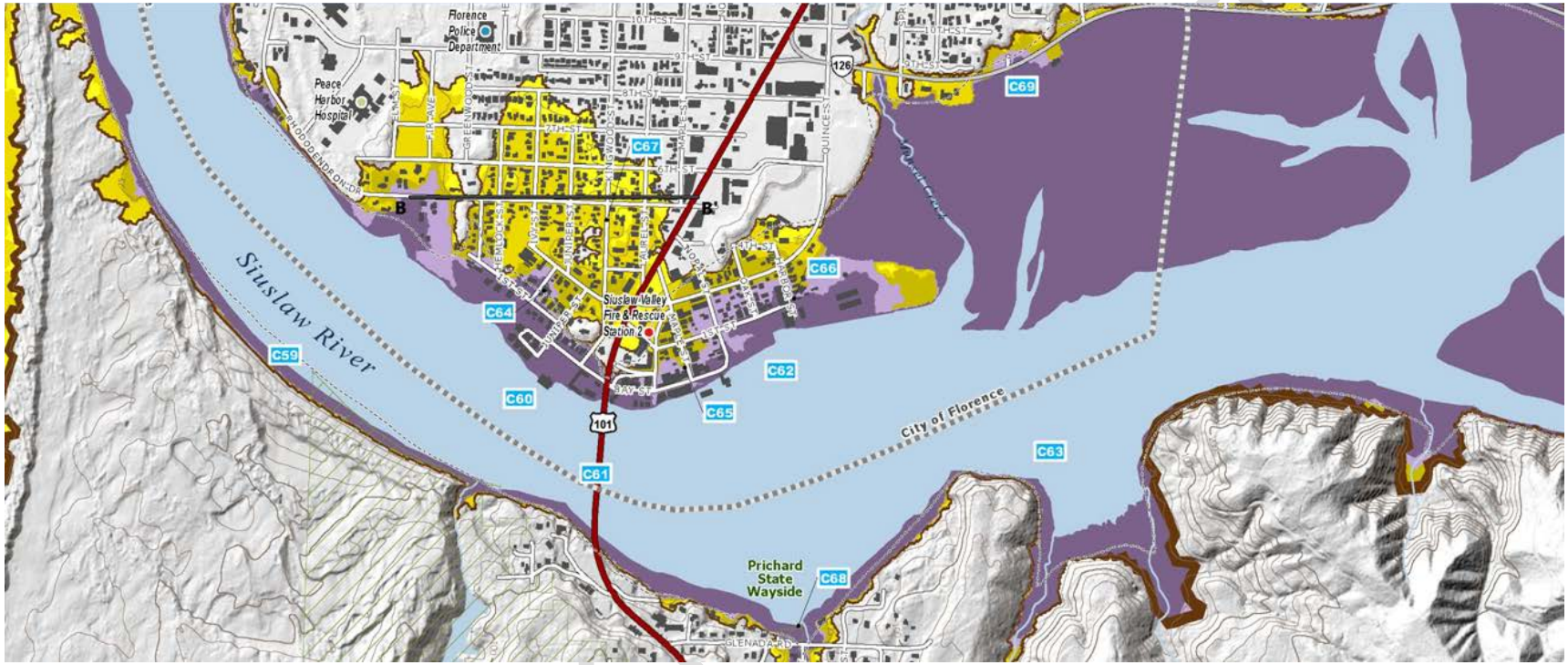
Mapleton
Siuslaw River
Siuslaw River
Introduction
Map Explanation
Cascadia Subduction Zone Setting
How Tsunamis Occur
Occurrence and Relative Size of Cascadia Subduction Zone Megathrust Earthquakes
Buildings within Tsunami Inundation Zones
Estimated Tsunami Wave Height through Time for Simulated Gauge Station
Maximum Wave Elevation Profiles
MAPLETON EAST
MAPLETON WEST
Distance along Profile, miles
Legend
Tsunami Inundation Map Index
Data References


Local Source (Cascadia Subduction Zone) Tsunami Inundation Map
Dunes City, Oregon
2013
Tsunami Inundation Map Lane-07
Introduction
Map Explanation
Pacific Ocean
Woahink Lake
Dunes City
Siltcoos Lake
Siltcoos
Cascadia Subduction Zone Setting
How Tsunamis Occur
Occurrence and Relative Size of Cascadia Subduction Zone Megathrust Earthquakes
Buildings within Tsunami Inundation Zones
Estimated Tsunami Wave Height through Time for Simulated Gauge Station
Maximum Wave Elevation Profiles
SIUSLAW RIVER
DUNES CITY
Legend
Tsunami Inundation Map Index
Data References



Potential High Impact Areas

Excerpted from DOGAMI TIM Florence Map



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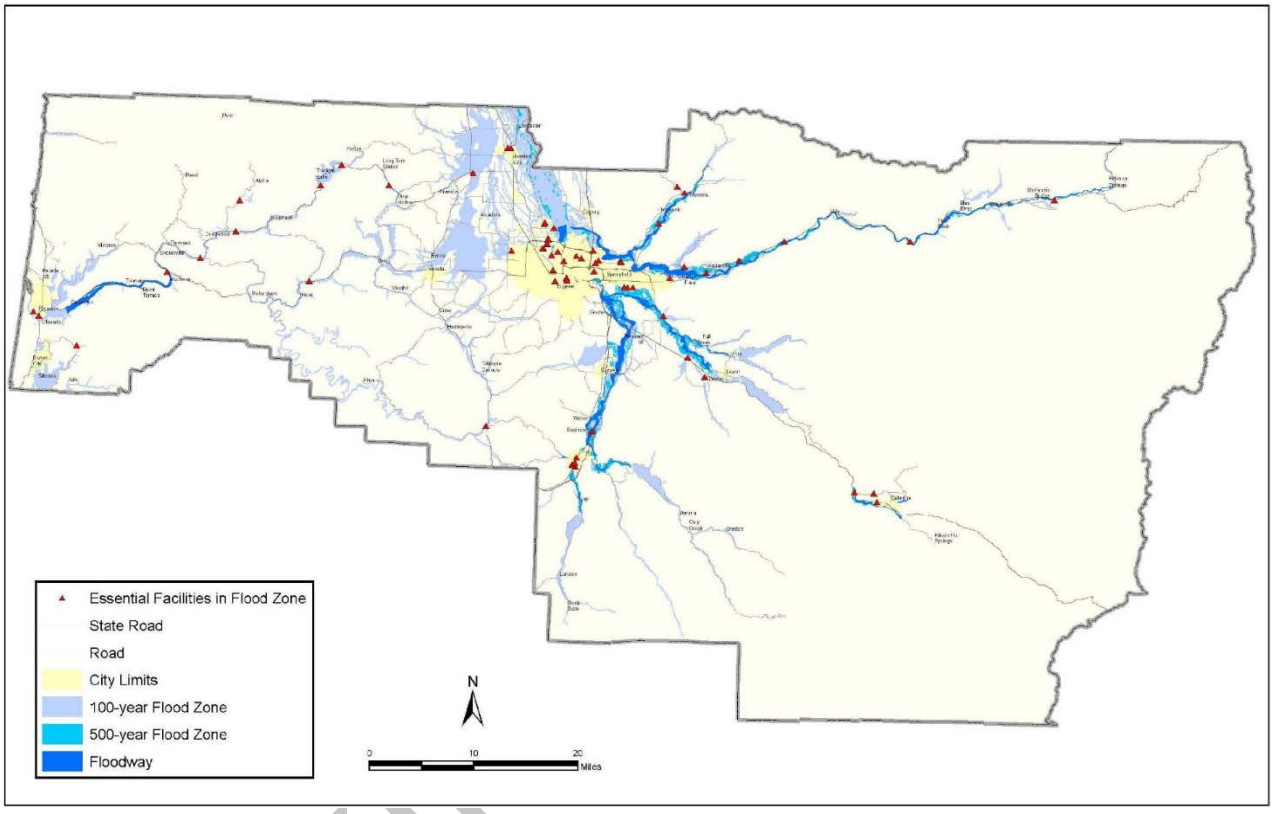
3.3.4 Facilities in Hazard Areas

It is also important to know what essential facilities are located in flood zones or the floodway. These features can be readily identified and shown on a map because we can predict where a flood is likely to occur. The map below shows schools, police and fire stations, Emergency Operations Centers and hospitals located in a flood hazard area.

Figure 3. Essential Facilities in Flood Zone



In addition to essential facilities in FEMA defined Special Flood Hazard Areas (SFHAs) shown on the previous map, the State of Oregon Natural Hazard Mitigation Plan notes there are 73 state owned facilities situated in SFHAs in Lane County, ranking second only to Marion County. Total value for these state facilities flood hazard areas is estimated at over $190 million.

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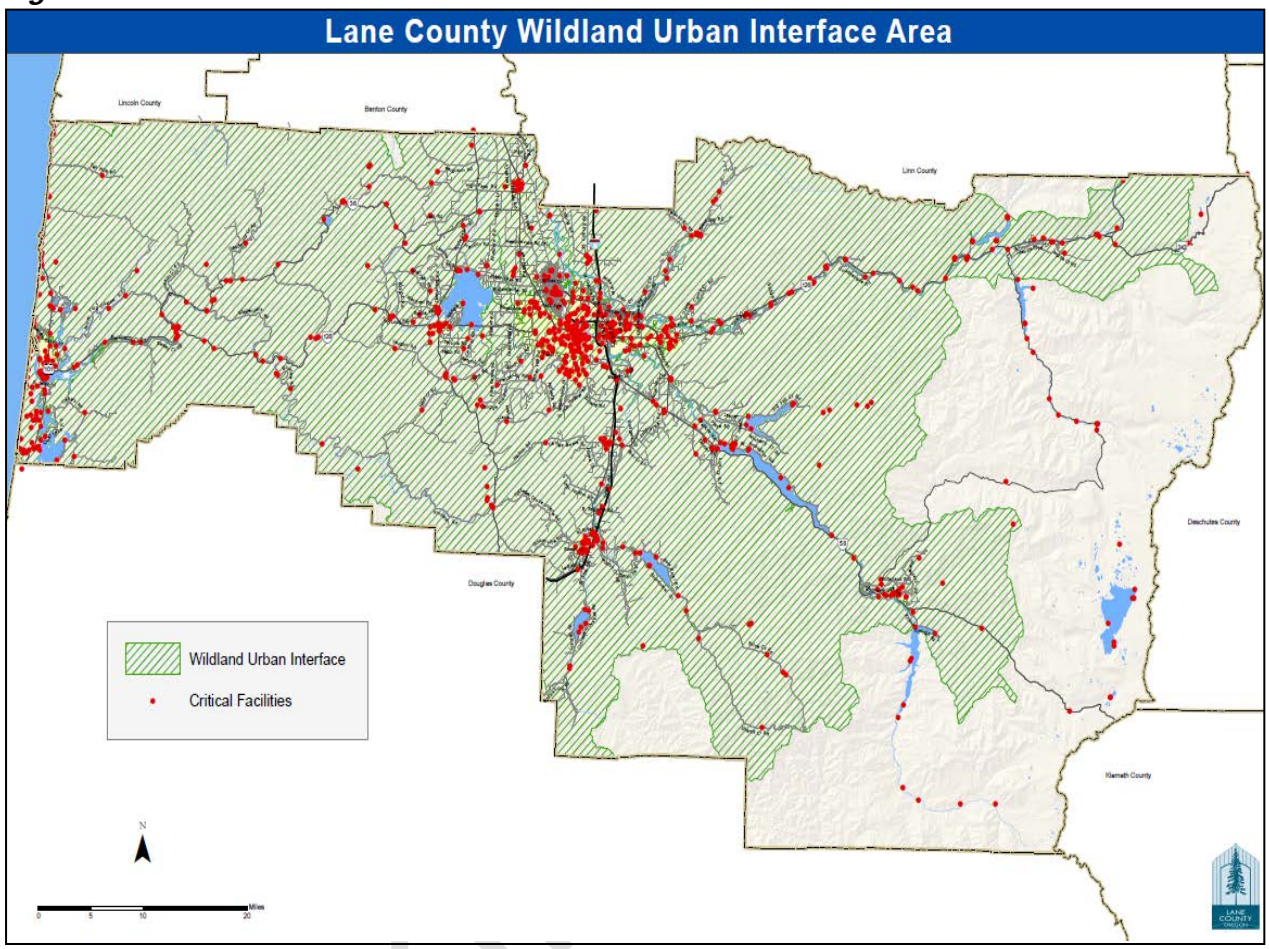
The following map shows critical facilities in the wildland-urban interface. Notable concentrations of facilities in the wildland-urban interface are south of the Eugene and Springfield metro areas, and in the surrounding areas of Cottage Grove, Westfir, and Oakridge.

Figure 7. Critical Facilities in Relation to Wildland-Urban Interface



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3.3.5 Potential Dollar Loss

The following map shows distribution of land improvement (structure) values in Lane County, with inset maps on the following pages showing greater detail for the Coast, Valley, and Cascades.. *(additional analysis under development)*

Figure 3-x Improvement Value per Parcel; Lane County

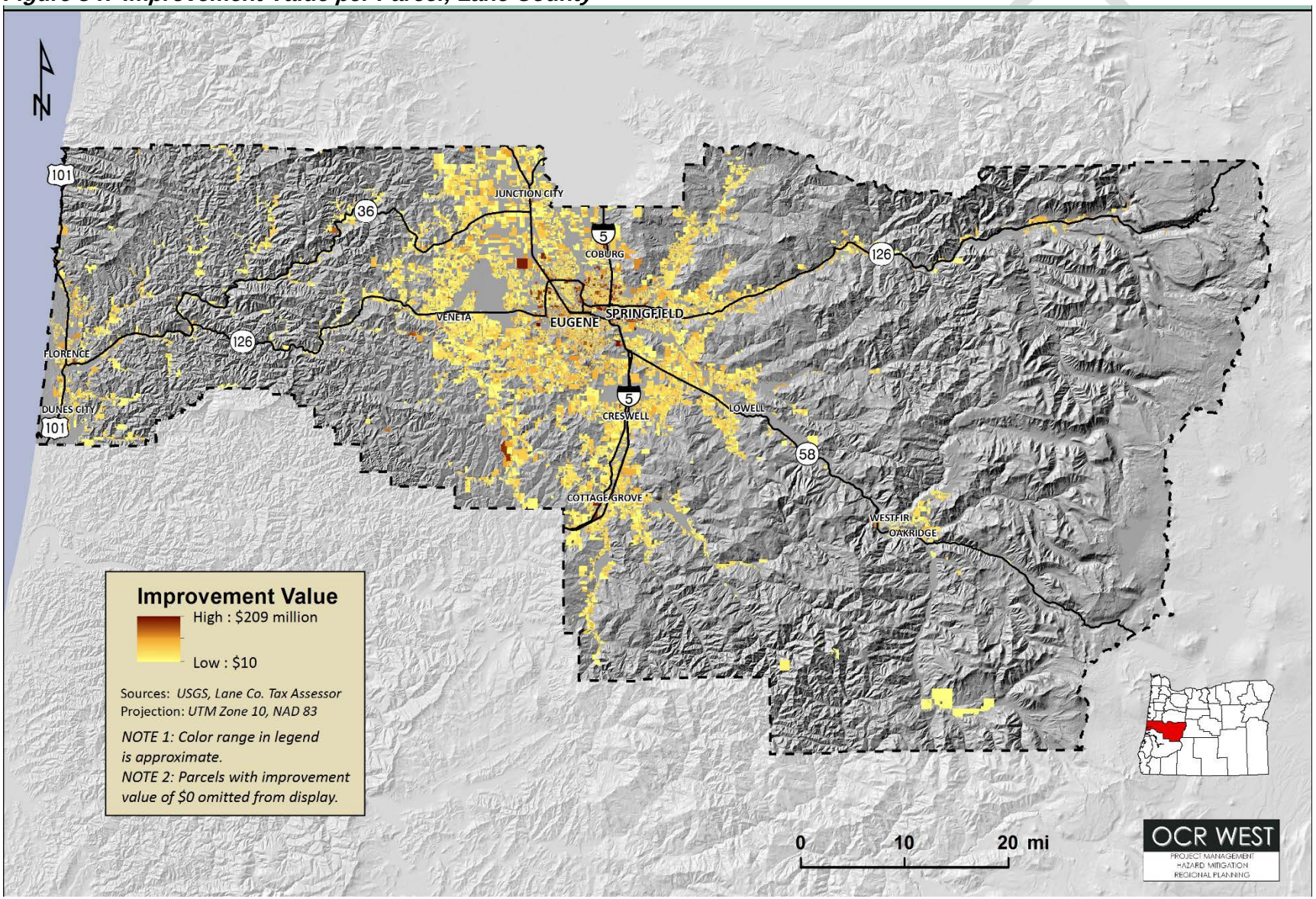


Figure 3-x Improvement Value per Parcel; Coastal Cities

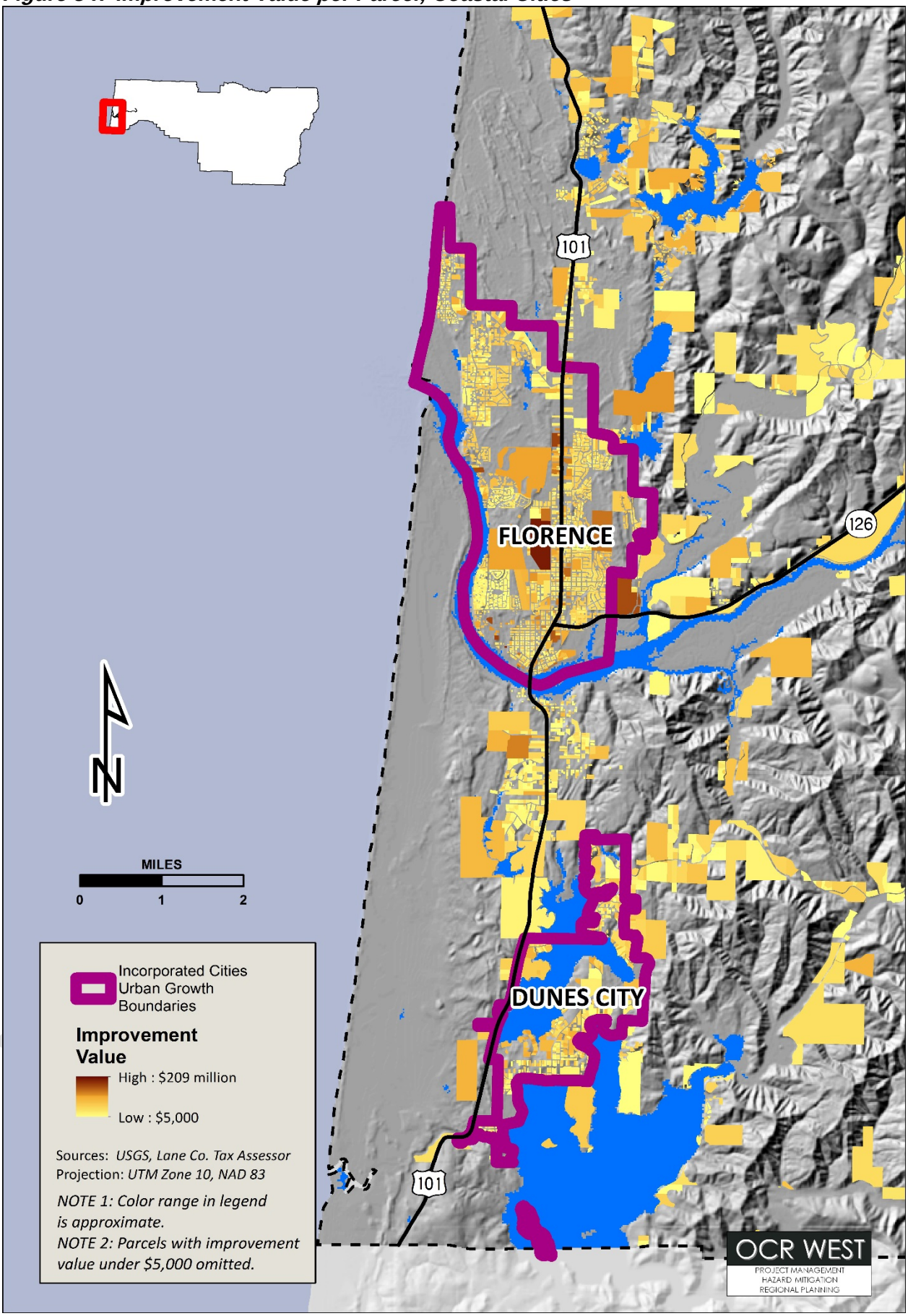


Figure 3-x Improvement Value per Parcel; Valley Cities

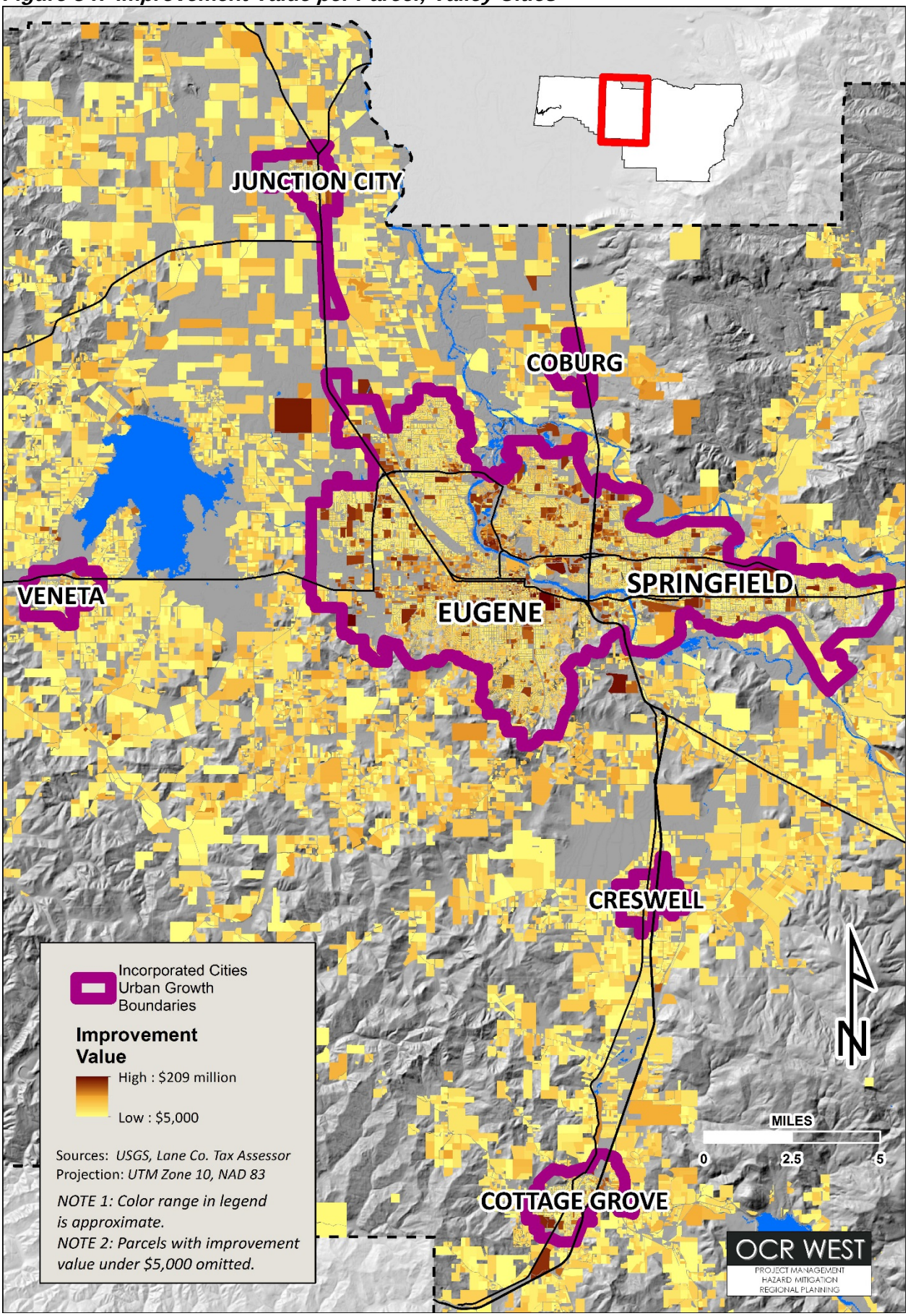
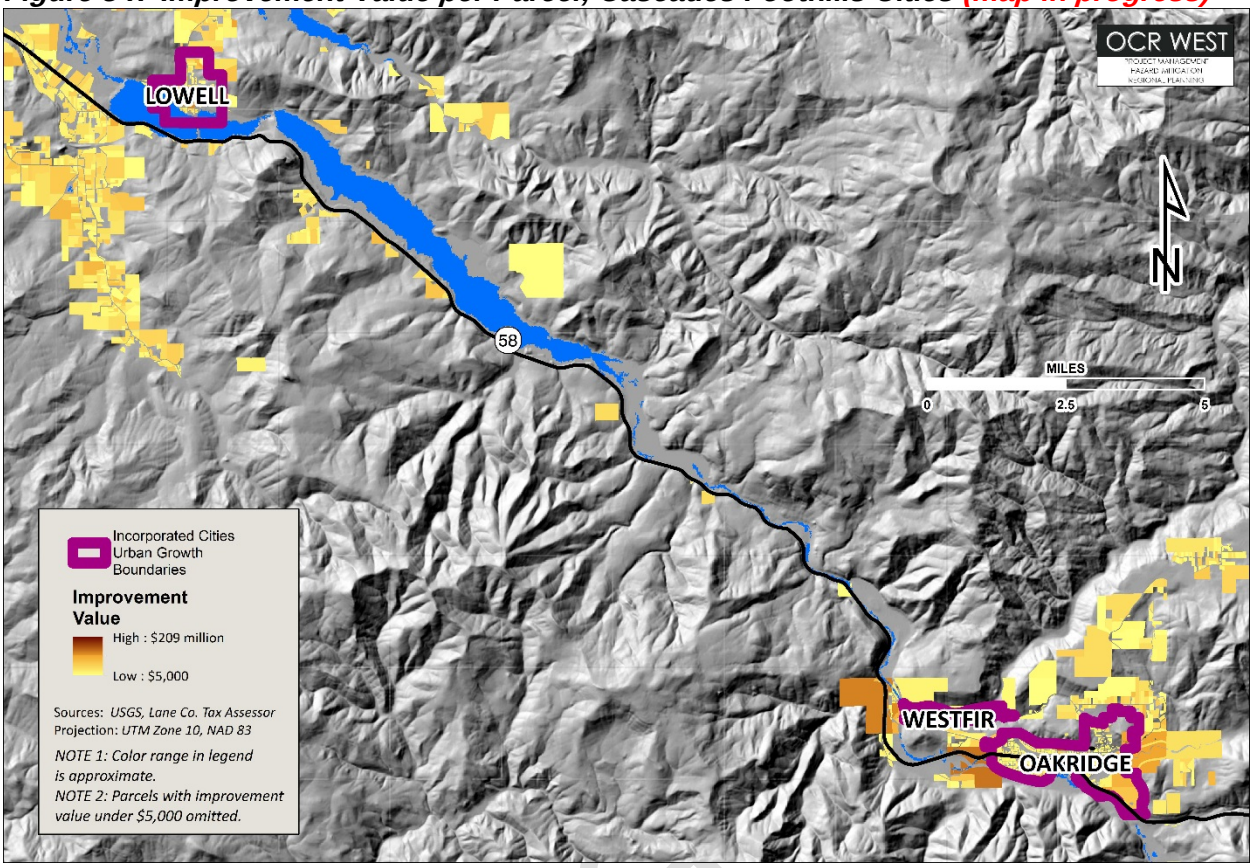


Figure 3-x Improvement Value per Parcel; Cascades Foothills Cities (map in progress)



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3.3.6 High Water Locations on County Roadways

A rather specific and serious concern relates to localized flooding and has to do with high water locations on county roadways. These are defined areas that experience some degree of flooding nearly every year. The problems arise from a combination of heavy rainfall and inadequate drainage. The impact of this type of flooding includes impeded access / egress by emergency response vehicles that need to use the roadways as well as economic disruption caused by the general public being unable to use these routes for getting to work, grocery shopping, eating out, etc.

The table below lists the ten high water locations that Lane County Public Works considers their highest priority.

Table 3-xx Top 10 High Water Locations Susceptible to Repeated Flooding

Road Number	Road Name	Beginning Mile Post	Ending Mile Post	Average Daily Traffic
3110	Love Lake Road	1.45		1,250
4335	Vaughn Road	8.35		750
1628	Coleman Road	0.09	0.37	500
6068	Edenvale Road	0.70	1.00	500
5070	North Fork Siuslaw Road	5.70		430
6122	Parvin Road	0.40		260
5036	Sweet Creek Road	4.57		200
1625	Herman Road	0.52	0.89	170
4093	Powell Road	0.139		60
4096	Simonsen Road	0.159		50

Source: Lane County

The maps of the following pages show all of the high water locations countywide that have been identified at the time of this writing. Additionally, a report discussing the results of a High Water Location Tour can be found in Appendix E.

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Figure 3-xx High Water Locations, Central Lane County

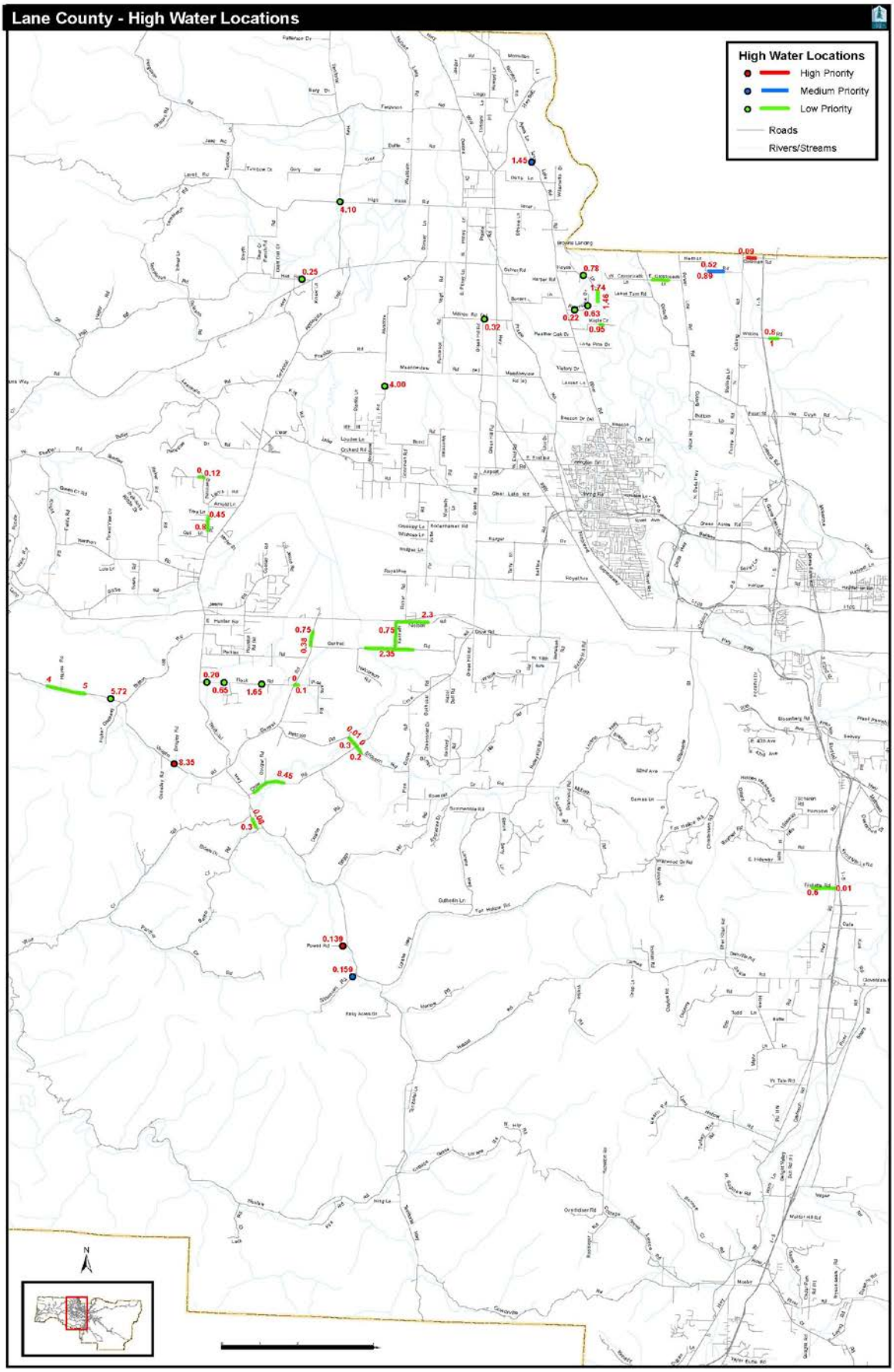


Figure 3-xx. High Water Locations, Western Lane County

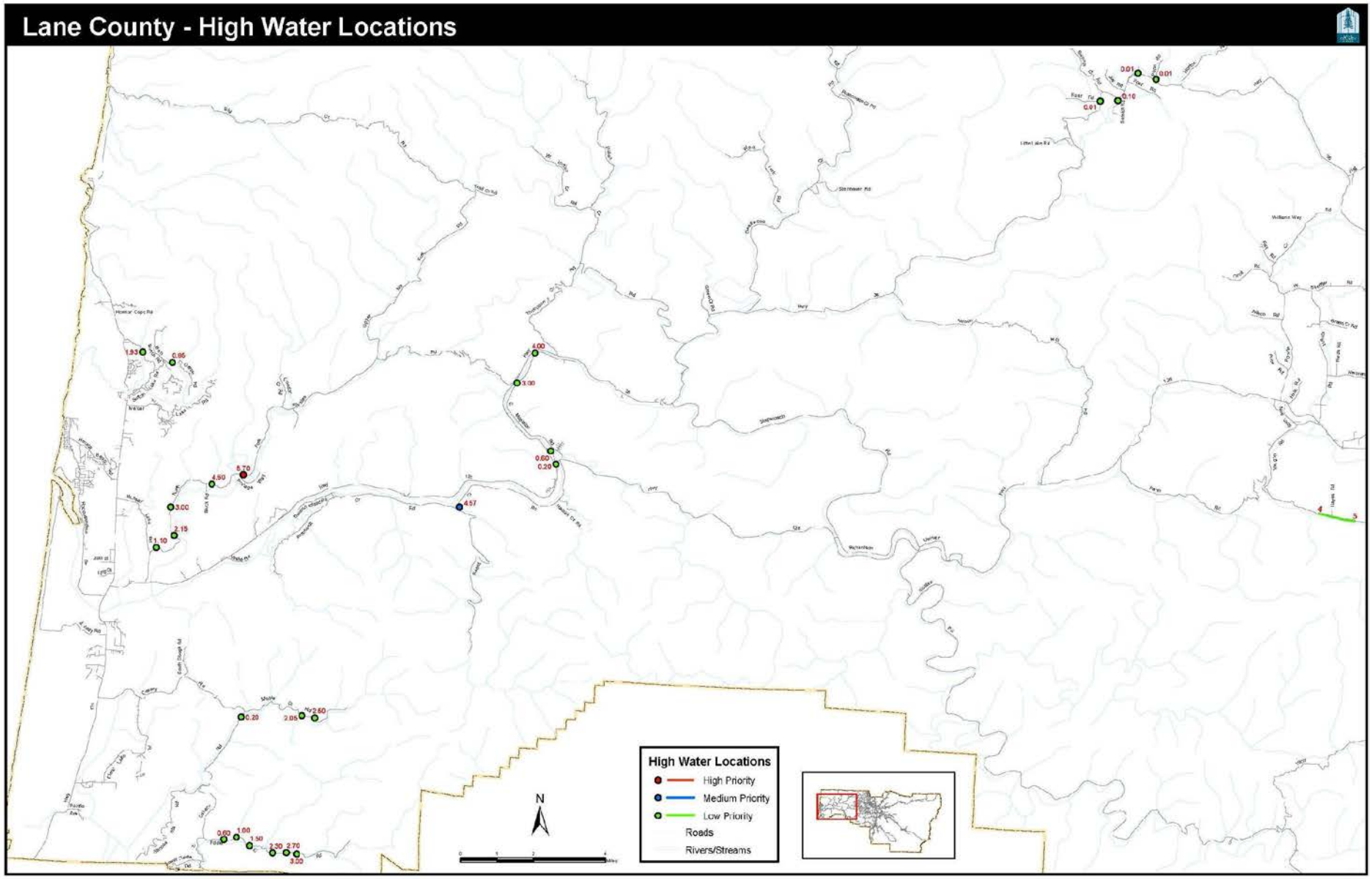
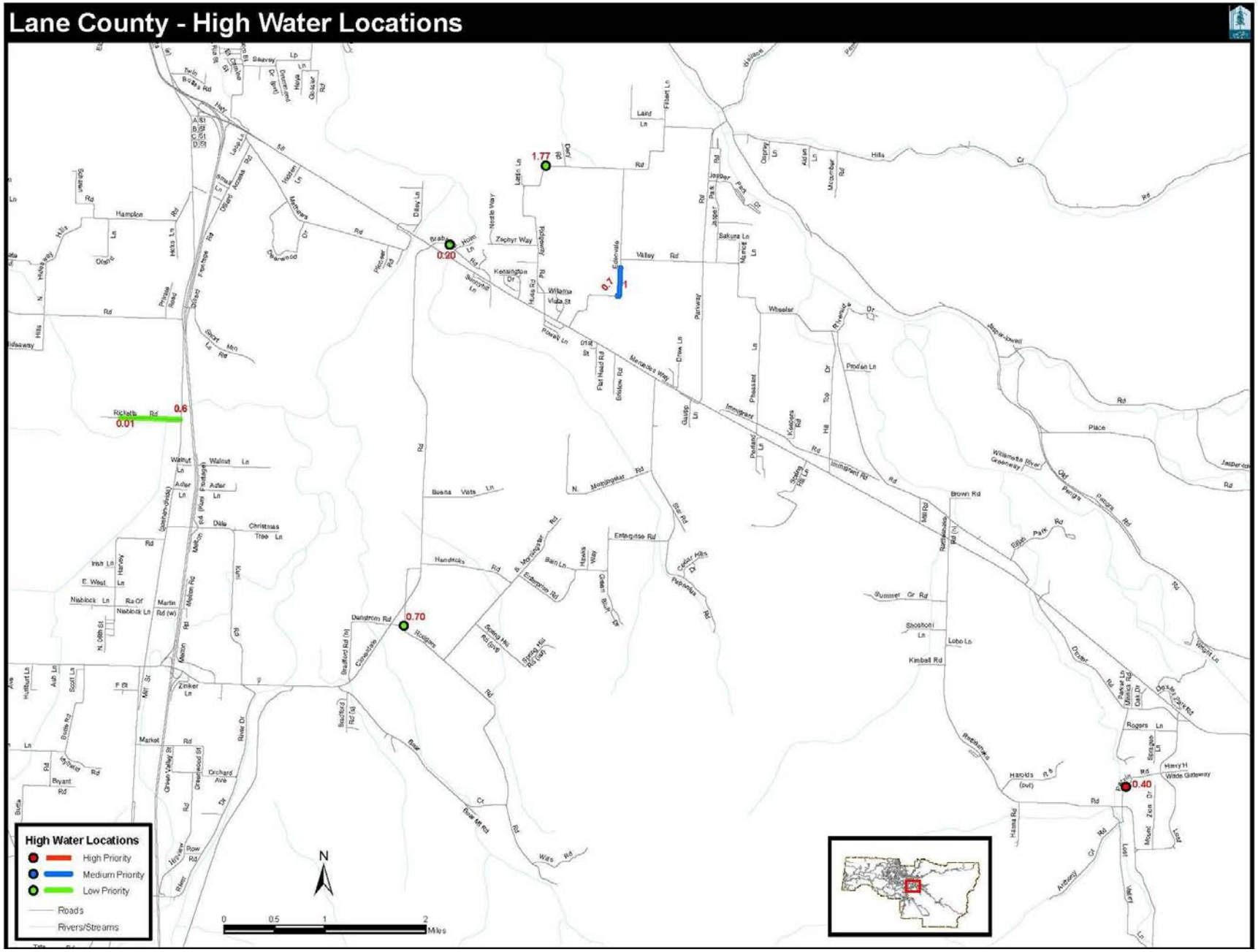


Figure 3-xx. High Water Locations, Eastern Lane County



CHAPTER 4. MITIGATION STRATEGY

44 CFR Requirement 201.6(c) (3):
The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This chapter describes Lane County's blueprint for reducing the potential losses identified in the risk assessment and is based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. The mitigation strategy creates a planning framework to reduce the impact of future hazard events. The structure of this mitigation strategy is intentionally straightforward:

- Establish goals
- Gather information, evaluate risk and vulnerability
- Identify a range of options to mitigate risk and vulnerability
- Implement best options
- Evaluate effectiveness
- Repeat

This chapter begins by defining the goals established early in the planning process, outlined in ***Section 4.1 (Local Hazard Mitigation Mission and Goals)***.

Section 4.2 (Mitigation Action Item Identification and Prioritization) describes the process through which mitigation actions were decided upon and ranked by relative priority.

Section 4.3 (Lane County Mitigation Action Items) lists mitigation activities to be pursued by the County. It consists of two subsections, Subsection 4.3.1 lists new action items identified during the current planning cycle, and Subsection 4.3.2 lists action items identified in the previous planning cycle and staged for implementation.

Section 4.4 (Coordination of Mitigation Planning Strategies) details methods and capabilities to implement mitigation goals and strategy via cooperative functions across departments and agencies.

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4.1 LOCAL HAZARD MITIGATION MISSION AND GOALS

44 CFR Requirement §201.6(c) (3) (i): *[The hazard mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

As stated in the Introduction, the Mission of this Plan is as follows:

Figure 4-1 Lane County Hazard Mitigation Action Plan: Mission Statement

To promote and implement actions to eliminate or reduce long-term risk to human life and property from the effects of hazards of all types and sources, and to enhance capability to prepare, respond, and recover from such incidents.

The Hazard Mitigation Steering Committee periodically reviews the goals for this plan to consider additions or changes. The current iteration of the goals for this plan are as follows:

Figure 4-2 Goals of the Lane County Hazard Mitigation Action Plan

Goal 1: Prevent loss of life and reduce injuries and illness.

Goal 2: Minimize and prevent damage to buildings and infrastructure.

Goal 3: Reduce recovery period and minimize economic losses for the community.

Goal 4: Maintain and improve ability of Lane County, municipal governments, and critical service providers to quickly resume operations.

Goal 5: Protect natural, historic, and cultural resources.

Goal 6: Increase awareness of hazards and understanding of mitigation methods.

Goal 7: Improve attractiveness to individuals and businesses by demonstrating effectiveness in dealing with a disaster.

Lane County's mitigation goals are in similar alignment with the goals of the State of Oregon Hazard Mitigation Plan (2012), listed below in Figure 4-2.

Figure 4-2 Goals from the State of Oregon Natural Hazard Mitigation Plan (2012)

Goal 1: Protect life and reduce injuries resulting from natural hazards.

Goal 2: Minimize public and private property damages and the disruption of essential infrastructure and services from natural hazards.

Goal 3: Increase the resilience of local, regional, and statewide economies.

Goal 4: Minimize the impact of natural hazards while protecting and restoring the environment.

Goal 5: Enhance and maintain state capability to implement a comprehensive statewide hazard loss reduction strategy.

Goal 6: Document and evaluate Oregon's progress in achieving hazard mitigation.

Goal 7: Motivate the public, private sector, and government agencies to mitigate against the effects of natural hazards through information and education.

Goal 8: Eliminate development within mapped hazardous areas where the risks to people and property cannot be mitigated.

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4.2 ACTION ITEM IDENTIFICATION AND PRIORITIZATION

44 CFR Requirement §201.6(c) (3) (ii)
The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Pursuant to the above stated goals, the Lane County Hazard Mitigation Steering Committee (HMSC) developed at least two (2) mitigation action items (measurable activities targeted at mitigating disaster events) which address each hazard type. Certain mitigation action items address more than one hazard type. Mitigation action items, implementation strategies, and methods for identification and prioritization are described in the following sections.

4.2.1 Action Item Prioritization – Vetting Process

There were several factors considered in determining the action items for the next five years. This Plan update is being written during a time that the United States is experiencing unprecedented economic hardship. Consequently, what could not be ignored is the ubiquitous problem of shrinking budgets and thinning resources. Therefore, to keep the plan meaningful, potential action items were prioritized and only those meeting the following criteria were included in the Plan:

- Does the purpose of the Action Item (AI) align with the core mission of Lane County government?
- Is there motivation to carry out the AI?
- Do we know what to do to carry out the AI?
- Does the AI address some of our most pressing challenges?
- Is implementing the AI feasible in terms of cost and resources?
- Are there tangible benefits?

4.2.2 Action Item Prioritization – Criteria and Formula

Following the initial vetting process for action item consideration, the Hazard Mitigation Steering Committee used a somewhat formulaic approach which emphasized the cost effectiveness, social effects, technical feasibility, administrative considerations, political or legal considerations, economic impacts, and environmental soundness. These criteria, organized under the STAPLE-E acronym, are listed below, followed by the method for benefit-cost review:

STAPLE E Criteria

- **S**ocial Effects
- **T**echnical Feasibility
- **A**dministrative Barriers/Considerations
- **P**olitical Considerations
- **L**egal Ramifications
- **E**conomic Impacts
- **E**nvironmental Soundness

Cost-Effectiveness/Benefit-Cost Ratio Criteria

An overall evaluation of an action item's expected benefits versus costs was also considered during action item identification and prioritization. Items with estimated benefits that outweighed expected costs (>1:1 BCR) were generally given favorable consideration over those action items with negative benefit-cost ratios (<1:1 BCR).

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Prioritization Formula

The list of hazard mitigation action item ideas established in the vetting process were evaluated based on STAPLE-E criteria, benefit-cost review, and other quantitative and qualitative factors. Participants evaluated each action item and assigned a numeric equivalent according to the following formula:

- Meets at least five STAPLE-E criteria and ≥1:1 BCR **- Numeric Equivalent 4**
- Meets three or four STAPLE-E criteria and ≥1:1 BCR **- Numeric Equivalent 2**
- Meets at least one STAPLE-E criteria and = 1:1 BCR **- Numeric Equivalent 1**

Numeric equivalent results for each action item were aggregated and ultimately used as a basis for mitigation project prioritization discussions. Order of mitigation action item listed in the section that follows (Section 4.3 Countywide Action Items) can be used to imply general priority of the action items. However, all projects listed have been vetted by the HMSC and are all considered valuable methods for reducing future disaster impacts in the planning area.

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4.3 LANE COUNTY MITIGATION ACTION ITEMS

4.3.1 New Mitigation Actions

The following section is a listing of mitigation activities proposed and adopted during the 2012-2017 planning cycle. Each of these item cross-reference with Appendix B (Interim Plan Amendments).

New Mitigation Action Item 1. Update/Develop Multi-Jurisdiction Hazard Mitigation Action Plan

Develop/Update Multi-Jurisdiction Hazard Mitigation Action Plan for Lane County and incorporated cities not currently covered by a FEMA sanctioned hazard mitigation plan.

Resulting planning process and multi-jurisdiction mitigation action plan document will:

- Develop new hazard mitigation plan for incorporated cities of Coburg, Creswell, Junction City, Lowell, Oakridge, Veneta, Westfir
- Update mitigation plan for Dunes City, Florence, Lane County
- Meet all Federal and State standards and requirements including Stafford Act and Disaster Mitigation Act of 2000, as amended, et al.
- Include extensive documentation of planning process
- Involve extensive public involvement and broad range of stakeholders
- Evaluate and mitigate all potential hazards including hazards not previously profiled, such as dam failure, hazardous materials incident, pandemic, and volcano
- Develop focused, detailed risk assessment and vulnerability analysis for each jurisdiction
- Establish defined goals and prioritized mitigation action items for each jurisdiction
- Outline physical mitigation projects, as well as regulatory processes and policy for each jurisdiction that support hazard mitigation goals
- Establish measures to prevent, protect and mitigate damage to both existing buildings and new and future buildings and facilities
- Promote education, proactive mitigation, and readiness measures by the general public
- Include provisions to mitigate repetitive loss properties and maintain NFIP compliance
- Include a process for plan integration with: departmental functions, operations of governance and regulatory processes, and existing and future plans
- Establish clearly defined schedule and implementation procedures for the 5-year cycle
- Be formally adopted by governing boards/councils of each jurisdiction

Responsible Agencies	Lane County, Cities of Coburg, Creswell, Dunes City, Florence, Junction City, Lowell, Oakridge, Veneta, Westfir.
Timeline	12 months
Cost	$88,900
Funding Source	HMGP DR-4169
Purpose	Creates a cohesive hazard mitigation action plan (HMAP) for all jurisdictions not currently covered by an HMAP. Updates HMAP for Lane County within 5-year cycle. Establishes new and updated risk assessment to relate latest hazard type and frequency analysis. Promotes mitigation activities and reduces repetitive losses. Reduces reliance on emergency response and encourages proactive planning on multiple levels.

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New Mitigation Action Item 2. Storm Harden/Retrofit and Relocate Backup Power Generation Site and Data Center for Lane County Administration Building

Relocate and protect central data server location and backup power generation for administration building at 125 E. 8th Avenue, Eugene. Current backup power generator and transfer switch is in basement of building and vulnerable to exterior and interior flooding sources and seismic hazards. This specific mitigation action item corresponds with Action Item 11 (Back-up Power for Critical Facilities, general). Project to be conducted in two phases: Phase 1: risk assessment/feasibility study, benefit-cost analysis, NEPA coordination and permitting; Phase 2: construction and implementation.

Responsible Agencies	Lane County, OEM, FEMA
Timeline	12 months (Phase 1), 24 months (Phase 2)
Cost	$150,000 (Phase 1 Feasibility), Phase 2 (Construction)
Funding Source	HMGP, OSRP
Purpose	Mitigates and prevents damage/disruption to critical facilities, emergency operations, administration, and continuity of operations.

New Mitigation Action Item 3. Develop and equip centralized call center, dispatch, and real-time web-based mapping interface specific to field operations with all 6 utilities in Lane County.

Functional details: Radio, cell phone, video, and internet communication capability. Operators on standby for field reports, 2-way info sharing. Video cameras on utility and first responder vehicles with wireless feed to EOC. Mapping goal: Real-time overview of regional situation. Ability to edit and upload web-based map in real-time showing: 1) road blockage, 2) power and/or communications outages, 3) repair priority, 4) dangerous conditions, 5) work crew status. Potential to extend to outward facing map interface, public access to report information.

Responsible Agencies	Lane County, OEM, FEMA, Local and regional utilities
Timeline	24 months
Cost	$35,000
Funding Source	EMPG, HMGP
Purpose	Mitigates damage/disruption to critical facilities, improves public and first responder safety. Addresses problem of geographic disconnect between county departments, EOC, and utilities during emergency situation. Improves coordination during emergencies between: A) county departments, B) cities and other agencies and departments, and B) utilities.

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New Mitigation Action Item 4. Identify areas that are subject to frequent power outages and develop appropriate solutions in cooperation with local utility providers to reduce the likelihood of a power and communications outage.

Activities include but are not limited to the following:

1) Assist and coordinate upgrading electrical power lines and communication lines, including conduit and support infrastructure.

2) Assist installation of equipment and techniques that improve secure wind/ice loading capacity.

3) Assist and coordinate routing critical power and communication lines underground.

4) Assist and coordinate adding interconnect switches to allow alternative feed paths, and disconnect switches to minimize outage areas.

Responsible Agencies	Lane County, local and regional utilities, OEM, FEMA, BPA
Timeline	24 months
Cost	$650,000 – $900,000
Funding Source	EMPG, HMGP
Purpose	High winds and ice during winter storms can topple trees and break limbs which in turn can result in power outages and disrupt telephone, computer, and TV and radio service. Ice from winter storms can accumulate on power lines, causing lines and poles to break. The DMA 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Improving power infrastructure by upgrading lines and poles to improve wind/ice loading, undergrounding critical lines, adding interconnect switches to allow alternative feed paths, and disconnecting switches to minimize outage areas will all help to improve electrical service to Lane County and protect critical infrastructure from winter storms, high winds, and other hazards.

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4.3.2 Existing Mitigation Actions

The following list of mitigation action items were identified and prioritized in the 2006-2012 planning cycle and published in Lane County HMAP Version 2.0. They are included here for implementation tracking purposes.

Mitigation Action Item 1. Establish Mitigation Coordinating Committee

Establish Mitigation Coordinating Committee to act as a forum for hazard mitigation issues, disseminate hazard mitigation ideas and activities to all participants, monitor implementation of the Action Items and report on progress and recommended changes to the Plan as appropriate; includes identifying opportunities to incorporate mitigation actions into other planning mechanisms, such as comprehensive or capital improvements, as appropriate.

Responsible Agencies	Lane County Emergency Management
Timeline	Ongoing, continuous
Cost	$10,000 – 20,000/year
Funding Source	various
Purpose	Demonstrates a deliberative approach to planning and implementation that involves the necessary stakeholders and subject matter experts to carry out action items and incorporate them into other planning mechanisms for broader reach throughout the community.

Mitigation Action Item 2. Public Education and Outreach

Conduct public outreach activities related to hazard mitigation and personal preparedness using a variety of media sponsored by various agencies, such as: community newsletters and direct mailings; news releases and public service announcements; presentations at meetings of neighborhood, civic or business groups; displays in public buildings or shopping malls; coordinated announcements on agency web pages.

Responsible Agencies	Lane County Emergency Management, various county departments, municipalities and special districts.
Timeline	Ongoing, continuous
Cost	$5,000/year
Funding Source	HMGP, PDM, USACE RIP, et al.
Purpose	Increases individual preparedness, decreases demands for emergency public safety measures. General mitigation for community assets.

Mitigation Action Item 3. Utilize HAZUS-MH Software

Develop in-house competency with FEMA's Risk/Vulnerability software (HAZUS-MH) so that additional loss-estimation data can be provided regarding reducing the effects of hazards on existing buildings and infrastructure.

- *Responsible Agency*: Lane County Public Works, GIS Division
- *Timeline*: June 2012 and continuing
- *Cost*: Staff time and costs associated with attending training at FEMA's Emergency Management Institute.
- *Benefits*: Informs decision makers and others interested in hazard mitigation about hazard risks and potential risk reduction measures.

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Mitigation Action Item 4. Hazard Mapping

Develop a list of hazard types to be mapped; identify, locate and obtain the necessary data and create hazardous area maps. Plot critical facilities and infrastructure on the hazardous area maps to show their location within the hazard areas.

- *Responsible Agency*: Lane County Emergency Management in partnership with Public Works, GIS Division
- *Timeline*: June 2013
- *Cost*: Staff time
- *Benefits*: Informs decision makers and others interested in hazard mitigation about hazard risks and potential risk reduction measures. Can serve as a foundation for Comprehensive Plan hazard inventories

Mitigation Action Item 5. Vulnerable Populations Database / Registry

Expand existing special needs population data to include detailed inventory of all at-risk communities (elderly, homeless, disabled, etc.) that are without access to transportation and communication and determine mechanisms for alert/ warning and evacuation.

- *Responsible Agency:* Lane County Public Health in partnership with the Vulnerable Populations Emergency Preparedness Coalition
- Timeline: Continuous
- *Cost:* Staff time
- *Benefits:* Potentially mitigates the impact of natural hazards on the community's most vulnerable populations.

Mitigation Action Item 6. Refine and Update Land Use Regulations

Review and develop recommendations to the Lane County Board of Commissioners for additions and enhancements to the Lane County Rural Comprehensive Plan (RCP) Goal 7, Natural Hazards Inventory and implementing land use regulations in Lane Code for the following known risks:

A. channel migration areas
B. dam failure inundation areas
C. expanded wildland-urban interface areas*
D. landslide / unstable slopes
E. special flood hazard areas (as updated studies and maps are produced)*
F. tsunami inundation areas
G. updated dune migration areas*
H. volcanic debris flow paths

**Adopted inventories and/or land use regulations currently exist for these hazards but may require periodic updates and refinements*

- *Responsible Agency*: Lane County Land Management Division
- *Timeline*: Continuous
- *Cost*: Staff time
- *Benefits:* By incorporating mitigation provisions into other plans and regulations, more offices will be implementing mitigation activities, hazardous areas will be avoided and new developments will be better protected.

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Mitigation Action Item 7. Examine Tsunami Warning Response Protocols

Implement recommendations listed in OEM's After Action Report dated August 2005 pertaining to the West Coast Tsunami Warning that was issued on June 14, 2005.

- *Responsible Agency*: Lane County Emergency Management in partnership with the West Lane Emergency Operations Group.
- *Timeline*: December 2012
- *Cost*: Staff time
- *Benefits:* Enhanced mitigation and response to tsunami warnings.

Mitigation Action Item 8. Upgrade Culverts and Storm Water Drainage Systems

For locations with repetitive flooding, flood damage, or road closures, determine and implement mitigation measures such as upsizing culverts or storm water drainage ditches.

- *Responsible Agency*: Lane County Public Works, Road Maintenance Division
- *Timeline*: Continuous
- *Cost*: $ 75,000 - $ 200,000
- *Benefits:* Reduced localized flooding, property damages and road closures.

Mitigation Action Item 9. Backup Power for Critical Facilities

Identify which critical facilities in Lane County need backup power and emergency operations plans to deal with power outages.

- *Responsible Agency*: Lane County Emergency Management
- *Timeline*: Continuous
- *Cost*: $25,000 - $150,000
- *Benefits:* Continuity of operations for government facilities that would otherwise experience service interruptions.

Mitigation Action Item 10. Planning for Terrorist Incidents

Enhance emergency planning, emergency response training and equipment to address potential terrorist incidents.

- *Responsible Agency*: Lane County Sheriff's Office
- *Timeline*: Continuous
- *Cost*: Staff time
- *Benefits:* Improved capability to protect the public and environment from terrorist threats.

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Mitigation Action Item 11. Cost-Benefit Review of Mitigation Action Items

During the next five year cycle of Plan implementation and review, more conduct periodic review of prioritization and conduct cost-benefit analysis to ensure we are adapting to changing priorities and economic crisis while at the same time capitalizing on the most beneficial projects for mitigating hazards and reducing risk.

- *Responsible Agency*: Lane County Emergency Management
- *Timeline*: Continuous
- *Cost*: Staff time
- *Benefits*: Assists prioritization of mitigation activities

Mitigation Action Item 12. Planning for Pandemic Illness and Other Health Hazards

Enhance emergency planning, emergency response training and equipment to address pandemic illness and other health hazards.

- *Responsible Agency*: Lane County Public Health
- *Timeline*: Continuous
- *Cost*: Staff time
- *Benefits:* Improved capability to protect the public from health hazards

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A minimum of two action items were developed for each profiled hazard. Table 4-1 below shows the type of hazards each action item addresses.

Table 4-1 Matrix of Action Items by Hazards Addressed (under development)

Action Item Number	Dam Failure	Drought	Earth-quake	Flood	Haz Mat Incident	Land-slide	Pan-demic	Tsunami	Volcano	Wildfire	Wind Storm	Winter Storm
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												

Source: Lane County Hazard Mitigation Steering Committee
Note: Action Items 1 through xx (in **bold**) prioritized

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4.4 COORDINATED MITIGATION STRATEGIES

CFR 44 Requirement: §201.6(c) (3) (ii):
[The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

A key component of the Mitigation Strategy is the implementation of preventive measures in community planning as a means for accomplishing the Plan goals.

The State of Oregon uses a unique but legally powerful system of statewide planning goals that must be addressed in local plans, including a state goal related to natural hazards. Its planning goals and guidelines are established by the Oregon Department of Land Conservation (DLCD), which reviews plans and oversees compliance. Natural hazard areas are the subject of Goal 7; they include floods, earthquakes, landslides, tsunamis, coastal erosion and wildfires. Over the years, DLCD has published significant guidance for local governments addressing planning and mitigation options for each of these hazards. It also notifies local governments when relevant new hazard information requires a local planning response, which must occur within three years (Schwab 2004). Response includes evaluating the risk based on the new information and adopting or amending plan policies and measures to avoid both development and site selection for essential facilities in hazard areas. (American Planning Association, 2010)

Lane County's uses its Comprehensive Plan as the overarching plan that possesses the legal standing as a reference point for local land-development regulations. The Comprehensive Plan includes a hazards / safety element that can be reinforced in community plans and programs such as this Natural Hazards Mitigation Plan.

In addition to the Comprehensive Plan, Lane County has several means for implementing preventive measures to protect new construction from hazards and to see that future development does not create unintended consequences in the form of hazardous conditions or economic loss. There are several ordinances in Lane Code that assist with achieving hazard mitigation through these types of preventive measures. Lane County Public Works, Land Management Division administers these preventive measures through (list not exhaustive):

- National Flood Insurance Program - Floodplain Management
- Building Codes
- Wildfire Protection
- Planning and Zoning
- Land Divisions
- Parks and Open Space

Additional measures for coordinated mitigation activities include County administration and budgeting as it relates to the capital improvement plans (CIPs), the selection and direction to private contractors, and development and administration of MOU's and cooperative agreements with public utilities and special districts. See also Section 5.3 for a listing of planning mechanisms suitable for integration with the Mitigation Strategy of this plan.

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4.4.1 National Flood Insurance Program Participation/Compliance

National Flood Insurance Program

In 1968, Congress passed the National Flood Insurance Act based on findings that: "(1) a program of flood insurance can promote the public interest by providing appropriate protection against the perils of flood losses and encouraging sound land use by minimizing exposure of property to flood losses; and (2) the objectives of a flood insurance program should be integrally related to a unified national program for floodplain management."

The Flood Insurance Act is administered through the National Flood Insurance Program, (NFIP). The NFIP is a voluntary program that is based upon cooperative agreements between the federal government and local participating communities. The NFIP enables property owners within participating communities to purchase flood insurance at a reasonable cost and helps to provide an insurance alternative to the rising costs of federal flood disaster relief. In return, participating communities must properly manage their floodplains by adopting and enforcing floodplain management ordinances aimed at reducing the likelihood of future flood damage to new construction.

Since 1970, Lane County has been a participating member of the NFIP. In order to participate in the NFIP, Lane County is required to adopt and enforce floodplain management ordinances aimed at reducing the likelihood of future flood damage to new construction within the regulated floodplain, also known as the Special Flood Hazard Area (SFHA). The county must manage land within SFHA in ways that meet or exceed standards set by the Federal Emergency Management Agency (FEMA). The Land Management Division is responsible for administering the day-to-day activities of the county's floodplain program, which are extensive. Specifically, the Land Management Division:

- maintains and administers Lane County's floodplain regulations
- reviews and issues floodplain development permits
- maintains elevation certificates for all new and substantially improved structures (and also maintains an extensive database of historic elevation certificates)
- ensures that encroachments do not occur within the regulated floodway
- implements measures to ensure that new and substantially improved structures are protected from flood losses
- maintains floodplain studies and maps and makes this information available to the public
- maintains a flood information website with digital flood insurance rate map (DFIRM) data
- conducts site visits to assess conditions and provide technical assistance to the public
- maintains a library of historical flood related information
- informs the public of flood insurance requirements
- conducts outreach and training about flood hazards and development within the floodplain

Table 3-xx below outlines data relevant to NFIP activities in Lane County.

Table 3-xx Number of policies, total premiums, claims made under the NFIP

Community	Last CAV Date	Effective FIRM Date	# of Policies	Total Premium	Paid Claims	Total Amount Paid in Claims
Lane County	9/24/2003	6/2/1999	2,639	$575,907,500	210	$2,246,000

Source: NFIP Bureau Net

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4.4.2 NFIP - Community Rating System (CRS)

In 1990, the National Flood Insurance Program's Community Rating System (CRS) was implemented. The CRS is sub-program within the NFIP created to recognize and encourage floodplain management practices that exceed the minimum NFIP standards.

Under the CRS, flood insurance premium rates are lowered to reflect reduced flood risk resulting from community activities that meet the objectives of the CRS. Those objectives are:

(1) Reduce flood losses, i.e.,
- protect public health and safety,
- reduce damage to buildings and contents,
- prevent increases in flood damage from new construction,
- reduce the risk of erosion damage, and
- protect natural and beneficial floodplain functions.

(2) Facilitate accurate insurance rating; and

(3) Promote the awareness of flood insurance.

As part of the Lane County Land Management Division's 2007 Long Range Planning Work Program, staff was formally directed to take actions necessary for the county to gain admittance into the CRS. Prior to submitting an application, LMD was first required by FEMA to process updates to the county's floodplain ordinances (LC 16.244 and LC 10.2.71) and to take measures necessary to address Lane County's repetitive flood loss properties. These activities were carried out during 2007 and on March 3, 2008 Lane County's CRS application and accompanying documentation was submitted to FEMA for formal review.

On July 2, 2009, Lane County received official notification of admission into the CRS, and has since maintained its standing in the CRS and is committed to continued NFIP compliance.

The current CRS rating for Lane County is a "7" on a scale from 10 (lowest) to 1 (highest). Lane County's 7 rating results in a 15 percent discount on flood insurance premiums for homes in Special Flood Hazard Areas (SFHAs).

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4.4.3 Building Codes

Building codes provide one of the best methods of addressing most of the hazards in this plan. They are the primary means for protecting new property from damage by snow / ice storms, flood, windstorms, landslides and earthquakes. When properly designed and constructed according to code, the average building can withstand the impacts of most of these forces.

The mission of Lane County's Building Program is to protect public safety, health and welfare wherever hazards associated with the design, erection, repair, removal, demolition or occupancy of structures have the potential to exist within the county's jurisdiction. The Building Program endeavors to fulfill this mission through efficient, professional, and equitable administration of nationally recognized code standards and local regulations.

Code administration, which is enforcement of code standards, is very important. Adequate inspections are needed during the course of construction to ensure that the builder understands and implements the requirements. The Building Code Effectiveness Grading Schedule (BCEGS) is a national program used by the insurance industry to determine how well new construction is protected from wind, earthquake and other non-flood hazards. Building permit programs are reviewed and scored, a class 1 community is the best, and a class 10 communities has little or no program. Lane County has a BCEGS classification of 4 for residential and 3 for commercial.

The building codes in use by Lane County are as follows:

Commercial Building Codes:

- 2010 Oregon Structural Specialty Code (OSSC): 2009 International Building Code (IBC) w/ 2010 Oregon Amendments
- 2010 Oregon Mechanical Specialty Code (OMSC): 2009 International Mechanical Code (IMC) and 2009 International Fuel Gas Code (IFGC) w/ 2010 Oregon Amendments
- 2008 Oregon Plumbing Specialty Code (OPSC): 2006 Uniform Plumbing Code (UPC) w/ 2008 Oregon Amendments
- 2010 Oregon Fire Code (OFC): 2009 International Fire Code (IFC) w/ 2010 Oregon Amendments
- 2008 Oregon Electrical Specialty Code (OESC): 2008 National Electric Code (NEC) w/ 2008 Oregon Amendments
- 2010 Oregon Energy Efficiency Specialty Code (OEESC): 2009 International Energy Conservation Code (IECC) w/ 2010 Oregon Amendments

Residential Building Codes:

- 2008 Oregon Residential Specialty Code (ORSC): 2006 International Residential Code (IRC) w/ 2008 Oregon Amendments
- 2008 Oregon Electrical Specialty Code (OESC): 2008 National Electric Code (NEC) w/ 2008 Oregon Amendments
- 2008 Oregon Plumbing Specialty Code (OPSC): 2006 Uniform Plumbing Code (UPC) w/ 2008 Oregon Amendments
- 2010 Oregon Manufactured Dwelling Installation Specialty Code (OMDISC)
- 2010 Oregon Energy Efficiency Specialty Code (OEESC): 2009 International Energy Conservation Code (IECC) w/ 2010 Oregon Amendments

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4.4.4 Planning & Zoning / Land Divisions & Open Space

Lane County has several combining zones outlined in Lane Code that help direct development away from hazardous areas by designating land uses that are more compatible to the natural conditions of the land. Among other things, these types of zoning regulations help mitigate natural hazards.

Natural Resources Conservation Combining District (Lane Code 10.250)
Natural Hazard Mitigation includes preserving protective features such as wetlands, estuarine marshes and floodplains. Protecting natural resources meets multiple objectives: preserves habitat, protects the environment and limits development in hazardous areas.

Lane County's Natural Resources Conservation Combining District applies to coastal area shorelands identified in inventory information as timber lands, agricultural lands or shorelands in dune areas. It is the purpose of the NRC District to encourage long-term human use of these coastal resources in a manner which protects the qualities of coastal water bodies and respects the natural systems. Activities which protect or enhance renewable resources are encouraged, as are recreation and public access to coastal waters.

Shorelands Mixed Development Combining Zone (Lane Code 16.241)

The Shorelands Mixed Development Combining Zone applies to coastal shore lands committed to commercial and industrial uses in proximity to the dredged channel of the Siuslaw River. Lane Code dictates that these shore lands be preserved for the expansion of existing water-dependent and water-related commercial or industrial uses. Part of the reason for doing this is to avoid geologic and hydrologic hazards and to avoid hazard to life or property.

Beaches and Dunes Combining Zone (Lane Code 16.243)
The Beaches and Dunes Combining Zone requires the completion of a Development Hazards Checklist as the initial screening process for any development proposed for Beach and Dune areas.

The Development Hazards Checklist is used to indicate certain potential hazards associated with the particular landform proposed for development including hazards associated with adjacent sites. The checklist screens for adequate protection against soil erosion from wind and surface water runoff as well as possible fire hazard or slide potential based on the existing site vegetation.

Floodplain Combining Zone (Lane Code 16.244)
The Floodplain Combining Zone outlines methods for reducing flood losses, clarifies to which lands the code applies, and specifies provisions for flood hazard reduction pertaining to foundations and anchoring, utilities, elevation for residential and non-residential structures, elevation of manufactured homes, elevation of recreational vehicles, enclosed areas, roads and subdivisions and partitions.

Specifically, Lane Code 16.244 (applicable to rural areas) and, 10.271 (applicable to areas within the Urban Growth Boundary) requires that all permit applications be reviewed to determine whether the proposed development site will be reasonably safe from flooding. If a proposed development site is in a flood hazard area, all site development activities (including grading, filling, utility installation and drainage modification), all new construction and substantial improvements (including the placement of prefabricated buildings and manufactured homes) are required to be constructed with methods, practices and materials that minimize flood damage.

Land Divisions
Lane Code 13.050 stipulates that any area determined to be dangerous for road or building development by reasons of geological conditions, unstable subsurface conditions, groundwater or seepage conditions, floodplain, inundation or erosion or any other dangerous condition shall

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not be divided or used for development except under special considerations and restriction. Special consideration and restriction shall consist of a detailed report by a professional engineer stating the nature and extent of the hazard and recommending means of protecting life and property from the potential hazard and/or the County shall impose limitations designed to minimize the known danger on development commensurate with the degree of hazard.

Parks and Open Space

Keeping the floodplain and other hazardous areas open and free from development is effective for preventing damage to new developments.

Lane County has preserved approximately 31,520 acres in the Severe Flood Hazard Area (SFHA) as open space with additional land preserved in a natural state.

Although natural hazard mitigation is not an explicitly stated goal in Lane County's Parks & Open Space Master Plan, Lane County owns or maintains 73 parks totaling over 4300 acres. Approximately 85% of the parks are located in a floodplain combining zone which naturally contributes to flood hazard mitigation.

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4.4.5 Wildfire Protection / Firewise Program

Community Wildfire Protection Plan (CWPP)
Recent fires in Oregon and across the western United States have increased public awareness of the potential losses to life, property, and natural and cultural resources. In July of 2005, the Lane County Commissioners directed the County Departments to work with state and federal agencies, fire protection districts, and community organizations throughout the County to develop an integrated wildfire plan. The Commissioners initiated this effort to reduce wildfire risk to citizens, the environment, and quality of life within Lane County. The Lane County Community Wildfire Protection Plan provides a guide for taking a more wildfire-based approach in managing our forestlands. The Lane County CWPP also assists the county in being more competitive for federal funding programs such as the Healthy Forests Restoration Act, the National Fire Plan, and the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation Program.

Firewise Communities & Incentive Program
The National Firewise Communities Program is an interagency effort designed to encourage local solutions for wildfire safety by involving homeowners, planners, community leaders, developers, firefighters and others in an effort to protect people and property from the risk of wildfire – before a fire starts. The Firewise approach focuses on planning, landscaping, construction, and home maintenance to help protect people, property, and natural resources.

In 2009, Lane County adopted policies in Lane Manual Chapter 4.3 to establish a grant incentive program designed to mitigate the risk of wildfire to rural residents.

The mission of the Lane County Firewise Incentive Program is to promote home construction and landscaping techniques that will prevent *fatalities, injuries, property loss and environmental damage resulting from wildfires.*

To help achieve this mission the program provides funding to partially or wholly reimburse the costs that rural home owners incur for certain types of home and landscaping improvements. These improvements are promoted by the National Firewise Communities Program and if implemented properly have been shown to reduce the probability that a home will be damaged or destroyed in a wildfire.

Currently, grants are offered for the following types of improvements:

1. Replacement of a wood shake roof with a roof consisting of a Class-A covering or Class-A assembly (80% of costs up to $4,000)
2. Installation of non-combustible exterior siding (80% of costs up to $4,000)
3. Installation of fire resistant (and energy efficient) exterior windows and skylights made from tempered glass, multi layered glazed panels or glass block (80% of costs up to $1,500)
4. Installation of non-combustible exterior doors (80% of costs up to $300)
5. Installation of spark arrestors on chimneys ($100)
6. Installation of mesh screening on exterior ventilation or deck openings that will prevent the entry of firebrands and the accumulation of flammable debris ($100)
7. Landscaping improvements that will create a defensible space around habitable structures. Under this category funding is available for brush removal, tree pruning, chipping and the planting of approved fire-resistant plants within a 30' buffer around homes (up to $1,000 depending on site specific conditions)

To date, Lane County's Firewise Incentive program has dispersed over $700,000 to property owners living in at risk areas.

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4.4.6 Continuity of Operations Plan, Emergency Operations Plan

As discussed in the introduction, a hazard mitigation action plan (HMAP) is distinguishable from a Continuity of Operations Plan (COOP) or Emergency Management Plan (EMP) in that it focuses on activities prior to disaster occurrence. These plans are directly and indirectly related. This section outlines the ways these plans are structured to work together and mutually support the purpose and goals of each.

Hazard Mitigation Action Plan (HMAP) – Emergency Operations Plan (EOP) – Continuity of Operations Plan (COOP)

Specifically, Section 4.4.6 of the HMP (this section) addresses coordination of mitigation strategies through the Lane County EOP and COOP. The EMP discusses hazard mitigation in Annex xx (Hazard Mitigation). The Lane County Continuity of Operations Plan addresses hazard mitigation in Annex xx.

In more general terms, the Lane County HMAP integrates with the EMP in at least two ways. First, a number of county personnel with roles and responsibilities in Emergency Support Functions, chain of command, etc. in the EMP are also members of the Hazard Mitigation Emergency Management Steering Committee (HMEM-SC). These personnel have roles in development, exercise, and implementation of each plan and thus contribute a multi-faceted perspective to each.

A second way these documents interrelate is through a requirement for technical review of each other during updates, thus ensuring opportunities to compare and share information, and to coordinate activities or objectives.

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CHAPTER 5. PLAN MAINTENANCE

5.1 ADOPTION

44 CFR Requirement §201.6(c) (5):
*[The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*

44 CFR Requirement §201.6(c) (5):
*For multi-Jurisdiction plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*

As stated in **Chapter 1. Introduction**, upon provisional approval of this plan document by OEM and the Federal Emergency Management Agency, the governing body for Lane County will formally adopt the plan in public session. Following local adoption, copies of the local adoption instrument will be included in Appendix A of this document.

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5.2 IMPLEMENTATION, MONITORING, EVALUATION, UPDATE

Requirement §201.6(c) (4) (i): *[The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

Plan Implementation

Lane County is committed to implementing this Hazard Mitigation Action Plan through implementation of the action items listed herein. Action item implementation will include a report to the Lane County Office of Emergency Management at the outset and at the completion of each project to ensure oversight, to gather feedback for future updates and to ensure that project timelines are met. The Lane County Office of Emergency Management will work in coordination with OEM during post disaster operations to ensure that disaster response teams have access to information and to ensure mitigation opportunities are identified.

In addition, the participating jurisdictions are committed to utilizing this plan to access mitigation grant funds to assist the implementation of action items set forth in Chapter 4 (Mitigation Strategy). Implementation of high benefit/low cost action items will be encouraged in parallel with high priority action items that require grant funding to implement. Opportunities to partner and share costs with affiliated agencies and neighboring jurisdictions for multi-objective projects are encouraged.

Monitoring

The Hazard Mitigation Steering Committee (HMSC) will monitor and assist implementation of the actions items in the Plan Update in the intervening years between plan update cycles. The party responsible for the actions in the plan will be tasked with preparing an annual progress report to submit to the Lane County Emergency Manager.

The Hazard Mitigation Steering Committee Convener will be responsible for arrangement of quarterly meetings with the HMSC as a means of oversight and coordination of activities.

Evaluation

To evaluate the effectiveness of the plan at achieving its stated purpose and goals, the Lane County Emergency Manager will host semi-annual meetings in the spring and fall. These meetings will include re-evaluation of the identified hazards to ensure that the full range of potential risks are addressed by this Plan. Also, changes in land use development patterns and community needs will be discussed as well as evaluating the relevance and prioritization of action items.

The HMSC will evaluate the plan to assess if significant changes have occurred in the premises upon which the plan was developed such as the following:

- changes in data sources and/or methodology used to determine vulnerabilities and loss estimates, in terms of quality and availability
- changes in federal or state plans that could affect the continued implementation of any of the mitigation actions
- the identification of new hazards requiring new mitigation actions
- changes in community perception relative to specific hazards

In addition to these functions, the HMSC agrees to work to educate and involve the public in hazard mitigation activities and to oversee the incorporation of this plan into future planning and public policy documents as these are updated or developed. The incorporation of this plan into other planning instruments will serve as an additional metric for success. This plan will ultimately be evaluated based on implementation of action items, the incorporation of mitigation principles into future public policy, improved public safety, and the overall reduction of losses for Lane County residents.

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Update

Lane County Emergency Management will continue to formally update the Plan at least once every five years. Update of the Lane County Hazard Mitigation Action Plan was finalized in 2012 and will remain current through 2017. No later than the fourth year of the five year cycle, in accordance with 44CFR, Section 201.6, the Hazard Mitigation Steering Committee (HMSC) will reconvene to update and amend the Hazard Mitigation Action Plan, allowing ample time for meetings, document drafting, revision and adoption within the required five year timeframe. The HMSC will also identify and discuss new mitigation measures to be added to the plan, and discuss and document accomplishments and/or implementation problems and recommended solutions.

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5.3 INCORPORATION INTO EXISTING AND FUTURE PLANNING MECHANISMS

Requirement §201.6(c) (4) (ii): *[The plan **shall** include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

Mitigation is most successful when it is codified and incorporated into the functions and priorities of government, planning and future development. Incorporating mitigation strategies into other planning documents is an effective way to leverage the support of affiliated agencies and departments while ensuring mutually supportive goals and policies.

Accordingly, the goals and mitigation strategies of this Hazard Mitigation Action Plan will be incorporated into other planning documents within the purview of participating jurisdictions as they are updated or are developed. Examples of such planning documents can be found in Section 4.4 (Coordination of Mitigation Planning Strategies).

Development of future plans or update of existing plans will include a review of this Hazard Mitigation Action Plan for consideration and incorporation of pertinent elements. To ensure the incorporation of goals and actionable items of this plan (Mitigation Strategy), Hazard Mitigation Steering Committee members will be invited to sit on future plan development or existing plan update committees, and this Hazard Mitigation Action Plan will be cited as a technical reference and data source for future plan update processes. Adopted planning documents and mechanisms applicable to this standard include the following:

- Lane County Comprehensive Plan
- Capital Improvement Plans
- Lane County Emergency Operations Plan
- Lane County Continuity of Operations Plan
- Lane County Community Wildfire Protection Plans (various departments and districts)
- Lane County Flood Damage Prevention Order
- Building Code
- Subdivision Code
- Erosion Control
- Stormwater Management

Additional opportunities for incorporating mitigation strategy into existing and future planning mechanisms include integration with Lane County's Community Health Improvement Plan (April 2013), and associated principles of 'Health in All Policies'.

Environmental Protection Agency (EPA) publication Flood Resilience Checklist is an outgrowth of the agency's Smart Growth Implementation Assistance Program. It encourages local governments to integrate hazard mitigation planning as a key element of comprehensive planning and growth management. Future iterations of Lane County's Rural Comprehensive Plan may consider these and other planning measures to further integrate hazard mitigation strategy with the long term development patterns of the planning area.

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5.4 CONTINUED PUBLIC INVOLVEMENT

Requirement §201.6(c) (4) (iii): *[The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the plan maintenance process.*

Throughout current and future planning cycles, city and county residents will be canvassed to solicit local information, continuing Lane County's dedication to involving the public directly in annual review and cyclical updates of this Hazard Mitigation Action Plan. In addition to the annual monitoring and evaluation meetings of the HMSC, meetings will be scheduled as deemed necessary by the Lane County Office of Emergency Management to provide a forum for which the public can express its concerns, opinions, or ideas about the plan and/or it's implementation. The HMSC will publicize meetings under standard public notice procedures and through local media outlets.

Attendance at the HMSC meetings is just the first level of public involvement planned for the local planning process. Members of the committee were encouraged to not only invite members of the public and local experts to future meetings, but also to carry on a dialogue outside of the formal meetings to develop a more comprehensive picture of the needs and concerns of county residents related to natural hazards and mitigation planning.

Copies of this plan will be catalogued and kept at all appropriate agencies and public libraries. There are also several mitigation action items that have been designed with involvement from the public in mind.

Many of the effects of natural hazards can be lessened by simply educating members of the public on actions they can take to minimize danger to themselves and their possessions. It is anticipated that these strategies will help develop ownership by the public in the plan, and that future iterations of the plan will include strategies that are developed via high levels of public participation.

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APPENDICES

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APPENDIX A. ADOPTION DOCUMENTS

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APPENDIX B. INTERIM PLAN AMENDMENTS

The following cross-references with Section 4.3 (Lane County Mitigation Action Items) in Lane County HMAP Version 2.3(d), and amends Lane County NHMP 2012 (2011 Program Action Items, page 66-67.

Mitigation Action Item 1. Update/Develop Multi-Jurisdiction Hazard Mitigation Action Plan

Develop/Update Multi-Jurisdiction Hazard Mitigation Action Plan for Lane County and incorporated cities not currently covered by a FEMA sanctioned hazard mitigation plan.

Resulting planning process and multi-jurisdiction mitigation action plan document will:

- Develop new hazard mitigation plan for incorporated cities of Coburg, Creswell, Junction City, Lowell, Oakridge, Veneta, Westfir
- Update mitigation plan for Dunes City, Florence, Lane County
- Meet all Federal and State standards and requirements including Stafford Act and Disaster Mitigation Act of 2000, as amended, et al.
- Include extensive documentation of planning process
- Involve extensive public involvement and broad range of stakeholders
- Evaluate and mitigate all potential hazards including hazards not previously profiled, such as dam failure, hazardous materials incident, pandemic, and volcano
- Develop focused, detailed risk assessment and vulnerability analysis for each jurisdiction
- Establish defined goals and prioritized mitigation action items for each jurisdiction
- Outline physical mitigation projects, as well as regulatory processes and policy for each jurisdiction that support hazard mitigation goals
- Establish measures to prevent, protect and mitigate damage to both existing buildings and new and future buildings and facilities
- Promote education, proactive mitigation, and readiness measures by the general public
- Include provisions to mitigate repetitive loss properties and maintain NFIP compliance
- Include a process for plan integration with: departmental functions, operations of governance and regulatory processes, and existing and future plans
- Establish clearly defined schedule and implementation procedures for the 5-year cycle
- Be formally adopted by governing boards/councils of each jurisdiction

Agencies	Lane County, Cities of Coburg, Creswell, Dunes City, Florence, Junction City, Lowell, Oakridge, Veneta, Westfir.
Timeline	12 months
Cost	$70,000
Funding Source	FEMA HMGP DR-4169
Purpose	Creates a cohesive hazard mitigation action plan (HMAP) for all jurisdictions not currently covered by an HMAP. Updates HMAP for Lane County within 5-year cycle. Establishes new and updated risk assessment to relate latest hazard type and frequency analysis. Promotes mitigation activities and reduces repetitive losses. Reduces reliance on emergency response and encourages proactive planning on multiple levels.

Mitigation Action Item 2. Storm Harden/Retrofit and Relocate Backup Power Generation Site and Data Center for Lane County Administration Building

Relocate and protect central data server location and backup power generation for administration building at 125 E. 8th Avenue, Eugene. Current backup power generator and transfer switch is in basement of building and vulnerable to exterior and interior flooding sources and seismic hazards. This specific mitigation action item corresponds with Action Item 11 (Back-up Power for Critical Facilities, general). Project to be conducted in two phases: Phase 1: risk assessment/feasibility study, benefit-cost analysis, NEPA coordination and permitting; Phase 2: construction and implementation.

Agencies	Lane County, OEM, FEMA
Timeline	12 months (Phase 1), 24 months (Phase 2)
Cost	$150,000 (Phase 1 Feasibility), Phase 2 (Construction)
Funding Source	FEMA HMGP
Purpose	Mitigates and prevents damage/disruption to critical facilities, emergency operations, administration, and continuity of operations.

Mitigation Action Item 3. Mitigation Coordinating Committee

Establish Mitigation Coordinating Committee to act as a forum for hazard mitigation issues, disseminate hazard mitigation ideas and activities to all participants, monitor implementation of the Action Items and report on progress and recommended changes to the Plan as appropriate; includes identifying opportunities to incorporate mitigation actions into other planning mechanisms, such as comprehensive or capital improvements, as appropriate.

Agencies	Lane County Emergency Management
Timeline	Ongoing, continuous
Cost	$10,000 – 20,000/year
Funding Source	various
Purpose	Demonstrates a deliberative approach to planning and implementation that involves the stakeholders and subject matter experts to carry out action items and incorporate them into other planning mechanisms for broader reach throughout the community.

Mitigation Action Item 4. Public Education and Outreach

Conduct public outreach activities related to hazard mitigation and personal preparedness using a variety of media sponsored by various agencies, such as: community newsletters and direct mailings; news releases and public service announcements; presentations at meetings of neighborhood, civic or business groups; displays in public buildings or shopping malls; coordinated announcements on agency web pages.

Agencies	Lane County Emergency Management, county departments, cities and special districts.
Timeline	Ongoing, continuous
Cost	
Funding Source	FEMA HMGP, PDM; USACE RIP, et al.
Purpose	Increases individual preparedness, decreases demands for emergency public safety measures. General mitigation for community assets.

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APPENDIX C. (INTERIM NOTES) MEETING MINUTES AND AGENDAS (2013-2017 CYCLE)

Minutes/notes from quarterly Hazard Mitigation Steering Committee meetings are included in the following appendix. Most recent meeting notes are listed directly below, creating a descending timeline of materials dating back to Hazard Mitigation Steering Committee inception.

Lane County

Hazard Mitigation/Emergency Management Steering Committee (HMEM-SC)

October 23, 2014 Meeting

MEETING NOTES

Attendees: Linda Cook, Keir Miller, Melissa Crane, Jonna, Matt Dupkus, Pete Zugelder, Mike Finch, Oren Schumacher, Greg Wobbe

Discussion Item 1: Hazard Mitigation Action Plan updates

General

- Lane County HMAP is a FEMA sanctioned document, requirements outlined in Code of Federal Regulations, and Disaster Mitigation Act of 2000.
- Roughly at mid-point of a 5-year planning cycle, including OEM/FEMA review/approval time.
- HMAP is current and meeting all requirements, including new FEMA requirements from 2013.

Progress (Last 12 months)

- Created mission statement, updated and expanded goals.
- Developed 4 new action items.
- Completed (or significant progress on) most of the 12 current action items (credit, HMEM-SC).
- Developed 4 new hazard profiles, a 5th in development:
    - Dam Failure
    - Drought
    - Hazardous Materials Incident
    - Pandemic
    - Volcano (currently in development)
- Updated and expanded 7 existing hazard profiles
    - Winter Storm
    - Flood
    - Windstorm
    - Wildfire
    - Earthquake (previously merged with tsunami)
    - Tsunami
    - Landslide

Committee Question: Additional hazard types to develop profiles and address in the HMAP?

Suggestion: Include terrorism, active shooter, arson profile. Due to FEMA requirements for vulnerabilities analysis for all profiled hazards, including specifics, HMEM-SC consensus is to develop hazard profile for Terrorism, Arson, Active Shooter, & incorporate as classified appendix. See action item below.

Meeting Follow-up Question: Consider title for classified appendix 'Malicious Activity', or some other phrase? (which inclusively incorporates terrorism, active shooter, arson, vandalism)?

Suggestion: Develop Cyber-Security hazard profile. Include discussion of all potential threats to IT infrastructure, including man-made (hacking, vandalism, data theft) and natural (solar flares, etc.). See action item below.

Suggestion: Develop analysis and profile for utility companies. Identify methods of improved coordination. Seek to identify risks and mitigation opportunities. Among other shared concerns and responsibilities with utilities is water supply safety (this also relates to terrorism discussion). See action item below.

Other HMAP Notes (Last 12 months)

- Reformatted document to meet new FEMA standards published spring 2013 (new structure). Transition to living document, more or less constant state of update and currency.
- Developed appendices for new data, progress reports, project tracking, key reference tools
- Though HMAP document has roughly doubled in size, it's structured to specifically address all federal guidelines, while easy to navigate.

Action Item: develop classified annex for Terrorism, Active Shooter, etc.

Action Item: develop classified annex for Cyber-Security

Action Item: develop analysis and profile for utility companies, identify coordination opportunities.

Discussion Item 2: Update on new mitigation action item to relocate backup power and data center for Lane County Administration Building

Updated Project Description (proposed): Relocate and protect central data server location and backup power generation for county administration building. Current backup power generators, transfer switch located in basement of building and/or lower floors and vulnerable to exterior (street level) and interior (160,000 gallon(!) chilled water tank) flooding sources and seismic hazards. Project to be conducted in two phases: Phase 1: risk assessment/feasibility study, benefit-cost analysis, NEPA coordination and permitting; Phase 2: construction and implementation.

Comment: State of Oregon currently has open grant opportunity which may be suitable to fund this project. Deadline approaching.

Comment: This project may or may not fit into long-term facility plans. Current condition of public services building and sheriff's office is not ideal (many things held together w/ duct tape).

Discussion Item 3: Ebola virus update, emergency management, general notes

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- General concerns, all staff should maintain awareness.
- Proactive measures, communication.

Discussion Item 4: Health in All Policies

- New County policy.
- Relationship to emergency management and hazard mitigation. Promulgation, integration with HMEM activities and documents

Action Item: integrate Health in All Policies description into HMAP document, Section 4.4 (Coordinated Mitigation Strategy) and Section 5.3 (Incorporation into Existing and Future Planning Mechanisms)

Discussion Item 5: Department, HMEM subject matter updates. Mitigation actions completed, proposed, and highest priorities.

Information Technology (Mike Finch)

1) Back-up cooling for the data center completed. Server network previously had no back-up cooling system.

2) Improvements to network servers, transition to pod system. Improved stability, web connectivity and data transfer.

Facilities (Matt Dupkus)

1) Fire alarm monitoring system. Established back-up account with secondary provider for seamless operation of fire alarm monitoring in event of phone system outage with primary provider. Improved preparedness & resilience of fire alarm system in case potential major event.

2) Coordination with IT on data center cooling back-up system

Public Works (Oren Schumacher)

1) Reimbursements received for Category A debris clean up per DR 4169 (public works and various departments).

2) Bridge safety/inspection following disaster event. Earthquake resiliency plan, alignment with State plan/process, rapid deployment of bridge inspection teams. Work in partnership with state, which is only 'sanctioned' inspection group. Rapid deployment inspection routes already set up via GIS. Potential problem likely to be encountered is roadway network/bridges are needed for rapid inspection/assessment.

General situation: Tens of thousands of bridges in the state, not many are seismic rated (similar for Lane County). Little Lake and Sweet Creek are two examples for county bridges. New, large bridges with federal funding generally are seismic designed.

3) Snow/ice response plan. Reviewing after-action reports, integrating lessons learned and updating response plan accordingly.

GIS (Melissa Crane)

1) Delivered crude oil train/landslide map. Useful for Senator Wyden and Merkley's roundtable forum in Eugene regarding proposed DOT rule changes.

2) Working on digitizing and preparing for publication of DOGAMI tsunami evacuation maps.

3) Assisting Deception Complex mapping.

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4) Developing and delivering training on mobile mapping application for road maintenance and dispatch (downed trees and powerlines). 1st responder safety. Real-time, onsite data. In progress, roughly 80% complete. Comment: grant funding requirement is to include outward facing, public access. Consensus is a read only interface, no public reporting/data editing method for this app (at this time).

5) Received training on RAPTOR, state emergency management mapping system (Real Time Assessment and Planning Tool for Oregon). Trained at middle level. Exploring integration with EMMA. Enhancements to EMMA.

Risk Management (Pete Zudelger)

1) Emergency Action Plans: developing for buildings that need it.

2) Evacuation/fire alarm drill last week, will send out after action report.

3) COOP work is underway (archived Webinars available on dashboard). Is there a MUA, MOU, or IGA with University, City of Eugene, etc for shared use of facilities if needed?

4) Active shooter training at Bethel, 50+ law enforcement (ALICE training, Alert-Lockdown-Inform-Counter-Evacuate). High quality, detailed training.

Dispatch (Jonna Hill)

Mobile Command trailer for dispatch. Two dedicated personnel. Re-equipped with better radio, generator obtained. Dispatch command trailer is self sufficient. Improved flexibility to use cell phone back-up for land line. Mobile was decided to be best suited for variable conditions in Lane County. Deployed for Deception Wildfire, pleased with speed of transport and set up, good drill.

Keir, Land Management

1) Engaged with Metro region. Various code amendments. Updating forest zone regs. Trying to adapt wildfire safety requirements to "Non-impacted Forest Zones". Spark arrestors for chimneys, water source for fire fight, etc. Somewhat focused on avoidance of fires starting at residences and migrating outward into timberlands.

2) Two staff attended National Flood Insurance Program week long training, intent is to increase number of CFMs in department.

3) Community Fire Protection Rating of 7 maintained in recent review.

4) FEMA Flood Insurance Rate Map (FIRM) update in progress, ongoing.

Discussion Item 5: Arrangements, Schedule for Next Meeting.

- 4th Thursday of every 3rd month
- Next up: Thursday, January 22, 2015

WORKING DRAFT

Lane County

Hazard Mitigation/Emergency Management Steering Committee (HMEM-SC)

July 24, 2014 Meeting

General Announcements

Attendees: Pete Zugelder, Matt Dapkus, Melissa Crane, Selene Jaramillo, Linda Cook, Mike Finch (IT), Keir Miller

Discussion Item 1: Recent Incidents, Coordination Cell Concept

Since December four events: 2 winter storms December and February, Seneca Sawmill protest, Springfield Mill fire.

Discussion of real time mapping applications, ESRI products; suite of tools

- Moderate scale emergencies
- Seneca sawmill protests
- Springfield plywood mill fire (did not have situational awareness of hazmat, suggestion that fire marshal should have database, City of Springfield has Drinking Water Protection Overlay Zones; 1st responder safety; evacuation messages were conflicting; Linda did request and receive CRTK database, EMMA may have similar info too.
- Gauge departmental interest in coordination cells

Develop routine practice for moderate scale emergency

Identify list of major hazmat facilities to get pre-defined situational awareness real time.

Discussion about relationship of Coordination Cells to COOP and EOP

Discussion about who/what departments to assemble as standard practice

Risk management, need to monitor risk exposure

General conclusion is a long path to implementation, multi-department and agency coordination, but is a good, workable idea

Comment/question re. data center outage and how it relates to emergency public info release. Current need for redundant data server, need to explore funding opportunities.

Discussion of real time mapping applications, ESRI products; suite of tools

Suggestion for flow chart/matrix for guiding coordination activation and procedures.

Discussion Item 2: Coordinated EOC, County Departments, Utilities

Goal of improved coordination between A) county departments, and B) utilities during emergencies. Seeking better solutions from a technical standpoint. Problem of geographic disconnect between county departments, EOC, and utilities during emergency situation.

- Potential solution: During emergency, activate centralized call center, dispatch, and real-time web-based mapping interface specific to field operations with all 6 utilities in Lane County.

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- Functional details: Radio and cell phone capability. Operators on standby for field reports, 2-way info sharing. Video cameras on utility vehicles with wireless feed to EOC.
- Mapping goal: Real-time overview of regional situation. Google Earth type solution discussed, ability to edit and upload web-based map in real-time showing: 1) road blockage, 2) power/communications outages, 3) repair priority, 4) dangerous conditions, 5) work crew status. Also discussed outward facing map interface, public access to report information.

Good idea, build into HMAP as action item.

Discussion Item 3: Hazard Mapping

- Mapping project: Hazardous Materials Incident Risk Assessment. Comprehensive GIS for EHS facilities. Determine which facilities have what materials. Note proximity to waterways, populations, facilities. Note roadway, railway intersections; pumps, compressor stations, transfer points; other risk of occurrence factors.

Groundwater protection zone, data is available statewide. Time of travel data/analysis

- Mapping project: Major Flood / Inundation Evacuation. USACE major flood data request.
- Mapping project: Comprehensive GIS for Utilities Network. Data collection challenges. See also discussion item 2 above.

Discussion Item 4: Departmental updates, hazard mitigation, emergency management

Capital Projects:	Mapping / GIS:
Emergency Services:	Public Health:
Facilities:	Public Works:
Floodplain:	Risk Management:
Information Services:	Road and Bridge:
Law Enforcement:	

Discussion Item 5: HMGP, DR-4169

- DR-4169 (presidential disaster declaration), Oregon Winter Storms. Lane County, primary impact jurisdiction per Project Worksheets.
- Hazard Mitigation Grant Program (HMGP), planning grant application (county update, new plan for rural cities)
- OEM feedback on facility retrofit, seismic, flood mitigation project application

Discussion Item 6: Mitigation Steering, Milestones, Road Ahead

2014

- Integrating HM-EM activities into standard departmental operations and future planning.
- Continued work with GIS, et al. on Risk Assessment/mapping, Vulnerability Analysis
- Documenting mitigation activities already completed and/or underway.
- Identifying new mitigation actions (all divisions, all project types).
- Pursue funding for Multi-Jurisdiction HMAP (Incorporated Cities w/o Plan).

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2015

- Secure funding and spearhead Multi-Jurisdiction HMAP process (12 months, 5-6 meetings).
- Develop grant applications for Lane County mitigation actions/projects.

2016

- Finalize Multi-Jurisdiction HMAP document and assist local adoption process
- Implement mitigation actions/projects applied for in previous year.

Discussion Item 7: Next Meeting.

- 4th Thursday of every 3rd month
- Next up: Thursday, October 23, 2014

GIS outputs on the agenda

Initial draft of the coordination cell

Keir will be at Firewise Community booth at fair

WORKING DRAFT

Lane County

Hazard Mitigation/Emergency Management Steering Committee

Spring Quarterly Meeting

April 24, 2014

9:00 am

LCSO Emergency Operations Center

MEETING NOTES

General Announcements

- Meeting Purpose: Mitigation Plan Maintenance, Project Implementation Updates, Departmental Reports, Steering Committee Feedback and Guidance.
- Format is discussion based, open forum.
- Desired meeting outcome: direction from committee; obtain observations, guidance from committee members.
- Purview of HMEM-SC and HMAP includes both county gov't and also broader community including public utilities, opportunity for funding.

Discussion Item 1: Federal Disaster Declaration 4169 (DR-4169 Oregon Winter Storms)

- Review DR-4169, it's relation to the Mitigation Plan, and project grant funds availability (HMPG)
- Recap of April 16 RPA applicant briefing.
- Discussion of storm events, lessons learned. Provide direction, next steps on coordination during storm events.

Oren is meeting with FEMA to discuss public works projects. Pete Zudelger PW is handling debris clearance and roads impacts (PA). Working well.

Goal of improving coordination of A) public works and B) utilities in emergency management and response, seeking better solutions from a technical standpoint. Problem of physical disconnect during emergency management situation.

Suggestion: During emergency, activate **centralized call center, dispatch, and real-time web-based mapping interface** specific to field operations with all 6 utilities in Lane County.

Both radio and cell phone capability. Operators on standby for field reports, 2-way info sharing.

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Mapping element, need for real-time overview of regional situation. Google Earth type solution suggested, ability to edit and upload web-based map in real-time showing: 1) road blockage, 2) power/communications outages, 3) repair priority, 4) dangerous conditions, 5) work crew status.

Boundaries between utilities are rough, approximate, but well understood among individual utilities

Also discussed outward facing map interface, public access to report/edit information.

Action Item 1: Research off the shelf solutions, prepare Draft 2 to propose to utilities. Incorporate into Hazard Mitigation Action Plan (HMAP).

Discussion Item 2: Major Flood / Inundation Map Update/Review

- Briefing on USACE map viewing meetings, public information campaign, next steps for evacuation planning.
- Current status, data availability, limitations, security.
- Map review, areas of interest, evacuation mapping.

Evacuation routes. Micro study areas, identify areas needing detailed study. Will be helpful to know where houses are on inundation maps. Also add county facilities, schools, hospitals, high traffic facilities.

Recommend digital solution first, phone apps, etc. Ultimately implement signage.

Discussion Item 3: Sharepoint Site

- Sharepoint site review, comments, feedback, new ideas.

System is up and running. Recently added mitigation project wish-list/update capability. Linda is going to create a Sharepoint card with log in info, directions.

Discussion Item 4: Departmental updates. Hazard Impacts. Mitigation actions completed, proposed, and highest priorities.

- Mitigation activities, departmental reports, mitigation wish list

Facilities: Completed: Roof work completed on facilities. Generator transfer switch for data system back-up power installed.

Action Item 1A) Facilities: Emergency generator and transfer switch needs to be relocated out of basement to higher elevation. Flood (internal or external source) and earthquake risk. Source of internal flood risk is 180,000 gallon steel chilled water tank. Previous architectural study recommended removal for hazard reasons.

Action Item 1B) ISO: Also looking to relocate main data servers to safer location. Considering a virtual host web solutions. Candidate for joint project with generator relocation.

Public Works: Completed/Ongoing: Network fleet. Testing interior plumbing drains. Various other activities.

WORKING DRAFT

Mapping: Completed: EMA has migrated to internet. Training sessions on EMA conducted. Created emergency management map for city of Cottage Grove. Ongoing: working on ways password protect certain data.

ISO: Completed: Maintaining road/address data. Ongoing: Working on firmer estimate for cost on Virtual server and proceed with application (see Action Item 1B).

Discussion Item 4: Steering, Establishing Milestones, Road Ahead

- Pursue funding for Multi-Jurisdiction HMAP (Incorporated Cities w/o Plan). This will involve outreach effort to those communities, coordination with OEM & FEMA Region X.

Update on status of Hazard Mitigation Action Plan (HMAP) for cities of Coburg, Creswell, Dunes City, Florence, Junction City, Lowell, Oakridge, Veneta, Westfir. These cities not currently covered by HMAP. HMGP for DR-4169.

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Lane County

Hazard Mitigation & Emergency Management Steering Committee (HM&EM SC)

Meeting Minutes

Date: Thursday, January 23, 2014

Time: 9:00 a.m. – 10:00 a.m.

Location: Lane County Sheriff's Office, Emergency Operations Center
125 E. 8th Avenue, Eugene, OR 97401

Attendees: Linda Cook (Emergency Management), Melissa Crane (Geographic Information Systems), Brian Craner (Capital Projects), Selene Jaramillo (Public Health), John Petsch (Public Work, Roads), Greg Wobbe (Contractor, Plan Development)

Facilitator(s): Linda Cook and Greg Wobbe **Scribe:** Greg Wobbe

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Discussion Item 1: Departmental updates. Mitigation actions completed, proposed, and highest priorities.

Review of public works year-end report form. Consensus: good degree of detail, majority relevant to hazard mitigation. Can serve as guide for other departments.

Question: HM & EM SharePoint site status: Yes it is developed and ready.

Capital projects requested template to submit mitigation action/activity report on SharePoint: Greg will develop a template and deliver to Linda. (Action Item)

Capital projects/facilities:

- Automatic transfer switch: working on permanent fix back up power. (completed)
- Modernization of data center: cooling system, replacing server equipment. Improved efficiency and reliability. (completed)
- Security upgrades at the jail, striving for appropriate balance of security, public interface. Gates. (completed)

Public Works:

- Hazmat spill trailer, first responder training (proposed)
- Animal services. Question: relevant to hazard mitigation. Consensus, yes. Important relationship to emergency evacuation, pets, homeowner responsibilities.

Risk Management:

- Community Emergency Response Training (CERT). Completed and ongoing.

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Public Health:

- Has a 5-year plan, Work plan, and Annual plan. Goals include public information for immunization and disease prevention.
- This is an excellent example of integration requirement, FEMA mitigation.
- Noted linkage to public health concerns resulting to flooding, other natural disasters.

GIS:

- Went live with emergency management mapping. Training (wait listed for January 30)
- Creating mapping application available to fire departments.
- Flood inundation maps. Digitizing inundation areas (generalized, based from USACE data)
- Evacuation planning mapping/modeling. Will use new transportation models/methods. More training proposed for traffic control/emergency management.
- Goal to establish 'high/dry' routes for major flood/dam failure. Noted complexity, need to create and inform public of standardized safe routes regardless of scenario.

Other discussion:

- Rural jurisdictions are reaching out to become incorporated into EOP/EAP. Suggested to use this initiative to also incorporate into HMAP. (Oakridge, Creswell, Veneta. Upper McKenzie, City of Florence, et al).
- Idea to develop, expand existing matrix of jurisdictional responsibilities to include evacuation, EOP, HMAP.
- Flood fight training in Lane County, response contractors; tentatively scheduled for spring. Possibly funded by PL 84-99 (see below).

Discussion Item 2: Review Goals and Consider Revision

Accepted Revision

Goal 1: Prevent loss of life and reduce injuries and illness

Accepted Revision

Goal 6: Increase awareness of hazards and understanding of mitigation methods

Discussion Item 3: Steering, Establishing Milestones, Road Ahead

2012

- Plan update, formal plan approval, adoption.

2013

- Established HM-EM Steering Committee and regular functions.
- Reformatted plan document: 5 chapter structure.
- Technical editing.
- Updated, expanded risk assessment, addressed new/additional hazards.

2014

- Integrating HM-EM activities into standard departmental operations and future planning.

WORKING DRAFT

- Continued work with GIS, et al. on Risk Assessment/mapping, Vulnerability Analysis
- Documenting mitigation activities already completed and/or underway.
- Identifying new mitigation actions (all divisions, all project types).
- Pursue funding for Multi-Jurisdiction HMAP (Incorporated Cities w/o Plan). This will involve outreach effort to those communities, coordination with OEM & FEMA Region X.

2015

- Secure funding and spearhead Multi-Jurisdiction HMAP process (12 months, 5-6 meetings).
- Develop grant applications for Lane County mitigation actions/projects.

2016

- Finalize Multi-Jurisdiction HMAP document and assist local adoption process
- Implement mitigation actions/projects applied for in previous year.

2017-2022

- Next 5-year cycle

Discussion Item 4: USACE Rehabilitation and Inspection Program (RIP)

- General information/overview: potential grant opportunity, mitigation related.

Discussion Item 5: Schedule, Future Meetings.

- Established standard quarterly meeting schedule, 4th Thursday of every 3rd month. Next meetings: April 24, July 24, etc.

WORKING DRAFT

Lane County

Hazard Mitigation & Emergency Management Steering Committee

Meeting Minutes

Date: Thursday, October 24, 2013

Time: 9:00 a.m. – 11:00 a.m.

Location: Lane County Sheriff's Office, Emergency Operations Center

125 E. 8th Avenue, Eugene, OR 97401

Attendees: Tony Black (Information Technology), Linda Cook (Emergency Management), Melissa Crane (Geographic Information Systems), Brian Craner (Capital Projects), Matt Dapkus (Facilities), Chris Doyle (Law Enforcement), Selene Jaramillo (Public Health), Michael Johns (Public Works, Fleet), Lisa Lacey (Risk Management), Gary Luke (Geographic Information Systems), Keir Miller (Land Management, Planning), John Petsch (Public Work, Roads), Greg Wobbe (Contractor, Plan Development), Pete Zugelder (Continuity of Gov't)

Absent: Jonna Hill (Public Safety Communications)

Facilitator(s): Linda Cook and Greg Wobbe **Scribe:** Greg Wobbe

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Discussion Item Notes

Item 1: Establish mission statement Hazard Mitigation Action Plan

To promote and implement actions to eliminate or reduce long-term risk to human life and property from the effects of hazards of all types and sources, and to enhance capability to prepare, respond, and recover from such incidents.

- Motion carries to adopt mission statement, as amended.

Item 2: Review and validate Plan goals, discuss revisions and additions

The following Plan goals were discussed and approved. All Emergency Management related Plans will use the same goals as applicable.

Goal 1: Save lives and reduce injuries and illness. (Applies to HMAP, EOP, and COOP to the extent applicable to those County Departments with Emergency Operations Plan functions.)

Goal 2: Minimize and prevent damage to buildings and infrastructure (Applies to HMAP, EOP)

Goal 3: Reduce recovery period and minimize economic losses for the community. (Applies to HMAP, EOP, COOP)

Goal 4: Maintain and improve ability of Lane County, municipal governments, and critical service providers to quickly resume operations. (HMAP, EOP, COOP)

Goal 5: Protect natural, historic, and cultural resources (HMAP, EOP)

Goal 6: Increase awareness and understanding of hazards and risks (HMAP, EOP, COOP)

Goal 7: Improve attractiveness to individuals and businesses by demonstrating effectiveness in dealing with a disaster.

- Action: Develop 'Basic plan' that serves as intro to HMAP, EOP, COOP, EAP.

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- Action: Group agreed to reference in action item descriptions the correlating goals being addressed.

Item 3: Ideas to engage stakeholders ('whole community' approach)

The group discussed stakeholder groups that they already work with that could be engaged in the Plan update process.

- Businesses: excavation contractors, timber contractors, Wildish (Randy Hledik), insurance companies
- Private organizations: HBLA, realtors assoc., LEPC, EWEB, EPUD, Blachly Lane, LTD, hospitals,
- Neighborhood groups: Agricultural groups, CSA's, Oregon Food Bank, Food For Lane County
- Non-profit organizations: Eugene climate change committee

- Motion: Establish 3-tiers of hazard mitigation meetings: discussed and tacitly agreed.
  - Tier 1: HM & EM Steering Committee (quarterly)
  - Tier 2: HM & EM Steering Committee, & Stakeholder Groups (annual)
  - Tier 3: HM & EM Steering Committee, Stakeholder Groups, & General Public (bi-annual).

Item 4: Ongoing discussion: how best to identify & develop action items by project type

Type - Prevention: (e.g., planning and zoning [floodplain regulations], open space preservation [parks and recreation area], land development regulations [large lot sizes], storm water management [clear ditches / larger retention basins], coastal barrier protection [building behind dunes], capital improvement planning [no infrastructure extended into hazard area], building codes.

- Floodplain management regulations are well established and documented.
- Are there analogous regulations relating to site review, development approval for Wildfire?
- Are there subdivision design standards, Firewise communities? (example: forest template dwelling application could include defensible space maintenance requirement, with liability for firefighting costs if not maintained? Good idea, bad idea?)
  - Discussion consensus: not yet, though it has been discussed in the past and could be beneficial if adopted
  - Design review for subdivision access roads does exist, though could be made more robust
  - Defensible space activities are ongoing in coordination with property owners.
  - Senate Bill 360, owner liability for fires that start on their property.
- Same question for Tsunami (e.g., are there disclaimer son property title transfer docs noting tsunami zone?)
  - Discussion consensus is that it's a good idea, but has been pushed back in the past by realtor groups, et al.
  - Discussion consensus recommends limiting critical infrastructure in Tsunami zone
- Building codes and earthquake. Assumption is that code addresses seismic factors for public and commercial buildings, but what about residential?

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- Answer: Yes, building code for residential, commercial, public, etc account for seismic, though it is noted that pre-1960 era building stock may be susceptible.
- Consensus: ongoing effort to understand private dams better.

Type - Property Protection: acquisition, relocation, rebuilding or modifying, floodproofing;

- Acquisition in the future could expand to include wildfire, tsunami.

Type - Public Education and Awareness: providing hazard maps and other hazard information; website; outreach programs providing hazard and mitigation information; asking business owners to provide info to employees; mass mailings; notices to residences and property owners in hazard-specific areas; displays in widely used facilities; media blitz; public access tv channel programs and announcements.

- Excellent ongoing work already occurring in this area.

Type - Natural Resource Protection: erosion and sediment control; wetland protection; dune restoration; reforestation; terracing; beach nourishment, vegetation management.

- Good opportunities to satisfy multiple objectives. Is anything ongoing in this area?
  Answer: Yes, numerous activities coordinating with watershed councils-ODFW for river, stream and riparian zone enhancements, USACE floodplain function restoration, etc.

Type - Critical Facilities Protection: specific to the facility; critical facilities include police and fire stations, hospitals, nursing homes and prisons, hazardous materials production or storage facilities.

- This is another good opportunity to satisfy multiple objectives. For example, storm hardening projects. Any specific sites come to mind as candidates?
  Needs more thought and future discussion.

Type - Structural Projects: levees, culvert upsizing, high flow diversions, debris basins, channel modifications, storm sewers, road elevations.

Road elevation, culvert upsizing are relatively common and effective. Many activities of this type already occurring.

Idea to develop map for fish passage culverts showing location and river/stream miles affected. Map could show both completed projects and planned projects.

Item 5: Steering Committee Members contributed the following Action Items

Public works/roads: Educate property owners who own and are responsible for road maintenance.

GIS: Inundation maps, multiple hazard types, various risk and vulnerability assessment analysis.

Capital projects: Work with other divisions, identify needs.

Information services: Identify infrastructure and communication needs of various departments.

Facilities: Working with capital projects: Exit signs, facility improvements, emergency logistics. Removed seismic hazards, overhead planter boxes (completed).

Road and Bridge: Hosting a flood preparation and planning workshop for multiple agencies, community, utilities, etc.

Floodplain: Annual mailing, advertise flood planning workshop. Informational outreach for Firewise program (spring).

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Public works: Seismic inspections, fish passage projects, 1997-ongoing.

Law Enforcement: At the jail, concrete planters for security, ballistic glass, hardening reception area (completed).

Health: Ongoing public education campaigns to increase immunization rates, and personal preparedness. Ongoing improvements to website, health/mitigation related. Review of facilities, needs assessment for Charnelton Building (too few phone lines, need more infrastructure and support capabilities, etc).

Emergency Services: CERT class ongoing. Develop preparedness standards for County employees…particularly staff with key COOP functions.

Risk Management: Ongoing work to monitor and report facilities that are underinsured.

- Action: Update HMAP and other Plan documents to include the above listed action items.

Item 6: Ongoing - develop asset inventory and loss estimations to inform priorities.

Advanced GIS analysis is planned and ongoing.

- Action: Update HMAP and other Plan documents to include the above listed action items.

Item 7: 'Recent Policy Changes – FEMA Mitigation & the NFIP'.

- Benefit Cost Analysis (BCA). New streamlined approach for acquisition of floodprone properties (August 2013). Highly technical, yet still seems like a somewhat arbitrary review process however, this new policy provides clarity.
- New methodology to account for long-term environmental benefits of open-space for acquisition projects (June 2013). This new policy brings FEMA's BCA methodology more in line with USACE and CBO.

Item 8: Idea considered to establish a single centralized website.

Instead of a single centralized website, it was decided to continue and expand use of links and cross-references amongst departmental websites, centered on Emergency Management website. Check policy, protocol for posting updates on websites.

Item 9: HMAP versions naming convention explained.

Current version 2.3 for fiscal year 2013-2014. Document version name will be updated per quarter following each HMEMSC meeting. Suffix a, b, c, d per fiscal year quarter. For example, the next update will be for the second quarter of Federal Fiscal Year 2014 and the naming convention for this update will be Version 2.3b

Item 10: Overview of SharePoint Site for Hazard Mitigation Action Plan:

No log in required. Plan document will typically be posted in Word doc file type for editing capability. Features explained, check out function, tasks, calendar, etc.

WORKING DRAFT

LANE COUNTY

HAZARD MITIGATION STEERING COMMITTEE

JULY 10, 2013

MEETING NOTES

- Quarterly meetings agreed. Next meeting set for October 24, 9:00 am, coffee yes.

- Morphing HMSC into committee with broader scope which will also oversee EOP, EAP, COOP in addition to HMAP. Invite Tony, and Lisa from risk management.

- Suggestion for a revised committee name might be HM/EMSC, for Hazard Mitigation and Emergency Management Steering Committee. Such a title would resonate with FEMA, as they occasionally make references to 'HM&EM programs/divisions' at state and local levels.

- It was discussed and agreed(*?)* to add health consequences analysis to hazard profiles and/or vulnerability analysis. *This is do-able and I have a plan if you concur with the idea.*

- Discussed and agreed to pursue using a SharePoint site as a promulgation/collaboration method.

- General comments from Melissa Crane indicating interest and capabilities to conduct more advanced hazard analysis mapping.

- Discussion regarding additions to HMAP goals. I think you captured them, but centered on the idea presented by Selene to add 'disease' and/or 'illness' to Goal #1. I also offered the suggestion to add 'historical' to Goal #5.

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APPENDIX D. (INTERIM NOTES) MITIGATION ACTION ITEMS: IMPLEMENTATION REPORTS

Ongoing Work // To-Do List

- Public works/roads: Educate property owners who own and are responsible for road maintenance.
- GIS: Inundation maps, multiple hazard types, various risk and vulnerability assessment analysis.
- Capital projects: Work with other divisions, identify needs.
- Information services: Identify infrastructure and communication needs of various departments.
- Facilities: Working with capital projects: Exit signs, facility improvements, emergency logistics.
- Road and Bridge: Hosting a flood preparation and planning workshop for multiple agencies, community, utilities, etc.
- Floodplain: Annual mailing, advertise flood planning workshop. Informational outreach for Firewise program (spring).
- Public works: Seismic inspections, fish passage projects, 1997-ongoing.
- Health: Ongoing public education campaigns to increase immunization rates, and personal preparedness. Ongoing improvements to website, health/mitigation related.
- Emergency Services: CERT class ongoing. Develop preparedness standards for County employees…particularly staff with key COOP functions.
- Risk Management: Ongoing work to monitor and report facilities that are underinsured.
- Plan Document: Update, expand, refine hazard profiles. Update and integrate physiographic region vulnerability analysis. Standardize risk assessment definitions and methodologies. Continue to refine procedures pursuant to maintenance as a 'living document' and correlation with previous versions, 5-year cycle, etc.

Wish List – Future Mitigation Projects

- Land Development/Planning: Future code considerations: wildfire mitigation elements for rural development, tsunami inundation zone disclaimers on recorded surveys, title transfer documents.
- Health: Review of facilities, needs assessment for Charnelton Building (too few phone lines, need more infrastructure and support capabilities, etc).

Completed Mitigation Actions

- Formed HMEM-SC
- Removed seismic hazards, overhead planter boxes (Facilities, completed 2013).
- LCSO: Lane County Jail, concrete planters for security, ballistic glass, hardening reception area (completed, 2013).

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APPENDIX E. (INTERIM NOTES) KEY FORMS & DOCUMENTS

Hazard Mitigation Project reports are to be prepared by or submitted to the local hazard mitigation officer at the start and completion of mitigation project implementation, or at various midpoints in the grant application, or implementation process. A template for this form is included on the following page.

Information collection during and after disaster occurrences is vital to mitigation planning and for coordination with state and federal emergency management officials. Forms included in this appendix will be used to document damages following disasters are maintained on file by the Lane County Emergency Manager:

- Disaster Summary Outline (Form DEM-93 revised 4/2000), or updated equivalent form
- FEMA Disaster Housing Program: Preliminary Damage Assessment
- Public Property Site Assessment Worksheet (Project Worksheet, PW)

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Hazard Mitigation Project Report

Date:
Project stage (check one): Planning ( ), Implementation ( ), Completed ( ) **Comments:**
Is grant funding being requested: Yes ( ), No ( ), Maybe ( ) **Comments:**
Project description, hazard or problem addressed:
Cost estimate, other comments, analysis:
Agencies involved, key contact information:
Citation/Reference in Hazard Mitigation Action Plan: Yes ( ), No ( ), Maybe ( )
Prepared by:
Return to: Linda Cook, PMP Lane County Emergency Management 125 E. 8th Avenue Eugene, OR 97401 541-682-6744 - office 541-682-3309 – fax Linda.Cook@co.lane.or.us

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OREGON EMERGENCY MANAGEMENT
INFRASTRUCTURE (PUBLIC ASSISTANCE) INITIAL DAMAGE ASSESSMENT FIELD DATA COLLECTION FORM

NAME OF PUBLIC (GOVERNMENT) OR PRIVATE NONPROFIT AGENCY: **COUNTY:** _____

(List damage and emergency response costs for only one agency on each form. Use more than one form per agency if necessary. Only certain private nonprofits should be included on this form. Additional Instructions for this form on reverse side.)

Category	Brief Description of Damage or Cost	Location	Estimated Cost	Comments (Impacts)

Inspector's Name: _____ **Contact Information:** _____ **Date:** _____

This Page Total by Category				Total
Total A	*$0*	*Total E*	*$0*	$0.00
Total B	*$0*	*Total F*	*$0*	
Total C	*$0*	*Total G*	*$0*	
Total D	*$0*	*Total*	*$0*	

Note: Instructions on following page.

INSTRUCTIONS FOR THE INSTRUCTIONS (PUBLIC ASSISTANCE) INITIAL DAMAGE ASSESSMENT FIELD DATA COLLECTION FORM

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This form is intended to be utilized by local government officials or their agent during the Initial Damage Assessment (IDA) to record estimates of damage,
costs, and impacts of the disaster on public infrastructure. The following categories of work shall be utilized:

Emergency Work Categories	Permanent Work Categories
A = Debris Removal	C = Roads and bridges
B = Protective Measures	D = Water control facilities
	E = Public buildings and equipment
	F = Public utility systems
	G = Parks and other

List the work performed, and public facilities damaged, as a direct result of the disaster. Estimate the cost of repair or restoration of damaged public facilities. Be sure to include both work that has been completed and which has not.

For Roads and bridges on the Federal Aid System, Enter "FAS" instead of "C" under the category of work; likewise for debris removal and protective measures related to FAS facilities. Alternatively, FAS damage and costs can be listed on separate field data collection forms if the local jurisdiction wishes. Although FAS costs will not be a factor in determining a request for a Presidential declaration, it may be useful to assess and summarize these damages for inclusion in any requests to the FHWA for assistance.

Only private nonprofits (PNPs) providing the following types of government-like services to the general public should be included on this form: education
facilities, utilities, emergency or medical facilities, custodial care facilities, museums, zoos, community centers, libraries, homeless shelters, and senior citizen centers. All other PNPs should be treated as businesses fro the purpose of damage assessment, and included on Individual Assistance damage assessment forms.

Local officials should be prepared to provide state and federal officials with a detailed cost breakdown of personnel, equipment, materials, and supplies for all completed work. While a variety of forms can be used to summarize these items, the format must document the type and location of work performed. Sample forms are available in the *Disaster Recovery Assistance Guidebook.* Be prepared to describe which sites will be repaired or reconstructed by estimates of potential threats and routine maintenance should not be listed on the forms.

Totals should be summarized on the Initial Damage Assessment Summary Report Form.

Excel Tips: To copy IDA DATA Form, highlight IS IDA DATA tab with cursor arrow + Ctrl, then drag.

FEDERAL EMERGENCY MANAGEMENT AGENCY

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PRELIMINARY DAMAGE ASSESSMENT SUMMARY					
PART 1 - APPLICANT INFORMATION				DATE	
COUNTY	NAME OF APPLICANT/AGENCY		NAME OF LOCAL CONTACT		PHONE NO.
POPULATION	TOTAL BUDGET Approved _____ Balance ___		MAINTENANCE BUDGET Approved ___ Balance ___		Date FY Begins
PART II - COST ESTIMATE - SUMMARY (COMPLETE SITE ESTIMATE BEFORE SUMMARIZING BELOW)					
CATE-GORY	NO. OF SITES	TYPES OF DAMAGE	COST ESTIMATE	Potential Local Funds for Recovery FUND/ACCOUNT	Available Balance
A		Debris Removal			
B		Emergency Protective Measures			
C		Roads & Bridges			
D		Water Control Facilities			
E		Public Buildings			
F		Public Utilities			
G		Recreational or Other			
			TOTAL 0		TOTAL 0

PART III - DISASTER IMPACTS (USE SEPARATE SHEETS IF NECESSARY)
A. GENERAL IMPACT

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1. Identify and describe damages which constitute a health and/or safety hazard to the general public.

2. Population adversely affected directly or indirectly by the loss of public facilities or damages.

3. What economic activities are adversely affected by the loss of public facilities or damage?

B. RESPONSE CAPABILITY:

Can the applicant respond and recover from the damages quickly and without degradation of public services? Describe.

C. IMPACT ON PUBLIC SERVICES IF DECLARATION IS NOT MADE:

e.g. Deferral of permanent repairs, impact on ongoing services and capital improvements, etc. Describe.

NAME OF INSPECTOR	AGENCY	PHONE NO.

FEMA Form 90-80, JAN 84

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APPENDIX F. DATA COLLECTION – HAZARD ANALYSIS

F.1 State of Oregon Disaster Declaration History

State of Oregon; Presidential Disaster Declaration History (data collection ongoing)

Month	Year	DR #	Lane County	General Description	Primary Affected Area	PA Total	IA Apps Approved	IA Total
Feb	2014	4169	yes	Winter				
Jan	2012	4055	yes	Winter				
Mar	2011	1964	no	Japan Tsunami				
Jan	2011	1956	no	Winter				
Dec	2008	1824	no	Winter				
Dec	2007	1733	no	Flooding, Landslides	Vernonia, Gearhart	$56,284,758	1,059	$6,402,583
Dec	2006	1683	no	Winter, Flooding		$5,095,726		
Nov	2006	1672	no	Flooding, Landslides	Astoria	$4,290,223		
Dec	2005	1632	no	Flooding, Landslides		$7,631,752		
Dec	2003	1510	yes	Winter		$10,289,394		
Feb	2002	1405	yes	Windstorm		$4,796,806		
May	1998	1221	no	Flooding	Crook County	not available		
Dec	1996	1160	yes	Winter, Flooding		not available		
Dec	1996	1107	yes	Windstorm		not available		
Feb	1996	1099	yes	Storms, Flooding		not available		
Jul	1995	1061	no	Flash Flooding	Wasco County	not available		
May	1994	1036	no	Salmon Industry		not available		
Sep	1993	1004	no	Earthquake	Klamarth County	not available		
Mar	1993	985	no	Earthquake	Clackmas, Marion			
Jan	1990	853	no	Flooding	Clatsop, Tillamook Counties			
Jan	1974	413	yes	Snowmelt, Flooding				
Dec	1972	319	yes	Storms, Flooding				
Feb	1971	301	no	Storms, Flooding	Clatsop, Tillamook Counties			
Dec	1964	184	yes	Rains, Flooding				
Feb	1963	144	n/a	Floods				
Oct	1962	136	yes	Storms				
Mar	1957	69	n/a	Flood				
Jul	1956	60	n/a	Flood				
Dec	1955	49	n/a	Flood				

Source: FEMA; https://www.fema.gov/disasters

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DOGAMI Tsunami Interpretive Map Series, IMS-24

Note: cross-references with Sub-section 3.2.8 (Tsunami Hazard Profile)

Introduction

The Oregon Department of Geology and Mineral Industries (DOGAMI) has been identifying and mapping the tsunami inundation hazard along the Oregon coast since 1994. In Oregon, DOGAMI manages the National Tsunami Hazard Mitigation Program, which has been administered by the National Oceanic and Atmospheric Administration (NOAA) since 1995. DOGAMI's work is designed to help cities, counties, and other sites in coastal areas reduce the potential for disastrous tsunami-related consequences by understanding and mitigating this geologic hazard. Using federal funding awarded by NOAA, DOGAMI has developed a new generation of tsunami inundation maps to help residents and visitors along the entire Oregon coast prepare for the next Cascadia Subduction Zone (CSZ) earthquake and tsunami. The CSZ is the tectonic plate boundary between the North American Plate and the Juan de Fuca Plate (Figure 1). These plates are converging at a rate of about 1.5 inches per year, but the movement is not smooth and continuous. Rather, the plates lock in place, and unreleased energy builds over time. At intervals, this accumulated energy is violently released in the form of a megathrust earthquake rupture, where the North American Plate suddenly slips westward over the Juan de Fuca Plate. This rupture causes a vertical displacement of water that creates a tsunami (Figure 2). Similar rupture processes and tsunamis have occurred elsewhere on the planet where subduction zones exist: for example, offshore Chile in 1960 and 2010, offshore Alaska in 1964, near Sumatra in 2004, and offshore Japan in March 2011.

CSZ Frequency

Comprehensive research of the offshore geologic record indicates that at least 19 major ruptures of the full length of the CSZ have occurred off the Oregon coast over the past 10,000 years (Figure 3). All 19 of these full-rupture CSZ events were likely magnitude 8.9 to 9.2 earthquakes (Witter and others, 2011). The most recent CSZ event happened approximately 300 years ago on January 26, 1700. Sand deposits carried onshore and left by the 1700 event have been found 1.2 miles inland; older tsunami sand deposits have also been discovered in estuaries 6 miles inland. As shown in Figure 3, the range in time between these 19 events varies from 110 to 1,150 years, with a median time interval of 490 years. In 2008 the United States Geological Survey (USGS) released the results of a study announcing that the probability of a magnitude 8-9 CSZ earthquake occurring over the next 30 years is 10% and that such earthquakes occur about every 500 years (WGCEP, 2008).

CSZ Model Specifications

The sizes of the earthquake and its resultant tsunami are primarily driven by the amount and geometry of the slip that takes place when the North American Plate snaps westward over the Juan de Fuca Plate during a CSZ event. DOGAMI has modeled a wide range of earthquake and tsunami sizes that take into account different fault geometries that could amplify the amount of seawater displacement and increase tsunami inundation. Seismic geophysical profiles show that there may be a steep splay fault running nearly parallel to the CSZ but closer to the Oregon coastline (Figure 1). The effect of this splay fault moving during a full-rupture CSZ event would be an increase in the amount of vertical displacement of the Pacific Ocean, resulting in an increase of the tsunami inundation onshore in Oregon. DOGAMI has also incorporated physical evidence that suggests that portions of the coast may drop 4 to 10 feet during the earthquake; this effect is known as subsidence. Detailed information on fault geometries, subsidence, computer models, and the methodology used to create the tsunami scenarios presented on this map can be found in DOGAMI Special Papers 41 (Priest and others, 2009) and 43 (Witter and others, 2011).

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Map Explanation

This tsunami inundation map displays the output of computer models representing five selected tsunami scenarios, all of which include the earthquake-produced subsidence and the tsunami-amplifying effects of the splay fault. Each scenario assumes that a tsunami occurs at Mean

Higher High Water (MHHW) tide; MHHW is defined as the average height of the higher high tides observed over an 18-year period at the Yaquina Bay (Central Coast Model) tide gauge. To make it easier to understand this scientific material and to enhance the educational aspects of hazard mitigation and response, the five scenarios are labeled as "T-shirt sizes" ranging from Small, Medium, Large, Extra Large, to Extra Extra Large (S, M, L, XL, XXL). The map legend depicts the respective amounts of slip, the frequency of occurrence, and the earthquake magnitude for these five scenarios. Figure 4 shows the cumulative number of buildings inundated within the map area.

The computer simulation model output is provided to DOGAMI as millions of points with values that indicate whether the location of each point is wet or dry. These points are converted to wet and dry contour lines that form the extent of inundation. The transition area between the wet and dry contour lines is termed the Wet/Dry Zone, which equates to the amount of error in the model when determining the maximum inundation for each scenario. Only the XXL Wet/Dry Zone is shown on this map. This map also shows the regulatory tsunami inundation line (Oregon Revised Statutes 455.446 and 455.447), commonly known as the Senate Bill 379 line. Senate Bill 379 (1995) instructed DOGAMI to establish the area of expected tsunami inundation based on scientific evidence and tsunami modeling in order to prohibit the construction of new essential and special occupancy structures in this tsunami inundation zone (Priest, 1995).

Time Series Graphs and Wave Elevation Profiles

In addition to the tsunami scenarios, the computer model produces time series data for "gauge" locations in the area. These points are simulated gauge stations that record the time, in seconds, of the tsunami wave arrival and the wave height observed. It is especially noteworthy that the greatest wave height and velocity observed are not necessarily associated with the first tsunami wave to arrive onshore. Therefore evacuees should not assume that the tsunami event is over until the proper authorities have sounded the all-clear signal at the end of the evacuation. Figure 5 depicts the tsunami waves as they arrive at a simulated gauge station. Figure 6 depicts the overall wave height and inundation extent for all five scenarios at the profile locations shown on this map.

Data References

Source Data: This map is based on hydrodynamic tsunami modeling by Joseph Zhang, Oregon Health and Science University, Portland, Oregon. Model data input were created by John T. English and George R. Priest, Department of Geology and Mineral Industries (DOGAMI), Portland, Oregon. Hydrology data, contours, critical facilities, and building footprints were created by DOGAMI. Senate Bill 379 line data were redigitized by Rachel L. Smith and Sean G. Pickner, DOGAMI, in 2011 (GIS file set, in press, 2012). Urban growth boundaries (2011) were provided by the Oregon Department of Land Conservation and Development (DLCD). Transportation data (2010 and 2007) provided by Lane and Lincoln Counties were edited by DOGAMI to improve the spatial accuracy of the features or to add newly constructed roads not present in the original data layer. Lidar data are from DOGAMI Lidar Data Quadrangles LDQ-2011-44124-B1-Heceta Head and LDQ-2011-44124-C1-Yachats.

Coordinate System: Oregon Statewide Lambert Conformal Conic, Unit: International Feet, Horizontal Datum: NAD 1983 HARN, Vertical Datum: NAVD 1988. Graticule shown with geographic coordinates (latitude/longitude).

References

WORKING DRAFT

2007 Working Group on California Earthquake Probabilities (WGCEP), 2008, The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2): U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203 [http://pubs.usgs.gov/of/2007/1437/].

Priest, G. R., 1995, Explanation of mapping methods and use of the tsunami hazard maps of the Oregon coast, Oregon Department of Geology and Mineral Industries Open-File Report O-95-67, 95 p.

Priest, G.R., Goldfinger, C., Wang, K., Witter, R.C., Zhang, Y., and Baptista, A.M., 2009, Tsunami hazard assessment of the northern Oregon coast: a multi-deterministic approach tested at Cannon Beach, Clatsop County, Oregon: Oregon Department of Geology and Mineral Industries Special Paper 41, 87 p.

Witter, R.C., Zhang, Y., Wang, K., Priest, G.R., Goldfinger, C., Stimely, L.L., English, J.T., and Ferro, P.A., 2011, Simulating tsunami inundation at Bandon, Coos County, Oregon, using hypothetical Cascadia and Alaska earthquake scenarios: Oregon Department of Geology and Mineral Industries Special Paper 43, 57 p.

Software: Esri ArcGIS® 10.1, Microsoft® Excel®, and Adobe® Illustrator®

Funding: This map was funded under award #NA09NW54670014 by the National Oceanic and Atmospheric Administration (NOAA) through the National Tsunami Hazard Mitigation Program.

Map Data Creation/Development*:Tsunami Inundation Scenarios*: George R. Priest, Laura L. Stimely, Daniel E. Coe, Paul A. Ferro, Sean G. Pickner, Rachel L. Smith *Basemap Data*: Kaleena L.B. Hughes, Sean G. Pickner

Map Production*:*
Cartography: Kaleena L.B. Hughes, Sean G. Pickner, Taylore E. Wille

Text: Don W.T. Lewis, Rachel L. Smith

Editing: Don W.T. Lewis, Rachel L. Smith

Publication: Deborah A. Schueller

Map Date: 03/04/2013

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Graphical Notes

Cascadia Subduction Zone Setting

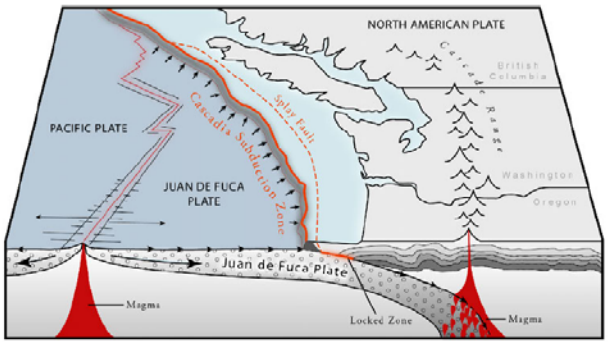


Figure 1: This block diagram depicts the tectonic setting of the region. See Figure 2 for the sequence of events that occur during a Cascadia Subduction Zone megathrust earthquake and tsunami.

How Tsunamis Occur

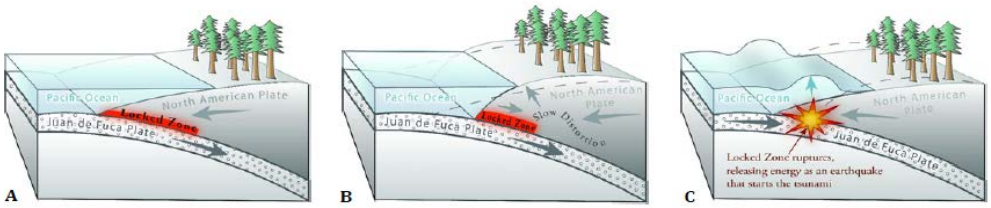
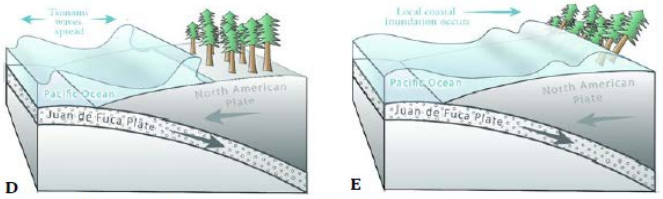


Figure 2: The North American Plate rides over the descending Juan de Fuca Plate at a rate of approximately 1.5 inches per year.

Because the two plates are stuck in place at the "locked zone," strain builds up over time and the North American Plate bulges up.

Eventually the locked zone ruptures and causes a great earthquake. The sudden slip of the two plates displaces Pacific Ocean water upward and creates a tsunami.



Displaced and uplifted Pacific Ocean water rushes in all directions.

Along the Oregon coast, tsunami waves run up onto the land for several hours.

Legend

Earthquake Size	Average Slip Range (ft)	Maximum Slip Range (ft)	Time to Accumulate Slip (yrs)	Earthquake Magnitude
XXL	59 to 72	118 to 144	1,200	~9.1
XL	56 to 72	115 to 144	1,050 to 1,200	~9.1
L	36 to 49	72 to 98	650 to 800	~9.0
M	23 to 30	46 to 62	425 to 525	~8.9
S	13 to 16	30 to 36	300	~8.7
XXL Wet/Dry Zone				

- Urban Growth Boundary
- Building Footprint
- Simulated Gauge Station (A1)
- Profile Location
- Senate Bill 379 Line
- State Park
- Elevation Contour (25 ft intervals up to 200 ft)
- Fire Station
- Police Station
- School
- Hospital/Urgent Care Clinic
- U.S. Highway
- State Highway
- Improved Road

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F.3 Data Sources, Citations

Works Cited

American Planning Association. (2010). *Hazard Mitigation: Integrating Best Practices into Planning.* American Planning Association.

FEMA. (1997, January 23). *Federal Disaster Declarations.* Retrieved from http://www.fema.gov/news/disasters.fema.

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Lane County CWPP. (2005). *Community Wildfire Protection Plan.*

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Pittman, A. (1996). And the Rain Came Down. *Eugene Weekly* .

The Associated Press. (2000, July 24). Ranger station in Oregon rebuilt after '96 arson. *The Seattle Times* .

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APPENDIX G. PREVIOUS PLANNING CYCLE (2006-2012)

The following sections outline activities from the previous planning cycle circa 2006-2012. Appendix H sub-sections include descriptions of planning meetings (H.1.1 Planning Process 2006-2012 Cycle), action item status report (H.1.2 Previous Action Item Status Report), notes and correspondence from previous planning cycle (H.1.3 Mitigation Notes and Correspondence 2006-2012), grant funded mitigation projects (H.1.4 Grant Funded Mitigation Projects), and data collection from the previous cycles (H.1.5 Data Collection 2006-2012 Cycle).

G.1 Planning Process 2006-2012 Cycle

2007

The county's Land Management Division (LMD) and Public Works GIS (PW-GIS) staff took on the development of a Community Wildfire Protection Plan (CWPP). Staff met with Oregon Department of Forestry (ODF) and the Lane County Fire Defense Board (comprised of 25 fire chiefs countywide) on several occasions to discuss the CWPP risk assessment and plan. The goal was to coordinate the use of data resulting from new structural vulnerability assessments being conducted by ODF and to evaluate new wildfire fuels/vegetation hazard data.

The Land Management Division also worked with the County Parks Department, ODF, several east Lane fire districts and the Willamette National Forest on the three fuels reduction and water supply grants that were awarded for mitigation projects.

Additionally Lane County Land Management Division submitted a 2007-2008 CWPP grant application for funding through the Lane County Legislative Committee (Title III). The proposal focused primarily on education and outreach projects and was awarded. These activities reinforced the importance of keeping public education and outreach central to the Plan.

2008

Lane County Emergency Management documented the local Flood Threat Recognition system in place as contribution to the Community Rating System (CRS) process. The Lane County Land Management Division is the lead agency in pursuing the CRS credit points for the County.

Special emphasis this year was on the earthquake hazard in Lane County. A special committee reviewed the DOGAMI report (IMS 24), identified key talking points for briefing elected officials about the hazard and, identified action items for mitigating risks.

It was further identified that special emphasis should be placed on dam vulnerability. With assistance from the Army Corps of Engineers, the most vulnerable dam identified in Lane County is Fern Ridge dam, which could be subject to liquefaction during a Cascadia Subduction Zone event. As such, a new hazard mitigation project was identified for that hazard that focuses on public education and outreach for residents living downstream of that dam.

2009

The Community Wildfire Protection Plan was presented at an East Lane Forest Protection Association meeting that included a 2009 summer tour to take an in depth look at how Senate Bill 360 gets applied across the landscape, Lane County's role in this effort and to see examples of fuels reduction on high and moderate rating sites.

The tour provided an opportunity for a group of about 30 people comprised of community members, stakeholders, government officials and elected officials to see how ODF and private landowners can work together with Lane County to reduce the threat of wild fire and to talk with the folks on the ground that make this happen.

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2010

Mitigation in Year Four of the previous planning cycle centered on 4 activities in addition to general plan maintenance and integration functions: safe pharmaceutical disposal, pandemic mitigation, flood mitigation, and risk assessment for dams.

This first involved enaging the community in keeping pharmaceuticals out of the waterways. A major community-wide drug take-back event was held in March. At the time, this was the first attempt at a coordinated effort in Oregon. It provided a multi-pronged opportunity to educate the public about the importance of keeping our drinking water sources free from hazardous chemicals, keeping chemicals out of the landfill, as well as keeping pharmacetuicals out of the wrong hands. Key participants were the Eugene Water and Electric Board (EWEB); Springfield Utility Board; City of Eugene Public Works Wastewater and Eugene Police; Springfield Public Works Environmental Services, Springfield Police; Lane County Waste Mangement, Emergency Management, Sheriff's Office, Public Works Waste Manage, Public Health and Youth Services. Also involved were about ten local pharmacists who volunteered their time the day of the event. This project helped us see that unanticipated projects can emerge to help mitigate hazards that are not typically addressed by mitigation plans.

Pandemic Influenza was a major concern in 2010 and an outreach effort was undertaken to mitigate widespread disease. Mitigation included, but was not limited to, applying an anti-microbial product to all high-traffic public areas in the county public service building, courthouse and parole and probation offices to serve a dual purpose of mitigating against any intentional spread of biological agents as well as the natural spread of H1N1 and other microbials. Responding to this unanticipated event led to the inclusion of "*Action Item 12. Action Planning for Pandemic Illness and Other Health Hazards*".

The county and state worked together to identify high water locations throughout Lane County that might be suitable for a mitigation grant. In August Lane County Emergency Management, Public Works and Oregon Emergency Management representative, Phil Carpenter, toured high water locations. Mr. Carpenter produced a report that will help with identifying specific staff and funding needs.

Since Lane County is home to nine out of the thirteen US Army Corps of Engineers (USACE) dams in the Willamette River basin, there was a great deal of public interest when USACE announced the need to repair spillway gates on several dams. The high level of interest provided an excellent opportunity for collaborating on engaging the community in flood mitigation discussions. Lane County and the cities of Eugene and Springfield joined the USACE to present preparedness information at two well attended community meetings hosted by USACE in September and October. Additionally, Lane County Emergency Management hosted a Flood Planning Workshop for over 55 agency officials throughout the County followed by a Sandbagging Class presented by USACE.

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Countywide Flood Workshop, Springfield Public Works, October 1, 2010

Countywide Flood Workshop, Springfield Public Works, October 1, 2010

2011

The primary focus for 2011 was an in-depth review of the HMAP to evaluate its usefulness over the long term. This led to a comprehensive update which resulted in a stand alone document that is more focused, more succinct, and easier to track than the 2006 edition. The goal is to have an easy-to-use Plan document to serve as a reference guide for all parties (public and private) engaged in mitigation activities. The intent over the next five years is to make a second attempt at an oversight committee but with a more streamlined, focused approach.

2012

In 2012 OEM and FEMA conducted review of the updated HMAP in accordance with state and federal standards. The document was approved by both agencies and adopted by the County Board by resolution.

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Lane County's mitigation planning process during the 2006-2012 cycle included several efforts to seek public input into the planning process.

- A special page on the Lane County Emergency Management website was established (www.lanecounty.org/prepare) to solicit public input. The entire document is available for download and an on-line form makes it easy to submit comments.

- Plan elements were discussed during public education and outreach activities. For example, the historical occurrences of some storm events were not found in early drafts. After discussion with the attendees at outreach events about their memories of past incidents committee members were able to refine their research efforts to improve the historical record of past occurrences.

- A news release was issued on Friday, February 17, inviting all members of the public to comment on the Plan Update either via the website, via email, by attending the public meeting or by contacting Lane County Emergency Management directly.

- A public meeting was held on March 1, 2012 to solicit input to the final draft before going to the Board of County Commissioners for final approval.

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G.2 Previous Action Item Status Report (2006-2012 Cycle)

The action items for the Natural Hazards Mitigation Plan were established by the committee in 2006. This section of the Plan Update provides a comprehensive review of the progress made on each of the action items. The action item status indicates if the action item has been completed, ongoing or removed from the plan. In addition, it will indicate whether the action item will be rewritten for the Plan Update.

The comprehensive plan review identified several problems with the original crafting of the action items.

- Action items were written for every type of hazard resulting in a significant amount of redundancy and overlap among the action items. In other words, one type of action item applied to many hazards and was, in essence, repeated multiple times.
- Hazards were not prioritized prior to creating the action items.
- Some action items were assigned to agencies that were not adopters of the plan and some agencies were not at the table at the time the action items were created.
- The action items did not address all of the county departments that have a role in hazard mitigation.

The Plan Update adopts a new structure for the action items. A more strategic approach will be used that allows more flexibility for achieving the intent of the action item. New funding opportunities and disasters occurring elsewhere that create a local sense of urgency can both be motivating factors for accelerating the accomplishment of an action item's intent in unanticipated ways. Therefore the Plan Update uses a broader definition for each Action Item to encourage continuous reflection and contemplation about the wide range of things that can be done to reduce hazards and to encourage more frequent status updates on each action item. Additionally, a shorter list of broad reaching action items makes it easier to keep the list of action items in front of county agencies and the public as constant reminders that we all need to do our part.

Another benefit to this approach is that it makes the county's Plan easier for cities and the local tribe to adopt. The action items could apply to all jurisdictions and with the addition of just a few jurisdiction-specific action items a small city or tribe could be on its way to implementing its own Natural Hazards Mitigation Plan.

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A. Action Item No: MH #1 Amended Item No: 1

"Create and formalize a Lane County Advisory Committee to oversee implementation, identify and coordinate funding opportunities, and sustain the Lane County Natural Hazards Mitigation Plan (including the CWPP) and the Emergency Operations Plan, as a single integrated effort."

Status Update:
Various sub-committees met periodically to implement hazard mitigation projects and to secure funding opportunities. This will continue to be ongoing and improved upon during the next plan performance period.

However, sustaining the NHMP, CWPP and EOP as a single integrated effort is not feasible. Although the intent is to ensure that elements of the NHMP are integrated into and coordinated with other plans, various staff members and departments work on these plans at different times based on department priorities and work plans therefore sustaining them as a single integrated effort is impracticable. However, incorporating mitigation action items into other planning mechanisms as appropriate is reasonable and attainable.

- **This item is rewritten as follows:** Establish Mitigation Coordinating Committee to act as a forum for hazard mitigation issues, disseminate hazard mitigation ideas and activities to all participants, monitor implementation of the Action Items and report on progress and recommended changes to the Plan as appropriate. Includes identifying opportunities to incorporate mitigation actions into other planning mechanisms, such as comprehensive or capital improvements, as appropriate.

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B. Action Item No's: MH #2, MH #3, MH #4, EH #1, WH #2, WH #4, WH #5, WH #7, LH #1

Amended Item No: 2

Status Update:
All of the items listed above pertain to some type of public education activity with some degree of overlap. Public education and outreach programs are an effective strategy for orienting community members to family preparedness and property protection measures. Every type of hazard should be mitigated in part through public outreach programs. To more broadly represent the many ways this gets accomplished, the 2011 Plan Update moves away from individual detailed activities to a more strategic approach to public outreach in general. As such, these individual action items will be replaced with a broader, overarching public outreach action item as rewritten below.

- **This item is rewritten as follows:** Conduct public outreach activities related to natural hazard mitigation and personal preparedness using a variety of media sponsored by various agencies, such as:
  - Community newsletters and direct mailings
  - News releases and public service announcements
  - Presentations at meetings of neighborhood, civic or business groups
  - Displays in public buildings or shopping malls
  - Signs in parks, along trails and on waterfronts that explain natural features (such as the river or ocean) and their relation to hazards (such as floods)
  - Brochures available in government buildings
  - Special meetings

Status Update:

The intent of these action items is to carry out effective public education and outreach activities. These have been achieved in many different venues by various agencies from speaking engagements, public mailers, website updates, etc. A sample listing of many of those activities is provided below.

- *Lane County Emergency Management delivers on average 8 public education presentations a year and is a regular guest on radio talk shows.*
- *Lane County has several departmental websites that help community members reduce various types of hazard risk*
- *According to a recent survey of fire service agencies in Lane County, 91% of agencies provide some form of information on how to reduce fire risk to the community.*

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C. Action Item No: MH #5 Amended Item No: 3

"Provide HAZUS training opportunities for County Staff (Lane County Public Works GIS technicians)."

Status Update:

The HAZUS software has been obtained from FEMA and training classes identified. However, there is a cost associated with staff attending the training and learning the software, therefore this action item is currently cost prohibitive due to shrinking budgets and decreasing staff resources. However, Lane County Emergency Management and Lane County Public Works have entered into a Memorandum of Understanding that allows Emergency Management to contract with Public Works on an ad-hoc basis to help cover some of the costs of Emergency Management related projects; training on HAZUS software could be one of those projects. If Lane County GIS technicians are trained in HAZUS then they will be able to create maps to inform decision makers about viable risk reduction measures.

This action item will remain in the plan as on-going but rewritten for better clarity.

- **This item is rewritten as follows:** Develop in-house competency with HAZUS software so that additional loss-estimation data can be provided regarding natural hazard risks and inform decisions about potential risk reduction measures.

D. Action Item No: MH #6, MH #9, LH #2, LH #4, VH #4, DH #3, HMH #3

Amended Item No: 4

All of the action items listed above relate to mapping and overlap in their pertinence to mapping hazardous areas or creating a regional repository for hazard data. Maps, particularly digitized maps using a Geographical Information System, are a major component of effective hazard mitigation. Maps can illustrate the hazard vulnerabilities of specific areas and inform planners and policy makers on important decisions. As such, these individual action items will be replaced with two action items: one overarching mapping action item that has broader application and the second that focuses on locating critical facilities within hazardous areas.

Status Update:

One idea for implementation was to "Create and maintain a single server/location that regional users can access for accurate GIS data. This is especially important for Land Management when issuing building permits or analyzing development proposals."

Although there is regional agreement about the benefits of a centralized location for storing map related metadata, the county and most cities opt to maintain their own data. Achieving a single, regional location for accessing accurate GIS data is not a high priority for agencies facing shrinking budgets and decreasing staff resources. A regional repository would require dedicated staff to locate, update, create and maintain metadata on an on-going basis. Lane Council of Governments has twice applied for grant funding for this project but funding was not

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awarded. This project is repeated each year in Lane Council of Government's annual list of top five projects but remains unfunded.

Nonetheless, a major accomplishment was achieved toward the intent of this action item: the creation of a GIS Data Catalog: List of Available Data. Although this falls short of the more comprehensive idea described above, it was an achievable alternative with significant benefit. The data catalog informs plan developers of the data available for producing maps and thereby encourages better analysis of key decisions.

With regard to digitizing existing maps, two circa 1980 maps depicting the U.S. Army Corps of Engineers' inundation zones in the event of a catastrophic failure of either Hills Creek or Look Out Point dams have been digitized for evacuation planning purposes.

- **This item is rewritten as follows:**
  - Develop a list of hazard types to be mapped; identify, locate and obtain the necessary data and create hazardous area maps.
  - Plot critical facilities and infrastructure on the hazardous area maps to show their location within the hazard areas.

E. Action Item No: MH #7 Amended Item No: 5

"Expand existing special needs population data to include detailed inventory of all at-risk communities (elderly, homeless, disabled, etc.) that are without access to transportation and communication and determine mechanisms for alert/ warning and evacuation."

Status Update:

Currently this action item is considered unfeasible because of the staff time to create and maintain an inventory database of this kind. However, an alternative implementation was pursued that focuses on providing information to the agencies that serve the at-risk communities so they can, in turn, address their clientele's needs for transportation and communication.

- **This action item will remain in the plan as-is in case the opportunity emerges to complete this item. Outreach to agencies serving at-risk populations will be on-going and covered under the public outreach programs.**

F. Action Item No: MH #8 Amended Item No: 6

"Review and develop recommendations to the Lane County Board of Commissioners for additions to land use regulations such as the creation of new potential hazard overlay zones or environmental constraint overlays (in addition to existing flood and wildland-urban interface overlays) such as tsunami inundation areas, steep slope, or debris flow prone areas."

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Status Update:

As a component of the Lane County Land Management Division's 2009-2010 Long-Range Planning Work Program, staff was directed to initiate a process to develop proposed amendments to the floodplain regulations of Lane Code Chapters 10.271 and 16.244. In addition, staff was directed to work with a Technical Advisory Committee to develop a "Drinking Water Protection Overlay Zone" for possible adoption by the Lane County Board of Commissioners.

These proposed code amendments were designed to achieve the following objectives:

- Protect human life, health and property.
- Minimize the potential for contamination to surface and ground waters
- Manage the alteration of flood hazard areas to minimize the immediate and cumulative impacts of development on the natural and beneficial functions of the floodplain.
- Minimize expenditure of public money on costly pollution remediation projects and emergency response operations.

On November 4, 2010 the Lane County Planning Commission voted 6-3 to cancel the public hearing on this matter and postpone indefinitely the process to review proposed floodplain regulations and a proposed drinking water overlay zone. This action followed the Lane County Board of Commissioners 3-2 vote earlier that same week to table the proposed ordinances and process.

The action by both the Board and Planning Commission ended the process and public hearings on the proposed floodplain and drinking water protection ordinances. The decisions by the two bodies were reached following significant public comment and concern about the matter.

Nonetheless, the Planning Commission voted to recommend that the Board of Commissioners prioritize the work on floodplain and drinking water regulations and put them on the Land Management Division's long-range planning work program for consideration in the future.

- **This action item will remain in the plan as on-going since it pertains to any type of hazard that could be mitigated through zoning.**

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G. Action Item No's: EH #2, EH #3, EH #4
Amended Item No: N/A – Item Completed

All of the above action items relate to earthquake mitigation:

EH 2: Develop an inventory of public and commercial buildings that may be particularly vulnerable to earthquake damage;

EH 3: Complete Rapid Visual Assessments to analyze seismic vulnerability of public facilities.

EH 4: Develop and implement projects for highest priority facilities from EH 3.

Status Update:

These action items were essentially completed as a function of Oregon Senate Bill 2 (2005) Statewide Seismic Needs Assessment Using Rapid Visual Screening. Senate Bill 2 (2005) directed DOGAMI, in consultation with project partners, to develop a statewide seismic needs assessment, including seismic safety surveys of: K-12 public school buildings and community college buildings that have a capacity of 250 or more persons, hospital buildings with acute inpatient care facilities, fire stations, police stations, sheriffs' offices and other law enforcement agency buildings. Lane County has a copy of the report showing the results of facility assessments conducted in Lane County: Implementation of 2005 Senate Bill 2 Relating to Public Safety, Seismic Safety and Seismic Rehabilitation of Public Buildings; the report is available for viewing or download at:

www.http://blog.oregonlive.com/oregonianspecial/DOGAMI-SNA-05-22-07.pdf

Assessment of commercial buildings (EH 2) is outside the jurisdiction of the county or state and implementation of seismic rehabilitation projects (EH 4) is the responsibility of each individual agency.

The statewide needs assessment consists of rapid visual screenings (RVS) of these buildings in accordance with FEMA-154, 2002 Edition, or an equivalent standard adopted by DOGAMI; information gathering to supplement RVS; and ranking of RVS results into risk categories. Senate Bill 2 (2005) provides the first step in a pre-disaster mitigation strategy that is further defined in Senate Bills 3-5 (2005). Senate Bill 3 (2005) directs the Oregon Emergency Management office to create a grant program for local communities. Senate Bills 4 (2005) and 5 (2005) direct the state treasurer to issue voter approved bonds. Altogether, $1.2 billion will be appropriated to improve seismic safety statewide. Note that grant funding for seismic rehabilitation is directly related to seismic needs assessment.

- **This action item will be removed from the 2011 Plan Update because it has been completed.**

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H. Action Item No: EH #5 Amended Item No: 7

"Implement recommendations listed in OEM's After Action Report dated August 2005 pertaining to the West Coast Tsunami Warning that was issued on June 14, 2005."

Status Update

Lane County Emergency Management created a best practices guide, Best Practices, Responding to Distant Tsunami Warning for the coastal counties in Oregon with input from those counties (see Appendix F).

This action item will be on-going but rewritten to reflect the broader need for continued Tsunami preparedness.

- **This item is rewritten as follows:** Continuously examine opportunities to improve response to distant tsunami warnings and a coastal earthquake generating a tsunami. Implement measures as feasible.

I. Action Item No. FH #1
Amended Item No: N/A – Item Completed

"Compile data and prepare GIS maps for structures within the 100-year floodplains. Use the newly available Lane County DFIRMs (Digital Flood Insurance Rate Maps) and the nearly complete & updated parcel base to create an online application for planners, property owners and potential land buyers to quickly and easily understand flood hazards."

Status Update

This item has been completed. Digital floodplain maps are accessible on the County's website using the County's Zone and Plan Map Viewer. The Zone and Plan Map Viewer is an interactive, web browser-based map tool that allows users to look up their property, zoom in and out, pan and turn on and off several different layers of map information related to planning and zoning.

- **This action item will be removed from the 20110 Plan Update because it has been completed.**

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J. Action Item No. FH #3
Amended Item No: N/A – Action Completed

"Conduct study to understand relationship between NWS stream gauge data and on-the ground flood impacts felt by landowners along the forks of the Willamette River."

Status Update

This item was completed however, it was for an area along the McKenzie River (not the Willamette).

Community members were invited to a meeting in September 2010 sponsored by the Lane County Sheriff's Office, Emergency Management Division to discuss flood warning services on the lower McKenzie River. National Weather Service representative, Andy Bryant, was there to guide the community through a discussion about past flooding along the lower McKenzie and how we could improve flood warning services for that area. Based on information from the February 1996 flood and information learned at the meeting from local residents about more recent high water events, a flood stage level was established at the Walterville gage to better reflect actual conditions observed on the ground to the flood-affected area.

In addition, the National Weather Service implemented an intermediary flood level for the Mohawk and Siuslaw Rivers in Lane County. Previously only two warning levels had been defined: Flood Stage (minor flood) and Major Flood. For the Mohawk and Siuslaw rivers there is a relatively big difference (in feet) between flood stage and major flood. Therefore the National Weather Service added an in-between level, called "Moderate Flood" to enhance flood warning services:

Mohawk River-Springfield Flood Stage = 15' Moderate Flood = 22' Major Flood = 25'

Siuslaw River- Mapleton Flood Stage = 18' Moderate Flood = 22' Major Flood = 28'

- **This action item will be removed from the 2011 Plan Update because it has been completed.**

K. Action Item No. FH #4
Amended Item No: N/A – Action Completed

"Complete the inventory of locations in Lane County subject to frequent storm water flooding."

Status Update:

This action item has been completed. A copy of the inventory of high water locations and their mapped location can be found in Appendix G.

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- **This action item will be removed from the 2011 Plan Update because it has been completed.**

L. Action Item No. FH #5 Amended Item No: 8

"For locations with repetitive flooding and significant damages or road closures, determine and implement mitigation measures such as upsizing culverts or storm water drainage ditches."

Status Update:

A tour of high water locations was completed in August 2010 by Emergency Management, Public Works Road Maintenance and a State mitigation contractor. A report was produced outlining the costs associated with remediating problematic areas. The inability to fund these types of major projects is the primary obstacle for completion.

- **This action item will remain in the 2011 Plan Update as on-going but low priority for funding. It is unlikely that projects will be completed from year to year on this action item.**

M. Action Item No. FH #6
Amended Item No: N/A – Action Completed

"Explore the potential for Lane County to participate in the Community Rating System (CRS) of the National Flood Insurance Program (NFIP)."

Status Update:

This action item has been completed. As part of the Lane County Land Management Division's 2007 Long Range Planning Work Program, staff was formally directed to take actions necessary for the county to gain admittance into the CRS. Prior to submitting an application, LMD was first required by FEMA to process updates to the county's floodplain ordinances (LC 16.244 and LC 10.2.71) and to take measures necessary to address Lane County's repetitive flood loss properties. These activities were carried out during 2007 and on March 3, 2008 Lane County's CRS application and accompanying documentation was submitted to FEMA for formal review.

On July 2, 2009, Lane County received official notification of admission into the CRS.

- **This action item will be removed from the 2011 Plan Update because it has been completed.**

N. Action Item No. WH #1, WH #8
Amended Item No: N/A – Action Completed

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"Work with utilities to establish agreed upon standards for all utilities operating in Lane County regarding tree pruning around transmission lines and trunk distribution lines."

"Develop a hazardous tree inventory for all County properties"

Status Update

These action items are somewhat misguided and unnecessary. According to a recent survey of utilities in the county, tree pruning is a primary measure they perform on a regular basis to maintain reliability. Survey comments include:

> "We make sure our transmission lines are clear of encroaching trees"
>
> "Our utiility only owns a small amount of transmission line, but it has the right-of-way cleared and trimmed on a regular basis to insure continuity of service"
>
> "We have five tree crews that work year round to trim and remove trees that are near our power lines. This is the number one action we perform to maintain reliability."
>
> "We have a vegetation management supervisor, utility arborist, and 12 contract tree trimming crews. We try to get through the entire primary system within 5 years.

Additionally, Lane County Public Works has a process for reporting hazardous trees outlined in section 8 of the Lane County Vegetation Management Standards and Guidelines, Series 2, Top Trimming Standards. Adhering to this policy is the extent to which staff resources can be dedicated to identifying and cataloging hazardous trees.

- **This action item will be removed from the 2011 Plan Update because its basic intent (tree maintenance) is adequately addressed by Standard Operating Procedures of both Lane County Public Works and local utilities.**

O. Action Item No. WH #9
Amended Item No: N/A – Action Completed

"Consider upgrading lines and poles to improve wind/ice loading, undergrounding critical lines, and adding interconnect switches to allow alternative feed paths and disconnect switches to minimize outage areas."

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Status Update

This action items pertains to local utilities; local utilities are not adopters of the county's hazard mitigation plan and the county has no control over the entities assigned to these items. However, according to a recent survey of utilities we found the following results:

- "upgrading lines and poles to improve wind / ice loading": 66.7% said they would only implement this type of measure after severe damages has occurred and 33.3% said it was either not applicable or cost prohibitive for their utility.

- "undergrounding critical lines": 33% said this had already been done; 33% said they would do so only after severe damage was incurred and; 33% said that it was not applicable or cost prohibitive for their utility.

- "adding interconnect switches to allow alternative feed paths and disconnect switches to minimize outage areas": 33% said they plan to do something along these lines in the next 1 – 5 years; 33% in the next 6 – 10 years and 33% said it not applicable or cost prohibitive for their utility.

➢ **This action item will be removed from the 2011 Plan Update because it is not specific to the county.**

P. Action Item No. WH #6 Amended Item No: 9

"Identify which critical facilities in Lane County need backup power and emergency operations plans to deal with power outages."

Status Update

This action item is on-going and in-progress. This action item will be incorporated into a new item that maps all critical facilities within hazardous areas. Those facilities will be surveyed to determine what kind of back-up power, if any, they have. This information will be depicted on the map.

- o According to a recent survey of Fire Service agencies, only about half of all fire service facilities have a back-up power source.

- o The Florence Events Center, a critical facility in the event of a coastal tsunami, recently purchased a back-up generator.

- o The Lane County Sheriff's Office Communications Center has back-up power.

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- **This action item will remain in the 2011 Plan Update as on-going**

Q. Action Item No. VH #3, DH #1, DH #2, TH #2
Amended Item No: N/A

"Upgrade physical security detection and response capability for critical facilities, including water systems."

"Train first responders on alert/warning systems, emergency plan and evacuation routes."

"Encourage the Corps of Engineers to complete seismic vulnerability assessments for dams upstream of heavily populated areas in Lane Countay and to make seismic improvements as necessary."

These action items were assigned to the Eugene Water and Electric Board (EWEB) and the U.S. Army Corps of Engineers (USACOE) and are specific to their dams or facilities. Neither EWEB nor the USACOE are adopters of the county's hazard mitigation plan and the county has no control over the agencies assigned to these items. Nonetheless, the intent of these items is valid and related activities were conducted by the county.

Status Update:

- Evacuation plans were discussed and development is in progress related to an impending catastrophic dam failure of the USACOE's Hills Creek and Lookout Point dams.
- The county worked closely with USACOE on a major public education campaign to inform the public about their on-going dam maintenance program, especially work currently being done on their spillway gates.
- The county participates in EWEB's annual exercises pertaining to their dams.

- **These action items will be removed from the 2011 Plan Update because they are not specific to the county. The intent of the action items will be incorporated into other rewritten action items.**

R. Action Item No. HMH #1, HMH #2 **Amended Item No: N/A**

"Enhance emergency planning, emergency response training and equipment to address hazardous materials incidents."

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"Ensure that first responders have readily available site-specific knowledge of hazardous chemical inventories in Lane County."

These action items were assigned to the state's Regional HazMat Team and the Oregon State Fire Marshal. Neither the Regional HazMat Team nor the State Fire Marshal are adopters of the county's hazard mitigation plan and the county has no control over the agencies assigned to these items.

- **These action items will be removed from the 2011 Plan Update because they are not specific to the county. However, the intent of the action items will be incorporated into other rewritten action items.**

S. Action Item No. TH #1 Amended Item No: 10

"Enhance emergency planning, emergency response training and equipment to address potential terrorist incidents."

Status Update

This is accomplished on an on-going basis through NIMS Compliancy requirements and projects funded by the State Homeland Security Grant.

- **This action item will remain in the 2011 Plan Update as on-going**

T. Action Item No. VH #1, VH #2 Amended Item No: N/A

"Update public emergency notification procedures for ash fall events."

"Update emergency response planning for ash fall events."

"Evaluate capability of water treatment plants to deal with high turbidity from ash falls and upgrade treatment facilities and emergency response plans to deal with ash falls."

These action items will be removed from the 2011 Plan Update ash fall events are considered a low probability, low consequence hazard.

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2008 Earthquake Mitigation Meeting

From: COOK Linda L

To: COOK Linda L; RIZZI Joseph D; SCHESSER Howard (SMTP); MURPHY Dennis; "Myron Smith"; BUCHANAN John (SMTP); "Oakridge Fire (oakfire@qwest.net)"; MORGAN Jacque (SMTP); "coburgfire@nu-world.com"; HOEHN Keith (SMTP); HARSHBARGER Guy (SMTP); ROSS Gary P (SMTP); GILLETTE Karen S; "Mary Bork (phnmab@comcast.net)"; WILDE Kristi J; SCHESSER Howard (SMTP); TILBY Chuck R; HOWARD Galen W; "DePew Tracy (HRSA@co.douglas.or.us)"; MURPHY Dennis; "Gerald Shorey (jerrysofd@qwest.net)"; MORGAN Jacque (SMTP); GILLETTE Karen S; "Triva N. Hazelton (Triva.Hazelton@therightbank.com)"; ANDRUS Abby; RIZZI Joseph D; MILLER Keir C; "Andre LeDuc"

Cc: HOWE Kent; "James Roddey"; TURNER Tom M

Subject: Notes from Earthquake Mitigation Meeting

Date: Monday, August 25, 2008 3:36:15 PM

Attachments: Notes from Earthquake Mitigation Meeting.doc

All,

Attached are the meeting notes from the Earthquake Mitigation Meeting held August 14. These notes are intended to prepare you for briefing local officials and others about the earthquake hazard in Lane County. The goal of the meeting was to ensure that we have a cohesive message countywide based on the most reliable information available.

Please feel free to contact me if you have any comments, questions or concerns. Thank you very much to everyone who contributed to developing these notes.

Linda

****

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for you

From: COOK Linda L

Sent: Wednesday, July 23, 2008 4:17 PM

To: RIZZI Joseph D; SCHESSER Howard (SMTP); MURPHY Dennis; 'Myron Smith'; BUCHANAN John (SMTP); Oakridge Fire (oakfire@qwest.net); MORGAN Jacque (SMTP); coburgfire@nu-world.com; HOEHN Keith (SMTP); HARSHBARGER Guy (SMTP); ROSS Gary P (SMTP); GILLETTE Karen S; COOK Linda L; 'Mary Bork (phnmab@comcast.net)'; WILDE Kristi J; SCHESSER Howard (SMTP); TILBY Chuck R; HOWARD Galen W; 'DePew Tracy (HRSA@co.douglas.or.us)'; MURPHY Dennis; 'Gerald Shorey (jerrysofd@qwest.net)'; MORGAN Jacque (SMTP); GILLETTE Karen S; 'Triva N. Hazelton (Triva.Hazelton@therightbank.com)'; ANDRUS Abby; RIZZI Joseph D; MILLER Keir C; 'Andre LeDuc'

Cc: HOWE Kent; 'James Roddey'; TURNER Tom M

Subject: Invitation to Earthquake Mitigation Meeting

All,

This is to invite you to a special meeting to discuss a report recently released by the Department of Geology and Mineral Industries (DOGAMI) that depicts damage and loss estimates for two types of worst case scenario earthquakes (crustal earthquake in the valley floor and a subduction zone earthquake in the Pacific ocean) for several counties, including Lane County. James Roddey, Earth Sciences Information Officer for DOGAMI, has agreed to provide an overview of the report and answer any questions. The intent is for those of us attending the meeting to better understand the risk to the communities we serve and to identify any potential actions that could be taken to mitigate the impact of such an event. Additionally, the information and discussion from the meeting should provide sufficient information for briefing our local officials, if necessary.

Date: Thursday August 14, 2008

Time: 1:30 - 3: 30 p.m.

Location: Lane County Public Service Building; Bob Straub Conference Room on second floor; 125 E. 8th Avenue, Eugene, OR 97401

Please R.S.V.P. by Monday August 11, 2008 via email reply or phone.

Thank you very much.

Linda L. Cook, PMP
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Notes from Earthquake Mitigation Meeting – August 14, 2008

Attendees: Mary Bork (K-12 Schools), Jacque Morgan (City of Florence), Bob Willoughby (City of Florence), Tracy DePew (Hospital Preparedness Region 3), Brian Johnson (Lane County Public Health), Joe Rizzi (City of Eugene), John Buchanan (Siuslaw Valley Fire & Rescue), Howard Schesser (City of Cottage Grove), Amanda Ferguson (City of Cottage Grove), Jessica (City of Cottage Grove), Keir Miller (Lane County Land Management), Bill Clingman (Lane Council of Governments), Linda Cook (Lane County Emergency Management), James Roddey (OR Dept. of Geology & Mineral Industries).

Talking points for briefing local officials and others about earthquake hazard risk in Lane County.

What We Know

• Earthquakes happen in the Pacific Northwest. The seismology lab at the University of Washington records roughly 1,000 earthquakes per year in Washington and Oregon. Between one and two dozen of these cause enough ground shaking to be felt by residents. Most are in the Puget Sound region, and few cause any damage. However, based on the history of past damaging earthquakes and an understanding of the geologic history of the Pacific Northwest, we are certain that damaging earthquakes (magnitude 6 or greater) will recur in our area, although we have no way to predict whether this is more likely to be today or years from now.

• The Cascadia Subduction Zone is a very long sloping fault in the Pacific Ocean that stretches from mid-Vancouver Island to Northern California. It separates the Juan de Fuca and North America plates. New ocean floor is being created offshore of Washington and Oregon, and the ocean floor is constantly being pushed toward and beneath the continent. As more material wells up along the ocean ridge, the ocean floor is pushed toward and beneath the continent. The Cascadia Subduction Zone is where the two plates meet.

• In May 2007 DOGAMI released the Statewide Seismic Needs Assessment Data depicting the vulnerability of critical facilities (schools, police, fire, hospitals, etc.,) to seismic hazards. The assessment used methodology called Rapid Visual Screening. The results indicate that many schools throughout Lane County are vulnerable to collapse during an earthquake. More information can be found at http://www.oregongeology.com/sub/default.htm.

• In July 2008, DOGAMI released a report describing the geologic hazards in a six-county area including Lane County, and providing damage and loss estimates for future major earthquakes. More information can be found at http://www.oregongeology.com/sub/publications/ims/ims-024/ims-24.htm

• In the event of a major earthquake in Lane County, depending on the time of day, time of year and type of earthquake, it is highly likely that hundreds of people will be killed, thousands of people will be injured and, tens of thousands of households will be displaced. Response resources will be overwhelmed.

• Major losses can also be expected in the event of a major crustal earthquake, but it is likely that outside resources from other parts of Oregon will be able to reach the affected area to provide assistance. In contrast, however, in the event of a major Cascadia Subduction Zone earthquake, coastal areas will be isolated and major damage will occur over a widespread area making it very difficult for outside resources to reach the affected areas.

• Landslides caused by earthquakes are very common. It is difficult to pinpoint the exact locations where landslides might occur in Lane County, but large areas of the County are believed to be at risk.

• The Army Corps of Engineers operates several dams in Lane County that are situated upstream of the Springfield-Eugene Metropolitan Area. The primary purpose of these dams is flood control and during certain times of the year thousands of acre-feet of water can be stored in reservoirs behind them. In the event of an earthquake these dams may become vulnerable to damage or even catastrophic failure.

What We Don't Know

• Although there a no *identified* active faults in Lane County, some could exist unbeknownst to us. The Scott Mills earthquake occurred on a fault that at the time was unknown to experts.

• It is impossible to predict the extent of damages to critical infrastructure such as water systems, wastewater systems, utilities, roads, bridges, etc.

• It is unknown whether disaster recovery plans are in place in either the public or private sector. Anecdotal information suggests that most companies and government agencies in Lane County do not have Disaster Recovery or Continuity of Business / Operations Plans in place.

• It is difficult to pinpoint the exact locations of where landslides might occur in Lane County due to ongoing environmental changes. For example, a once barren hillside that was once the site of a landslide may today be covered over with brush and difficult to spot.

What Can Be Done

• Policies such as local ordinances can be put in place to regulate zoning, re-zoning and development on hillsides. The city of Salem is a good example of a local community that successfully passed such a law.

• Mitigation funding can be set aside to focus specifically on seismically retrofitting schools. In many cases there are only sections of the school that are particularly vulnerable (i.e., the cafeteria) making it cost-effective to retrofit just certain sections of the school instead of all school buildings.

• Evacuation planning could be performed to identify assembly areas and supply distribution sites.

• Topographic changes could be documented using Light Detection and Ranging (LIDAR) technology (a remote sensing system used to collect topographic data using aircraft-mounted lasers). After a baseline

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data set has been created, follow-up flights can be used to detect topographic changes to assist with pinpointing hazard-prone locations throughout Lane County.

• A minimal amount of funding could be provided to sustain Community Emergency Response Team (CERT) Programs. CERT Programs educate citizens about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. CERT members can assist others in their neighborhood or workplace following an event when professional responders are not immediately available to help.

• Continuity of Government / Business Plans could be developed to anticipate service interruption issues and to identify ahead of time how to be self-sustaining during an emergency or disaster.

• April is Earthquake Awareness Month. This could be an opportunity to for local governments to promote public education and outreach about earthquake preparedness.

• Participate in Cascadia Peril in April. Cascadia Peril is a statewide exercise that will simulate how communities and agencies across Oregon will be handling emergencies three days after a massive subduction zone earthquake that leaves more than 1,000 dead.

• Help support OWIN (Oregon's Wireless Interoperable Network). On June 27, 2008, the Oregon Legislature Emergency Board did not approve the $76 million in funding requested by OWIN necessary to build microwave, buildings, and towers in the Western half of Oregon in the effort to improve Oregon's outdated public safety communications capabilities. Governor Kulongoski is disappointed the funding request did not receive the majority vote necessary from the Senate members of the Emergency Board. Governor Kulongoski is planning another request for OWIN funding at the September 25-26, 2008, Emergency Board. It is important for Oregon to act now to prepare for implementation of a federal law change requiring the state to change its radio system from wideband to narrowband by 2013. Failure to do so can result in the loss of federal funding and retraction of previously approved radio frequencies resulting in significant setbacks to this effort.

• Work with the Army Corps of Engineers on understanding the latest information available regarding the current state of dams in Lane County. In particular, identify whether any dams or at greater risk than others of failure during an earthquake.

WORKING DRAFT

From: MORGENSTERN Karl [mailto:Karl.MORGENSTERN@eweb.org]
Sent: Monday, July 06, 2009 9:20 AM
To: STEWART Faye H
Cc: 'Cary Hart'; Paul Wagner; HEUSER Jason; MORGENSTERN Karl; COOK Linda L
Subject: RE: Forest Protection Tour

Dear Commissioner Stewart,
As a Board member for the East Lane Forest Protection Association (ELFPA) I wanted to express our sincere thanks for your continued support in understanding the importance of planning for wild fire in Lane County and being proactive to reduce these threats in wildland urban interface areas. The East Lane Forest Protection Association would like to invite you on our 2009 summer tour on July 14th at 8am (starts at ODF office in Springfield) to take an in depth look at how SB 360 gets applied across the landscape, Lane County's role in this effort and see examples of fuels reduction on high and moderate rating sites (see attached agenda). This is a good opportunity for you to see how ODF and private landowners work together with Lane County to reduce the threat of wild fire and talk with folks on the ground that make this happen. We realize this invite is for something happening next week and apologize for the tardiness (we only finalized this tour last week), but still hope you can find the time to join us. Please let us know if you plan on attending or if you have any questions. Thanks and take care…km

Karl Morgenstern
Eugene Water & Electric Board
Drinking Water Source Protection Coordinator
P.O. Box 10148
Eugene, Oregon 97440
Phone (541) 341-8552
Fax (541) 984-4724

WORKI

Meeting notes

Emergency Public Health and Medical Resource Management Planning Meeting

10/05/2009
2:00 PM to 3:30 PM
Carmichael Room, Lane County Juvenile Justice Center

Attendees: Howard Schesser, City of Cottage Grove; Jan Kinney & Linda Sherwood, Peace Health Siuslaw; Cathy Stone & Mark Groham, McKenzie Willamette; Wayne Johnson & Corinne Ginet Yeager, Peace Health Riverbend; Fred Lundgren, City of Springfield; Joe Rizzi, Eugene; Linda Cook, Lane County Emergency Management; Brian K. Johnson, Selene Jaramillo (note taker), Lane County Public Health

Phone: Maury Sanders, City of Florence; Kim Gibson, Peace Health Riverbend; Candace Barr, Jana Waterman, Lane County Medical Society; Glenda Koyama, Marsha, and Susan, Cottage Grove Hospital.

Overview of appropriate process to make a request for resources from local government agencies and Public Health:

- Brian Johnson shared information he learned at regional meeting on Friday, October 3 in discussion with Randy Shaw of the Oregon Public Health Division: for public health and medical requests it is appropriate for the request to go directly to the County, with a courtesy copy to the local city government. A Declaration of Emergency is NOT required to process a resource request for consumable supplies such as N95 masks. The Sheriff, as the local emergency management director has concurred that this process will be appropriate under the current H1N1 pandemic circumstances.

  Note: It was later discussed that resource shortages leading to altered standards of care for hospitals would require an emergency declaration. Examples of such resource shortages include lack of bed space, physicians and nurses.

- Two different situations reviewed:
  - Current H1N1 Pandemic request protocol:
    - Exhaust all available options. Hospital should then contact Linda Cook, Lane County Emergency Manager, via phone and email, courtesy copy to city and Lane County Public Health. Linda will respond in timely manner and redirect request if needed.
  - In elevated disaster situations, including escalation in the current pandemic intensity or severity (circumstances leading to altered standards of care at hospitals), and other broad impact disasters (like floods and earthquakes):
    - Use protocol and forms presented by Brian Johnson:
      - Exhaust all other options, then send formal Request for Assistance to Linda Cook and copy the city emergency manager where hospital is located, and Lane County Public Health.
      - Use forms ESF 8- Resource Request Form, and ICS Form 260 or equivalent.
- The Hospital will receive a response that the request has been received, and will get a final determination that may include:
  - when the item requested will be delivered
  - alternative to item requested
  - partial fulfillment of request
  - advice that request has been forwarded to the State
  - agency is unable to fulfill the request
- Linda proposed using National Weather Alert system language to indicate the level of need or urgency of a request or resource related communication, such as Alert, Watch and Warning. Alert to indicate that the communication is for informational purposes only and no action is required. Watch to indicate that a formal request may be required in the near future; Warning to indicate need for timely action.
- It was clarified that if the County, a City or the State provide assistance with resources to a Hospital, there is an expectation that the Hospital would pay for most resources received.
- Memoranda of Agreement or Understanding between Hospitals and Cities or other Government Agencies were

2010 Flood Mitigation Meetings

Flood Mitigation Meeting

Date: Thursday, August 26, 2010

Time: 1:30 p.m. - 3:30 p.m.

Agenda:

Situation Overview: Linda Cook, Lane County Emergency Management
Weather Outlook - Tyree Wilde, National Weather Service
Mapping / GIS Update - Eric Brandt, Lane Council of Governments
Public Information - Amber Fossen, Lane County
Public Works Projects - Michael Johns, Lane County Public Works
Emergency Notification Systems - Linda Cook, Lane County Emergency Management
Preparedness Actions - Linda Cook, Lane County Emergency Management

Actual Meeting Duration: 66min.

Attendees in person at Sheriff's Office Emergency Operations Center:

Amy Echols, Army Corps of Engineers
Dustin Bengston, Army Corps of Engineers
Jonna Hill, Lane County Sheriff's Office, Communications Center
Amber Fossen, Lane County Public Information Officer
Michael Johns, Lane County Public Works
Linda Cook, Lane County Emergency Management
Abby Andrus, Lane County Emergency Management

Attendees who reported in via teleconference:

Eric Brandt, Lane Council of Governments
Kevin Cardoza, Eugene Water & Electric Board
Sonny Chickering, Oregon Department of Transportation
Bill Clingman, Lane Council of Governments
Brian Conlon, City of Springfield, Public Works
Linda Cook, Lane County Emergency Management
Karen Gillette, Lane County Public Health
Chief Keith Hoehn, Lowell Rural Fire Protection District
Roger Kline, Army Corps of Engineers

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Rick Little, Oregon Department of Transportation

Keir Miller, Lane County Land Management

Joe Rizzi, City of Eugene, Emergency Management

Annette Scarle, Lane County Risk Management

Jeremy Scherer, Lane County Land Management

Adam Vellutini, Lane County Transportation Planning

Ken Vogeney, City of Springfield

Kristi Wilde, Central Lane Communications Center (Eugene Police)

Tyree Wilde, National Weather Service

Situation Overview: Linda Cook, Lane County Emergency Management

- The Army Corp of Engineers (Corps) will be repairing spillway gates that will create an increased river flow earlier and higher than normal for longer than normal. In other words, they will be releasing storm water accumulation into rivers soon after each storm causing the rivers to run higher than we are accustomed to.
- The Corps will perform flood control measures as they always do and will be working to prevent flood conditions.
- Weather conditions will ultimately determine if flooding will occur (this is a wait-and-see situation similar to last year's H1N1 flu pandemic)

Weather Outlook - Tyree Wilde, National Weather Service

- The National Weather Service (NWS) looks at sea surface temperatures in the equatorial Pacific Ocean to predict seasonal forecast. From the sea surface temperatures the NWS determines if it will be an El Niño, La Niña, or a neutral state.
- Last year we were in an El Niño state which means we were warmer and dryer than normal.
- This year we are transitioning to La Niña which means we will likely be cooler and wetter than normal. The La Nina conditions should persist until well into 2011.
- Month to month temperature and precipitation projection:

  October, November, December - Temperature (undetermined)

  Precipitation will be wetter than normal

  January, February, March - Temperature will be below normal (colder)

  Precipitation will be wetter than normal

- Last La Niña was 2007-08. There were wind storms on the coast and significant flooding in NW Oregon and in Washington State.

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- 1998-2001 were al La Niña years. In 1998-99 there was a good snow pack. The other years were fairly normal…showing us that all La Niña states do NOT behave the same.

- Stay informed on weather conditions: products to help with decision making:

  Outlooks/Watches/Warnings -

  Outlooks: 2-3 days before. If there will be heavy rains coming we let people know if possible flood potential

  Watches: 12hours before

  Warnings: when there is high confidence there will be flooding

  Get info from:

  National Weather Service website Weather.gov/Portland or,

  There is a free email subscription service (ask Linda Cook for Tyree Wilde's contact information and he can sign you up for the email subscription service)

- Dustin Bengston, Army Corps of Engineers offered additional resources:

  The Corp directs people to Northwest River Forecast Center. Northwest River Forecast Center (co-located with National Weather Service; Corps works with NWS on products); Monitors river levels and projected flows.

  The Corp's operations of the dam are fed back to NW River Forecast Center.

  Willamette Valley Teacup Diagram is primarily used during summer conservation but you can see real time info from Corps dams

- Open discussion for Tyree (National Weather Service):

  Joe Rizzi: Will you be doing the conference call updating that you had done in years past for larger than normal weather coming through?

  Yes. When there is a high impact event coming in then there is a conference call held for the stakeholders

  **

  Linda Cook: What happened in 1964 to make that flooding so severe?

  It was a similar setup to the '96 floods with rain on snow event. Rain on snow (both were transition from El Niño to la Niña years)

  In 1964 there were fewer reservoirs in place and less dam control

  **

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Joe Rizzi: Did the 1964/1996 floods make it to the 100-yr level?

1996 flood: No

1964 flood: heaviest hit was south valley (1996 was more north valley). Flood control projects Cougar, Blue River, Foster and Green Peter dams were not online in 1964 flood

Mapping / GIS Update - Eric Brandt, Lane Council of Governments

- We are currently coordinating a group of GIS coordinators from Lane County, Eugene, and LCOG. Our goal is to identify if there is local information that would help the Corp with their project planning and to learn of data that the Corp had developed that could help us locally.
- So far we have learned that the Corp will be working on hydraulic model development with FEMA related to the 100-yr flood maps. As of now there are no hydraulic models for the mid-fork Willamette.
- Currently the Corp is referring to the FEMA maps, which represent the best available data at this time for flood planning purposes.
- Locally, no agency has their own set of models/maps.
- We do have localized and recent data including: LIDAR data, a 2008 orthophotography flight that covers the project data good and is good control data. We are happy to share the data with the Corps. We will assemble an inventory of local data assets and publish those datum but they are not useful for the lay person.

Linda Cook, Lane County Emergency Manager offered side notes.

- NO projection maps will be available (depicting flood stage 1, 2, 3 feet above flood stage) that we had hoped to get and that were discussed in previous meetings.
- In terms of maps to use for emergency planning, we will be referring the public to the 100-yr fema flood maps when determining if their residence is in the flood plain.

Public Works Projects –

Michael Johns, Lane County

- No projects currently of concern; prepared for flood
- Is there a map that could be put together as the event occurs?

Brandt: No plans exist to do that but we do have data to support putting together reasonable maps. LIDAR has limitations due to vegetation such as blackberry bushes along banks appearing as though the ground is 3 feet higher than it is. It would be best to go to own agency first to see what they can do for you…but we will talk about doing something like that.

Brian Conlon, City of Springfield

- City of Springfield has a lot of work going on in the Gateway area and we also have a Regional Hospital that was constructed post ‘1996 (flood) so we have a real interest in getting information about that area.

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- Springfield Public Works will begin meeting next week with maintenance and land survey staff to get a handle on what we know so far; we will be looking at historical data of high water events in the last 20 years.

- Springfield Public Works has committed to a sandbagging planning event.
  Lane County received a donation of 90,000 seed bags that can double as sandbags. Springfield PW has agreed to store them at their facility and the Corps will host a sandbagging workshop. Friday Oct 1st Les Miller from the Corps would put on the event for public agencies and the following day would be the same thing for local citizens.

- We are taking a cautious approach not to alarm the public at this time and would like to collaborate with other local agencies before releasing any media to the public. We would like to do a combined information release.

Linda Cook, Lane County Emergency Manager offered side notes:

- Reason we are focusing on Springfield so heavily is because of the way the river runs. It runs differently through Springfield than in Eugene…in Eugene it runs through a channel whereas in Springfield it does not. Focusing on Jasper, Lowell, possibly Cedar Flats areas.

Emergency Notification Systems -

Linda Cook, Lane County Emergency Management

- The Sheriff's Office Communications Center uses the Emergency Alert System (EAS). The emergency message goes out over TV and radio. A pre-recorded script is used to launch a message. The person wishing to launch a message must be authenticated as having the authority to do so. The Emergency Alert System is used for federal and state emergencies and can also be used for local emergencies.

- Lane County is In the process of entering into an intergovernmental agreement with Benton and Linn Counties who currently do not have EAS notification systems of their own so we are going to be launching messages for them as well and so there may be some overlap in sending emergency messages…more to come on that later…

Kristi Wilde, Central Lane Communications Center

- Community Emergency Notification System (CENS) "Reverse 9-1-1" involves sending a recorded message via telephone to a specific geographic location. Gives us the ability to take a map and select a specific area or take a pre-identified area and quickly identify telephone landlines in that area and send a recorded message. Really easy to do pre-planning with the CENS system.

- Would like to pre-plan /map areas of concern for flood in advance and give them a name and put them into the system, establish thresholds and determine authority for sending out the message.

- CENS is able to notify 1000's of people within minutes.

- Hoping to use anecdotal information from local agencies for flooding from years past for establishing maps for CENS pre-plans.

- CENS does not notify Cell phone users.

WORKING DRAFT

Preparedness Actions - Linda Cook, Lane County Emergency Management

- Sandbagging Event October 1 and 2 (Corps and Springfield Public Works)

- Corps will work with Lane County to put on town hall meetings (deciding on 1 or 2 meetings) one in Springfield and possibly second in River Road area where there is occasional flooding. More to come on that…

- Lane County is working with the National Weather Service on a town hall meeting for the lower McKenzie River area. NWS is trying to determine a reasonable way to set a flood stage for them. Working with residents to identify what a flood stage should look like on the McKenzie River.

- Note for public agencies – it is important to keep a good accounting of any emergency response expenditures in the event that federal reimbursements become available. Need a good record of where your money is going to be eligible…just a reminder. City of Springfield has already set up a program account code for this coming storm season.

Public Information - Amber Fossen, Lane County and others

Linda Cook: In response to the Register Guard article regarding the work the Corps is doing on the spillway gates this year; the media has contacted Lane County for a news release. Should we put something out now or stand down…we have to have a unified message. Is there anyone concerned about Lane County releasing a statement to the media?

No…just as long as all PIO's are talking with one another so we all have the same message.

Chief Hoehn: Please include the rural area as well (don't just emphasize the big cities).

Amber Fossen: Reminded the group that she is the lead contact for news releases.

Rick: ODOT …timing of news release is important in response to the Register Guard article in order to show all of the various agencies are prepared and working together. Also, we should dedicate a specific website as the go to site for all information.

Lane County Emergency Management will be the "go to" website; will work to make it more up front for weather monitoring, flood preparedness, etc.

Kier Land Management: Annual outreach by Lane County Land Management for Community Rating System; required to mail out a letter to all land owners in the flood plain, talks about flood insurance, know where your house is located, etc…will go out end of September (all over lane county). We should include something on the Corps work that will be going on…

Amy Echols: Regarding Register Guard reporter Sue Palmer, the story she ran was earlier than we had asked…she did not mention efforts for collaboration but is aware and says she will run more articles in the future. She also said she will run articles on what the public can do to prepare for a possible flooding.

WORKING DRAFT

FLOOD PLANNING WORKSHOP AND HANDS-ON SANDBAG TRAINING

Please join the City of Springfield, the Lane County Sheriff's Office and U.S. Army Corp of Engineers for a Flood Planning Workshop

Date: Same classes offered both dates – choose one or both sessions on either date
Friday October 1, 2010 / Saturday October 2, 2010

Time: Morning Session: 9 am – 12 pm / Afternoon Session: 1 pm – 3 pm

Location: City of Springfield, Public Works Maintenance Division
201 S. 18th Street, Springfield, OR 97477

*****Space is limited to 50 people per day*****
Please RSVP via email to: prepare@co.lane.or.us or call 541-682-6744

Morning Session: Managing a Flood Fight (9 am – 12 pm)

Who Should Attend: Strike team and task force leaders such as Incident Commanders, ICS Planning Chiefs, ICS Operations Chiefs, Public Works Managers and Supervisors, Public Safety Managers and Supervisors, Utility Managers, Facility Managers, Emergency Managers

What You Will Learn: How to plan and conduct a flood fight

Format: Classroom lecture and participant involvement

What to Bring: If you have them, maps showing your facility locations and flood related plans or policies

Afternoon Session: How to Sandbag (1 pm – 3 pm)

Who Should Attend: Property and business owners in flood prone areas; CERT Team leaders and other volunteer agency leaders; first responder field personnel who would be charged with leading a crew in a sandbagging effort

What You Will Learn: How to fill and use sandbags so you can lead others

Format: Classroom briefing followed by a short walk to outside hands-on training

What to Wear: Please check the weather and dress appropriately to work outside filling and moving sandbags. We will first assemble in a classroom and then take about a 4 minute walk to the sandbagging area.

What to Bring: Protective eye wear and gloves

We look forward to seeing you there!

Every year is a good year to prepare for a flood

This is a template that all attendees were asked to complete in an effort to mitigate the impacts of potential flooding and to update it each year.

Flood Response Plan for: _____(agency)
Prepared by: _____(lead contributor)
Date _____(period of time covered by plan)

Purpose

1. Purpose of this plan is to specify methods for early recognition of floods and dissemination of warnings which are accurate, timely, and reliable; and

2. To prevent injury and loss of life due to flooding and flood related causes.

3. To reduce public and private property damages from flooding and flood related causes.

Current Weather Outlook (winter 2010-2011)

- Transitioning from El Nino to La Nina conditions
- Above average rain Oct – Mar
- Cooler than normal temperatures Jan – Mar

Type of Flooding this Plan Addresses

☐ Surface Water Flooding (Drainage Systems) ☐ Coastal Flooding

☐ River and Stream Flooding ☐ Other

Collaborating Agencies: *Based on the roles of other agencies, who do you need to collaborate with to effectively accomplish your mission.*

Mutual Aid Agencies: *In the event that your resources are exhausted, who can you turn to for mutual aid?*

Monitoring Weather and Conditions

- ☐ **National Weather Service Online Tools** _____ (*assigned to*)
- ☐ **NOAA Weather Radio** _____ (*assigned to*)
- ☐ **Newspapers and Periodicals** _____ (*assigned to*)
- ☐ **Ground Patrols and Observations** _____ (*assigned to*)
- ☐ **Physical Inspections** _____ (*assigned to*)

Triggers for Response Actions

Vulnerabilities

Response Priorities

Resources

Notification and Alerts

COOK Linda L

From: COOK Linda L
Sent: Friday, February 17, 2012 3:50 PM
To: COOK Linda L; *LC News Broadcasters; *LC Department Directors; *Lane LCSO Briefing
Subject: For Immediate Release

LANE COUNTY SHERIFF'S OFFICE

Thomas M. Turner, Sheriff
125 E. 8th Avenue
Eugene, OR 97401
Phone: 541-682-4150
Fax: 541-682-4522
Email: sheriff's office@co.lane.or.us

NEWS RELEASE

www.lanesheriff.org

CASE NUMBER: N/A
DATE / TIME OF INCIDENT: 3:30 p.m.
DATE / TIME OF RELEASE: Hazard Mitigation Plan Review - Public Meeting
NATURE OF STORY:

LOCATION:

DETAILS:

Lane County Emergency Management announces the completion of the five year update to the *Lane County Natural Hazards Mitigation Plan*. This has been a year-long effort that reviewed the major hazards to which the County is exposed: snow/ice storms, flood, windstorm, wildfire, earthquake, tsunami and landslides.

A variety of measures have been identified that can reduce exposures to the dangers and damage posed by the hazards along with 12 action items to be implemented by the County. The resulting Plan is available for review on the Sheriff's Office emergency management website, www.lanecounty.org/prepare. A public meeting will be held at 10:00 a.m., Thursday, March 1, 2012 at Lane County Public Works, Training Room 3.

Comments on the Plan may be submitted via an on-line form at lanecounty.org/prepare; via email to prepare@co.lane.or.us; at the public meeting; or to:

Linda Cook
Lane County Sheriff's Office, Emergency Management
125 E. 8th Avenue
Eugene, OR 97401

The Mitigation Coordinating Committee will meet after the public meeting, review any desired changes, and recommend a final draft of the Plan Update for adoption by the Board of County Commissioners.

Prepared by: Linda L. Cook 541-914-0267

G.4 Data Collection 2006-2012 Cycle

G.4.1 Utility Providers Survey

Introduction
Lane County Emergency Management conducted a survey of the local utility companies using Survey Monkey, an on-line survey tool, in June of 2011. The goal of the survey was to collect responses regarding the hazard and mitigation measures that are/are not taken by utility companies in Lane County for inclusion in the 5-year update to the Lane County Natural Hazards Mitigation Plan.

Participants
All utility companies in Lane County were invited to participate in the survey. Three surveys were completed and the agencies are listed below:

- Blachly Lane Electric Cooperative
- Eugene Water and Electric Board
- Emerald People's Utility District (2 responders, 1 combined survey result)

Survey Results/Key Findings

- Wind and snow storms are the biggest cause for power outages and damages to the utility.
- When hazards occur, wind and ice storms have the severest impact on the utilities.
- All three of utilities believe that providing looped distribution service or other redundancies to critical facilities would be an extremely effective mitigation measure for lessening the impact of natural hazards however, one utility finds it cost prohibited while the other two utilities estimate looped distribution service will be provided in 1-5 years or 6-10 years.
- Two of the utilities believe that providing under-ground lines near business districts and critical facilities would be an extremely effective mitigation measure and the other responding utility has already done this. The two utilities who have not completed this mitigation measure find it either cost prohibited or that they can only provide it after severe damage has been done to the existing lines.
- All agencies perform regular tree maintenance around transmission lines, including monitoring the health of the trees.

WORKING DRAFT

Survey Questions and Responses

Each of the questions in the survey was not necessarily responded to by every survey taker, so the number of responses shown for each question varies. Some questions were multiple-choice, while other questions directed the survey taker to comment on, or mark all answers that apply. Each question below includes a "response count", indicating how many total responses were received.

Q1: How frequently do the following natural hazards cause power outages or facility damages for your utility?

Answer Options	Never	Once per year	2-3 times per year	4 or more times per year	Response Count
Domestic Terrorism / Vandalism	0	1	1	0	2
Earthquake	2	0	0	0	2
Flood	1	1	0	0	2
Hazardous Materials Incident	1	1	0	0	2
Ice Storm	0	2	0	0	2
Landslide	1	1	0	0	2
Snow Storm	0	0	2	0	2
Wind Storm	0	0	2	0	2
Wildfire	2	0	0	0	2
Other (please specify)					1
				answered question	2
				skipped question	1

Q2: Please rate the severity of impact the hazards have on your electric facilities when they occur.

Answer Options	No Impact	Minimal Impact	Moderate Impact	Severe Impact	Response Count
Domestic Terrorism / Vandalism	0	2	0	0	2
Earthquake	2	0	0	0	2
Flood	1	1	0	0	2
Hazardous Materials Incident	1	1	0	0	2
Ice Storm	0	1	0	1	2
Landslide	1	1	0	0	2
Snow Storm	0	1	1	0	2
Wind Storm	0	0	1	1	2
Wildfire	2	0	0	0	2
Other (please specify)					1
				answered question	2
				skipped question	1

Q3: Please rate the level of effectiveness each of the following mitigation measures could have in lessening the impact

of natural hazards on your utility.

Answer Options	Already Done	Somewhat Ineffective	Somewhat Effective	Extremely Effective	N/A or Cost Prohibitive	Rating Avg	Response Count
Installing additional poles to support transformers	2	1	0	0	0	1.33	3
Installing additional guy-wires	2	0	1	0	0	1.67	3
Providing looped distribution service or other redundancies to critical facilities	0	0	0	3	0	4.00	3
Elevating pad-mounted transformers above the base flood elevation	1	1	1	0	0	2.00	3
Replacing damaged poles with higher-rated poles of the same or different material	1	0	2	0	0	2.33	3
Cross bracing on H Frame Poles	2	0	1	0	0	1.67	3
Removing large diameter communication lines	0	0	2	1	0	3.33	3
Upgrading conductors to Wind-Motion Resistant Conductors	0	0	2	0	1	3.00	3
Upgrading lines and poles for wind / ice loading	0	0	1	1	1	3.50	3
Under-grounding lines near business districts and critical facilities.	1	0	0	2	0	3.00	3
					answered question		3
					skipped question		0

Q4: If you had to estimate, at what point in time do you think your utility might implement the mitigation measures you identified as effective in the previous question?

Answer Options	Already Done	In the next 1 - 5 years	In the next 6 - 10 years	Only After Severe Damage	N/A or Cost Prohibitive	Rating Avg	Response Count
Installing additional poles to support transformers	2	0	0	0	1	1.00	3
Installing additional guy-wires	2	0	0	1	0	2.00	3
Providing looped distribution service or other redundancies to critical facilities	0	1	1	0	1	2.50	3
Elevating pad-mounted transformers above the base flood elevation	2	0	0	1	0	2.00	3
Replacing damaged poles with higher-rated poles of the same or different material	1	0	0	2	0	3.00	3

Cross bracing on H Frame Poles	2	0	0	1	0	2.00	3
Removing large diameter communication lines	0	0	0	1	2	4.00	3
Upgrading conductors to Wind-Motion Resistant Conductors	0	0	0	1	2	4.00	3
Upgrading lines and poles for wind / ice loading	0	0	0	2	1	4.00	3
Under-grounding lines near business districts and critical facilities.	1	0	0	1	1	2.50	3
					answered question		3
					skipped question		0

Q5: Please briefly describe any hazard mitigation projects your electric utility has completed in the past five years.

Answer Options	Response Count
We have established redundancy in our distribution circuits at several substations that give us distribution ties to more than one source. We have also installed "tree wire" circuits to mitigate fallen trees in a wind storm. Significant tree trimming. none 5 and 10 year capital plans designed to replace aging infrastructure.	
answered question	*3*
skipped question	*0*

Q6: Please briefly describe any hazard mitigation projects your electric utility plans to complete in the next five years.

Answer Options	Response Count
We plan on installing more "tree wire" circuits as this has proven to withstand many of the hazards a wind storm brings. We also plan on utilizing more underground mainline throughout our system. We also have several reconducter jobs and feeder line rebuilds planned through out system. none Rebuilding the downtown network, replacing feeders, some transmission work.	
answered question	*3*
skipped question	*0*

Q7: Does your agency regularly perform tree maintenance around transmission lines?

Answer Options	Response Percent	Response Count
Yes	100.0%	3

No	0.0%	0
Please briefly explain your answer:		
EPUD only owns a small amount of transmission line, but it has ROW cleared on a regular basis to insure continuity of service. We make sure our transmis'n lines are clear of encroaching trees. We have a vegetation management supervisor, utility arborist, and 12 contract tree trimming crews. We try to get through the entire primary system within 5 years.		
	answered question	3
	skipped question	0

Q8: Does your agency regularly evaluate the health of trees near your facilities?

Answer Options	Response Percent	Response Count
Yes	100.0%	3
No	0.0%	0
Please briefly explain your answer		
"Danger trees" are aggressively looked at and we work with the tree owner to trim or remove the tree until it is deemed safe. We evaluate tree health during our annual PUC inspections. With the employees listed above.		
	answered question	3
	skipped question	0

Q9: Does your agency maintain a hazardous tree inventory?

Answer Options	Response Percent	Response Count
Yes	33.3%	1
No	66.7%	2
Please briefly explain your answer		
EPUD has regular ROW inspections where "danger trees" are indentified and kept track of until the situation is corrected. Danger trees are removed within weeks of indentifying them. We don't have any as we remove them immediately.		
	answered question	3
	skipped question	0

Q10: Does your agency encourage property owners to prune trees near service drops?

Answer Options	Response Percent	Response Count
Yes	33.3%	1
No	66.7%	2
Please briefly explain your answer		

But, rather than have the customer do the trimming we ask that they call us and we send a serviceman by to do the actual trimming. We also deenergize the lines when property owners are working around them. We find that customers tend to get too enthusiastic and venture too close to our other facilities; transformers, primary lines, etc.	
answered question	3
skipped question	0

Q11: Please indicate whether the following mapping activities would be useful toward mitigating hazard impacts on your utility.

Answer Options	Not Useful	Somewhat Useful	Very Useful	Unsure; Need More Info	Rating Avg	Response Count
Access to a centralized GIS data repository for hazard data	1	0	2	0	2.33	3
Identifying areas vulnerable to landslides as a result of wildfires.	1	0	2	0	2.33	3
answered question						3
skipped question						0

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G.4.2 Fire Service Survey

Introduction

Lane County Emergency Management conducted a two-part fire service survey using Survey Monkey, an on-line survey tool, in May of 2011. In part-one, the goal was to collect responses regarding the description and condition of fire service facilities for incorporation into FEMA's HAZUS loss estimation database for purposes of estimating losses related to disasters. In part-two, the goal of the survey was to collect qualitative information regarding risk mitigation measures for inclusion into the 5-year update to the Lane County Natural Hazards Mitigation Plan.

Participants

All fire service agencies in Lane County were invited to participate in the survey. Seventeen agencies took part in responding to the survey and are listed below:

Coburg Fire District
Dexter RFPD
Eugene Fire & EMS Department
Goshen Fire District
Hazeldell Rural Fire District
Junction City Rural Fire Protection District
Lane County Fire District #1
Lane Rural Fire/Rescue
Lowell Rural Fire Protection District
McKenzie Fire/Rescue
Oakridge Fire & EMS
Pleasant Hill Rural Fire Protection District
Santa Clara Fire District
Siuslaw Valley Fire and Rescue
South Lane County Fire & Rescue
Springfield Fire & Life Safety
Upper McKenzie Rural Fire Protection District

Survey Results/Key Findings

Part 1 – HAZUS, FEMA loss estimation database

- Majority of fire service agencies report buildings in good to excellent condition. A small percentage of responders report buildings in poor to average condition. See chart.
- The majority of service buildings are constructed of wood with slab on grade foundations.
- Only about half of all fire service facilities have a back-up power source.
- 7 out of 54 service buildings are set up to function as post-hazard shelter facilities.

Part 2 – NHMP, Risk Mitigation

- 91% of all agencies provide some form of information on how to reduce fire risk to the community.
- Information provided to the community is most commonly dispersed through the Lane County Fire Prevention Co-op, agency websites, information display boards, and agency newsletters.
- Most agencies will provide individual homeowner consultations.
- Most agencies help to educate residents on fire risk reduction measures on an annual basis.

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- The most common obstacles that hinder the ability of an agency to fight fire are poor address signage and driveways that are too narrow and that have no turnabout.

Survey Questions and Responses

Each of the questions in the survey was not necessarily responded to by every survey taker, so the number of responses shown for each question varies. Some questions were multiple-choice, while other questions directed the survey taker to comment on, or mark all answers that apply. Each question below includes a "response count", indicating how many total responses were received. Participant responses are also summarized at the end of the survey results.

Q2: Please rate the level of condition the building is currently in.

Answer Options	Poor	Fair	Avg	Good	Very Good	Exclnt	Rating Avg
Building Exterior	2	10	7	14	9	12	4.00
Roof	3	11	6	11	10	13	3.98
Building Foundation	3	6	5	18	12	10	4.11
Building Interior	7	7	6	13	12	9	3.80
Overall Perception of Building	3	10	6	11	15	9	3.96
						answered question	54
						skipped question	0

Q3: What type of structure is this building? Check all that apply.

Answer Options	Response Percent	Response Count
Wood	81.5%	44
Steel	38.9%	21
Reinforced Concrete	5.6%	3
Unreinforced Concrete	1.9%	1
Reinforced Masonry	18.5%	10
Unreinforced Masonry	20.4%	11
Other (please specify)	0.0%	0
	answered question	54
	skipped question	0

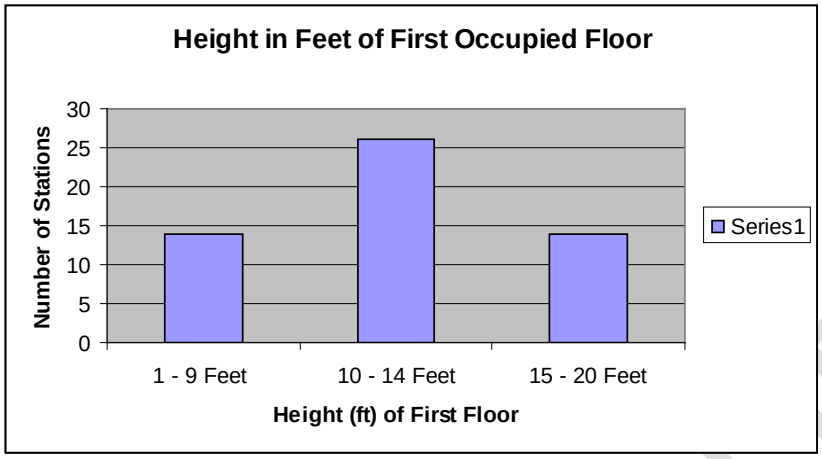
Q4: What year was the building constructed?			
Answer Comments			Response Count
1949	1974	1993	
1950	1975	1994	
1961	1975	1997	
1962	1975	1998	
1963	1975	1998	
1964	1976	1998	
1966	1978	1998	
1967	1978	1999	
1968	1980	2001	
1968	1981	2005	
1970	1981	2005	
1970	1981	2006	
1970	1984	2009	
1970	1984	2009	
1971	1985	2010	
1971	1988	2010	
1973	1993		
	answered question		51
	skipped question		3

Q5: What type of foundation does the building have? Check all that apply.		
Answer Options	Response Percent	Response Count
Pile	5.6%	3
Pier	1.9%	1
Solid Wall	1.9%	1
Basement/Yard	0.0%	0
Crawl Space	1.9%	1
Fill	1.9%	1
Slab on Grade	94.4%	51
Other (please specify)	3.7%	2
	answered question	54
	skipped question	0

Q6: What is the height (in feet) of the first occupied floor?

Answer Options	Response Count
See Table 6.A Below	54
answered question	54
skipped question	0

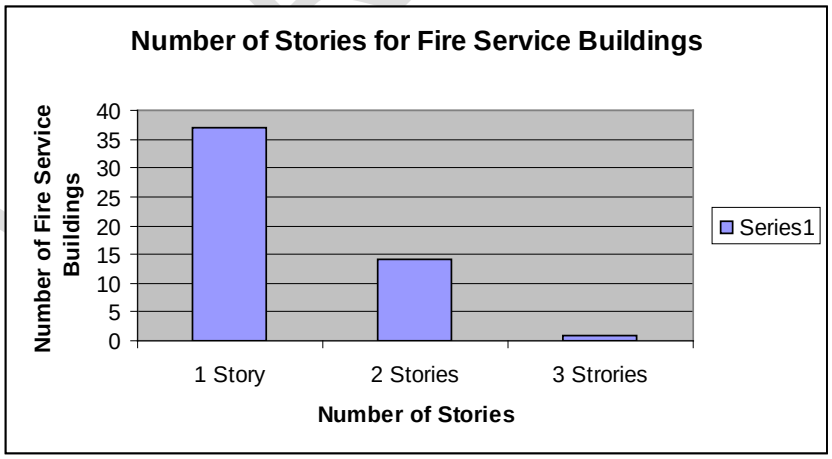
Table 6.A



Q7: How many stories does this building have?

Answer Options	Response Count
See Table 7.A Below	54
answered question	54
skipped question	0

Table 7.A



Q8: Does the building have a backup power source?

Answer Options	Response Percent	Response Count

Yes	51.9%	28
No	48.1%	26
	answered question	54
	skipped question	0

Q9: Is your facility set-up for the function of a post-hazard shelter location? If yes, what is the shelter capacity?

Answer Options	Response Percent	Response Count
Yes	13.0%	7
No	87.0%	47
Total Shelter Capacity:		8
	answered question	54
	skipped question	0

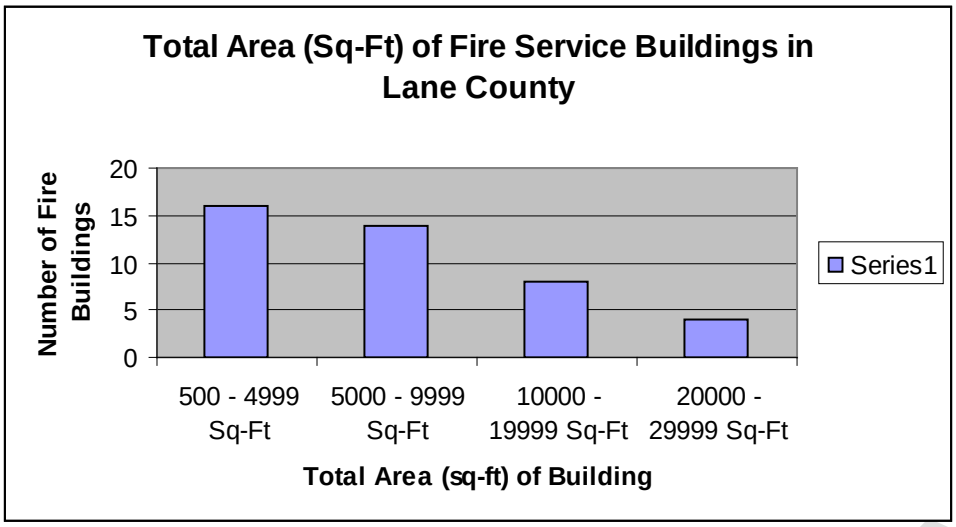
Q9 Cont. If yes, what is the shelter capacity?

Station	Total Shelter Capacity:
1	50
2	50
3	100
4	10
5	75
6	100
7	50

Q10: What is the total building area in square feet?

Answer Options	Response Count
See Table 10.A Below	43
answered question	43
skipped question	11

Table 10.A



Q11: Is this building equipped with a kitchen?		
Answer Options	**Response Percent**	**Response Count**
Yes	77.4%	41
No	22.6%	12
	answered question	53
	skipped question	1

Q12: What is the total number of vehicles housed at your facility?					
Answer Options	**1**	**2**	**3**	**4**	**Response Count**
Trucks	8	1	1	0	10
Engines	26	16	2	0	44
Medic Units	15	4	2	1	22
Tender	23	4	0	0	27
Brush	20	2	1	0	23
Boats	5	2	0	0	7
SUV	10	6	1	1	18
Other Vehicles (please specify)					28
				answered question	49
				skipped question	5

Q13: Does your agency provide information to the community about how to reduce fire risk?

Answer Options	Response Percent	Response Count
Yes	90.9%	20
No	9.1%	2

Q14: How does your agency provide fire risk reduction information to your community. Click all that apply.

Answer Options	Response Percent	Response Count
Community Meetings	61.9%	13
Information Display Boards	42.9%	9
Mailers	28.6%	6
Public Service Announcements provided to local media by your agency	28.6%	6
Your Agency Newsletter	33.3%	7
Through Lane County Fire Prevention Co-op	66.7%	14
Your Agency Website	57.1%	12
Not Applicable (N/A)	0.0%	0
Other (please specify)		4

Q15: Does your agency provide individual homeowner consultations about how to reduce fire risk?

Answer Options	Response Percent	Response Count
Yes	81.8%	18
No	18.2%	4

Q16: Are homeowner consultations performed as a normal course of day-to-day business or reserved for planned outreach projects?

Answer Options	Response Percent	Response Count
Day-to-Day Business	54.5%	12

Planned Outreach Projects	31.8%	7
Not Applicable (N/A)	18.2%	4

Q17: What issues do homeowner consultations most commonly address?

Answer Comments	Response Count
Smoke Detectors	
Neighbors, clearance to vegetation and fuels	
fuel loading, defensible space & driveway information	
fuel loading & defensible space	
Combustibles to close to ignition sources, batteries dead in smoke detectors, overloaded outlets.	
vegetation, access and fire rating	
wild land issues	
driveway access	
not something we do very often only on request from the homeowner which only happens a few times a year	
Wild land Urban Interface fuels reduction and structural triage	
Defensible Space	
Access (driveways, bridges), Defensible space, Construction methods and materials	
Smoke and Co2 alarms, escape plans, portable heater safety, trip hazards, use of power cords	

Answered Questions 13

Q18: Please indicate how often your agency helps educate residents on the following risk reduction measures. Choose the answer that is most current.

Answer Options	At least once in the past 1yr	At least once in the past 3yrs	Plan to in the next 1yr	Plan to once in the next 3yrs	Response Count
Benefits of replacing wood shake roofs	11	1	6	0	18

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Benefits of steel vent screening	8	1	6	0	15
Benefits of fire safe decking	10	1	6	0	17
Placing wood piles more than 30 feet from outbuildings	10	1	6	0	17
Providing 10 feet or more clearance around propane tanks	10	1	6	0	17
Removing hazardous vegetative fuel around structures	10	1	6	0	17
Other (please specify)					3

Q19: Does your agency have an evacuation plan for communities most at risk of fire?

Answer Options	Response Percent	Response Count
Yes	40.9%	9
No	59.1%	13

Q20: How have you communicated the fire evacuation plan? Check all that apply.

Answer Options	Response Percent	Response Count
Community meetings	19.0%	4
Mailers	9.5%	2
Information display boards	0.0%	0
In person when asked	28.6%	6
Not Applicable (N/A)	57.1%	12
Other (please specify)		7

Q21: Please indicate about how often the following obstacles interfere with your agency's ability to fight fires.

Answer Options	Never	Once every few years	Once per year	Two times or more per year	On every call	Response Count
Accessing gated communities	2	14	2	4	0	22

Impassable roadways due to vegetative overgrowth	1	12	2	7	0	22
Driveways too steep for apparatus	4	12	4	2	0	22
Single lane bridges	3	12	5	2	0	22
Poor address signage	4	10	0	7	1	22
Long driveways with no turnabout	2	8	4	7	0	21
Long driveways too narrow for two vehicles	2	9	2	8	1	22
Lack of accessible water sources for fighting fires	4	12	1	4	1	22
Water delivery systems inadequate for fighting fires	7	11	1	1	2	22
Other (please specify)						0

Q22: How would you like to see these fire fighting obstacles resolved?

Answer Comments	Response Count
Engage community in vegetation management and public education about wild land urban interface fires.	
Better monitoring by County of Fire Code when issuing building permits and follow up of rural areas	
Better code enforcement and plans review	
Address markers need to be purchased. Building permits not given out until proof that there is access.	
planning with input from the local community	
public education, zoning requirements	
by county ordinance and/or state fire code	
A good start would be to get county support on board with a standard enforced road standard that is enforceable no only when new construction happens but whenever the driveway begins to get overgrown or the road becomes to rough to drive on.	
The biggest obstacles are driveway clearance for height and width, enforcement of county code.	
Enforcement of driveway standards thru the building permit process	
Addressed through permit process with county and enforce rules & increase notification of district on new construction. Method to enforce current standards on older properties. Incentives to upgrade.	
5 water tenders, good enforcement of current regulations	
Through education	
	13

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G.4.3 Results of High Water Location Tour

MEMO

To: The Record

From: Philip Carpenter

Date: August 13, 2010

Subject: Lane County Roads

On August 12, 2010, I met with Linda Cook, Emergency Manager, Lane county Sheriff's Office, and Mike Russell, Senior Engineering Associate, Lane County Department of Public Works, to discuss a potential Pre-Disaster Mitigation project related to County roads that consistently experience flooding.

Linda explained that the Corps of Engineers plans to release 15 % more of the inflow to the Middle Fork Willamette River Dexter, Lookout Point, and Hill Creek Dams during the upcoming winter season in order to repair the dam gates. She is concerned that the increased flow will cause an increase in the flooding of several of the County's roads. Dan referred to the list of County roads previously provided OEM (attached) and noted that most of the roads would not be effected by the Corps of Engineers activities.

I discussed some of the factors that would be required for the cost/benefit study including:

- frequency and nature of past flood damages,
- length and duration of detours caused by past flood events,
- past repair costs from flood events,
- traffic control costs during past flood events.
- traffic counts, and
- proposed mitigation measures with costs and timelines.

We then visited the following sites:

Love Lake Road # 3110—Priority 2

Low spot in road occurs under dual rail road bridges. Flood flows are from the Willamette River about ½ mile to the east and along the rail road ditches and overland across fields. Mitigation measures would probably include raising the rail roads and their approaches at great expense, constructing an overpass over the rail roads at great expense, or raising road bed of the road approaches and between the bridges to a level that would accommodate at grade crossings at somewhat less expense. Getting a favorable benefit/cost value may be difficult. See two photographs below.

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Hayes Lane #3120—No priority given

There are at least 3 low spots on this dead end road. One of the low spots is about ¼ mile long where the road crosses Spring Creek. Flooding is from the Willamette River and Spring Creek There are approximately 50 homes dependent on the road for normal and emergency access. The photos below show the low spots and a flood pole erected in the far end low spot. Mitigation would be to raise the road bed at the low spots and to provide culverts for cross drainage.

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HIGH FLOOD WATER
6 6
5 5
4 4
3 3
2 2
1 1
0 0
Lane County Roads
Hayes Lane 3120
Flood pole in low spot
August 12, 2010


4 FT
4 FT
Lane County Roads
Hayes Lane 3120
Flood pole in low spot
January 09 flood level
August 12, 2010

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Riverview Drive #3135—No priority given

Typical low spot that flood from the Willamette River. Mitigation would be to raise road bed with cross drainage culverts (see typical photograph above for Hayes Lane)

Cross Road Lane West # 1650—Not on list and no priority given.

Typical low road that flood from the Willamette River. Mitigation would be to raise ½ mile (+ or -) road bed with cross drainage culverts (see typical photograph below for Coleman Road).

Herman Road #1625—Priority 2

Typical low road that flood from the Willamette River. Mitigation would be to raise ½ mile (+ or -) road bed with cross drainage culverts (see typical photograph below for Coleman Road).

Coleman Road #1628—Priority 1

Typical low road that floods. Mitigation would be to raise ½ mile (+ or -) road bed with cross drainage culverts. See photograph below.

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Edenvale Road # 6068—Priority 2

Typical low road that floods from Middle Fork Willamette River. Flood issues for this portion of the road will be exacerbated due to the Corps of Engineer dam improvement work. Mitigation would be to raise ½ mile (+ or -) road bed with cross drainage culverts (see typical photograph above for Coleman Road).

Parvin Road # 6122—Priority 1

Typical low spots that flood on both sides of a historic bridge crossing Anthony Creek. The bridge is being raised 1 foot because of past floating debris damage. Mitigation would be to raise road bed with cross drainage culverts.

Site visit summary

Most of the flooding of the Lane County roads occurs in low spots or short segments of roads. Emergency access is the primary concern related to the periodic flooding. Residential settlements often are located at the end of one-way roads that flood. Mitigation for these roads would be to raise the road bed and install cross culverts.

Raising low spots and/or short segments of Lane County roads will require an evaluation (E.O. 11988) of the effect on the adjacent floodplains and Environmental/Historic Preservation reviews. In some situations detailed hydraulic analysis may be required to evaluate these floodplain effects. If the roads to be raised are in mapped floodplains CLOMRs may required.

WORKING

G.4.4 All-Hazard Event Summary 2006-2012

The following table shows severe weather events by year of occurrence and physiographic region affected.

Table 4. Summary Table of Significant Weather Events in Lane County.

Year	Snow / Ice Storm	Flood	Windstorm	Wildfire (at or near Lane County)	Landslide	Earth-quake	Distant Tsunami	Drought
2011	CSCD/R CSCD/F		CSCD/R CST		CST		CST	
2010	CSCD/R CSCD/F WVF		CSCD/F					
2009	CSCD/R		CSCD/R	CSCD/R				
2008	CSCD/R CSCD/F WVF			CSCD/R				
2007	CSCD/R CST/R	CST WVF	CSCD/R CSCD/F CST/R WVF					
2006	CSCD/R CSCD/F CST/R	CST WVF	CST WVF					
2005	CSCD/R CSCD/F WVF CST/R	CST WVF	WVF				CST	WVF
2004	CSCD/R CSCD/F WVF CST/R (DR 1510)		WVF (DR 1510)					
2003	CSCD/R CSCD/F WVF CST/R		CST		CST			
2002	CSCD/R CSCD/F CST/R		CST WVF (DR 1405)	CST/R				
2001	CSCD/R CSCD/F WVF CST/R		CST					
2000	CSCD/R							
1999	CSCD/R CSCD/F		WVF		CST			
1998	CSCD/R CSCD/F			CSCD/R				
1997	CSCD/R CSCD/F WVF	CST WVF (DR 1160)						
Table 3-xx Con-tinued	**Snow / Ice Storm**	**Flood**	**Windstorm**	**Wildfire (at or near Lane County)**	**Landslide**	**Earth-quake**	**Distant Tsunami**	**Drought**
1996	CSCD/R	CST	CST	CSCD/R				

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	CSCD/F WVF	**WVF (DR 1099)**	**WVF (DR 1107)**					
1995	**CSCD/R**	WVF	WVF					
1994	**CSCD/R CST/R**		CST WVF					
1993	**CSCD/R WVF**		CST					
1992								
1991				CSCD/R				
1990	WVF							
1989	CST WVF		WVF					
1988				CSCD/R				
1987								
1986								
1985								
1984			WVF					
1983								
1982								
1981			WVF					
1974		**WVF (DR 413)**	WVF					
1972		**WVF (DR 319)**	WVF					
1971	WVF		WVF					
1969	WVF CST							
1968	WVF							
1964		**WVF (DR 184)**	WVF				CST	
1963			WVF					
1962			**WVF (DR 136)**					
1950	CSCD/R WVF							

CST Coast Region

CST/R Coast Range

WVF Willamette Valley Floor

CSCD/F Cascade Foothills

CSCD/R Cascade Range

(DR XXX) FEMA Disaster Declaration and Number

WORK

G.5 Grant Funded Mitigation Projects

Following pages include reports from FEMA Region X, Lessons Learned and Information Sharing and Oregon Emergency Management describing mitigation projects in Lane County funded with FEMA mitigation grants and general success stories.

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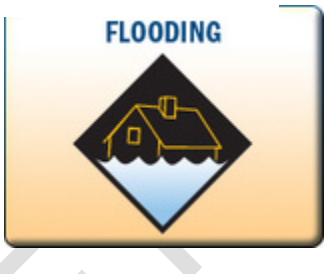
LCSO Emergency Management

Mapleton Elevation: HMGP Project

Source: FEMA, Lessons Learned and Information Sharing

https://www.llis.dhs.gov/content/mapleton-elevation



Nestled in a narrow valley of Oregon's Coastal Range, Mapleton has been subject to repeated flooding from the Siuslaw River. In January 2012, the Siuslaw again rose and covered much of Mapleton, but 22 area families didn't have to muck out their homes, tear down wallboard, or toss waterlogged treasures. That is because their homes had been elevated using funding from FEMA.

After the massive 1996 floods, the Oregon Office of Emergency Management (OEM) earmarked a portion of its FEMA hazard mitigation funds to elevate homes in hard-hit areas like Mapleton. The goal was to provide long-term solutions to repetitive floods.

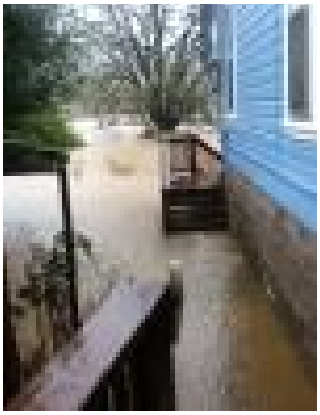
The January 2012 flooding was the first major test of the elevation projects begun 16 years ago. They passed with flying colors.

"The stress is nothing like before," said Bryan Moore, a Mapleton resident. "There was no water in the house -- that's awesome!"

Moore's wife Mashell remembers what it was like in 1996. Her husband is pastor of the church next door which "always floods." As the water rose, Bryan and the, other men in the neighborhood worked frantically to move everything in the church to higher levels. Mashell was left to deal with their 102-year-old home.

"I was by myself, trying to haul things upstairs," Mashell said. "Then the lights went out and I was working in the dark." She set out candles but the flames ended up setting a table on fire. "It wrecked everything."

When she learned about the FEMA funding, Mashell was the driving force behind elevating their home. The process took time and plenty of paperwork, but by November 1996 her home had been jacked up onto steel piers. It's a good thing, because Mapleton flooded again later that month.



Mapleton's building requirements also have changed since 1996. New construction now must be built above flood levels.

Mike McAllister engineered many of the Mapleton home elevations. A long-time resident himself, McAllister knows firsthand what his neighbors went through then and now. "We had fewer people out of their homes this time," said McAllister. "And by people I mean entire families including kids and pets." Fewer people out of their homes also meant less mess, less expense, and less disruption to the small town along the river.

Lane County Emergency Manager Linda Cook is well aware of the community's flood issues. She will be requesting additional hazard mitigation money to elevate at least one more Mapleton home and "will be on the lookout for other interested property owners to include in the application." If elevating the entire structure is not feasible or possible, "a lot of damage can be mitigated," said Cook. This could include elevating critical structures such as electrical panels, water heaters, and furnaces.

Cook also recommends people "learn the art and science of sandbagging so you can be ready to use them whenever the river reaches a certain level."

The dictionary defines elevate as "to move or raise to a higher position." It also means to raise the spirits. Both definitions apply to the Mapleton home elevations.

Notes:

FEMA Region: **FEMA Region X**

County: **Lane County, Oregon**

Project Start Date: **07-01-1997**

Project End Date: **07-01-2000**

Sector: **Private**

Hazard Type: **Flooding**

Activity/Project Type: **Elevation, Structural, Elevation, Utilities**

Funding Source: **Hazard Mitigation Grant Program (HMGP)**

Funding Recipient: **Lane County**

Structure Types: **Wood Frame**

Project Cost: **$1,005,799.00**

Since mitigation effort began, has a disaster tested its value? **Yes**

Multiple Flood Insurance Claims? **Yes**

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Ensuring Critical Communication

Harness Mountain Mitigation Project, Sub grantee: Emerald People's Utility District
Hazard Mitigation Grant Program, FEMA DR-1405-OR, Project 1405.0005

LANE COUNTY, OREGON—Loss of electricity is an inconvenience, but when critical communications that our society depends on are inoperative, it can lead to disaster. The communications facility on the 3,350-foot summit of Harness Mountain not only provides an important service for the regional communities, but it is a vital relay station for the Federal Aviation Administration (FAA) and the Oregon State Police.

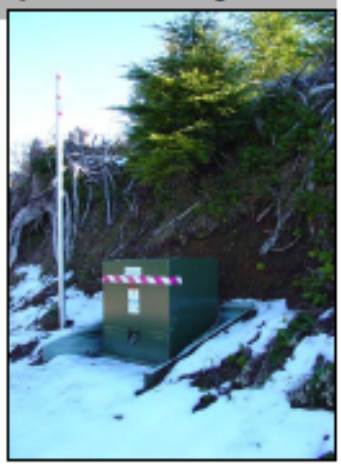
Unfortunately the 12kV overhead line that serves the summit was plagued with repetitive outages and required difficult emergency measures to restore power. With shoulder deep snow, impassable roads and fallen trees, the task of restoring power could take many hours or even days. Understanding the importance of ensuring service to their customers, Emerald People's Utility District (EPUD) decided to break the cycle of emergency repairs by placing the line underground.

Harness Mountain Customers
- Federal Aviation Administration
- Oregon State Police
- Qwest
- American Tower Corp.
- Pacific Microwave
- Weyerhaeuser Company
- Douglas Forest Protection
- Pacific Power and Light
- Northwest Pipeline

Problem: EPUD 5.5-mile easement through Weyerhaeuser Co. forest was prone to repetitive outages and difficult repair.

Solution: The underground line is no longer vulnerable to wind, ice, and snow damage and acts doubly to avoid wild fire ignitions.

Having the entire line underground will virtually eliminate outages caused by snow and wind and enable Emerald PUD, for the first time since 1983, to be a dependable power source for the nine critical communication and broadcast sites.



Project cost: $176,280

Losses Avoided: Following the recent 2003-04 winter storms, Emerald PUD reported that all Harness Mountain roads were blocked from fallen timber and it would have taken ten days of work for two crews at $200 per hour per crew to repair overhead line damages. According to Craig Andrus of Emerald PUD, "This was an effective project!"

FEMA OREGON emergency management

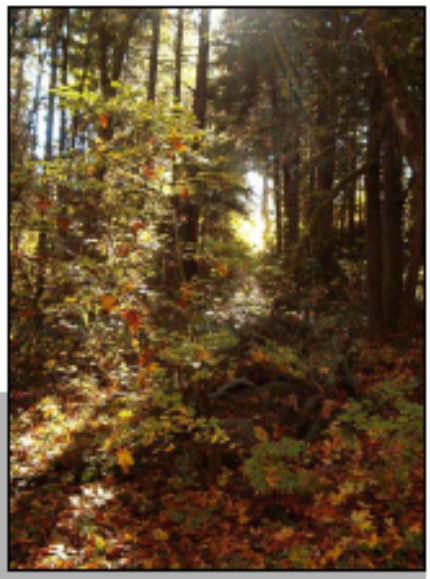
Disaster avoided through mitigation measures

No Loss of Power, No Loss of Data

Overhead to Underground Conversion, Sub grantee: Lane Electric Cooperative
Hazard Mitigation Grant Program, FEMA DR-1405-OR, Project 1405.00011

LANE COUNTY, OREGON—The cost of repairing repetitive storm impacts adds up over time. The Lane Electric Cooperative estimates it spends $7,000 annually to repair storm damages to its overhead lines in the Blue River Reservoir area along Highway 126. Falling trees pose the greatest hazard to overhead lines. Outages sometimes occur two to three times per year and take four to eight hours to repair.

During the 2002 windstorm, the HJ Andrews Forest Research facility, which supports over 50 research scientists and 30 graduate students, lost power for seven days. The outage resulted in the loss of sensitive data from the 35 climate collection stations at the facility.



Problem: Falling trees along this former overhead easement caused repetitive outages.

Problem: Dense snowfalls near the HJ Andrews Research facility created expensive delays in service restoration.

Solution: Placing lines underground ensures reliable service to HJ Andrews' scientists and students. Underground electrical cabinet at left.

In order to provide reliable power to the HJ Andrews facility and surrounding residences, the Lane Electric Cooperative chose to place the overhead lines underground using Hazard Mitigation Grant Program funds. With the project completed in October of 2003, **no outages occurred during the recent winter storms, despite high winds and heavy snow falls.**

Project cost: $75,469

Losses avoided: Replacement to original pre-project condition would be $80,000 with annual storm damage repairs of $7,000.

FEMA

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Reducing Damage, Maintaining Service

Underground Emerald Circuit, Sub grantee: Springfield Utility Board
Hazard Mitigation Grant Program, FEMA DR-1405-OR, Project 1405.0001

SPRINGFIELD, OREGON— During the recent wind, snow and ice storms in the Willamette Valley, what was once a sure bet for power outages is now a mitigation success. By undergrounding the overhead electric line called the Emerald Circuit, the Springfield Utility Board (SUB) has strengthened their capability for future delivery of services and increased their capacity to respond to other emergency problems.

The Emerald Circuit is a main distribution line among three substations serving approximately 800 homes; assorted businesses, a fire station and two SUB water reservoirs. As a backup, this line provides power to another 400 homes, schools, a shopping center, and numerous traffic signals.

Problem: Emerald Circuit right of way showing 25' easement within 50'-90' tall wooded corridor. Note leaning small tree hazard left of line.

Solution: Same project section as above, with fallen tree. Underground line did not sustain damage from broken trees during recent winter storms.

Construction: Underground lines will minimize future emergency repairs on this steep terrain. Trench with conduit in place next to existing poles and line.

The new section of underground line essentially replaces ~2,700 feet of line that was prone to outages caused by the proximity of tall trees from the adjacent Weyerhaeuser and other private property. The lines traverse an incredibly rugged and steeply sloping landscape that required complex servicing of above ground line during wintertime conditions. The subgrantee followed best management practices and all electrical codes for the installation. A certified archaeologist was on-site during trenching operations as required by the NEPA Environmental Assessment.

Project Costs: $163,642

Losses Avoided: Estimations that a major storm damaging all poles and lines would cost $144,000 to $180,000 for replacement.
Single pole and conductor replacement: $12,000 to $15,000.

FEMA

OREGON emergency management

HMGP 1405.0001, Springfield Utility Board. Julie Slevin, Dennis Sigrist and Raymond Meduna (subgrantee, along w/ Brian and Stan) conducted a preliminary final inspection of this project on August 27, 2003. All of the project construction work was completed with the new line energized and operational. Remaining project activities included hydro-seeding of the disturbed ground area (to occur when the fall rains arrive) and final reconciliation of eligible expenses/reimbursement.

The new section of UNDERGROUND line essentially replaces ~2,700 feet of line that was prone to outages caused by the proximity of tall trees from the adjacent Weyerhaeuser and other private property. The lines traverse an incredibly rugged and steeply sloping landscape (we walked the ENTIRE length) and can appreciate the complexity of serving the above ground line during winter-time conditions. The subgrantee followed best management practices and all electrical codes for the installation. A certified archaeologist was on-site during trenching operations as required by the NEPA Environmental Assessment.

Intermediate vault (above) and termination boxes/switches at medical facility (below). Connection to main power pole off of Hwy 99 (top right).

HMGP 1405.0003, Consumers Power, Inc. (CPI). Julie Slevin and Dennis Sigrist along with James Ramseyer; Paul Rumpca and Greg Pierce (representing the subgrantee) conducted a final inspection of this project on October 15, 2003. All of the project construction work was completed with the new underground line energized and operational. The existing over-ground routing (poles) was transferred to the local telephone company as they continue to use the poles for their services. Remaining project activities include final reconciliation of eligible expenses for reimbursement. The subgrantee presented the (expected) final billing request during the project inspection.

The new section of UNDERGROUND line essentially replaces ~1,400 feet of line that was prone to outages caused by the proximity of tall trees from the adjacent buffer area (trees protected by city regulations). The new underground routing significantly improves system reliability for the "Medical Hill" complex of hospitals, clinics and labs.

Top: Abandoned above ground line easement showing susceptibility to falling vegetation damages.

Middle: Beginning point of circuit from above ground to underground.

Right: Harness Mountain (mountaintop) and communications' facilities.

Right: Main power transmission line intermediate termination at mountaintop.

HMGP 1405.0005, Emerald People's Utility District (EPUD) - Harness Mountain Underground Electrical Line. Abby Kershaw, Julie Slevin and Dennis Sigrist along with Craig Andrus (representing the subgrantee) conducted a final inspection of this project on November 12, 2003. All of the project construction work was completed with the new underground line energized and operational. The existing over-ground routing to the mountaintop was decommissioned and all utility poles removed. Intermediate power junction boxes were installed at a number of locations (about ⅛ mile spacing based on the length of underground conductor per spool), *see picture, center, with replacement culvert.*

The new underground routing significantly improves system reliability to the mountaintop where a number of communications users have antennas and relay equipment, including the Oregon State Police, the Federal Aviation Administration and others.









HMGP 1405.0005, Emerald People's Utility District (EPUD) - Harness Mountain Underground Electrical Line.

Culvert installation using a single back-hoe. A number of culverts were replaced when the overhead line was converted to underground (buried). Replacing the culverts were necessary to ensure safe, direct-burial of the underground 12,000 volt power line and to protect the roadway from runoff/erosion.

Top: Connection from overhead power to vault.

Right: Underground routing replaced poles that were frequently damaged by falling vegetation.

Right: Main power transmission line along Hwy. 126 and connection to underground (distant pole).

HMGP 1405.0011, Lane Electric Cooperative (LEC) - M229 Overhead to Underground Conversion. Julie Slevin and Dennis Sigrist along with Debi Wilson, Vester and Tom (representing the subgrantee) conducted a final inspection of this project on October 30, 2003. All of the project construction work was completed with the new underground line energized and operational. The existing over-ground routing to the research station (tie-in) and other users was decommissioned and replaced by direct burial underground power cable. Intermediate power junction boxes were installed at a number of locations (*see picture, below* ↓).

The new underground routing significantly improves system reliability to the research station and other uses in the area.

HMGP 1510.0010 – Lane Electric Co-op, ED Circuit Rebuild. Final project inspection on November 30, 2004; Abby Kershaw, Dennis Sigrist, Julie Slevin and Stan Prihar (OEM) with Vester Sanders and Jody Ogle representing the subgrantee.

Our field visit essentially inspected the entire circuit including the over-ground routing and the two distribution taps. Private property access did not allow complete inspection at one location (which wasn't an issue).

Project involved replacing poles, using improved/flexible insulators, and trenching two new underground distribution circuit taps in an area that was frequently impacted by outages caused by wind and winter storms. The completed mitigation project will provide benefits to a number of local users and improve the overall reliability of the ED (Eugene-Drain) transmission line that lies in a previous BPA right-of-way which is now owned by Lane Electric. This project also provided a side benefit of better equipment access to the co-op's right-of-way. Because of good project oversight and best management practices, the overall project cost was less than budgeted!

HMGP 1510.0013, City of Oakridge. Abby Kershaw and Julie Slevin inspected the City Oakridge 'roofing' project (gymnasium and kitchen area) on March 10, 2005. This HMGP project essentially replaced the leaking roof with a long-life polymer membrane and reinforcement of the roof valley with a similar material. Kevin Urban represented the sub-grantee during the inspection.

The project was completed on-schedule and within budget per the fixed-price contract between the sub-grantee and a local contractor. All documentation was reviewed and contractor payments accounted-for.

DR-1510.0014. Eugene Water and Electric Board (EWEB) – Blanton Heights Mitigation Project. Final field project inspection occurred on July 8, 2005 and included Dennis Sigrist and Stan Prihar from OEM with Teresa Siemanowski and Nancy Cueto representing EWEB. The entire project area is located along Blanton Road, Eugene in Lane County, Oregon. The new 2800 feet section of underground feeder essentially follows the same path as the existing electric overhead line, along Blanton Road with transfer switches (top photo in the background with water pumping equipment in the foreground) at each terminus (lower right photo, transfer switch in the foreground with connection to overhead power in the background) and intermediate underground vaults accessible by manhole (such as the one at 40th Ave. W. along Blanton Road, upper right photo).

The project will reduce the frequency and duration of electrical outages experienced by the Blanton Heights area customers, including nine media communication sites and multiple drinking water pump stations. The undergrounding is essentially located along existing right-of-way easements by the road, city park, and water tank/pumping facility.

The financial review of the project was also conducted at the same time as the field inspection where it was noted the project cost greatly exceeded the 25% non-federal local match as the federal (75%) share was capped at $100,000.