Lane County
Natural Hazards Mitigation Plan
2011 Update

This page intentionally left blank

Contents

Introduction

Lane County is subject to natural hazards that threaten life and health and have a history of causing extensive property damage. To better understand these hazards and their impacts on our communities, Lane County adopted a FEMA approved Natural Hazards Mitigation Plan in 2006. This document constitute the five year update to the Plan.

Plan Update Process

Monitoring and Implementing the Plan

Throughout the last five years various approaches were used for plan implementation and updates including those initially outlined in the 2006 Plan. Over time it became apparent that the breadth of the initial Plan as written was too unwieldy for a single committee to oversee. Additionally, we found interest in the mitigation plan gradually decline as committee members were asked to focus on all hazards, all of the time. Although committee members 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 Plan alive.

Adjustments to the plan implementation and review process were gradually made over time. Reviews and updates were conducted on a project-by-project basis which proved to generate more enthusiasm, achieve more results and ultimately engaged more people in the process. Additionally, it was recognized that unexpected incidents and situations inevitably emerge that necessitate mitigation therefore the decision was made to keep the Plan flexible enough to address new and emerging projects.

Here are highlights of the Plan update process that demonstrate how neighboring communities, local government and regional agencies and interested parties were involved in the planning process.

Year One: 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 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.

Year Two: 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.

Year Three 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.

Year Four 2010

- A new project emerged in 2010 that 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.

- Pandemic Influenza was a major concern in 2010 and a major 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.

- 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. Phil 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 (USACOE) dams in the Willamette River basin, there was a great deal of countywide interest when USACOE 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 USACOE to presente preparedness information at two well attended community meetings hosted by USACOE 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 USACOE.

Year Five 2011

- The primary focus for this year has been on an in-depth, comprehensive review of the plan itself to evaluate its usefulness over the long term. This Plan Update creates 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.

Updating the Plan

Lane County Emergency Management staff completed a comprehensive review of all sections of the Lane County NHMP to evaluate the document's relevance and effectiveness over the long term. The purpose of this Plan Update is to track implementation of activities and evaluate the overall effectiveness of the plan itself.

It has been determined that a substantial re-organization of the Plan itself will be the essence this Plan Update. The Plan Update is written so that it can serve as a more succinct, stand-alone document that can be easily read and understood by subject matter experts and the general public alike.

The goal of the Plan re-organization is to provide a tool for continuing to engage the public and give them a chance to provide feedback. This will include periodic presentations on the plan's progress to elected officials, community groups, public meetings and postings on social media and interactive websites.

Keeping the Plan Current

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.

To evaluate the effectiveness of the plan at achieving its stated purpose and goals, the Lane County Emergency Manager will host a semi-annual meeting with all action item owners to discuss progress on the plan in May and September of each year.

Lane County Emergency Management will continue to formally update the Plan at least once every five years.

Community Profile

The state's Office of Economic Analysis estimates the county's 2009 population to be 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.

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 caused the employment in the services and retail sectors to grow. 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 two hospitals and several private schools are located here. The two hospitals are McKenzie-Willamette and Peace Health, while schools in private higher education include Northwest Christian University and Eugene Bible 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.[1]

National trends such as population growth outstripping job-creation, the growing difficulty of getting into the job market due to 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 increase but overall income levels do not

[1] New Region 5 Occupational Projections; Agriculture in Lane County; Lane County Detailed Industry Employment Oregon Employment Department, 2010

increase at the same rate due to shifts in the economy, then rent and cost burdens will rise for an increasing number of households.

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.2 Lane County's population density in 2000 was 70.9 people per square mile. This figure is estimated at 77 per square mile in 2009.3

Lane County Incorporated Jurisdictions

Jurisdiction	Estimated Population 2009	2000-2009 Population Change	Number of Households 2000	Estimated Number of Households 2009	Average Household Size	Median Household Income
Lane County	347,690	7.7%	130,453	139,593	2.39	$42,852
Coburg	1,080	11.5%	367	336	2.79	$63,214
Cottage Grove	9,485	12.3%	3,264	3,306	2.71	$42,819
Creswell	4,790	33.8%	1,271	1,953	2.51	$43,750
Dunes City	1,360	9.65%	558	634	2.22	$39,786
Eugene	157,100	13.9%	58,110	62,257	2.26	$44,090
Florence	9,580	31.9%	3,564	4,363	1.91	$35,670
Junction City	5,460	15.7%	1,823	2,170	2.54	$38,662
Lowell	1,030	17%	315	271	2.68	$50,250
Oakridge*	3,755	18.4%	1,345	972	2.34	$26,662
Springfield	58,085	9.9%	20,514	22,666	2.46	$37,738
Veneta	4,975	80.1%	966	1,512	2.65	$45,000
Westfir	340	21.4%	100	116	2.33	$40,625
Unincorporated Areas	90,650	-7.7%	N/A	N/A	N/A	N/A

Unincorporated areas of Lane County are Heceta Water District, Mapleton, Port of Siuslaw, Elmira, Crow, London, Marcola, Row River Valey, McKenzie Valley and Blue River

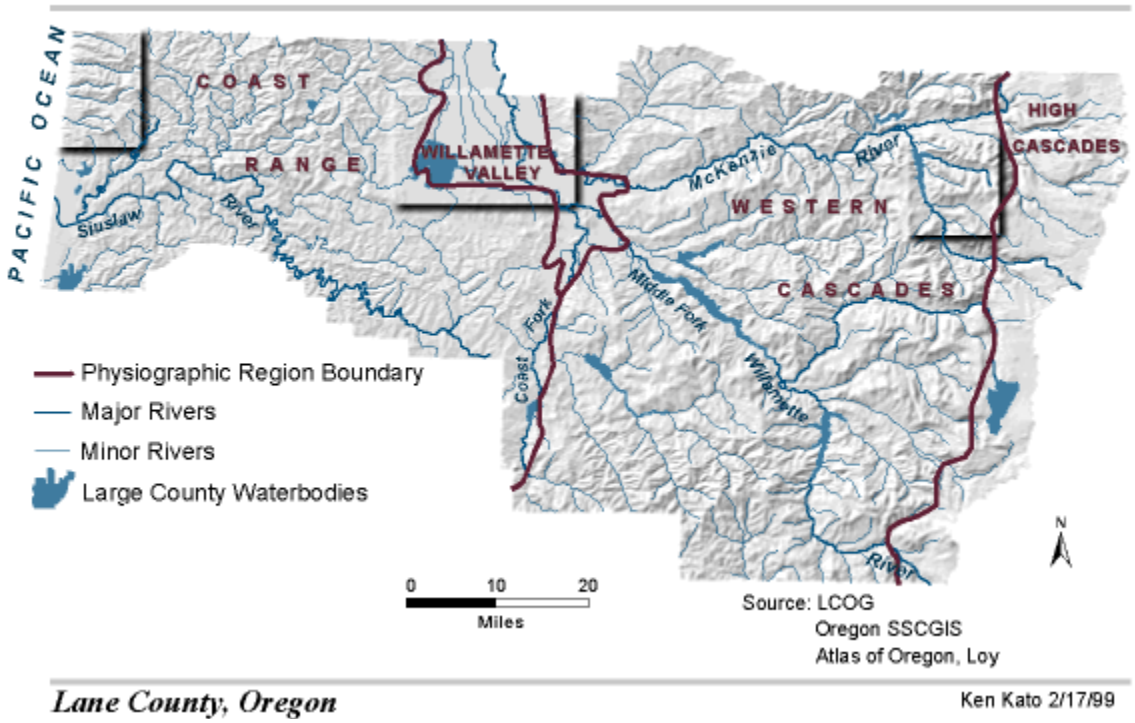
*Data used for Oakridge Estimated Number of Households; Average Household Size; and Median Household Income reflects 2000 Census data.

[2] Data collected from US Census 2000 and 2005-2009 Community Survey. The calculated used was percentage of increase of the 2000 occupied housing units (130,453) and the 2009 (139,593) number.
[3] US Census American Community Survey 2005-2009

Hazard Analysis

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.

Geography and Climate Overview



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.

The large size and geographic diversity of Lane County are important factors to consider in mitigation planning for natural and manmade hazards. For planning purposes, we consider five main physiographic regions within Lane County, based on nomenclature commonly used by the National Weather Service:

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 throughout the year.

This region is the only portion of Lane County subject to coastal hazards such as storm surge flooding and tsunamis. Occasional 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.

Normal annual precipitation is between 65 to 90 inches. The highest monthly precipitation values for the coast occur in the winter months of November, December, and January. Freezing temperatures at the coast are rare. The months of July, August, and September tend to be the warmest, but average summer temperatures are only about 15 degrees above the coldest month, January.

Coast Range. Stretching the full length of the state, the Coast Range is a heavily forested area with peaks ranging from 2,000 to 5,500 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. Spots high on the west slopes of the range may get over 100 inches of rain annually. Snowfall in the Coast Range is minimal, usually only one to three inches annually.

Willamette Valley. Tall mountain ranges and the Willamette River create the V-shaped Willamette Valley that stretches approximately 125 miles long and 60 miles wide. The valley reaches the Oregon – Washington border to the north and the City of Cottage Grove to the south. Lane County is located in the southern portion of the Willamette Valley, characterized by mild temperatures through the year with cool, wet winters and warm, dry summers. The average annual precipitation is less than 40 inches.

Extreme temperatures in the valley are rare. Days with a maximum temperature above 90 degrees Fahrenheit occur only 5-15 times per year on average and, days with below zero temperatures occur only about once every 25 years. Mean high temperatures range from the low 80's in the summer to the low 40’s in the winter, while average lows are generally in the low 50's in summer and low 30's in winter.

Although snow falls every few years in the South Willamette Valley, amounts are generally quite low. Valley floor locations throughout Oregon average 5-10 inches per year, mostly during December through February, recognizing that much higher totals are observed at higher elevations in the foothills every year.

Ice storms occasionally occur and high winds typically occur several times per year in association with major weather systems.

Cascade Foothills. The lower elevation area of the western slopes of the Cascade Range is considered the Cascade Foothills. This region is heavily forested and moderately populated in places.

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 rain, summer thunderstorms and fall snow all snow contribute to the annual precipitation total, but pale in comparison to winter precipitation totals.

Hazards Profile & Assessment Updates

Snow / Ice Storm

Geographic Extent

Snow and ice storms occur most commonly in the Cascade Range and Cascade Foothills in the eastern portion of the County and less frequently in the valley floor.

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.

Significant Occurrences Since 2006[4]

In the past five years there have been no major disaster declarations related to snow storms. However, there have been significant localized occurrences that may be of interest to the community from a historical perspective.

2011

- **February 14:** Heavy snow reported at 31 inches at the McKenzie SNOTEL[5] (Oregon NRCS, 2007-2008) site located in Lane County in the Willamette National Forest.

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

2010

- **November 21:** 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:** The McKenzie SNOTEL site measured 13 inches of new snow between during an eight hour period on November 18th.

2009

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

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

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

[4] 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

[5] The McKenzie SNOTEL (for SNOw TELmetry) site is part of the Natural Resources Conservation Service (NRCS) data collection program; the site is located in Lane County in the Willamette National Forest. Site elevation is 4770 ft; Latitude 44.21 Longitude -121.87

2007

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

2006

- **March 8:** 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.

Flood

Geographic Extent

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

Lane County has nearly 140,000 Acres of land in the floodplain. This is equivalent to well over 200 square miles. Over 11,000 individual parcels are partially or entirely located within the floodplain. Statewide, Lane County has more river miles of floodplain than any other county. Ongoing development along these rivers continues to displace natural areas that have historically functioned to store flood waters.

The Army Corps of Engineers operates 13 multi-purpose water projects (also known as dams) in the Willamette Valley, with nine of those projects situated in Lane County. These dams were constructed between 1941 and 1968. A primary purpose of these dams is flood control, although they only control flooding on 50% 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 tributaries and rivers with no flood control devices, such as the Siuslaw and Mohawk rivers.

Flooding occurs when climate, geology, and hydrology combine to create conditions where river and stream waters flow outside of their usual course and "overspill" beyond their banks. In Lane County, the combination of these factors, augmented by ongoing development, create chronic seasonal flooding conditions. 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. Snowmelt from the Central Cascades provides a continuous water source throughout the year, and can contribute significantly to flooding.

Flooding is most common from October through April, when storms from the Pacific Ocean bring intense rainfall to the area. Larger floods result from heavy rains that continue over the course of several days, augmented by snowmelt at a time when the soil is near saturation from previous rains.

Repetitive Loss Properties

Repetitive loss properties are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978.

There are twenty one Repetitive Loss Properties identified in Lane County. The property locations are broken down as follows:

Mapleton	11 residences, 1 business
Springfield	5 residences
Cottage Grove	1 residence
Elmira	1 residence
Vida	1 residence
Walton	1 residence

Significant Occurrences Since 2006[6]

In the past five years there have been no major disaster declarations related to flood in Lane County. However, there have been significant localized occurrences that may be of interest to the community from a historical perspective.

[6] 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

2007

- **December 3:** The Siuslaw River flooded near Mapleton, causing minor lowland flooding. An abnormally long period of consistently heavy rainfall led to widespread flooding, with the worst hit areas in the Coast Range and areas draining from the Coast Range to the Pacific Ocean.

2006

- **January 14:** 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.

- **January 17:** 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.

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

- **December 14:** The Siuslaw River near Mapleton crested at 18.3 feet; flood stage for this river is 18.0 feet.

Magnitude or Severity of Past Events

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.

In February 1996, prolonged precipitation accompanied by an early snowmelt, caused by a warm-weather trend known as a “Pineapple Express,” caused many rivers and creeks throughout Lane County to rise to 100-year flood levels. Flooding was particularly severe along the Siuslaw and Mohawk Rivers. (Lane County Land Management Division, 2011)

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 this February storm. The approved federal share amounts for this storm's disaster declaration DR-1099-OR were as follows: Federal share approved amount for public assistance for Lane County was $564,608; Individual Assistance for disaster housing was for $720,706; Individual & Family Grant amount was $220,564. Small Business Administration loans reached $1.75M 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. 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 in the western portion of Lane County caused extensive damage within the community of Mapleton.
- The floods of 1945, 1942 and 1927 caused severe damage in the valley floor 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.

Probability of Future Events

Based on historical occurrence, Lane County expects a significant flood event every 15 – 20 years however much of the risk is mitigated through dams.

Windstorm

In the past five years there have been no major disaster declarations related to windstorms in Lane County. However, there have been significant localized occurrences that may be of interest to the community from a historical perspective.

Geographic Extent

For Lane County, the highest potential for severe windstorms is highest at the coast and then fairly uniform across the rest of the county. In the hilly areas, however, the level of wind hazard is strongly determined by local conditions of topography and vegetation cover.

For Lane County, the two-year recurrence interval of sustained wind speeds range from about 37 to 47 miles per hour. 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.

For Lane County, the 50-year recurrence interval of wind speeds range from about 62 to 75 miles per hour. 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.

Significant Occurrences Since 2006

2011

- March 13: A severe windstorm whipped through Lane County leaving travelers trapped on a West Boundary Road as they tried to bypass a highway 58 closure. West Boundary Road was impassable at both ends due to downed trees and power lines. Damages to public infrastructure Lane County totaled approximately $1.5 million.

2010

- December 29: In Creswell, a thunderstorm produced a funnel cloud, dime size hail and strong winds. A few trees and branches were blown down.

2007

- June 6: During an afternoon under a particularly cool and unstable airmass, a funnel cloud was sighted near the Eugene airport by the personnel at the Eugene Air Traffic Control Tower.

- December 3: High wind gusts measuring 76 knots 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.

- Decemeber 19: A potent Pacific storm and associated cold front brought strong 52 knot winds to the coast and heavy snow to the Cascades.

2006

- February 3: 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.

- March 7: 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 37 knots. $375,000 in damage was reported.

Magnitude or Severity of Past Events

2011

- 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.

2002

- 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, President Bush declared a major disaster for the State of Oregon. Lane County's damage estimate for public infrastructure as over $3.5 million.

Probability of Future Events

Based on historical occurrence, Lane County expects a significant windstorm about once every 10 years.

Wildfire

Geographic Extent

The Lane County wildland-urban interface is large, approximately 2,269,000 acres or 3,543 square miles. The size of Lane County's wildland-urban interface 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)

Significant Events Since 2006

Although there have been thirteen 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.

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 sixty fires in an approximately 500,000 acre area in the south zone of the Willamette National Forest near Oakridge. Fifty-two of the fires were confirmed, and over 200 acres in total were burned.

Magnitude or Severity of Past Events

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: 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.

1998

- Aug 13: 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: 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: Lightning caused a series of forest fires, known as the **Moolack Complex**, in the Willamette National Forest east of Oakridge. 11,375 acres were burned with $1.7 million in damage to campgrounds and timber interests. The fire smoldered for almost 2 months before it was declared out on October 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 State 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 (Polk County) drainage about six miles southeast of Oakridge to be ready to evacuate.

Other

- 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. Then in 1929, a number of large fires burned most of the central Coast Range in Lane County, covering nearly 80,000 acres. The fires re-burned some previously burned areas, and burned green forest as well. With the timber gone, the Great Depression starting, and the land 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. (Oregon Department of Forestry, 2010)

Probability of Future Events

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.

Earthquake / Tsunami

Geographic Extent

A tsunami is a series of sea waves, usually caused by a displacement of the ocean floor by an undersea earthquake. As tsunamis enter shallow water near land, they increase in height and can cause great loss of life and property damage.

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.

We distinguish between a tsunami caused by an undersea earthquake near the Oregon coast (a local tsunami) and an undersea earthquake far away from the coast (a distant tsunami).

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.

Significant Events Since 2006

A devastating M9 earthquake struck off the coast of Japan at about 3:00 PM on Friday, March 11, 2011 – the time zone conversion made it 10:00 PM on Thursday, March 10, local time. As such, Thursday evening at 11:30 PM a tsunami watch was issued for the coastal areas of Oregon by the National Weather Service in Portland.

Friday morning at 12:44 AM the tsunami watch was updated to a warning:

> "This message updates the alert status to warning and advisory.
> ..A tsunami warning is now in effect which includes the coastal areas of California and Oregon from Point Conception California to the Oregon-Washington Border..."

The update from a tsunami watch to warning triggered the decision making process for when to invoke evacuation procedures. The areas to be evacuated were the coastal areas of Lane County inside the inundation zone as defined by the Oregon Department of Geology and Mineral Industries (DOGAMI). Tsunami wave arrival times for the central Oregon coast were predicted for 7:00 AM.

Fire Chief John Buchanan and Police Chief Maury Sanders monitored the impact of this distant tsunami on Hawaii along with NOAA information and made the official decision to evacuate the inundations zones at around 2:30 AM.

To ensure a smooth and safe evacuation effort and to discourage travel to the coast, resources were quickly mobilized from various agencies.

A full activation was invoked for the West Lane Emergency Operations Center (EOC) located at Siuslaw Valley Fire & Rescue in Florence. The Lane County Sheriff's Office located in downtown Eugene also initiated a Level Two (limited) EOC activation to provide support to the city. Communications between the two EOC's were frequent and effective resulting in excellent information flow going both ways. At all times the City of Florence and Siuslaw Valley Fire & Rescue were considered a Unified Command and the lead agencies for this incident.

A smooth and successful evacuation was accomplished as a direct result of years of tsunami preparedness planning, training and exercises sponsored by the West Lane Emergency Operations Group. Years of public education and outreach also proved effective as the majority of citizens were poised to follow instructions and evacuate according to plan. There was a segment of the population that was unaware of their location in proximity to the inundation zone and therefore created a spike in calls to the City of Florence.

There were three times at Heceta Beach when it was observed that the water was receding anywhere from 50 to 150 feet and then followed by a returning surge of water that would reach the original water level. The behavior of the

water was as expected for on oncoming tsunami wave but stopped short of flooding the area. Surge times were 7:30 AM, 8:00 AM and 9:30 AM.

Previous Occurrences

Tsunamis from locations across the Pacific Ocean basin and from the Cascadia Subduction Zone off the Washington coast have hit coastal communities in the 900 – 930 era, 1700, the 1890's, 1944-1953 era, 1949, 1960, 1964 and 1980.

Probability of Future Events

Great earthquakes in the Pacific Ocean basin generating tsunamis that impact Oregon's outer coast and the Strait of Juan de Fuca occur at a rate of about every six hundred years. A rate of occurrence for local earthquakes and landslides that generate tsunamis has not been determined

Landslide

In many parts 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.

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.

Summary Table of Significant Weather Events in Lane County

	Snow / Ice Storm	Flood	Windstorm	Wildfire (at or near Lane County)	Landslide	Earth-quake	Distant Tsunami	Volcano	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)							
1996	CSCD/R	CST	CST	CSCD/R					

	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	Cscd/F	Cascade Foothills
Cst/R	Coast Range	Cscd/R	Cascade Range
WVF	Willamette Valley Floor	(DR XXX)	FEMA Disaster Declaration and Number

Updated Mitigation Strategy

This section 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 goals for the 2006 edition of Lane County's Natural Hazards Mitigation Plan are still relevant today and are central to this Plan Update. The goals focus on reducing or avoiding long-term vulnerabilities to hazards in Lane County:

- Goal 1: Save lives and reduce injuries
- Goal 2: Minimize and prevent damage to buildings and infrastructure
- Goal 3: Reduce economic loss
- Goal 4: Decrease disruption to services
- Goal 5: Protect natural and cultural resources
- Goal 6: Increase awareness and understanding of the hazards and risks

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

Preventive Measures in Community Planning

The State of Oregon uses a unique but legally powerful system of state 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 the siting of 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
- Building Codes
- Planning and Zoning
- Land Divisions
- Parks and Open Space

National Flood Insurance Program

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.

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. With regard to wildfire, protective measures can be taken as discussed in Section 5 of this plan.

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

Planning and Zoning

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.

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.

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 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.

2006 Action Item Update Overview

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.
- The 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.

2006 Item-by-Item Analysis

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.

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

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.

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 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."

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.**

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.**

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 xxx).

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.**

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 XXXX

- **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

"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."

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.

- According to a recent survey of Fire Service agencies, only about half of all fire service facilities have a back-up power source.
- The Florence Events Center, a critical facility in the event of a coastal tsunami, recently purchased a back-up generator.
- The Lane County Sheriff's Office Communications Center has back-up power.

- **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."

"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.

2011 Program Action Items

Action Item 1. 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 Agency*: Lane County Emergency Management
- *Timeline*: Continuous
- *Cost*: Staff time
- *Benefits*: 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.

Action Item 2. Public Education and Outreach

Conduct public outreach activities related to natural hazard mitigation and personal preparedness using a variety of media sponsored by various agencies, such as:

a. Community newsletters and direct mailings
b. News releases and public service announcements
c. Presentations at meetings of neighborhood, civic or business groups
d. Displays in public buildings or shopping malls

- *Responsible Agency:* Lane County Emergency Management. Other county departments will also participate along with municipalities and special districts.
- *Timeline:* Continuous
- *Cost:* Most projects will only cost staff time for the development of electronic newsletters and website postings. Others, such as directed mailings and brochures will have printing and/or postage expenses.
- *Benefits:* There are many benefits to having a well-informed public. For example, deaths from various hazards are declining over time as people become more aware of what they should and should not do. More self-help and self-protection measures will be implemented if people know about them and are motivated to pursue them.

Action Item 3. Utilize HAZUS-MH Software

Develop in-house competency with HAZUS-MH software so that additional loss-estimation data can be provided regarding natural hazard risks and inform decisions about potential risk reduction measures.

- *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.

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.

e. 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.

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.

Action Item 6. Land Use Regulations

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 wild land-urban interface overlays) such as tsunami inundation areas, steep slope, or debris flow prone areas.

- *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.

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.

Action Item 8. Upsize Culverts and Storm Water Drainage Systems

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.

- *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.

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.

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.

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*: Maximizes benefit to the community in terms of hazard risk reduction and mitigation.

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.

FEMA. (2011). *Fire Management Assistance Declarations.* Retrieved from http://www.fema.gov/news/disasters_state.fema?id=41#fire.

Lane County CWPP. (2005). *Community Wildfire Protection Plan.*

Lane County Land Management Division. (2011). *Floodplain Information.* Retrieved from http://www.lanecounty.org/departments/pw/lmd/landuse/pages/flood_info.aspx.

Oregon Department of Forestry. (2010). *State Forests Management Plan, Revised Plan April 2010.*

Oregon NRCS. (2007-2008). How Much Water Will We Have? *Retrieved from http://www.or.nrcs.usda.gov/snow/about/SNOTEL%20fact%20sheet.pdf* .
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* .

US Forest Service, Pacific Northwest Region. (1991). *Warner Creek Fire Collection.*