



WOODBURN
O R E G O N
Incorporated 1889

City of Woodburn

Addendum to the Marion County Natural Hazards Mitigation Plan

Report for

City of Woodburn
270 Montgomery St.
Woodburn, OR 97071-4730

Prepared by:

Oregon Partnership for Disaster Resilience
1209 University of Oregon
Eugene, OR 97403-1209

April 8, 2010





FEMA

April 8, 2010

Honorable Sam Brentano
Honorable Janet Carlson
Honorable Patricia Milne
Marion County Board of Commissioners
P.O. Box 14500
Salem, Oregon 97309

Dear Commissioners Brentano, Carlson, and Milne:

On January 27, 2006, the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) approved the *Marion County Natural Hazard Mitigation Plan* as a multi-jurisdictional local plan as outlined in 44 CFR Part 201. With approval of this plan, the following entities are now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through January 27, 2011:

Marion County

City of Aurora

City of Keizer

City of Silverton

City of Woodburn

The list of approved jurisdictions has been updated to include the city of Woodburn, which has recently adopted the City of Woodburn Addendum to the Marion County Natural Hazard Mitigation Plan. To continue eligibility the plan must be reviewed, revised as appropriate, and resubmitted within five years of the original approval date.

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact our State counterpart, Oregon Emergency Management, which coordinates and administers these efforts for local entities.

Sincerely,

A handwritten signature in blue ink that reads "Mark Carey".

Mark Carey, Director
Mitigation Division

cc: Dennis Sigrist, Oregon Emergency Management

KM:bb

COUNCIL BILL NO. 2819

RESOLUTION NO. 1960

A RESOLUTION ADOPTING THE CITY OF WOODBURN'S REPRESENTATION IN THE MARION COUNTY MULTI-JURISDICTION HAZARD MITIGATION PLAN

WHEREAS, the City of Woodburn is vulnerable to the human and economic costs of natural, technological and societal disasters, and

WHEREAS, the City Council of the City of Woodburn recognizes the importance of reducing or eliminating those vulnerabilities for the overall good and welfare of the community, and

WHEREAS, the City of Woodburn has participated in the development of the Marion County Multi-Jurisdiction Natural Hazard Mitigation Plan, which has established a comprehensive, coordinated planning process to eliminate or minimize these vulnerabilities, and

WHEREAS, the City staff has identified natural hazard risks and prioritized a number of proposed actions and programs needed to mitigate the vulnerabilities of the City of Woodburn to the impacts of future disasters, and

WHEREAS, these proposed projects and programs have been incorporated into the Marion County Multi-Jurisdiction Natural Hazard Mitigation Plan that has been prepared and promulgated for consideration and implementation by the cities of Marion County; **NOW, THEREFORE**,

THE CITY OF WOODBURN RESOLVES AS FOLLOWS:

Section 1. The City Council of the City of Woodburn hereby accepts and approves of its section of the Marion County Multi-Jurisdiction Hazard Mitigation Plan as a reasonable process to identify and plan for potential hazards in the City of Woodburn and Marion County,

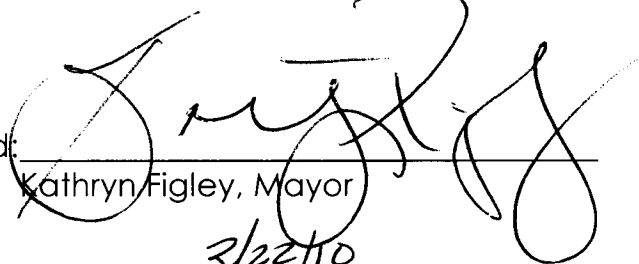
Section 2. City personnel are requested and instructed to pursue available funding opportunities for implementation of the actions and proposals designated therein,

Section 3. The City of Woodburn will, upon receipt of such funding or other necessary resources, seek to implement the mitigation proposals identified by the City's Hazard Mitigation Planning Committee, and

Section 4. The City of Woodburn will continue to participate in the updating and expansion of the Marion County Multi-Jurisdiction Hazard Mitigation Plan in the years ahead, and

Section 5. The City of Woodburn will further seek to encourage the businesses, industries and community groups operating within and for the benefit of the City of Woodburn to also participate in the updating and expansion of the Marion County Multi-Jurisdiction Hazard Mitigation Plan in the years ahead.

Approved as to form:  3/18/2010
City Attorney Date

Approved: 
Kathryn Figley, Mayor

Passed by the Council 3/22/10
Submitted to the Mayor 3/23/10
Approved by the Mayor 3/24/10
Filed in the Office of the Recorder 3/24/10

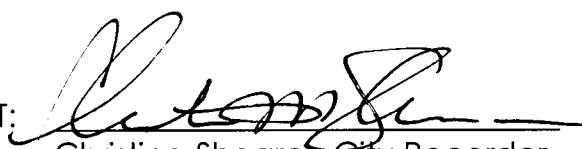
ATTEST: 
Christina Shearer, City Recorder
City of Woodburn, Oregon

Table of Contents

SECTION 1: PLANNING PROCESS

OVERVIEW	1
ADDENDUM DEVELOPMENT PROCESS	1

SECTION 2: COMMUNITY PROFILE

GEOGRAPHY & CLIMATE	7
POPULATION & DEMOGRAPHICS	8
EMPLOYMENT & ECONOMICS	9
HOUSING	10
LAND USE & DEVELOPMENT	11
TRANSPORTATION	17
CRITICAL FACILITIES & INFRASTRUCTURE	21
HISTORIC & CULTURAL RESOURCES	21
GOVERNMENT STRUCTURE	22
EXISTING PLANS & POLICIES	22
COMMUNITY PARTNERS	24

SECTION 3: RISK ASSESSMENT

DROUGHT	26
EARTHQUAKE	27
FLOOD	39
LANDSLIDE	45
VOLCANO	47
WILDFIRE	48
WINDSTORM	55
SEVERE WINTER STORM	56

SECTION 4: MISSION, GOALS, AND ACTION ITEMS

MISSION	59
GOALS	59
MITIGATION ACTION ITEMS	60

SECTION 5: PLAN IMPLEMENTATION AND MAINTENANCE

PLAN ADOPTION	63
CONVENER	63
COORDINATING BODY	64
PLAN MAINTENANCE	65
CONTINUED PUBLIC INVOLVEMENT & PARTICIPATION	70
FIVE-YEAR REVIEW OF PLAN	70

APPENDIX A: PLANNING & PUBLIC PROCESS

A1

APPENDIX B: GRANT PROGRAMS

B1

APPENDIX C: ECONOMIC ANALYSIS

C1

APPENDIX D: ACTION ITEM WORKSHEETS

D1

APPENDIX E: COMMUNITY PARTNERS

E1

Section 1: Planning Process

Overview

Woodburn developed this addendum to the Marion County multi-jurisdictional Natural Hazards Mitigation Plan in an effort to increase the community's resilience to natural hazards. The addendum focuses on the natural hazards that could affect the city of Woodburn, Oregon, which include drought, flood, earthquake, landslide, volcano, wildfire, wind storm, and severe winter storm. It is impossible to predict exactly when disasters may occur, or the extent to which they will affect the city. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from natural hazards.

The addendum provides a set of actions that aim to reduce the risks posed by natural hazards through education and outreach programs, the development of partnerships, and the implementation of preventative activities via the comprehensive plan, development code, public facilities plan, transportation system plan, or parks master plan. The actions described in the addendum are intended to be implemented through existing plans and programs within the city.

Addendum Development Process

In the fall of 2006, the Oregon Partnership for Disaster Resilience (the Partnership / OPDR) at the University of Oregon's Community Service Center partnered with Oregon Emergency Management (OEM) to develop a Pre-Disaster Mitigation Planning Grant proposal to create natural hazards mitigation plan addenda for Oregon's Mid/Southern Willamette Valley cities. FEMA awarded the region with a Pre-Disaster Mitigation planning grant, and planning efforts with the cities of Aurora, Keizer, Silverton, and Woodburn began in the winter of 2009. The Partnership facilitated and documented each of the cities' planning processes.

The following representatives served as steering committee members for the city of Woodburn's natural hazard mitigation planning process.

- Dan Brown, *Public Works Director*, City of Woodburn
- Jim Hendryx, *Community Development Director*, City of Woodburn
- Natalie Labossiere, *Senior Planner*, City of Woodburn
- Don Dolenc, *Associate Planner*, City of Woodburn
- Nita Marr, *Police Executive Assistant*, City of Woodburn
- Paul Iverson, *Fire Marshal*, Woodburn Fire District

- Steve Krieg, *Building Official*, City of Woodburn
- Jason Tlusty, *Patrol Division*, Woodburn Police Department

The planning process and associated resources used to create Woodburn's Addendum to the Marion County Natural Hazards Mitigation Plan were developed by the Partnership. To coordinate planning efforts, the steering committees from Aurora, Keizer, Silverton, and Woodburn participated in joint meetings facilitated by the Partnership. The planning process was designed to: (1) result in an addendum that is Disaster Mitigation Act 2000 compliant; (2) coordinate with the state's plan and activities of the Partnership; and (3) build a network of local organizations that can play an active role in plan implementation. The following is a summary of major activities included in the planning process including public outreach activities.

Plan Work Sessions

Project Kickoff (February – March, 2009)

On February 25, 2009, the Partnership hosted a kickoff meeting in Salem with representatives from the cities of Aurora, Keizer, Silverton, and Woodburn. The purpose of the meeting was: 1) to provide an overview of the Pre-Disaster Mitigation Program and the Oregon Partnership for Disaster Resilience; 2) to describe the four-phase mitigation planning process and schedule of meeting dates to occur; and 3) to provide instruction and guidance in developing community steering committees. One or two representatives from each city (i.e., "city leads") attended. Following the meeting, city leads were asked to develop full steering committees and to review and edit the community profile section of their city addendum.

Risk Assessment (April – May, 2009)

On April 15, 2009, the Partnership facilitated a risk assessment training / work session with the cities of Aurora, Keizer, Silverton, and Woodburn. The training was developed and implemented by the Partnership, with assistance from Oregon Emergency Management, the United States Geological Survey, the Federal Emergency Management Agency (FEMA Region X), and City-County Insurance. Full steering committees from each city were present. The purpose of the work session was to: (1) explain the process and components of a risk assessment; (2) identify and discuss previous natural hazard events within each community; and (3) identify the cities' risks and vulnerabilities to natural hazards.

The Partnership facilitated and documented discussions within each community's steering committee, and used this information to develop the hazard sections below for the city of Woodburn. Work session materials and sign-in sheets for the April 15th meeting are located in Appendix A, Planning and Public Process.

Action Item Development (June, 2009)

On June 10th, 2009, the Partnership facilitated an action item development training / work session with the cities of Aurora, Keizer, Silverton, and Woodburn. The work session was developed and implemented by the Partnership, and full steering committees from each city were present. The purpose of the work session was to: 1) identify missions and goals for each city's addendum; and 2) select and develop mitigation action items. The Partnership facilitated and documented discussions within each community's steering committee, and subsequently developed Section 4 below for the city of Woodburn. Work session materials and sign-in sheets for the June 10th meeting are located in Appendix A, Planning and Public Process.

Plan Implementation and Maintenance (July-August 2009)

On July 29th, 2009, the Partnership facilitated a plan implementation and maintenance training / work session with the cities of Aurora, Keizer, Silverton, and Woodburn. The work session was developed and implemented by the Partnership, with assistance from Oregon Emergency Management. With guidance and facilitative assistance from the Partnership, each steering committee identified plan 'conveners' and 'coordinating bodies.' Additionally, each committee established plan maintenance schedules, and strategies for continuing public involvement throughout the five-year plan implementation and maintenance cycle. Finally, the Partnership asked each community to identify opportunities or strategies for: 1) implementing mitigation actions via existing plans and policies; and 2) incorporating mitigation-related activities and responsibilities into city employees' work plans or job descriptions. Please see Section 5 below for information regarding Woodburn's plan implementation and maintenance strategies.

Aside from community discussions, the Partnership presented information related to grant opportunities and founding resources. Additionally, Oregon Emergency Management provided a general overview of the benefit-cost analysis process that's required when developing applications for federal mitigation grant programs.

Public Involvement

Stakeholder Survey

As part of a regional public involvement effort, the Partnership developed and distributed an online survey to a select group of stakeholders in each community. Representatives from the following organizations were identified by Woodburn's steering committee members, and contacted via email to participate:

- Police Captain, City of Woodburn
- Business Manager, St. Lukes Catholic Church
- Member, Woodburn Chamber of Commerce
- Director, Chemeketa Community College - Woodburn
- Assistant City Engineer, City of Woodburn

- Community Services Director, City of Woodburn
- Mayor, City of Woodburn
- Fire Chief, Woodburn Fire District
- Public Works Division Manager – Maintenance, City of Woodburn
- Senior Planner, City of Woodburn
- Public Works Division Manager – Water Resources, City of Woodburn
- City Administrator, City of Woodburn
- President, Woodburn Ambulance Services

Results from the online survey were used to inform the city’s risk assessment and mitigation actions. Please see Appendix A, Planning and Public Process for a complete list of organizations that were invited to participate, in addition to survey results.

Plan Review

The city’s steering committee served as the primary plan reviewers. Upon completion of a final draft addendum, the city informed residents about the plan, and requested feedback using the following methods:

- The city posted a final draft of the plan on the city’s website, along with a public notice in both English and Spanish (see below). Additionally, copies were available for viewing at the public library, as well as the Economic & Development Services office. All draft copies included contact information to facilitate public comment.

PUBLIC NOTICE

The City of Woodburn is developing a Natural Hazards Mitigation Plan to better prepare the City for drought, earthquake, flooding, and other natural disasters. The City invites any interested person to comment on the plan before it is finalized. Drafts of the plan are available at:

- *The Woodburn Public Library, 280 Garfield, Woodburn, OR 97071*
- *At City Hall, Economic & Development Services Department, 270 Montgomery St., Woodburn, OR 97071*
- *Or you can download further information by clicking on the links below:*

*Addendum to the Marion County Natural Hazards Mitigation Plan
Appendix D: Action Item Worksheets*

If you have any questions, please contact the Economic & Development Services Department at 503-982-5246.

- The city posted flyers in both English and Spanish at City Hall, the public library, the public works building, and the Pinos y Campesinos Unidos del Noroeste (PCUN). The flyers briefly described the natural hazards mitigation plan, and the opportunity for public comment.

- A representative from the city's steering committee attended a City Council meeting in November, 2009 to announce the completion of a final draft. The steering committee member additionally talked about how the public could review the plan and provide comments / concerns to the city.

Additionally, six of the stakeholders that participated in the online survey also volunteered to review plan drafts. The steering committee contacted those persons during the final review process. Marion County's project webpage located on *The Partnership* website (www.OregonShowcase.org) hosted plan drafts.

Finally, the Partnership, with a commitment from the Institute for Business & Home Safety (IBHS) provided individuals in the region with access to, and use of, the IBHS interactive, web-based *Open for Business* property protection and disaster recovery planning tool. The purpose of the planning tool is to: (1) create understanding of the importance of disaster planning; (2) teach local businesses how to navigate the interactive, web-based *Open for Business* property protection and disaster recovery planning tool; (3) assist small businesses in developing their own plans during the training; and (4) teach businesses how to communicate the importance of developing and utilizing plans for property protection and recovery from business interruption. An Open for Business workshop was held in Marion County in October, 2009.

The final adopted and approved addendum will be posted on the University of Oregon Libraries' Scholar's Bank Digital Archive.

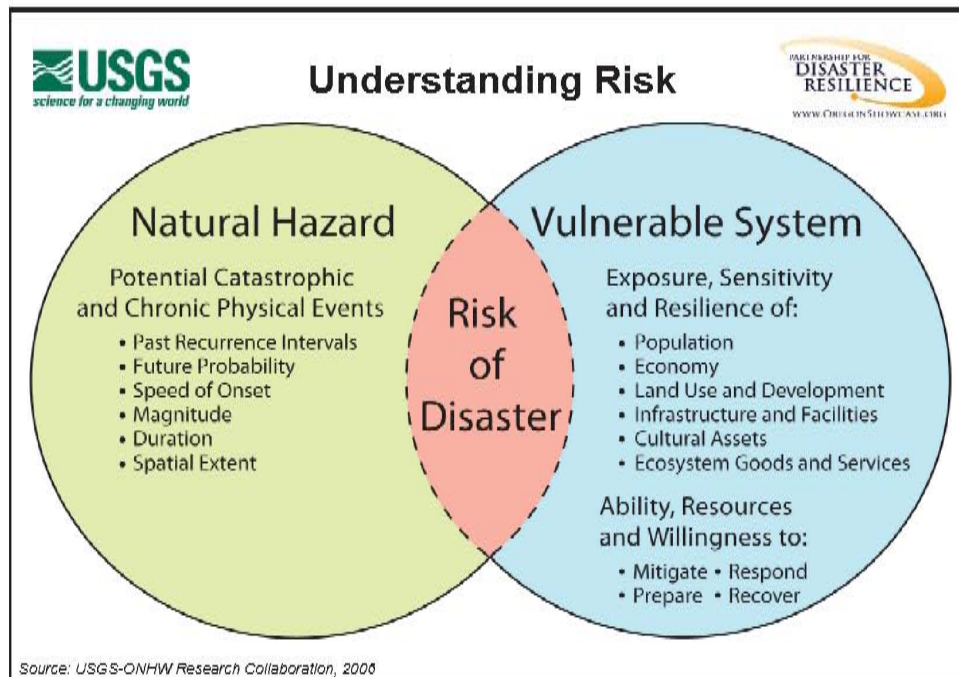
Adoption

The city of Woodburn adopted the Marion County Natural Hazard Mitigation Plan via resolution on Insert Date, Year.

Section 2: Community Profile

The following section describes the city of Woodburn from a number of perspectives in order to help define and understand the city's sensitivity and resilience to natural hazards. Sensitivity factors can be defined as those community assets and characteristics that may be impacted by natural hazards, (e.g., special populations, economic factors, and historic and cultural resources). Community resilience factors can be defined as the community's ability to manage risk and adapt to hazard event impacts (e.g., governmental structure, agency missions and directives, and plans, policies, and programs). The information in this section represents a snapshot in time of the current sensitivity and resilience factors in the city when the plan was developed. The information documented here, along with the risk assessments in Section 3 below, should be used as the local level rationale for the city's risk reduction actions identified at the end of this addendum. The identification of actions that reduce the city's sensitivity and increase its resilience assist in reducing overall risk, or the area of overlap in Figure 1 below.

Figure 1. Understanding Riskⁱ



Geography & Climate

The city of Woodburn is located in Marion County, Oregon, 18 miles northeast of the city of Salem along the I-5 corridor. Woodburn is located in Oregon's Willamette Valley which experiences a moderate climate. In

August the average high temperature is 82 degrees and the average low temperature is 51 degrees. Wintertime temperatures in January range from an average high of 46 degrees to an average low of 33 degrees.ⁱⁱ The average annual precipitation is 39.9 inches.ⁱⁱⁱ Major bodies of water in Woodburn include Senecal Creek and Mill Creek. Woodburn is located on a flat area, with farmland surrounding the city on all sides.

Population & Demographics

Woodburn has changed significantly in population since it was first incorporated in 1889. The city originally began as a small farming and manufacturing community. Beginning in the 1960's Woodburn became a suburb of Salem and Portland with its proximity to I-5. Over the past 18 years, Woodburn has grown 74%. Table 1 below shows the city's growth over the last 18 years.

Table 1. Woodburn Population Change, 1990-2008

Year	Population	% Change
1990	13,404	-
2000	20,100	50%
2008	23,355	16%

Source: Portland State University, Population Research Center^{iv}

Disaster impacts (in terms of loss and the ability to recover) vary among population groups following a disaster. Historically, special needs groups, particularly children, the elderly, the disabled, minorities, and low income persons require post-disaster assistance.

In 2000, almost 35% of Woodburn's population (6,543) spoke English less than "very well."^v Furthermore, approximately 51% of Woodburn's residents are "Hispanic or Latino (of any race)." Racial and ethnic minority households tend to have inferior public services, infrastructure, and building stock, and to be more vulnerable to extreme natural events. Additionally, language barriers can hinder the effectiveness of awareness campaigns, evacuation procedures, and post-disaster recovery opportunities.^{vi}

Younger populations typically require direction and assistance in a natural disaster event. They are also more likely to develop post-traumatic stress disorders, depressions, anxieties, and behavioral disorders because they are unable to understand and process the implications of a disaster.^{vii} In 2000, about 8.9% of Woodburn's population, or 1,797 people were under the age of 5.

Elderly individuals require special consideration due to their sensitivities to heat and cold, their reliance upon public transportation for medications, and their comparative difficulty in making home modifications that reduce

risk to hazards.^{viii} In 2000, about 18.1% of Woodburn’s population was 65 years of age or older.

Additionally, low-income households have fewer financial resources to recover from a natural disaster. According to the 2007 American Community Survey, 8.2% of families and 13.9% of individuals were living below the federal poverty level in Woodburn.

Public venues that are likely to attract high numbers of local residents and tourists are also an emergency management planning challenge. Woodburn is also home to the Woodburn Company Stores. These stores represent the largest tax-free outlet center in the West, and numerous non-resident shoppers and tourists visit Woodburn on a daily basis. Because the Woodburn Company Stores are a tourist draw, city staff and local emergency managers (i.e., state, county and city) should work with the stores’ owners and employees to further educate local and tourist populations about natural hazards.

Employment & Economics

Historically, the city of Woodburn was a commercial, agricultural, and industrial community that grew around the railroad that currently runs through the center of town.^{ix} Today, Woodburn’s economy is still largely based on manufacturing, agriculture, construction and retail trade. Woodburn’s proximity to I-5 allows for an auto-oriented service economy to exist along the interstate corridor. Table 2 below indicates Woodburn’s major employment sectors.

Table 2. City of Woodburn Employment by Major Industry

Industry	Persons Employed	% of Population
Manufacturing	1,446	16.0%
Agriculture, forestry, fishing and hunting, and mining	1,355	15.0%
Construction	1,321	14.6%
Retail trade	980	10.9%
Educational, health and social services	975	10.8%
Arts, entertainment, recreation, accommodation and food services	832	9.2%
Wholesale trade	573	6.3%
Professional, scientific, management, administrative, and waste management services	463	5.1%
Finance, insurance, real estate, and rental and leasing	403	4.5%
Transportation and warehousing, and utilities	260	2.9%
Information	149	1.7%

Industry	Persons Employed	% of Population
Public administration	137	1.5%
Other services (except public administration)	132	1.5%
Civilian employed population 16 years and over	9,026	100%

Source: US Census, American Community Survey 2005-2007.^x

Median income can be used as an indicator of the strength of the region's stability. In 2007, the median household income in Woodburn was \$40,750.^{xi} This is \$9,257 less than the national median household income and \$4,740 less than Marion County's median household income.^{xii} Low-income residents may be more vulnerable to the impacts of natural hazard events, and may limit the community's ability to quickly recover after a natural disaster. As noted above, 8.2% of families are also considered to be below poverty status.

Housing

Housing type and age are important factors in mitigation planning. Certain housing types tend to be less disaster resistant and warrant special attention: mobile homes, for example, are generally more prone to wind and water damage than standard stick-built homes. Generally the older the home is, the greater the risk of damage from natural disasters. This is because stricter building codes have been developed following improved scientific understanding of plate tectonics and earthquake risk. For example, structures built after the late 1960s in the Northwest and California use earthquake resistant designs and construction techniques. In addition, FEMA began assisting communities with floodplain mapping during the 1970s, and communities developed ordinances that required homes in the floodplain to be elevated to one foot above Base Flood Elevation.

In 2007, Woodburn had 7,696 housing units. Of those, 94.9% were occupied (7,301), and 5.1% were vacant (395).^{xiii} Of the occupied housing units, 65.2% (4,762) were owner-occupied and 34.8% (2,539) were renter occupied.^{xiv} Studies have shown that renters are less likely than homeowners to prepare for catastrophic events.^{xv} Renters tend to have higher turnover rates that may limit their exposure to hazard information. Likewise, preparedness campaigns tend to pay less attention to renters. Renters typically have lower incomes and fewer resources to prepare for natural disasters, and renters may lack the motivation to invest in mitigation measures for rented property.^{xvi}

Woodburn also has a large number of older housing structures that may be vulnerable to earthquakes. Approximately 57.3% of the housing units were built before 1980 when more stringent seismic codes were put into place (see Table 3 below).

Table 3. City of Woodburn Housing Structure Age, 2007

Year Built	Total Structures	% of Structures
2005 or later	88	1.1%
2000 to 2004	1,008	13.1%
1990 to 1999	1,335	17.3%
1980 to 1989	850	11.0%
1970 to 1979	1,542	20.0%
1960 to 1969	1,772	23.0%
1950 to 1959	255	3.3%
1940 to 1949	464	6.0%
1939 or earlier	382	5.0%
Total Housing Units	7,696	100%

Source: US Census, American Community Survey.^{xvii}

In addition, Table 4 shows that 69% of Woodburn’s homes are single-family housing units. Mobile homes represent 7.5% of the Woodburn’s housing units. There are five mobile home parks within the city limits that accommodate 429 mobile home units. Additionally, there are two mobile home subdivisions in Woodburn that accommodate 102 units, and there are four mobile home parks near (but outside) the city limits that accommodate a total of 155 units.

Table 4. City of Woodburn Housing Type, 2007

Housing Type	Total Structures	% of Structures
Single-Family Unit	5,325	69.2%
Multi-Family, 2 units	163	2.1%
Multi-Family, 3 or 4 units	427	5.5%
Multi-Family, 5 to 20 units	1,179	15.3%
Mobile home	577	7.5%
Boat, RV, van, etc.	25	0.3%
Total Housing Units	7,696	100%

Source: US Census, American Community Survey.^{xviii}

Land Use & Development

According to the 2005 Buildable Lands Inventory, the land area within the city of Woodburn spans a total of 4,572 acres within the Urban Growth

Boundary (UGB) which includes land in the city limits.^{xix} The city contains the following general zones that determine the development pattern within the community: Single-Family Residential, Medium-Density Residential, Downtown Development and Conservation, Commercial, Industrial, and Public/Open Space.

The city contains areas within the 100-year floodplain along Mill Creek and Senecal Creek. The Woodburn Development Ordinance prohibits new development within the 100-year floodplain.

In 2005, the city completed an urban growth boundary expansion that added 979 acres into its Urban Growth Boundary to accommodate projected growth for the year 2020. Future development is projected to occur in the south and southwest part of the city and to the north above the Oregon Golf Association at Tukwila. Figure 2 shows the current zoning of Woodburn, and Figure 3 shows the zones and land areas slated for future growth in the city.

Figure 2. Woodburn Zoning Map.

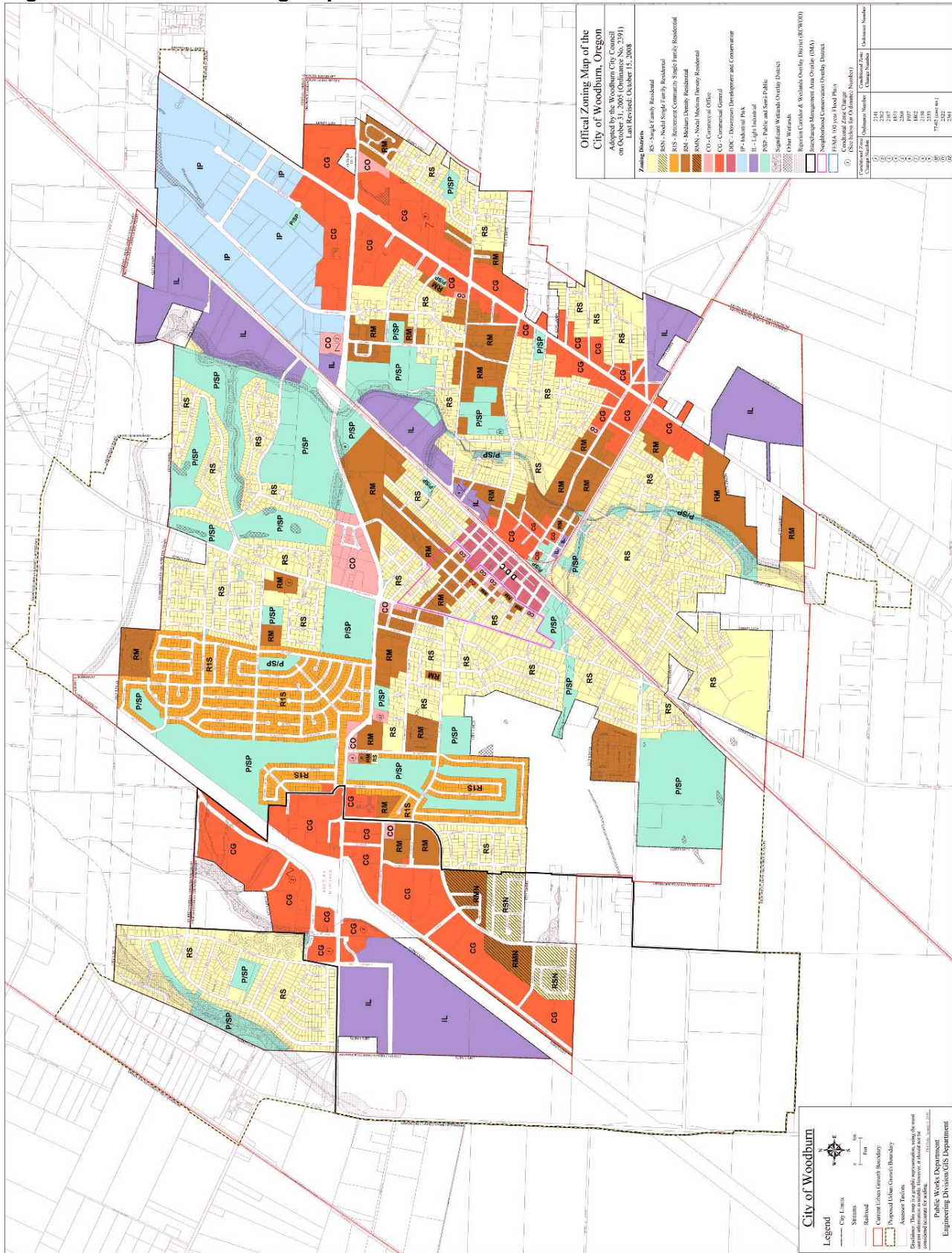
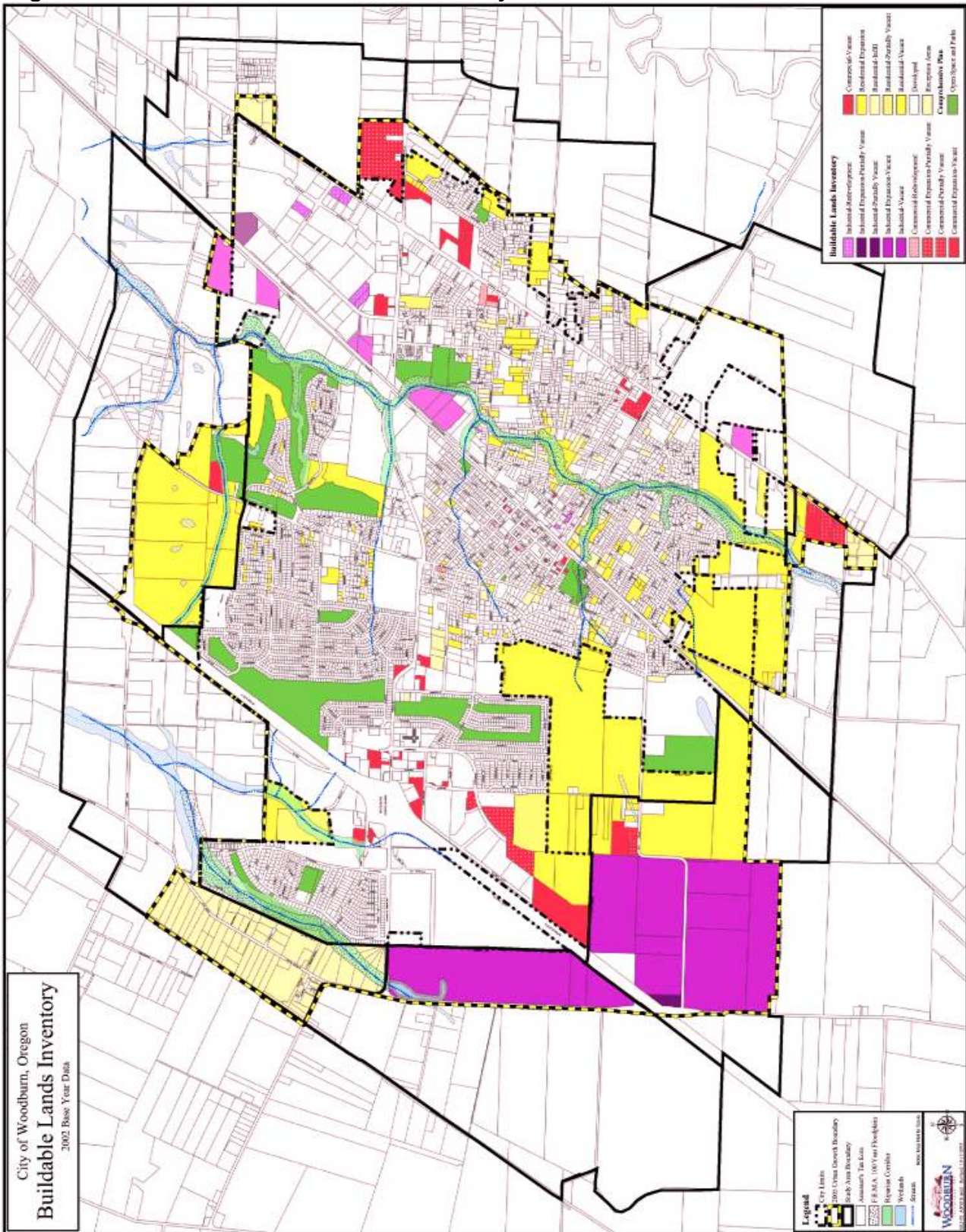


Figure 3. Woodburn Buildable Lands Inventory.



Transportation

Woodburn is connected to several surrounding cities by a number of state and interstate highways that run through the community. Interstate 5, the major north-south interstate along the west coast, connects Woodburn with Portland to the north and Salem to the south. Highway 99E runs parallel to I-5, linking Woodburn with Salem and Keizer to the south and Oregon City to the north. Highway 214 is a major east-west state highway that connects Woodburn with smaller communities such as St. Paul to the west, and Mt. Angel and Silverton to the southeast. Highway 211, which also runs east-west, connects Woodburn with Molalla and Estacada to the east. Finally, Union Pacific has a railroad running parallel to I-5 and Highway 99 going through downtown Woodburn. The Burlington Northern Santa Fe railroad also runs near the western part of the city. Woodburn's proximity to several transportation routes has encouraged several types of commercial and industrial enterprises to locate in the city.

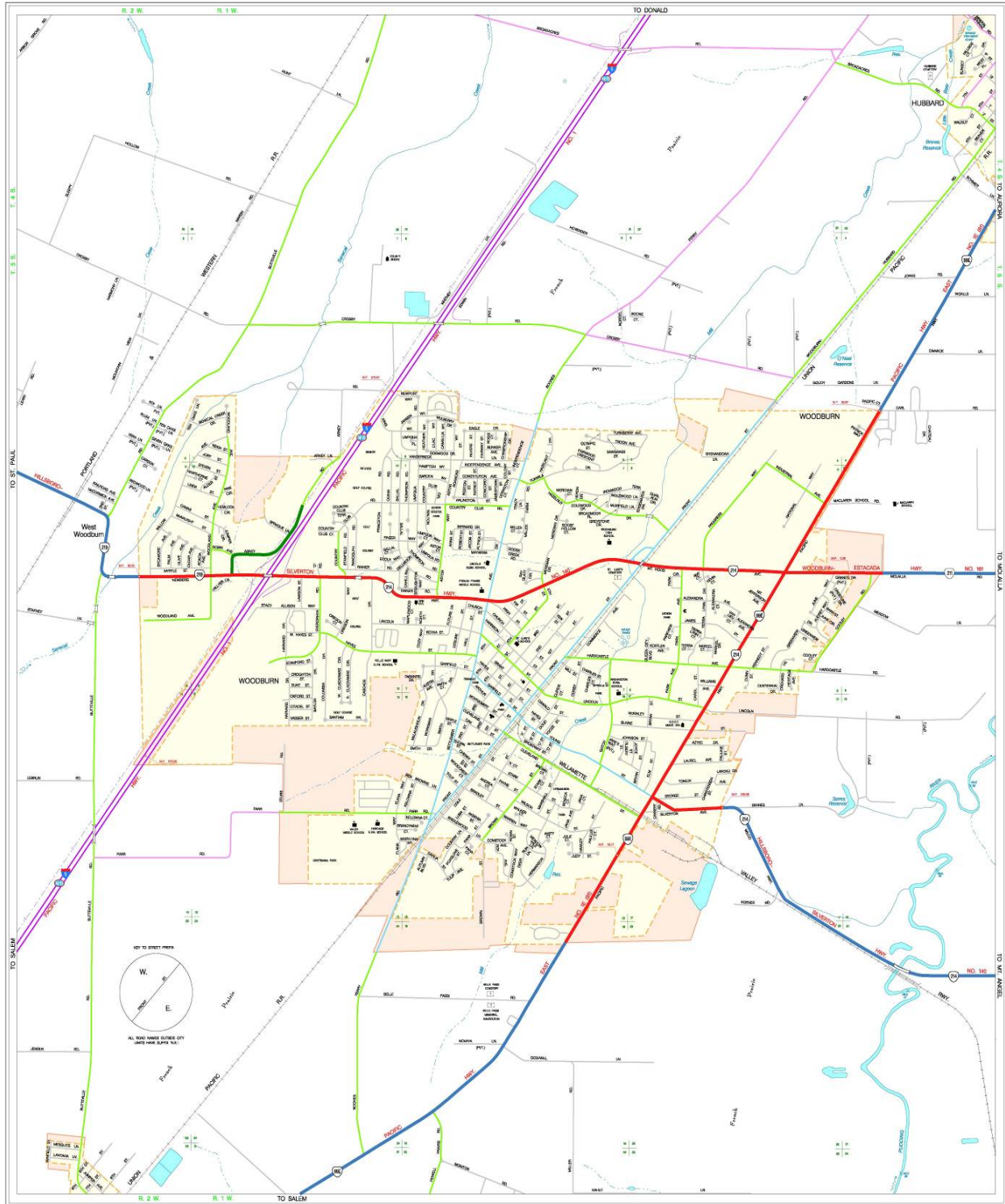
Transportation is also an important consideration when planning for emergency service provisions. Growth within the city will put pressure on the major and minor roads, especially if the main mode of travel is by single occupancy vehicles. How people travel to work is indicative of the prevalence of single occupancy vehicle travel, and can help predict the amount of traffic congestion and the potential for accidents. Table 5 below represents the different methods Woodburn residents use to travel to work. Figure 4 shows the major transportation networks that run through Woodburn. Woodburn also has a bus transit system that connects various areas of the city.

Table 5. Transportation Mode Used to Commute to Work, Woodburn, 2007.

Method of Commuting	Number of Residents	% of Residents
Car, truck, or van -- drove alone	4,875	58.7%
Car, truck, or van -- carpooled	2,843	34.2%
Worked at home	255	3.1%
Walked	172	2.1%
Other means	133	1.6%
Public transportation (including taxicab)	25	0.3%
Mean travel time to work (minutes)	26.8	-

Source: US Census, American Community Survey, 2005-2007.^{xx}

Figure 4. Woodburn Transportation Map.



<p>LEGEND</p> <p>FOR FURTHER FUNCTIONAL CLASSIFICATION INFORMATION CONTACT ODOT REGION OFFICE</p> <p>INTERSTATE</p> <p>MAJOR COLLECTOR</p> <p>MINOR COLLECTOR</p> <p>LOCAL ROAD</p> <p>US ROUTE - US ROUTE - INTERSTATE ROUTE</p> <p>NATIONAL HIGHWAY SYSTEM ROUTE</p> <p>CITY LIMIT</p> <p>AVIATION MAINTENANCE CENTER</p> <p>BRIDGE</p> <p>RAILROAD</p> <p>STATE - OTHER FUNCTIONALLY CLASSIFIED - LOCAL ROAD</p>	<p> PUBLIC BUILDING COURTHOUSE CITY HALL ARBORETUM POST OFFICE SCHOOL LIBRARY SAFETY REST AREA WASH STATION PARK & RECREATION LOCATION RAMPWAY - CITY TRANSFER COMMERCIAL - GENERAL AVIATION AIRPORT STOP - PORT FACILITY SIGNAL MT - SIGNAL - OUTER STOPOVER SITE </p>	<p>PUBLISHED BY</p> <p>NORTH</p> <p>PREPARED DIGITALLY BY THE OREGON DEPARTMENT OF TRANSPORTATION IN COOPERATION WITH THE U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION</p>	<p>This product is for informational purposes and may not have been prepared for or be suitable for legal engineering or planning purposes. Users of this information should review or consult the primary data and information sources to determine the suitability of the information.</p> <p>SCALE</p> <p>750 0 750 1500 FEET</p> <p>200 0 200 400 METERS</p>	<p>WOODBURN Population 22,875*</p> <p>OREGON TRANSPORTATION MAP Showing Functional Classification of Roads City of WOODBURN</p> <p>T. 4 S. R. 1 W. W.M.</p> <p>MARION COUNTY 2007</p> <p>AVAILABLE TRANSPORTATION SERVICES WOODBURN TOLL FREE 800-452-4529</p> <p>AVAILABLE TRANSPORTATION SERVICES WOODBURN TOLL FREE 800-452-4529</p>
--	--	--	---	---

Copies available from the Oregon Department of Transportation, Map Distribution Unit, Mt. Creek Office Park, 555 13th St. NE, Suite 2, Salem, Oregon 97301-4176, Telephone (503) 986-9154, <http://ogdn.oregon.gov/COOP/DT/DTAT/Map/Maps.html>
 * Based on current Oregon Population Report, College of Urban and Public Affairs, Portland State University, <http://pub.oupa.pdx.edu>

Critical Facilities & Infrastructure

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

Woodburn contains a number of critical facilities that provide necessary services to city residents. Woodburn City Hall contains the office space for the Administration, Finance, Community Development Department, and Municipal Court. The Woodburn Police Department is located on Mt. Hood Avenue. The Woodburn Fire District contains four fire stations, two of them in the city limits. Fire Station # 21 is located at 1776 Newberg Highway and is the Fire District's headquarters, and Station # 22 is located on James Street. The Woodburn School District contains eleven schools in the city. Additionally, Woodburn has a Head Start facility, and Saint Luke Parochial School is located within city limits as well. There is no hospital in the city limits, but there is an urgent care clinic (Wellspring), and the Salud Medical Center also provides a variety of medical services. The nearest major hospitals are located in Silverton and Salem.

Woodburn also contains a number of critical infrastructure facilities. The city contains three water treatment plants that draw water from six wells around the city. The city's above-ground storage tank has a capacity of 750,000 gallons, and the city has an underground storage reservoir totaling 4.7 million gallons. Woodburn also has a wastewater treatment plant located east of the city along Highway 211. Because of Woodburn's flat topography, the city maintains ten lift stations that are necessary for the provision of sanitary sewer services. Portland General Electric has a maintenance facility in the city. Electric power is supplied to the city by three substations - one within the city limits and two outside the city.

Historic & Cultural Resources

Historic and cultural resources such as historic structures and landmarks can help to define a community and may also be sources of tourism dollars. Because of their role in defining and supporting the community, protecting these resources from the impact of disasters is important.

Buildings and sites listed on the National Register of Historic Places contain special significance for national, state, or local history. It is the country's official list of historic buildings and sites worthy of preservation. Woodburn has three buildings listed on the National Register. These buildings include:

- Bank of Woodburn
- Old Woodburn City Hall

- Jesse H. Settlemier House

Another primary historic resource is Woodburn's Historic Downtown. Downtown Woodburn is a historic Oregon town center originally oriented toward the rail line. Over the years, Woodburn has retained much of the downtown's character, building stock, and public facilities.

Other historic and cultural resources in Woodburn include the Woodburn Museum, the French Prairie Historical Society, Settlemier Park, Legion Park, Nelson Park, Centennial Park, Burlingham Park, Alvah Cowen Park, Senior Estates Park, and the Woodburn Tulip Festival which happens annually in March and April.

Woodburn is also home to the Woodburn Company Stores. Because the Company Stores is the largest tax-free outlet center in the West, numerous non-resident shoppers and tourists visit Woodburn on a daily basis.

Government Structure

The city of Woodburn operates under a council-manager form of government. The City Council consists of a mayor and six councilors. They are advised by the Planning Commission, Urban Renewal Agency and Budget Committee. The city administrator is appointed by City Council to administer the city of Woodburn and to implement policies set by the Council.

The Woodburn City Hall contains the offices for the following city departments: administration; finance; community development which includes planning and building; public works; and municipal court. The Community Development Department plays an important role in natural hazard mitigation through implementation of the zoning ordinance. In addition, the Building Division is responsible for implementation of local building codes to ensure that buildings are constructed to standards set forth by the Oregon Building Codes Division.

Existing Plans & Policies

Communities often have existing plans and policies that guide and influence land use, land development, and population growth. Such existing plans and policies can include comprehensive plans, zoning ordinances, and technical reports or studies. Plans and policies already in existence have support from local residents, businesses and policy makers. Many land-use, comprehensive, and strategic plans get updated regularly, and can adapt easily to changing conditions and needs.

The city of Woodburn's Natural Hazards Mitigation Plan Addendum includes a range of recommended action items that, when implemented, will reduce the city's vulnerability to natural hazards. Many of these recommendations are consistent with the goals and objectives of the city's existing plans and policies. Linking existing plans and policies to the Natural Hazards Mitigation Plan helps identify what resources already

exist that can be used to implement the action items identified in the plan. Implementing the plan's action items through existing plans and policies increases their likelihood of being supported and getting updated, and maximizes the city's resources.

Table 6 below lists the plans and policies already in place in Woodburn.

Table 6. Woodburn Existing Plans and Policies

Name	Last Revised	Author/ Owner	Description	Relation to Natural Hazard Mitigation
Woodburn Comprehensive Plan	2005	City of Woodburn	Establishes the city's authority to plan for and deal with issues related to the future development of Woodburn.	<ul style="list-style-type: none"> • Explains the flood hazards found in Woodburn. • Provides policy guidelines for future development and land use in the city. • Policies and implementation actions addressing natural hazards and Goal 7 in the Comprehensive Plan can be linked with natural hazard action items.
Woodburn Development Ordinance (WDO)	2002	City of Woodburn	Provides regulations and development standards in the city of Woodburn.	<ul style="list-style-type: none"> • The Development Ordinance regulates development in riparian corridors and wetlands, including flood hazard areas.
Woodburn Transportation Systems Plan (TSP)	2005	City of Woodburn	The TSP guides the management and development of transportation facilities in Woodburn, incorporating the community's vision, consistent with state, regional, and local plans, including the city's Comprehensive Plan.	<ul style="list-style-type: none"> • Mitigation actions relating to improving transportation facilities should be linked with goals and policies found in the Transportation Systems Plan.
Woodburn Parks Master Plan	2009	City of Woodburn	The Parks Master Plan helps meet the needs of current and future residents by building on the community's unique parks and recreation assets and identify new opportunities.	<ul style="list-style-type: none"> • Mitigation actions that relate to Woodburn parks should be consistent with goals and policies stated in the Parks Master Plan..

Name	Last Revised	Author/ Owner	Description	Relation to Natural Hazard Mitigation
Woodburn Public Facilities Plan (PFP)	October 2005	City of Woodburn	The Public Facilities Plan identifies major infrastructure projects necessary to serve the Year 2020 projected population of 34,9191 and examines the effect on utility and transportation infrastructure resulting from 2005 expansion of the Urban Growth Boundary.	<ul style="list-style-type: none"> • Contains capital improvement projects for storm water and flood mitigation. • Mitigation actions in this plan can be incorporated into the Capital Improvements Plan for Public Facilities.

Community Partners

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

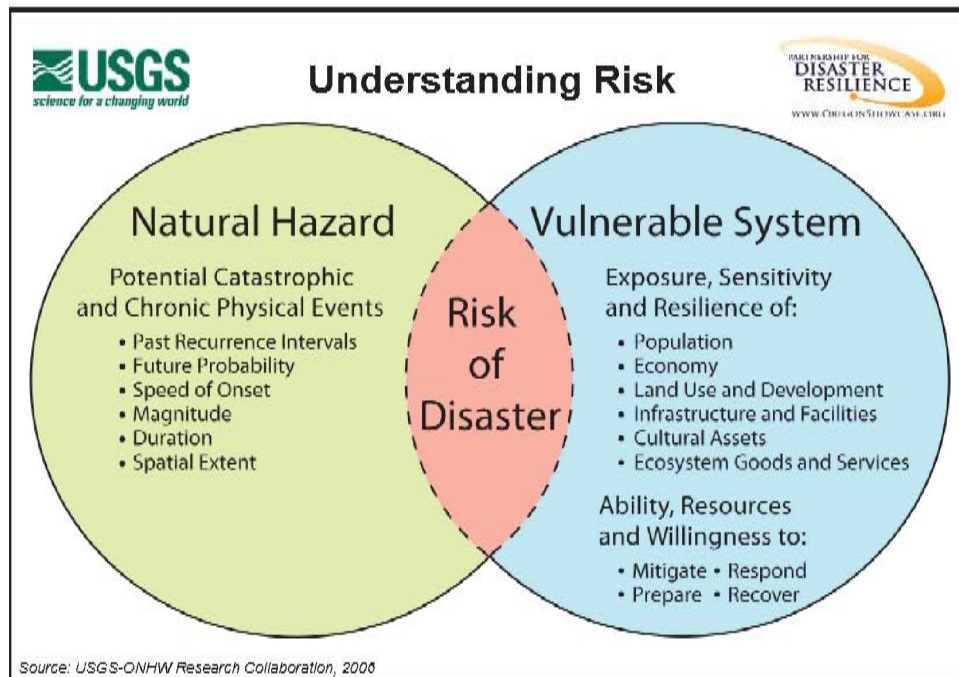
Appendix E highlights community organizations, major housing providers, religious congregations, and medical care providers within the city that may be potential partners for implementing mitigation actions. These organizations can be involved in natural hazards mitigation through:

- Education and outreach: organization could partner with the community to educate the public or provide outreach assistance on natural hazard preparedness and mitigation.
- Information dissemination: organization could partner with the community to provide hazard-related information to target audiences.
- Plan/project implementation: organization may have plans or policies that may be used to implement mitigation activities or the organization could serve as the coordinating or partner organization to implement mitigation actions.

Section 3: Risk Assessment

This section expands on Marion County’s Natural Hazards Mitigation Plan by addressing Woodburn’s unique risks to the following natural hazards: drought, earthquake, flood, landslide, volcano, wildfire, windstorm, and severe winter storm. The information in this section was paired with information from the Community Profile during the planning process in order to identify issues and develop actions aimed at reducing overall risk, or the area of overlap in Figure 5 below.

Figure 5. Understanding Risk^{xxi}



The following hazard assessments describe each hazard’s probability of future occurrence within Woodburn, as well as the city’s overall vulnerability to each hazard. In order to facilitate connections with Marion County and the state of Oregon’s probability and vulnerability rating systems, the city of Woodburn used the same rating scales as provided within Oregon Emergency Management’s Hazard Analysis Methodology template. (See Marion County’s Hazard Analysis scores in Appendix A. Rating scales are listed below). Note that the city did not complete a full hazard analysis. Probability estimates are based on the frequency of previous events, and vulnerability estimates are based on potential impacts that were discussed during the April 15th risk assessment workshop.

Probability scores address the likelihood of a future major emergency or disaster within a specific period of time as follows:

High = One incident likely within a 10-35 year period

Moderate = One incident likely within a 35-75 year period

Low = One incident likely within a 75-100 year period

Vulnerability scores address the percentage of population or region assets likely to be affected by a major emergency or disaster, as follows:

High = More than 10% affected

Moderate = 1-10% affected

Low = Less than 1% affected

Because Marion County's Natural Hazards Mitigation Plan (NHMP) does not provide probability and vulnerability estimates, all references to Marion County's probability and vulnerability rankings are referencing Marion County's 2006 Hazard Analysis document (see Appendix A). When Marion County's NHMP is updated in 2012, the county's steering committee will incorporate probability and vulnerability ratings in the NHMP.

Drought

The Marion County Natural Hazards Mitigation Plan adequately identifies the causes and characteristics of drought within the region, as well as historical drought events. Drought can affect all segments of a jurisdiction, particularly those employed in water-dependent activities (e.g., agriculture, recreation, etc.). Additionally, public water providers can experience shortages. The extent (i.e., magnitude or severity) of a drought depends upon temperature and rainfall/snowfall over a period of time, as well as hydrological conditions and populations affected.

According to the city's 2007 Water Quality Report, Woodburn has an adequate supply of water to meet the needs of its residents. The city draws water from 6 wells, all of which tap the Troutdale aquifer, a semi-confined aquifer. Residents use an average of 1.8 million gallons of water per day, although in summer months, usage will occasionally exceed 5 million gallons per day. During the drier parts of the year, the city suggests that residents make adjustments to how they use water for outside purposes, such as watering yards and gardens.

The city's Water Master Plan (developed in 1997 and updated in 2001) found that Woodburn has sufficient water rights to meet projected water demands through 2020. The plan was based on a projected population potential of 38,586, which exceeds the "coordinated Year 2020 population projection" of 34,919. In order to meet increased demand, the city will need to install 6 new wells in the west and southwest area of the city. These wells are programmed to be installed at an approximate rate of one well every five years.^{xxii}

In regards to water storage capabilities, the city has 5.45 million gallons in four reservoirs, which exceeds the projected 2020 master plan requirement of 5.13 million gallons of storage. All treatment plants have emergency

generators capable of plant operation. Likewise, the city has portable generators that can be used to provide emergency power to other wells. ^{xxiii}

Droughts are a fairly rare occurrence in Woodburn, although they are possible if the region has a particularly dry winter season. The climate is typically mild with wet winters and dry summers, and rainfall averages about 41 inches per year.^{xxiv} According to Marion County's Natural Hazards Mitigation Plan, two major droughts have occurred in the past 33 years. The period between 1976 and 1977 was the single driest year of the century. Similarly, February 2005 was the driest February on record since 1977. Given the frequency of past events, Woodburn estimates a high probability that droughts will occur in the future. (Note: Marion County does not estimate probability or vulnerability ratings for drought-related events. As such, Woodburn is unable to say whether its vulnerability and probability estimates are greater than the county's.)

Because the city of Woodburn has adequate emergency production and storage capacities, the city estimates a low vulnerability to drought events. Due to expected changes and unpredictability in climate patterns, the city acknowledges uncertainty in this estimate, and will re-evaluate conditions when this plan is updated.

Portions of a community that are typically affected by droughts include those that depend on agriculturally-based operations, water-dependent recreational activities, and water-borne transportation systems. As shown above in Table 2, agriculture employs 15% of Woodburn's population. Domestic water-users may also be subject to conservation measures or could be faced with significant increases in electricity or water rates.

Earthquake

The Marion County NHMP adequately describes the causes and characteristics of earthquakes for the region, as well as the location and extent of potential earthquake hazards. Below, Figures 6-9 further detail the city's earthquake-related landslide, amplification, and liquefaction risks. Earthquakes are fairly infrequent occurrences, but have affected Marion County and Woodburn in the past. The city of Woodburn agrees that the county's historical account is accurate, and noted the following impacts that occurred during the March 1993 Scotts Mills Earthquake:

- At a local store, pesticides, paints, and car batteries fell off shelves and mixed together, causing hazardous fumes that affected several employees.
- Unreinforced masonry buildings downtown had catastrophic failures. Parapet materials were damaged or fell in multiple instances.
- The second story of Washington Elementary school was damaged so severely that it had to be removed.

When determining the probability of earthquakes, it is difficult to estimate the recurrence intervals from available data. Paleoseismic studies along the Oregon coast indicate that the state has experienced seven Cascadia Subduction Zone (CSZ) events possibly as large as M9 in the last 3,500 years. These events are estimated to have an average recurrence interval between 500 and 600 years, although the time interval between individual events ranges from 150 to 1000 years. Since Marion County's NHMP was developed in 2007, better earthquake probability estimates have surfaced. Scientists now estimate that the chance in the next 50 years of a great subduction zone earthquake is between 10 and 20 percent assuming that the recurrence is on the order of 400 ± 200 years.^{xxv} Crustal and deep intraplate earthquakes remain difficult to predict.

Figure 6. Woodburn Relative Earthquake-Induced Landslide Hazard Map.

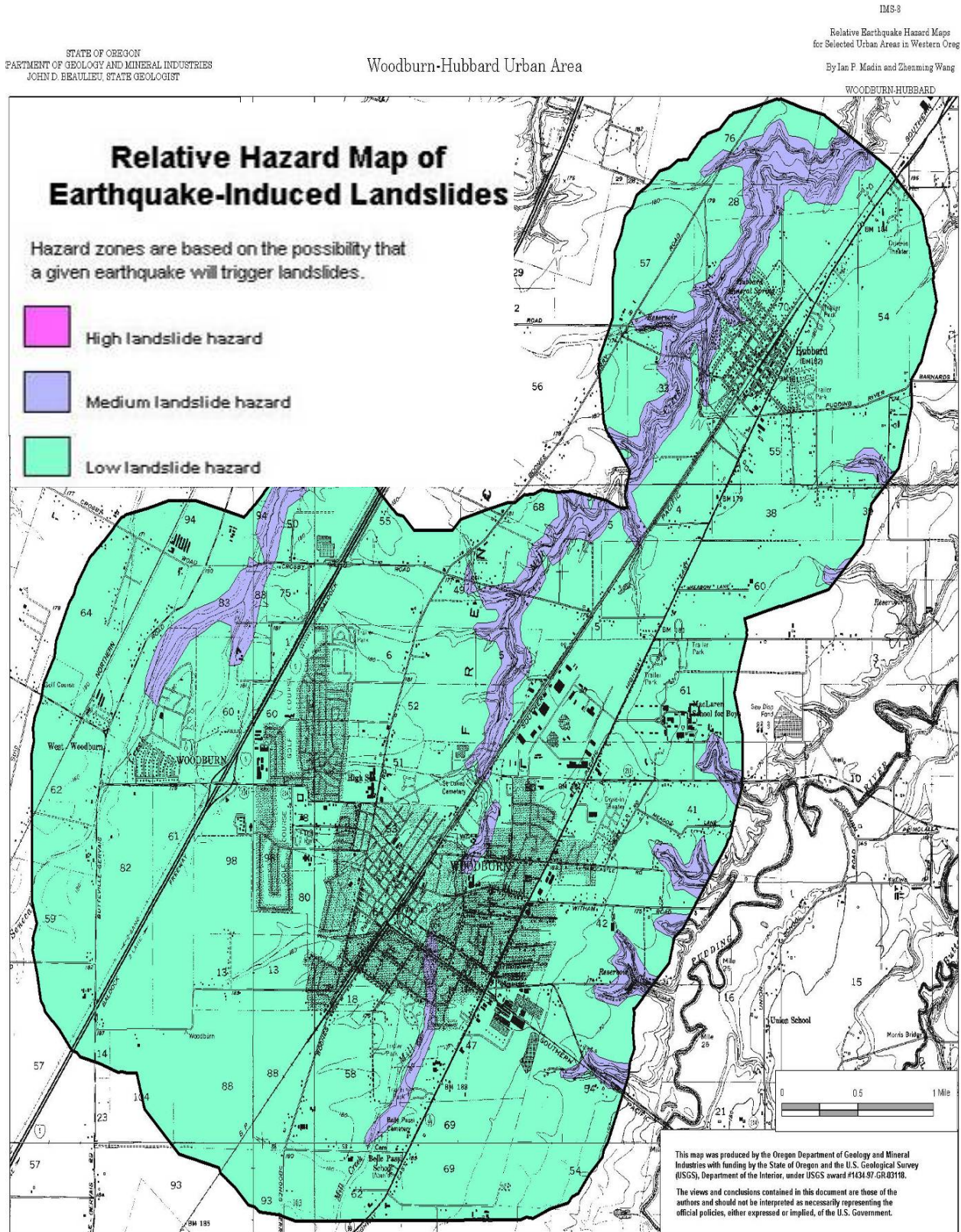


Figure 7. Woodburn Relative Earthquake Amplification Hazard Map.

STATE OF OREGON
 DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
 JOHN D. BRAULIEU, STATE GEOLOGIST

Woodburn-Hubbard Urban Area

IMS-3
 Relative Earthquake Hazard Maps
 for Selected Urban Areas in Western Oregon
 By Ian F. Madin and Zhenming Wang

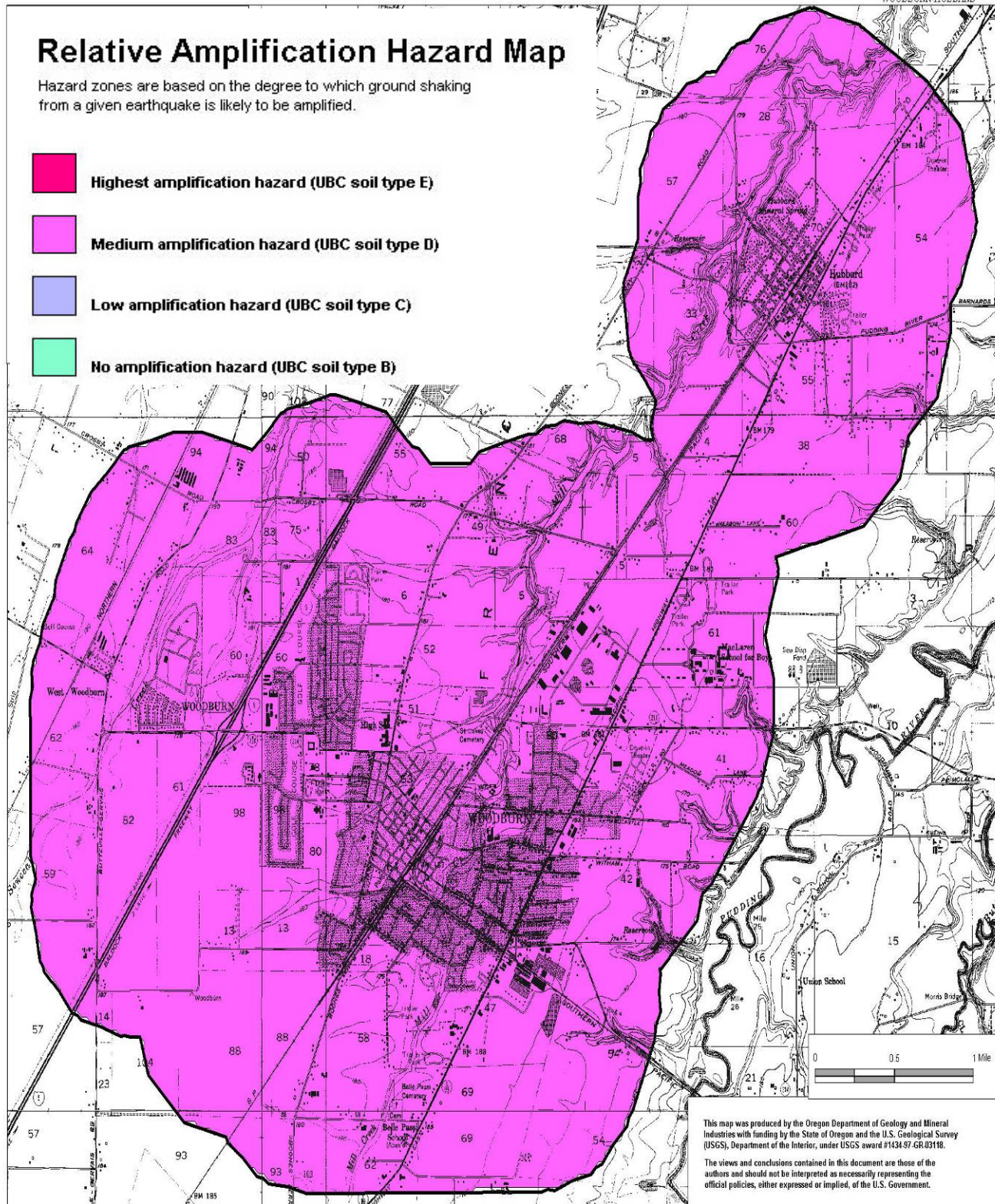


Figure 8. Woodburn Relative Earthquake Liquefaction Hazard Map.

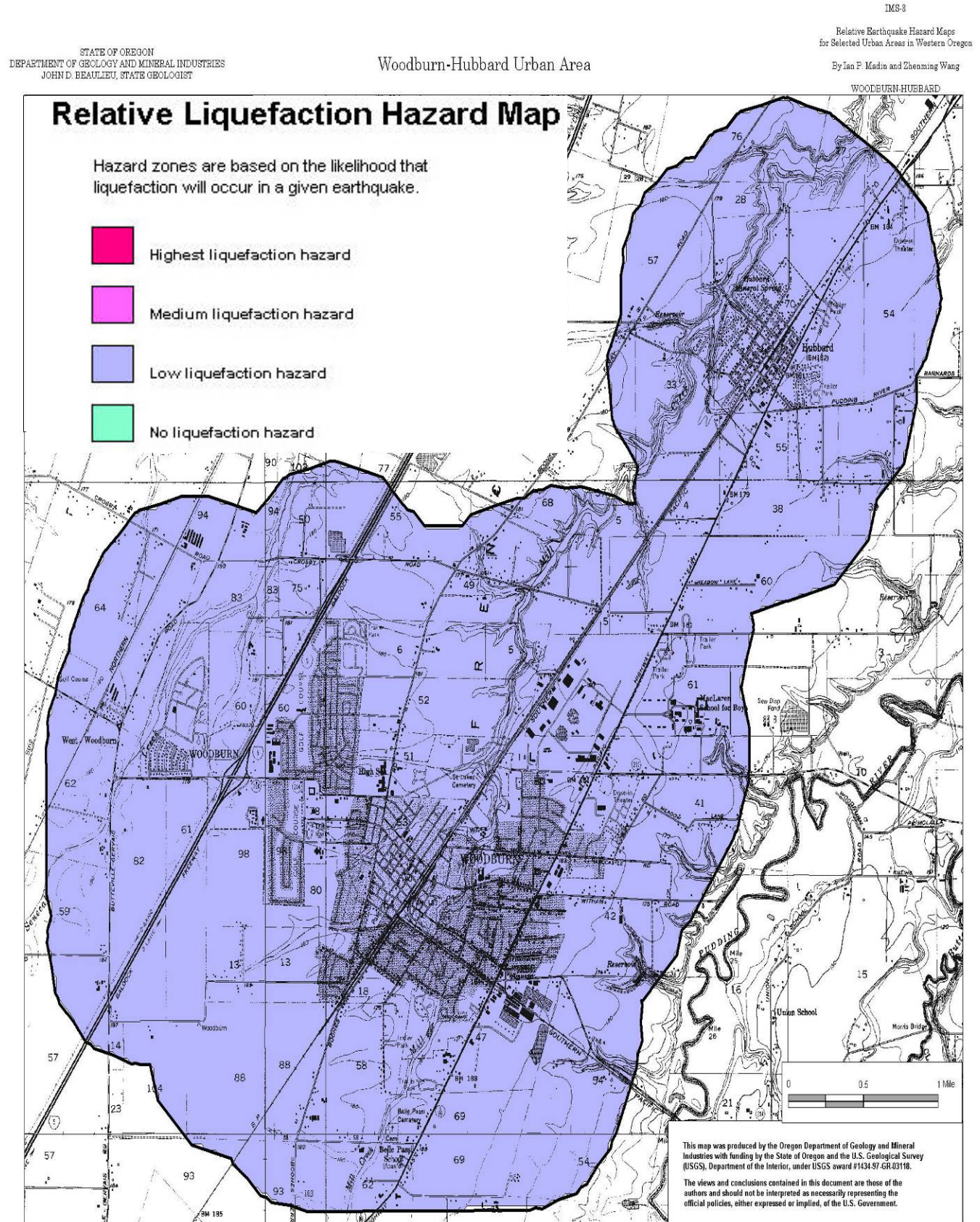
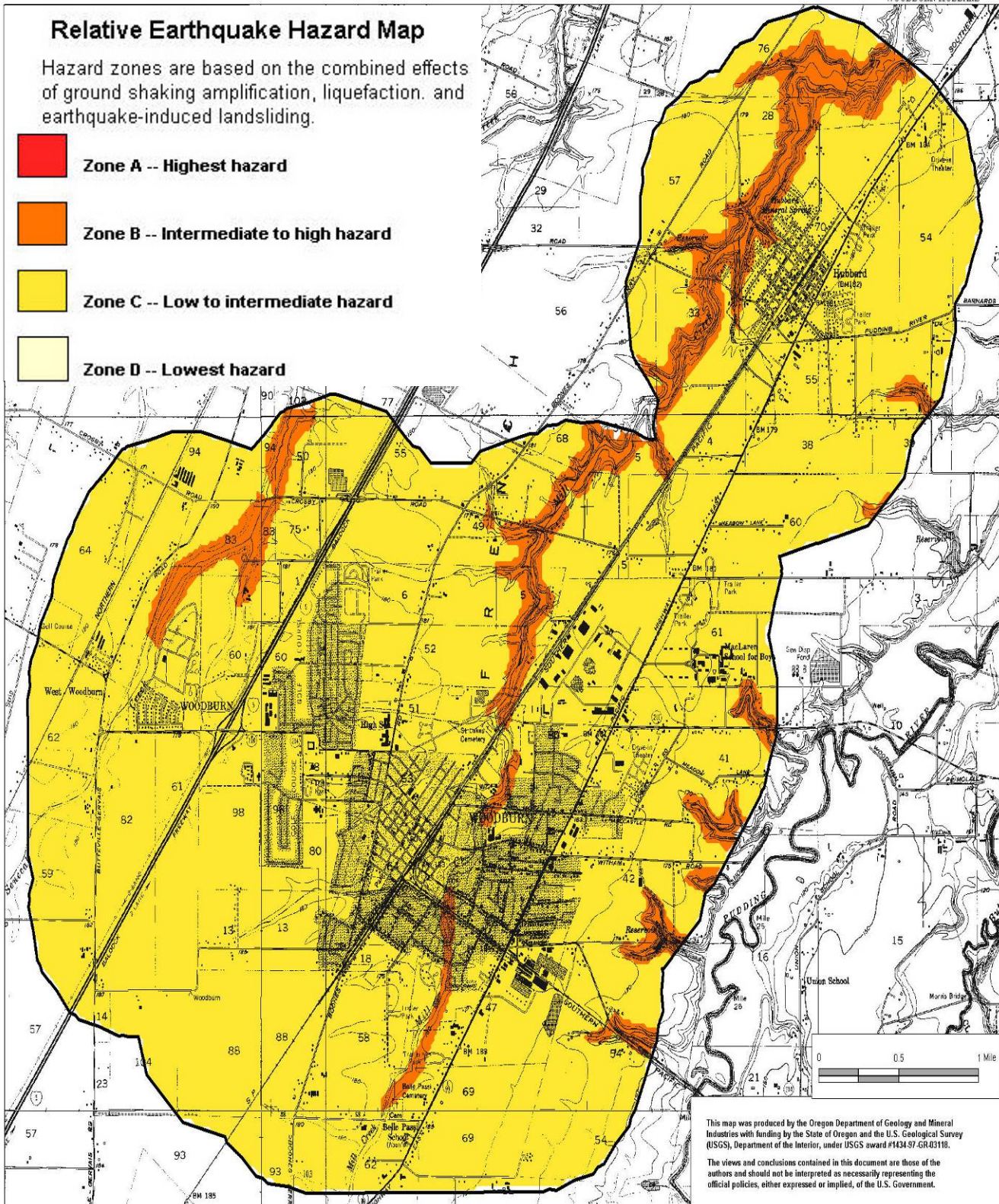


Figure 9. Woodburn Relative Earthquake Hazard Map.

STATE OF OREGON
 DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
 JOHN D. BEAULIEU, STATE GEOLOGIST

Woodburn-Hubbard Urban Area

IMS-8
 Relative Earthquake Hazard Maps
 for Selected Urban Areas in Western Oregon
 By Ian P. Madin and Zhenming Wang



Marion County estimates a high probability that earthquakes will occur in the future, as well as a high vulnerability to earthquake events. Both ratings are also true for the city of Woodburn. The extent of structural damages, injuries and deaths will depend on the type of the earthquake, the city's proximity to the epicenter, and the magnitude and duration of the event. Potential earthquake-related impacts are well-documented in Marion County's NHMP, but buildings, transportation systems, utility and communication networks, and lifelines including water, sewer, storm-water and gas lines are particularly at risk. Additionally, damage to roads and water systems will make it difficult to respond to post-earthquake fires. The following additional vulnerabilities / potential impacts were identified by the city's steering committee and stakeholders:

- The city has a large non-English speaking population. In 2000, almost 35% of the population (6,543) spoke English less than "very well."^{xxvi} In emergency situations, these groups may need particular attention and assistance. Likewise, outreach strategies that inform residents of shelters or preventative activities should be distributed in multiple languages.
- The city's steering committee identified a need within the community to identify populations (i.e., senior or disabled populations) that may need particular assistance in pre-disaster evacuation protocols or after disaster events. This could be a voluntary registry or a preliminary assessment of current needs.
- The entire city may have disruptions in communication systems. This will be an issue for schools (i.e., contacting parents), businesses, and public services. Likewise, transportation systems are likely to be disrupted after a high-magnitude earthquake. Information technology does exist, however, between City Hall and the new police station.
- The city draws a large tourist population to the Woodburn Company Stores (outlet mall). Sheltering and caring for tourists post-event may be a difficult endeavor. Logistics for sheltering or providing food and basic care for the entire population will also be a challenging task.
- The MacLaren Youth Facility may be seismically unstable. Additional assessment is required (although, this is a state facility and outside of the city's jurisdiction). The facility houses up to 500 people at a time.
- Generally, older buildings may require seismic retrofit. This includes businesses in unreinforced masonry buildings, and older homes and buildings including the old City Hall, Library, and the historic Settlemeir House. Likewise, utility systems, communication systems, transportation corridors, and business or industrial centers may be vulnerable to seismic activity. Figure 10 identifies buildings in Woodburn that are 60 years or older.

- The city’s steering committee believes that there are fragile waterlines in downtown Woodburn. Seismic activity may disrupt the water lines and prevent distribution to residents. Emergency generators for the water system currently have only a 72 hour supply of fuel.
- The city’s water tower was built in 1962 and may be vulnerable to seismic activity.
- The Interstate 5 overpass, if damaged, could isolate Woodburn from neighboring communities – especially if Highway 99E is damaged as well.
- An important water main is supported by the Hazelnut Street Bridge, where foundation problems have been identified. If the bridge fails either by seismic action or storm erosion, this line will fail also.

In 2007, the Department of Geology and Mineral Industries (DOGAMI) conducted a seismic needs assessment for public school buildings, acute inpatient care facilities, fire stations, police stations, sheriffs’ offices, and other law enforcement agency buildings.^{xxvii} Buildings were ranked for their “probability of collapse” due to the maximum possible earthquake for any given area. Within the city of Woodburn, the following buildings were rated:

Very High (100%)

- Lincoln Elementary School
- Washington Elementary School

High (> 10%)

- French Prairie Middle School
- Nellie Muir Elementary School
- Woodburn Police Department

Moderate (> 1%)

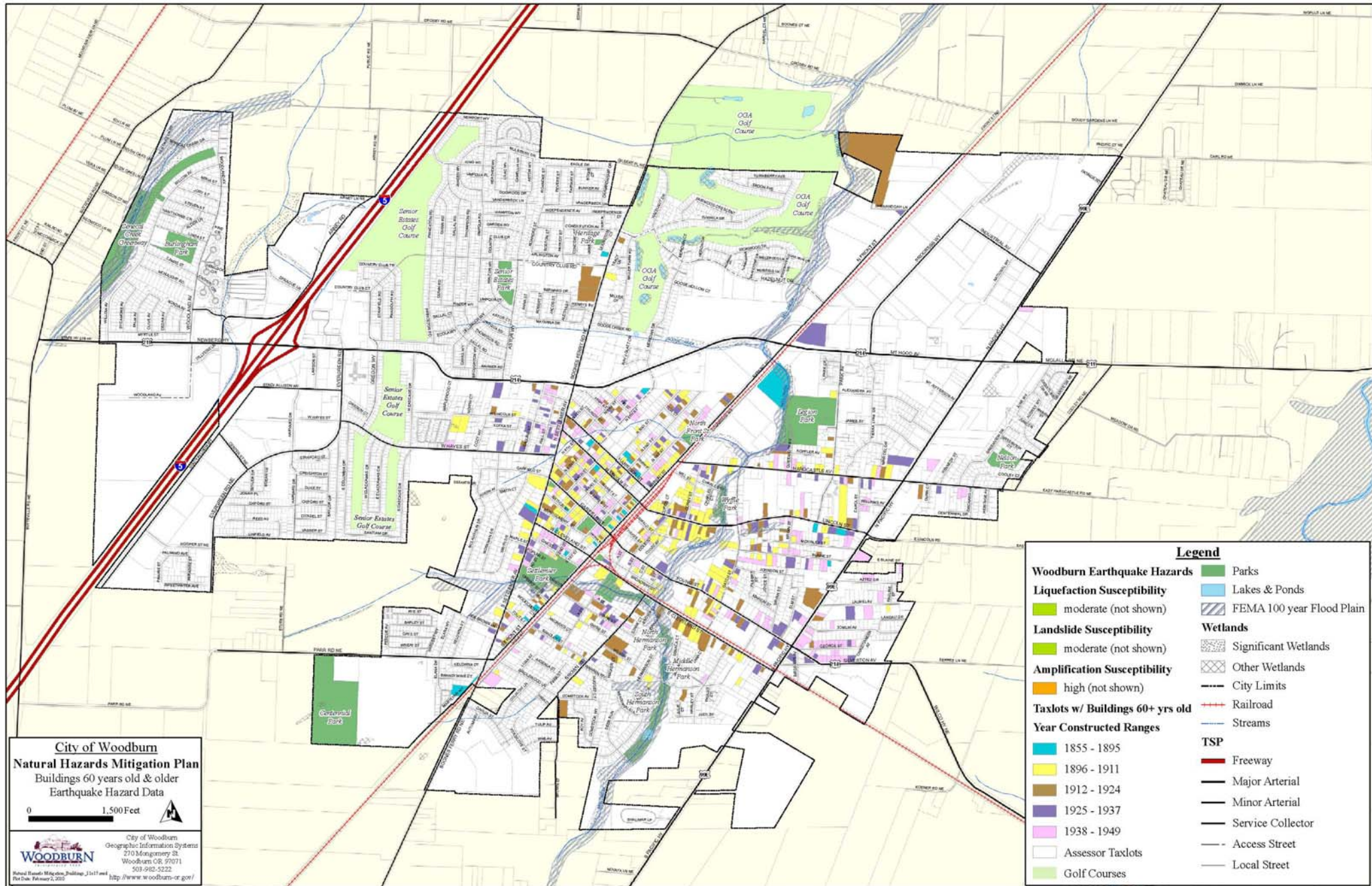
- Woodburn High School
- Woodburn RFPD
- Woodburn RFPD Station 21

Low (< 1%)

- Branch-Woodburn Center
- Heritage Elementary
- Valor Middle School

Please refer to Marion County’s NHMP for more detail regarding earthquake-related hazards, issues, and estimated vulnerabilities and damages in given scenarios. Existing earthquake mitigation activities are also well-documented within Marion County’s NHMP.

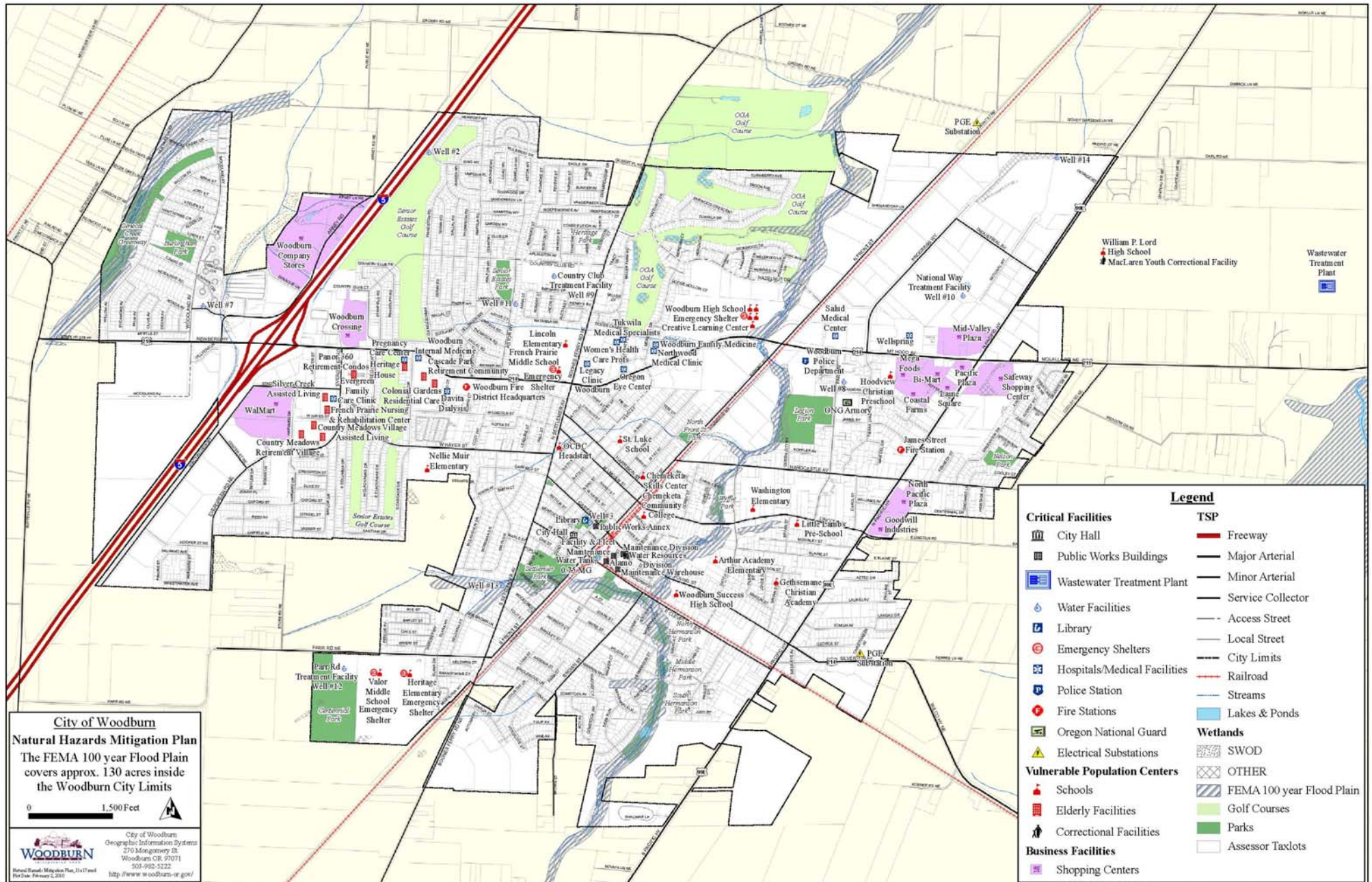
Figure 10: Older Buildings



Flood

The Marion County NHMP adequately describes the causes and characteristics of flooding for the region, as well as the history of major flooding events. The location of Woodburn's flooding hazard is best described within the city's Flood Insurance Rate Map (FIRM, see Figure 11-below). The primary flood source in Woodburn is Mill Creek, the main drainage way for the city. Mill Creek drains to the Pudding River, and Senecal Creek drains a small portion of the city's urban growth boundary (UGB) area west of I-5. Additionally, a very small portion of the east part of the city (east of Highway 99E) naturally drains directly to the Pudding River.^{xxviii} The extent of flooding hazards in Woodburn primarily depends on climate and precipitation levels. Withdrawals for irrigation and drinking water, as well as stream and wetland modifications or vegetation removal can influence water flow as well.

Figure 11: FEMA 100 Year Floodplain



Woodburn has been a participant in the National Flood Insurance Program since May, 1974, and the city's most current effective FIRM is dated January 2, 2003. As of May 26th, 2009 the city has 48 flood insurance policy holders. Woodburn has had three property losses, no claims in a B, C, or X zone (i.e., not special flood hazard areas) and no repetitive flood losses. Total claims on property losses amount to \$14,780.70. The community's last Community Assistance Visit (CAV) was on June 24, 2004, and the city also had a Community Assistance Contact (CAC), or a telephone 'audit' of a community's flood hazard program on February 25, 1993. Additionally, the city has had 19 Letters of Map Change, meaning map amendments or map revisions have occurred.

Marion County estimates a high probability that flooding will occur in the future, and a moderate vulnerability to flood hazards. Both ratings are true for the city of Woodburn as well. As part of a "healthy stream approach" to stormwater management, the city attempts to replicate the natural flow of water as often as possible. This cuts back on flooding issues. Likewise, East Senecal Creek accommodates run-off from the city's UGB. The Hardcastle/Gatch area is particularly prone to flooding, and lawn debris frequently backs up into culverts near Wyffel Park between Lincoln and Hardcastle. The city has an existing culvert replacement program, and Hardcastle Street will be receiving an additional culvert, as well as Marshall St.

Landslide

The Marion County NHMP adequately describes the causes, characteristics, location and extent of landslides for the region. Currently, there is no comprehensive list of landslide events or dates for Marion County^{xxix}, and the same is true for the city of Woodburn. The city is relatively flat with an elevation differential of only 50 feet, ranging from 150 to 200 feet above sea level.^{xxx} As such, the city's steering committee believes that landslides are not likely to occur within city limits.

As shown in Figure 6 above, Woodburn's likelihood of experiencing earthquake-induced landslides is relatively low. There are some areas (mostly along riverbeds and channels) that have a 'moderate' risk of earthquake-induced landslides. Although Figure 6 cannot be used to predict the occurrence of non-earthquake induced landslides, it does show areas of increased slope. As such, the city can infer that the same areas may also experience slides caused by heavy rainfall or changes in vegetative cover. The likelihood of this occurring is unknown. To conduct a better risk assessment, more information would be needed regarding slopes, soils, moisture content, vegetative cover, and the nature of underlying materials.

Marion County does not estimate probability or vulnerability ratings for landslide hazards. Due to the city's flat topography, Woodburn estimates a low probability that landslides will occur within city limits. Because landslides can have regional effects, the city of Woodburn estimates a

moderate vulnerability to landslides (with the assumption that they are more likely to occur outside of city limits, causing transportation-related issues for city residents and businesses). As mentioned in the Marion County NHMP landslide chapter, communities can suffer immediate damages and losses of service as a result of transportation closures. The impact of closed roads or bridges may be increased if the networks serve as critical lifelines to hospitals or other emergency facilities. Please see Marion County's NHMP for a more comprehensive description of potential landslide-related community impacts.

Volcano

Marion County's NHMP adequately describes the causes and characteristics of volcano-related hazards, as well as the location of volcanic areas and the extent of potential damages. Immediate danger areas for volcanic eruptions lie within a 20-mile radius of the blast site,^{xxxi} and ashfall is likely to affect communities downwind of the eruption. Mount Hood and Mount Jefferson are the closest of the cascade volcanoes to Woodburn (see Figure 12 below). Additionally, Mount Saint Helens and Mount Adams are located north of Mount Hood, and the Three Sisters lie to the south of Mount Jefferson.

Figure 12. Mt. Hood and Mt. Jefferson's Locations in Relation to the City of Woodburn



Due to Woodburn's distance from volcanoes, the city is unlikely to experience the immediate effects that eruptions have on surrounding areas (i.e., mud and debris flows, or lahars). Depending on wind patterns, however, the city may experience ashfall. The eruption of Mount St. Helens in 1980, for example, coated the Willamette Valley with a fine layer of ash.

Mount Jefferson's last eruptive episode culminated about 15,000 years ago. The volcano is capable of large explosive eruptions, meaning areas downwind are at risk of experiencing ashfall. The largest eruption of

Mount Jefferson occurred between 35,000 and 100,000 years ago, and caused ash to fall as far away as the present-day town of Arco in southeast Idaho. Although an event has not occurred in a long time, experience at explosive volcanoes elsewhere suggests that Mount Jefferson cannot be regarded as extinct.^{xxxii}

Mount Hood's last eruption ended shortly before the arrival of Lewis and Clark in 1805. When Mount Hood erupts again, it will severely affect areas on its flanks and far downstream in the major river valleys that head on the volcano. Likewise, volcanic ash may fall on areas up to several hundred kilometers downwind.^{xxxiii} Please see Marion County's NHMP for more details regarding Mt. Hood and Mt. Jefferson, as well as additional Cascade volcanoes.

Marion County estimates a low probability that volcanic eruptions will occur in the future, and a moderate vulnerability to volcanic events. Both ratings are true for the city of Woodburn as well.

Hazards related to volcanic eruptions (i.e., potential community impacts) are adequately described in the Marion County NHMP. Although the city of Woodburn is unlikely to experience lahars or lava flows, tephra (sand-sized or finer particles of volcanic rock that is ejected rapidly into the air from volcanic vents) drifts downwind from the explosions and can form a blanket-like deposit of ash. Tephra is a public health threat, and can damage agriculture and transportation systems (i.e., aircraft and on-the-ground vehicles). Tephra can also clog drainage systems and create major debris management problems. Within Woodburn, public health would be a primary concern, and keeping transportation routes open/accessible would be important as well.

Wildfire

The Marion County Natural Hazards Mitigation Plan accurately describes the causes and characteristics of wildfire in Marion County, as well as the history of wildfire events. As mentioned in the Marion County NHMP, the wildland-urban interface is not designated by geography alone, and certain conditions must be present for significant interface fires to occur (i.e., hot, dry, windy weather; inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm resources; and a large fuel load, or dense vegetation). Likewise, the severity of a wildfire is affected by the severity of these conditions.^{xxxiv} Please see Marion County's NHMP for a more comprehensive description of the conditions that create or exacerbate wildfire events.

Within the Marion County Community Wildfire Protection Plan (CWPP), the city of Woodburn is not listed as a "community at risk." Figure 13 below is taken from the Marion County CWPP and shows overall risk ratings throughout the county. Note that Woodburn is located in an area

of “low” risk.¹ Likewise, Figure 14 shows locations in the county that have been affected by wildfires in the past. The city of Woodburn is fairly removed from these areas.

Marion County estimates a moderate probability that wildfires will occur in the future. Given Woodburn’s lack of past wildfire events, and distance from areas of concern, Woodburn estimates a low probability that wildfires will occur in the future.

Additionally, Marion County estimates a moderate vulnerability to wildfire events. Due to Woodburn’s isolation from the majority of at-risk areas, Woodburn is unlikely to be affected directly by wildfires. Should they occur nearby, however, the city could be affected by smoke, impacting people with respiratory problems, and potentially the elderly or very young. As such, Woodburn’s vulnerability to wildfires is also moderate.

Community wildfire issues are adequately described in Marion County’s NHMP, as well as conditions that generally increase an area’s risk. Please see Marion County’s NHMP for additional information regarding potential wildfire-related community impacts.

¹ The CWPP’s methods for identifying communities at risk require assessing:

1. Residential density: based on 1 structure per 40 acres with a minimum of 4 residences and ¼ -mile buffer; and
2. Fire District. (In Marion County, there are 22 fire districts that provide structural fire protection).

Figure 13. Wildfire Risk Areas in Marion County

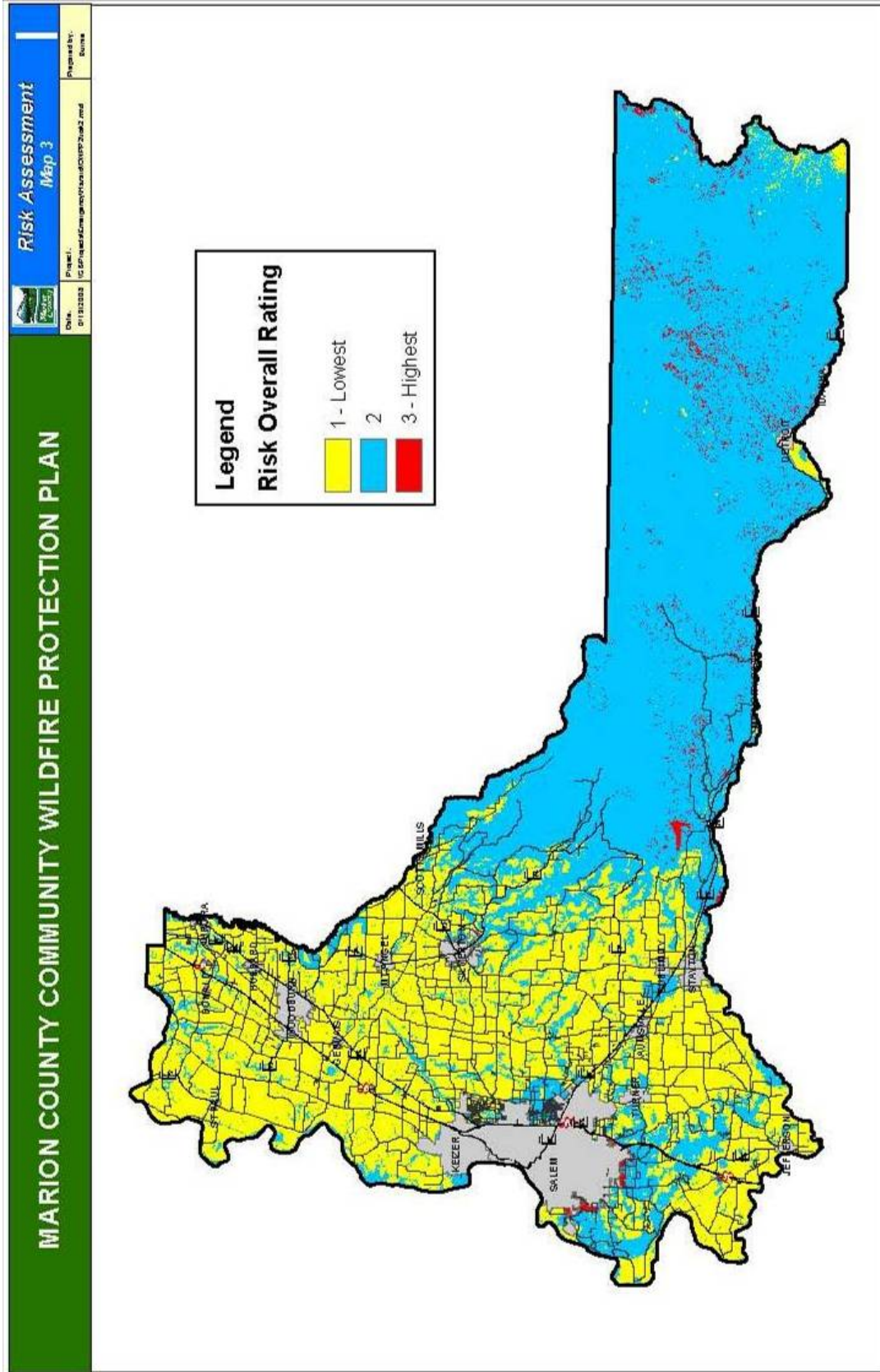
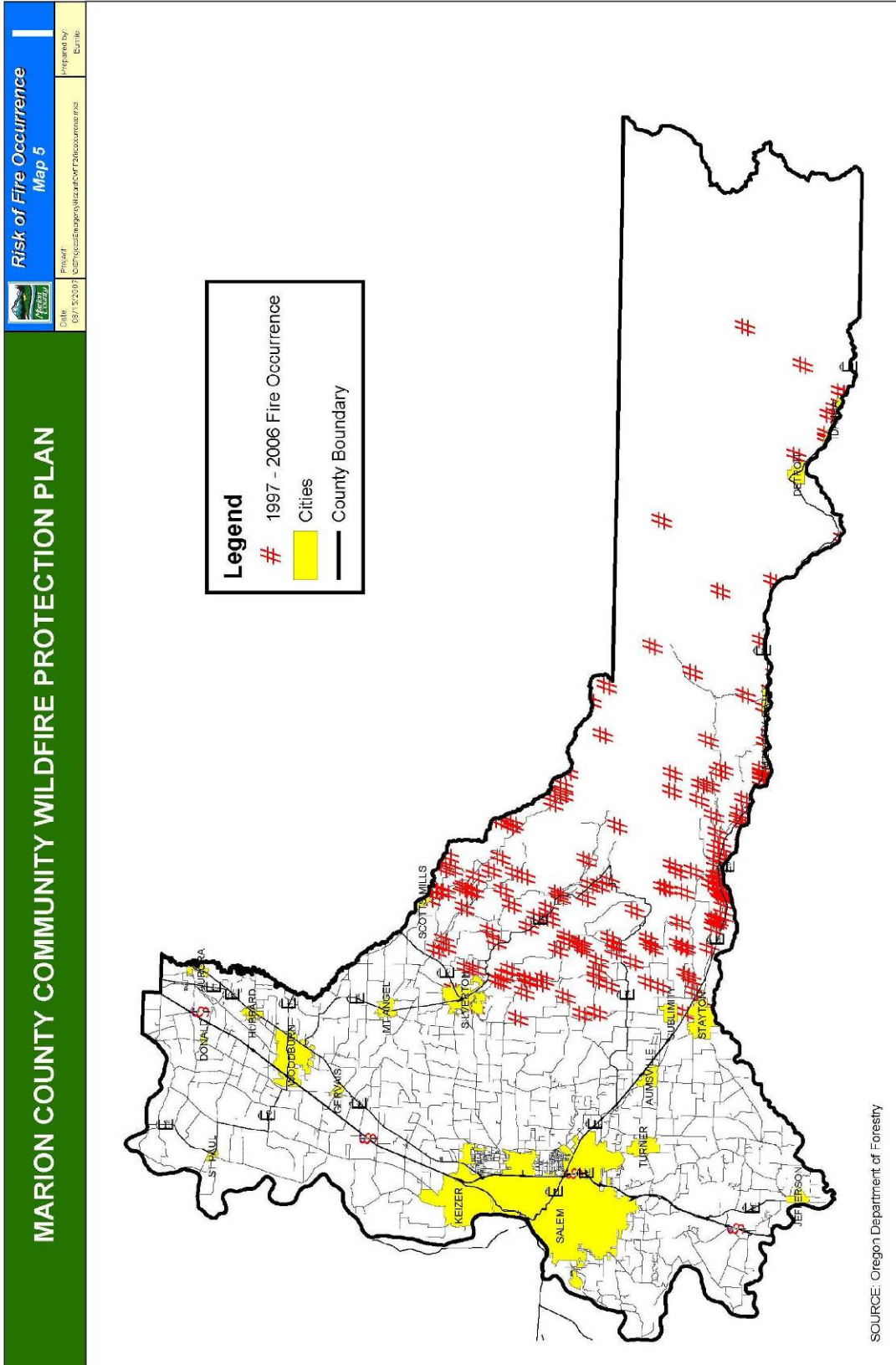


Figure 14. Locations of Past Wildfires in Marion County



Windstorm

The Marion County NHMP adequately describes the causes, characteristics, location, and extent of the windstorm hazard. Marion County’s plan also describes historical wind storm events up to 2005. Significant recent events that have impacted Marion County, including Woodburn, are described in Table 7 below.

Table 7. Historical Windstorm Events

Date	Windstorm Event
March 2008	Windstorm measured at 40 mph causes \$15,000 in damage near Woodburn.
February 2006	Windstorms with gusts up to 77 mph cause \$227,000 in damages in Linn, Lane, Marion, Benton, Polk, and Yamhill Counties.
January 2006	Windstorm with winds up to 58 mph caused a total of \$500,000 in damages spread out over Yamhill, Marion and Polk Counties, as well as Clackamas, Columbia, Washington, and Multnomah Counties.
January 2005	Windstorms cause \$6,000 of damage in Linn and Marion Counties. A storm total of \$15,000 in damages spread out among Linn, Marion, Clackamas, Multnomah, and Washington Counties.
December 2004	\$6,250 in property damage to Marion, Lane, and Polk Counties.
February 2002	Willamette Valley had wind gusts of 70 mph. Led to presidentially declared disaster in several western counties. (Marion County was not included in the disaster declaration, but still experienced significant impacts.)
December 1995	Windstorm in Salem, caused \$500,000 in damage in Woodburn, 20,000 people in Silverton and Woodburn lost power.
November 1981	Winds in Salem at 52 mph, 23 power lines down on Silverton Road.
March 1971	50 mph winds in Marion County, caused damages in Hubbard, Scotts Mills, and Salem.
October 1962	Columbus Day Storm. Caused 4 injuries in Silverton, \$4 million damages in Salem, and \$8 million damages in Marion County as a whole.
December 1951	Winds at 57 mph with gusts measures at 76 mph, caused power outages in Silverton and closed north and south Santiam highways.

Source: Marion County Natural Hazards Mitigation Plan, 2005; National Climatic Data Center.

The Willamette Valley has also experienced occasional tornadoes, many of which have produced significant damage and occasionally injury or death. Since 1957, five reported tornadoes have struck Marion County, however no tornadoes have touched down near Woodburn or impacted the city.^{xxxv}

Marion County estimates a high probability that windstorms will occur, and a high vulnerability to windstorm events. Both ratings are true for the city of Woodburn as well.

Woodburn currently participates in a number of wind storm mitigation activities to prevent loss of life and property in a windstorm. These activities include closing parks during high wind events, regularly assessing the health of trees, and educating the public about tree health and pre-emptive measures the public can take to prevent future wind storm damage from trees.

Windstorms can have significant impacts on life and property. Debris carried along by extreme winds can contribute directly to injury and loss of life and indirectly through the failure of protective structures (i.e., buildings) and infrastructure. Windstorms have the ability to cause damage more than 100 miles from the center of storm activity. High winds can topple trees and break limbs which in turn can result in power outages and disrupt telephone, computer, and TV and radio service. Street trees in downtown Woodburn are particularly vulnerable to damaging utilities and property.

In addition to the immediate effects of wind damage, the loss of power due to windstorms can have widespread impacts on business and economic activity. Downed trees can block roads and railways, disrupting access to businesses. Damage to crops and farms that surround Woodburn can also hurt the local economy.

A sustained loss of power can seriously strain provision of emergency services and the operation of water and sewer facilities and transportation systems. In Woodburn, operator control is needed to operate some pump facilities, and emergency generators for the water system currently have only a 72 hour supply of fuel. Woodburn's sanitary system also relies on force mains, which need power to run, and there are some lift stations without emergency power.

Please see Marion County's NHMP for a comprehensive description of potential windstorm-related impacts, including the effects that are likely to occur at varying wind speeds.

Severe Winter Storm

Marion County's NHMP adequately describes the causes and characteristics of severe winter storms for the entire planning area, including the city of Woodburn. Snow and ice are relatively rare in western Oregon, but cold air can occasionally be funneled through the Cascades between the Gorge and Portland. If a Pacific storm happens to

reach the area at the same time that the cold air is present, larger than average snow events may result.^{xxxvi} Winter storms can happen throughout Marion County, including the city of Woodburn, and the extent of the storms will depend upon precipitation levels, temperatures, and the effects of the storm system on the built environment.

Marion County's NHMP accurately describes the history of severe winter storm events for the county as well as Woodburn. In addition to the events listed in Marion County's NHMP, two more recent events are noteworthy:

- January-February 2008: Record-setting snowstorms in Marion County. State of emergency declared in Marion County and surrounding counties.
- December 2008-2009: Winter storm throughout the Willamette Valley, heavy snow and ice. State of emergency declared in Marion County and surrounding counties.

Marion County estimates a high probability that severe winter storms will occur in the future, as well as a high vulnerability to such events. Both ratings are also true for the city of Woodburn.

Winter storms can bring snow, ice, and high winds that can cause significant damage to property and people. Downed trees and limbs caused by ice storms can become major hazards for houses, cars, utilities and other property. Residents and visitors are vulnerable to winter storms because icy roads can make it difficult to drive, and prolonged exposure to the cold can cause hypothermia. The temporary loss of home heating can be particularly hard on the elderly, young children, and other vulnerable populations. Icy roads can also limit the mobility of the elderly and very young if they need to be evacuated.

Severe winter weather can temporarily close key roads and highways, businesses, schools, government offices and other important community services. Long-term closure of Interstate 5 and state highways such as 99E and 214 can be problematic for Woodburn's businesses which rely on the city's access to major transportation routes. Below freezing temperatures can also lead to breaks in uninsulated water lines. Ice on tree limbs and power lines can cause power failures as well. All of these effects, if they last more than several days, can create significant economic impacts for Woodburn as well for the surrounding region.

Finally, a winter storm can impede access to Woodburn's water pump and wastewater pump facilities which require human staffing to operate. Likewise, emergency generators for the water system currently have only a 72 hour supply of fuel. Please see Marion County's NHMP for a more comprehensive description of potential winter storm-related community impacts.

Section 4: Mission, Goals, and Action Items

Mission

The city of Woodburn adopts Marion County's Natural Hazards Mitigation Plan mission and goals. The mission of the Marion County Natural Hazards Mitigation Plan is: to promote sound public policy designed to protect people, critical and essential facilities, infrastructure, utilities, private property, and the environment from natural hazards. The plan fosters partnerships, coordinated implementation and funding, public awareness, and the development of multi-objective strategies for mitigation.

The mission statement was agreed upon by the city's steering committee at the Action Item Development Workshop on June 10th (see Appendix A for details).

Goals

The plan goals help guide the direction of future activities aimed at reducing risk and preventing loss from natural hazards. The goals listed here serve as checkpoints as agencies and organizations begin implementing mitigation action items.

The Woodburn Steering Committee reviewed Marion County's goals on June 10th, 2009. The city adopts the county's goals with modification.

Goal #1: PUBLIC AWARENESS

Goal Statement: Advocate for public awareness of natural hazard risks, emergency notification and response, and resources for citizen preparedness.

Goal #2: EDUCATION

Goal Statement: Educate the public on natural hazard risk and how to successfully prepare for a natural disaster with minimal property damage and no loss of life.

Goal #3: PREVENTION

Goal Statement: Minimize risks to life, property, the environment, and the economy from natural hazards.

Goal #4: FUNDING AND IMPLEMENTATION

Goal Statement: Identify potential funding sources and implement potential mitigation projects.

Goal #5: PARTNERSHIPS AND COORDINATION

Goal Statements:

- Create, maintain and enhance partnerships with other stakeholders involved with natural hazard management.
- Coordinate natural hazard mitigation efforts with adjacent jurisdictions and public/private agencies' risk management activities.
- Coordinate natural hazard mitigation with city plans and policies.

Goal #6: NATURAL RESOURCES UTILIZATION

Goal Statement: Promote the use of natural systems and features, watershed planning, and land use planning for natural hazard mitigation whenever possible to reduce long-term costs to the city and maximize effectiveness.

Goal #7: EMERGENCY SERVICES

Goal Statement: Coordinate and integrate natural hazard mitigation activities, with emergency operations plans and procedures.

Mitigation Action Items

Short and long-term action items identified through the planning process are an important part of the mitigation plan. Action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk. Each action item has a corresponding action item worksheet describing the activity, the project's rationale, potential ideas for implementation, and coordinating / partner organizations. The action item worksheets can assist the community in pre-packaging potential projects for grant funding. Full action item worksheets are located in Appendix D.

Note: Due to Woodburn's isolation from wildfire and landslide risk areas, Woodburn's steering committee believes that implementing wildfire and landslide-related mitigation actions would not be cost-effective at this time. As such, the city has not identified wildfire or landslide mitigation action items. Woodburn will partner with Marion County, however, on the implementation of mitigation strategies that benefit both jurisdictions.

Drought

1. Partner with Marion County to support local agencies' training on water conservation measures.

Earthquake

1. Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices through public education.

2. Complete inventory of high-risk buildings, critical facilities, and infrastructure that may be particularly vulnerable to earthquake damage.
3. Evaluate the structural integrity of city-owned buildings.
4. Require new city facilities to exceed the minimum structural requirements for seismic loading.
5. Seek funding to further assess the “probability of collapse” for Lincoln Elementary School, Washington Elementary School, French Prairie Middle School, Nellie Muir Elementary School, and Woodburn High School.
6. Update the city’s Comprehensive Plan to reflect the latest information on seismic hazards.
7. Encourage residents and commercial businesses to purchase earthquake insurance.
8. Install automatic shut-off valves in all city facilities that use natural gas.

Flood

1. Widen culverts near Wyffel Park and Gatch Street between Lincoln Street and Hardcastle Avenue.
2. Implement mitigation action items in the Public Facilities Plan.
3. Partner with Marion County to conduct workshops for target audiences on National Flood Insurance Programs, mitigation activities, and potential assistance from FEMA’s Flood Mitigation Assistance and Hazard Mitigation Grant Programs.
4. Continue compliance with the National Flood Insurance Program through the enforcement of local floodplain ordinances.
5. Update the city’s Flood Insurance Rate Maps (FIRM) as funding becomes available.

Volcano

1. Identify critical facilities and equipment that can be damaged by ashfall, and develop mitigation activities to prevent damage to these facilities.

Wind Storm

1. Educate the public about the benefits of proper tree pruning and care in preventing damage during windstorms.
2. Educate the community about the risk of downed power lines, aerial power lines in the vicinity of trees, and preparedness measures to take in the event of a power outage.
3. Require new city facilities to exceed the minimum structural requirements for wind loading.

Severe Winter Storm

1. Educate homeowners about choosing ice and windstorm-resistant trees and landscaping practices to reduce tree-related hazards in future ice storms.
2. Educate citizens about ways to weatherize their homes, as well as safe emergency heating equipment.

Multi-Hazard

1. Develop a voluntary registry of populations that may need particular assistance in an emergency situation.
2. Further develop risk assessment maps to show areas at risk for all hazards.
3. Establish mutual aid agreements between government agencies and commercial businesses in the event of an emergency (e.g., fuel, heavy equipment, food, etc.).
4. Encourage residents to prepare and maintain 72-hour kits.
5. Provide periodic first-aid and CPR classes to members of the public.
6. Develop a post-disaster redevelopment plan.
7. Continue development of CERT teams to ease the load on emergency services following a disaster.
8. Develop and equip emergency shelters to take care of residents and vulnerable populations such as the elderly, the very young, and visitors.
9. Educate businesses and governmental organizations about the importance of continuity of operations plans to make them more resilient to natural hazards.
10. Establish a template that documents the information FEMA wants on each hazard event.
11. Obtain and use FEMA HAZUS-MH software.
12. Identify necessary warning system improvements.
13. Improve communication equipment in City Hall and in city vehicles, and identify additional radio operators to serve as communication backup in an emergency.
14. Ensure that all critical facilities have backup power and emergency operations plans to deal with power outages.
15. Evaluate the city computer system, network, and website for the ability to function during an emergency.
16. Identify mitigation projects that could be accomplished by volunteers or interns and involve them in the implementation process.

Section 5:

Plan Implementation and Maintenance

This section details the formal process that will ensure that Woodburn's Addendum remains an active and relevant document. The plan implementation and maintenance process includes a schedule for monitoring and evaluating the plan annually, as well as producing an updated plan every five years. Because this addendum lives within the Marion County Natural Hazard Mitigation Plan, the city will coordinate with the county's five-year plan update schedule.

Finally, this section describes how the city will integrate public participation throughout the plan maintenance and implementation process.

Plan Adoption

After the addendum is locally reviewed and deemed complete, the Director of Public Works submits it to the State Hazard Mitigation Officer at Oregon Emergency Management. Oregon Emergency Management submits the plan to the Federal Emergency Management Agency (FEMA--Region X) for review. This review addresses the federal criteria outlined in the FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, the city will adopt the plan via resolution. At that point the city will gain eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program funds, and Flood Mitigation Assistance program funds.

The City Council will be responsible for adopting the city of Woodburn's Natural Hazard Mitigation Plan Addendum. This governing body has the authority to promote sound public policy regarding natural hazards.

Convener

On July 29th, 2009, Woodburn's steering committee identified the Public Works Director as the convener for Woodburn's Addendum to the Marion County Natural Hazards Mitigation Plan. The convener's responsibilities include:

- Coordinate coordinating body meeting dates, times, locations, agendas, and member notification;
- Documenting the discussions and outcomes of committee meetings;
- Serving as a communication conduit between the coordinating body and key plan stakeholders;

- Identify emergency management-related funding sources for natural hazard mitigation projects;
- Coordinate plan update processes;
- Participating in Marion County’s plan update meetings;
- Submitting future plan updates to Oregon Emergency Management for review; and
- Coordinating local adoption processes.

Coordinating Body

On July 29, 2009, the Woodburn Steering Committee identified the following community members to serves as the coordinating body for the city’s addendum. These members include:

- Woodburn Public Works Director
- Woodburn Police Chief
- Woodburn Planning Department representative
- Woodburn Building Official
- Fire Chief, Woodburn Fire District
- Woodburn Chamber of Commerce representative
- Salud Medical Center representative
- Wellspring Medical Center representative
- Woodburn Mayor
- Woodburn Hispanic Liaison

The coordinating body’s roles and responsibilities include:

- Attending future plan maintenance and plan update meetings;
- Serving as the local evaluation committee for funding programs like the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program, and the Flood Mitigation Assistance Program
- Prioritizing and recommending funding for natural hazard risk reduction projects;
- Documenting successes and lessons learned;
- Evaluating and updating the natural hazards mitigation plan in accordance with the county’s five-year plan update schedule;
- Developing and coordinating ad hoc or standing subcommittees as needed; and
- Coordinating public involvement activities.

To make the coordination and review of the Woodburn Addendum as broad and useful as possible, the coordinating body will engage additional stakeholders and other relevant hazard mitigation organizations and agencies to implement the identified action items. Specific organizations have been identified as either internal or external partners on the individual action item forms located in Appendix D. Likewise, any coordinating organizations that are not part of the coordinating body will be invited to attend future meetings as well

Plan Maintenance

Plan maintenance is a critical component of the natural hazard mitigation plan. Proper maintenance of the plan ensures that this plan will maximize the city's efforts to reduce the risks posed by natural hazards. This section includes a process to ensure that a regular review and update of the plan occurs. The coordinating body and local staff are responsible for implementing this process, in addition to maintaining and updating the plan through a series of meetings outlined in the maintenance schedule below.

Semi-Annual Meetings

The coordinating body will meet at least semi-annually to complete the following tasks. Where possible, the schedule of these meetings will coincide with the annual grant cycle deadlines to allow for enough time to apply for funding. During the first meeting of the year, the coordinating body will:

- Discuss available (or soon-to-be available) funding streams, and which mitigation actions should be implemented within the coming year. All departments and organizations that are responsible for mitigation actions should be invited to attend (in addition to the regular coordinating body).
- Review existing action items to determine appropriateness for funding, and prioritize potential projects using the methodology described below;
- Educate and train new members on the plan and mitigation in general; and
- Document the meeting by saving the agenda, sign-in sheet, and meeting minutes. This will be of benefit to the coordinating body when conducting the plan update.

During the second meeting of the year the committee will:

- Come prepared to discuss any new risk assessment data (i.e., from the Department of Geology and Mineral Industries or otherwise);
- Review the plan update toolkit and determine whether any ongoing plan update tasks can be accomplished at this meeting.

New data should be incorporated when available, resulting in a hazards mitigation plan that remains current and up-to-date;

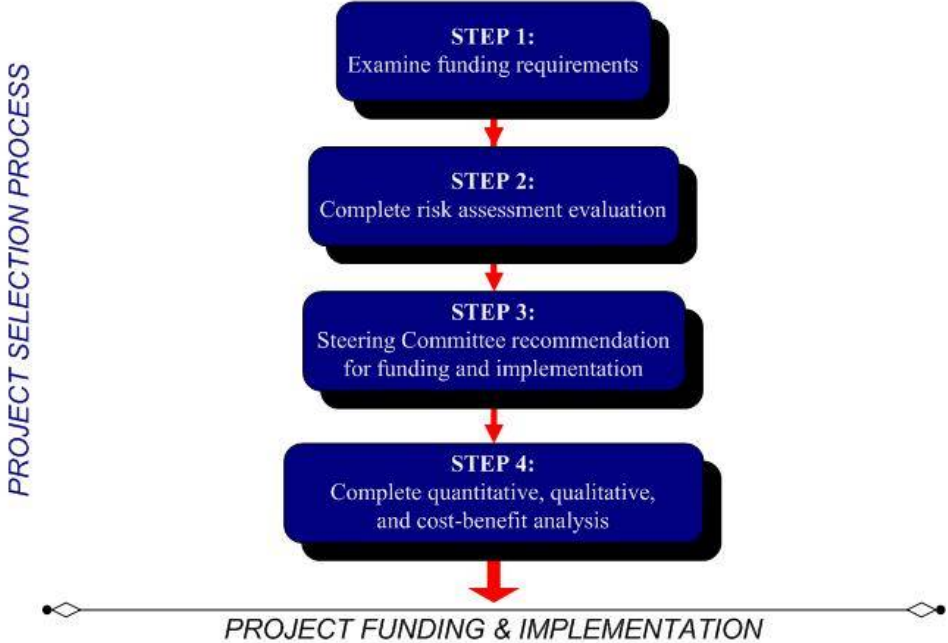
- Discuss any opportunities for continued public involvement (if needed); and
- Document successes and lessons learned during the year. Likewise, the convener should document this meeting by saving the agenda, sign-in sheet, and meeting minutes. This will be of benefit to the coordinating body when conducting the plan update.

Project Prioritization Process

The Disaster Mitigation Act of 2000 (via the Pre-Disaster Mitigation Program) requires that jurisdictions identify a process for prioritizing potential actions. Potential mitigation activities often come from a variety of sources; therefore the project prioritization process needs to be flexible. Projects may be identified by coordinating body members, local government staff, other planning documents, or the risk assessment. Figure 15 illustrates the project development and prioritization process.

Figure 15: Project Prioritization Process

Action Item and Project Review Process



Source: Community Service Center’s Partnership for Disaster Resilience at the University of Oregon, 2008.

Step 1: Examine funding requirements

The first step in prioritizing the plan’s action items is to determine which funding sources are open for application. Several funding sources may be appropriate for the city’s proposed mitigation projects. Examples of mitigation funding sources include but are not limited to: FEMA’s Pre-Disaster Mitigation competitive grant program (PDM), Flood Mitigation Assistance (FMA) program, Hazard Mitigation Grant Program (HMGP), National Fire Plan (NFP), Community Development Block Grants (CDBG), local general funds, and private foundations, among others. Please see Appendix B for a more comprehensive list of potential grant programs.

Because grant programs open and close on differing schedules, the coordinating body will examine upcoming funding streams’ requirements to determine which mitigation activities would be eligible. The coordinating body may consult with the funding entity, Oregon Emergency Management, or other appropriate state or regional organizations about project eligibility requirements. This examination of funding sources and requirements will happen during the coordinating body’s semi-annual plan maintenance meetings.

Step 2: Complete risk assessment evaluation

The second step in prioritizing the plan's action items is to examine which hazards the selected actions are associated with and where these hazards rank in terms of community risk. The coordinating body will determine whether or not the plan's risk assessment supports the implementation of eligible mitigation activities. This determination will be based on the location of the potential activities, their proximity to known hazard areas, and whether community assets are at risk. The coordinating body will additionally consider whether the selected actions mitigate hazards that are likely to occur in the future, or are likely to result in severe / catastrophic damages.

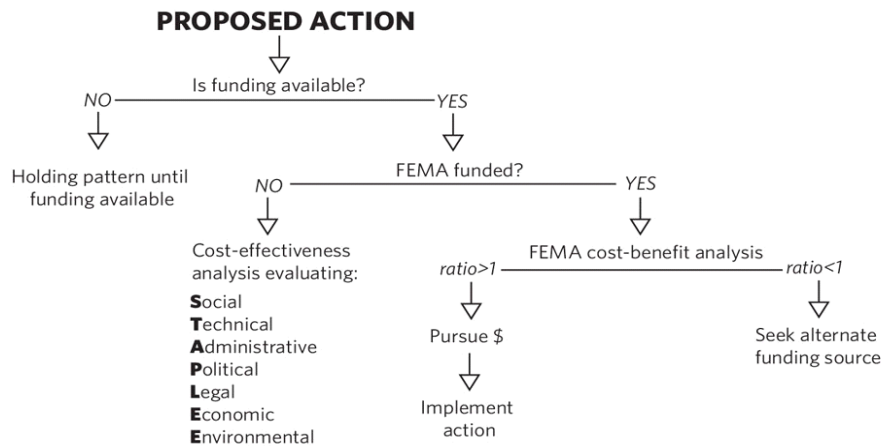
Step 3: Coordinating body recommendation

Based on the steps above, the coordinating body will recommend which mitigation activities should be moved forward. If the coordinating body decides to move forward with an action, the coordinating organization designated on the action item form will be responsible for taking further action and, if applicable, documenting success upon project completion. The coordinating body will convene a meeting to review the issues surrounding grant applications and to share knowledge and resources. This process will afford greater coordination and less competition for limited funds.

Step 4: Complete quantitative and qualitative assessment, and economic analysis

The fourth step is to identify the costs and benefits associated with the selected natural hazard mitigation strategies, measures or projects. Two categories of analysis that are used in this step are: (1) benefit/cost analysis, and (2) cost-effectiveness analysis. Conducting benefit/cost analysis for a mitigation activity assists in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. Determining the economic feasibility of mitigating natural hazards provides decision makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects. Figure 16 shows decision criteria for selecting the appropriate method of analysis.

Figure 16: Benefit Cost Decision Criteria



Source: Community Service Center’s Partnership for Disaster Resilience at the University of Oregon, 2006.

If the activity requires federal funding for a structural project, the coordinating body will use a Federal Emergency Management Agency-approved cost-benefit analysis tool to evaluate the appropriateness of the activity. A project must have a benefit/cost ratio of greater than one in order to be eligible for FEMA grant funding.

For non-federally funded or nonstructural projects, a qualitative assessment will be completed to determine the project’s cost effectiveness. The coordinating body will use a multivariable assessment technique called STAPLE/E to prioritize these actions. STAPLE/E stands for Social, Technical, Administrative, Political, Legal, Economic, and Environmental. Assessing projects based upon these seven variables can help define a project’s qualitative cost effectiveness. The STAPLE/E technique has been tailored for use in natural hazard action item prioritization by the Partnership for Disaster Resilience at the University of Oregon’s Community Service Center. See Appendix C for a description of the STAPLE/E evaluation methodology.

Implementation through Existing Programs

The city of Woodburn currently addresses statewide planning goals and legislative requirements through its comprehensive land use plan, a capital improvement program, transportation systems plan, public facilities plan, mandated standards and building codes. In addition, the Woodburn City Council conducts annual goal-setting meetings. To the extent possible, Woodburn will work to incorporate the recommended mitigation action items into existing plans, programs and policies, as well as develop emergency management goals that will help make natural hazard mitigation a city priority. Implementing the Addendum’s actions items through existing plans, programs and policies increases the likelihood of action items being supported, increases the likelihood that the plan gets updated to remain current, and efficiently uses the city’s existing resources.

Continued Public Involvement & Participation

The city of Woodburn is dedicated to involving the public directly in the continual reshaping and updating of the Woodburn Natural Hazard Mitigation Plan Addendum. Although members of the coordinating body represent the public to some extent, the public will also have the opportunity to continue to provide feedback about the plan.

To ensure continued public involvement and participation in the city's plan update processes, the city of Woodburn will:

- Post a copy of the plan on the city's website with contact information. Additionally, any significant changes to the plan will be described in the local newspaper. Newspaper articles will summarize changes, and will direct readers to the city's website in order to review the plan and provide comments.
- Publicly announce upcoming coordinating body meetings when needed. The announcements will be posted on the City Calendar on Woodburn's website.
- Pass a City Council resolution when the city applies for a FEMA grant;
- Post a one-page description of the Natural Hazards Mitigation Plan on the city's website in Spanish to reach out to the city's Spanish-speaking population;
- Post a copy of the plan on the Chamber of Commerce website.

Additionally, the city's natural hazards mitigation plan addendum has been archived in the University of Oregon Libraries' Scholar's Bank Digital Archive. Contact information for the plan's convener is listed on the plan to facilitate comments and feedback.

Five-Year Review of Plan

This plan will be updated every five years in conjunction with the Marion County Natural Hazard Mitigation Plan. The following 'toolkit' can assist the convener in determining what plan update activities need to occur. Likewise, the toolkit can assist the convener in determining which plan update activities can be discussed during regularly-scheduled plan maintenance meetings, and which activities require additional meeting time or the formation of sub-committees.

Mitigation Plan Update Toolkit

<i>Question</i>	Yes	No	<i>Plan Update Action</i>
Is the planning process description still relevant?			Modify this section to include a description of the plan update process. Document how the planning team reviewed and analyzed each section of the plan, and whether each section was revised as part of the update process. (This toolkit will help you do that).
Do you have a public involvement strategy for the plan update process?			Decide how the public will be involved in the plan update process. Allow the public an opportunity to comment on the plan process and prior to plan approval.
Have public involvement activities taken place since the plan was adopted?			Document activities in the "planning process" section of the plan update
Are there new hazards that should be addressed?			Add new hazards to the risk assessment section
Have there been hazard events in the community since the plan was adopted?			Document hazard history in the risk assessment section
Have new studies or previous events identified changes in any hazard's location or extent?			Document changes in location and extent in the risk assessment section
Has vulnerability to any hazard changed?			Document changes in vulnerability in the risk assessment section
<i>Have development patterns changed? Is there more development in hazard prone areas?</i>			
<i>Do future annexations include hazard prone areas?</i>			
<i>Are there new high risk populations?</i>			
<i>Are there completed mitigation actions that have decreased overall vulnerability?</i>			

Mitigation Plan Update Toolkit

<i>Question</i>	<i>Yes</i>	<i>No</i>	<i>Plan Update Action</i>
Did the plan document address National Flood Insurance Program repetitive flood loss properties?			Document any changes to flood loss property status
Did the plan identify the number and type of existing and future buildings, infrastructure, and critical facilities in hazards areas?			1) Update existing data in risk assessment section or 2) determine whether adequate data exists. If so, add information to plan. If not, describe why this could not be done at the time of the plan update
Did the plan identify data limitations?			If yes, the plan update must address them: either state how deficiencies were overcome or why they couldn't be addressed
Did the plan identify potential dollar losses for vulnerable structures?			1) Update existing data in risk assessment section or 2) determine whether adequate data exists. If so, add information to plan. If not, describe why this could not be done at the time of the plan update
Are the plan goals still relevant?			Document any updates in the plan goal section
What is the status of each mitigation action?			Document whether each action is completed or pending. For those that remain pending explain why. For completed actions, provide a 'success' story.
Are there new actions that should be added?			Add new actions to the plan. Make sure that the mitigation plan includes actions that reduce the effects of hazards on both new and existing buildings.
Is there an action dealing with continued compliance with the National Flood Insurance Program?			If not, add this action to meet minimum NFIP planning requirements
Are changes to the action item prioritization, implementation, or administration processes needed?			Document these changes in the plan implementation and maintenance section
Do you need to make any changes to the plan maintenance schedule?			Document these changes in the plan implementation and maintenance section
Is mitigation being implemented through existing planning mechanisms (such as comprehensive plans, or capital improvement plans)?			If the community has not made progress on process of implementing mitigation into existing mechanisms, further refine the process and document in the plan.

-
- i Source: USGS - Partnership for Disaster Resilience Research Collaborative, 2006.
- ii Weatherbase.com, "Salem Oregon," <http://www.weatherbase.com>, accessed February 3, 2009.
- iii Ibid.
- iv Portland State University: Population Research Center, *2007 Oregon Population Report*, <http://www.pdx.edu/prc/annualorpopulation.html>, (March 2008), 12.
- v US Census, "Profile of Selected Social Characteristics: 2000," Fact Sheet, Woodburn, OR, www.census.gov.
- vi Morrow, B., 1999, Identifying and mapping community vulnerability: Disasters, v. 23, no.1, p.1-18.
- vii Ibid.
- viii McGuire, L., Ford, E., and Okoro, C., 2007, Natural disasters and older US adults with disabilities – implications for evacuation: Disasters, v.31, no.1, p.49-56.
- ix City of Woodburn, *Woodburn Comprehensive Plan*, (Woodburn, OR: City of Woodburn, 1999), 5-7.
- x US Census, "Selected Economic Characteristics, 2005-2007," 2005-2007 American Community Survey 3-Year Estimates, Woodburn, OR, www.census.gov.
- xi Ibid.
- xii Ibid.
- xiii US Census, "Selected Housing Characteristics, 2005-2007," 2005-2007 American Community Survey 3-Year Estimates, Woodburn, OR.
- xiv Ibid.
- xv Morrow, 1999; Burby and others, 2003.
- xvi Burby and others, 2003.
- xvii Ibid.
- xviii Ibid.
- xix 2005 Buildable Lands Inventory, 3-4
- xx US Census, "Selected Economic Characteristics, 2005-2007," 2005-2007 American Community Survey 3-Year Estimates, Woodburn, OR, United States, www.census.gov.
- xxi Source: USGS - Partnership for Disaster Resilience Research Collaborative, 2006.
- xxii City of Woodburn Public Facilities Plan, 2005.

-
- xxiii City of Woodburn Public Facilities Plan, 2005.
- xxiv City of Woodburn Public Facilities Plan, 2005.
- xxv NOAA, 1993. Tsunamis affecting the West Coast of the United States: 1806-1992.
- xxvi US Census, "Profile of Selected Social Characteristics: 2000," Fact Sheet, Woodburn, OR, www.census.gov.
- xxvii McConnell, Vicki S. Department of Geology and Mineral Industries. *Statewide Seismic Needs Assessment: Implementation of Oregon 2005 Senate Bill 2 Relating to Public Safety, Earthquakes, and Seismic Rehabilitation of Public Buildings.* 2007. <http://www.oregongeology.com/sub/projects/rvs/OFR-007-02-SNAA-onscreen.pdf>.
- xxviii City of Woodburn Public Facilities Plan, 2005.
- xxix Marion County Natural Hazards Mitigation Plan, Landslide Chapter.
- xxx City of Woodburn Public Facilities Plan, 2005.
- xxxi Marion County Natural Hazards Mitigation Plan, Volcanic Eruptions Chapter.
- xxxii United States Geological Survey, Cascades Volcano Observatory. Vancouver, Washington. <http://vulcan.wr.usgs.gov/>
- xxxiii United States Geological Survey, Cascades Volcano Observatory. Vancouver, Washington. <http://vulcan.wr.usgs.gov/>
- xxxiv Marion County Natural Hazards Mitigation Plan, Wildfire Chapter.
- xxxv Marion County Natural Hazards Mitigation Plan, Windstorm Chapter.
- xxxvi Marion County Natural Hazards Mitigation Plan, Severe Winter Storm Chapter.

Appendix A: Planning and Public Process

The following appendix documents Woodburn’s natural hazards mitigation planning and public involvement processes.

Work Sessions

Informational Meeting Agenda	A2
Kickoff Meeting Agenda.....	A3
Kickoff Meeting Sign-In	A4
Kickoff Meeting Materials	A6
Risk Assessment Meeting Agenda	A19
Risk Assessment Meeting Sign-In.....	A20
Marion County Hazard Analysis	A25
Goals & Action Item Meeting Agenda.....	A26
Goals & Action Item Meeting Sign-In	A27
Goals & Action Item Meeting Materials	A30
Plan Implementation & Maintenance Meeting Agenda	A35
Plan Implementation & Maintenance Meeting Sign-In.....	A36
Plan Implementation & Maintenance Meeting Materials	A38

Stakeholder Interviews

Interview Questions.....	A47
Stakeholders Contacted	A49
Stakeholder Survey Results	A53

Meeting: Region 3 City Mitigation Plans
Date: September 16, 2008
Time: 10:00 am – 12:00 pm
Location: Marion County Public Works

AGENDA

1. Welcome & Introductions **(5 minutes)**
 - Krista Dillon, OPDR
2. Partnership Overview **(20 minutes)**
 - Krista Dillon
3. Pre-Disaster Mitigation Planning Grant **(15 minutes)**
 - Krista Dillon
4. City Mitigation Planning Process & Timeline **(30 minutes)**
 - Megan Findley, OPDR
5. Next Steps **(20 minutes)**
 - Krista Dillon
6. Questions??? **(20 minutes)**

Meeting: Region 3 Cities Kickoff

Date: February 25, 2009

Time: 2:00 pm – 5:00 pm

Location: Marion County Public Works Building, 5155 Silverton Rd NE, Salem, OR

AGENDA

1. Welcome & Introductions **(20 minutes)**
- Megan Findley

2. OPDR Overview **(40 minutes)**
- Andre LeDuc

3. Pre-Disaster Mitigation Program Overview **(30 minutes)**
- Megan Findley

Break (15 minutes)

4. 4-Phased Planning Process **(45 minutes)**
• Steering Committee & Stakeholder Selection Exercise
- Gregoor Passchier

5. Public Involvement Opportunities Discussion **(30 minutes)**
- Megan Findley

6. Admin & Next Steps **(15 minutes)**
- Megan Findley & Gregoor Passchier

Meeting Sign-In

Region 3 Cities 'Kickoff' Work Session. February 25th, 2009; 2-5pm
Marion County Public Works Building. Courthouse Square 555 Court Street N.E., Salem, OR.

Name	Representing	Email	Roundtrip mileage (if applicable)
Rich Boerstal	City of Silverton - PW	rboerstal@silverton.or.us	
DARREL MATHEWS	CITY OF SILVERTON, SDF	bangsandburns@pngus.net	
Rick Lewis	City of Silverton - PD	rlewis@silverton.or.us	
John VANDERZANDEN	Marion County EM	Jvanderzanden@co.marion.or.us	
Dan Brown	City of Woodburn	Dan.Brown@ci.woodburn.or.us	
NATALIE LABOSSIERE	City of Woodburn	Natalie.Labossiere@ci.woodburn.or.us	
Kaurie Boyce	City of Aurora	recorder@ci.aurora.or.us	
Carrie Brennecke	City of Woodburn	Carrie.brennecke@ci.woodburn.or.us	

Name	Representing	Email	Roundtrip mileage (if applicable)
Krista Rowland	Marion County Emergency mgmt	Krowland@ cognarion.sv.	
Julie Amicci	Tigard PETS PET EMERGENCY PROGRAM	Juliepax@hotmail.com	
Kevin Watson	City of Keizer	watsonk@keizer.org	



Memo

To: Cities Developing Mitigation Plan Addenda (Keizer, Woodburn, Aurora, Silverton)
From: Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center
Date: February 25, 2009
Re: **Natural Hazards Mitigation Plans- Developing a City Addendum**

Purpose

The purpose of this memo is to inform communities about the process for developing a city addendum to their county's natural hazards mitigation plan. This memo outlines the federal requirements for city addenda and summarizes the planning process cities will follow in developing their addenda. The planning process includes: 1) developing a steering committee of local constituents to guide the planning process; 2) conducting an issue identification and hazard identification workshop to determine the city's vulnerability to natural hazards; and 3) developing action items to reduce the impact of natural hazard events.

City Specific Addendum and Multi-jurisdictional Planning Requirements

A natural hazards mitigation plan identifies long and short-term strategies that can permanently reduce or alleviate the loss of life, property, and injuries resulting from natural hazards. A FEMA-approved natural hazards mitigation plan gives a jurisdiction access to three types of grant funding: the Pre-Disaster Mitigation Grant Program (PDM); the Hazard Mitigation Grant Program (HMGP); and the Flood Mitigation Assistance Grant Program (FMA).¹ Without a FEMA-approved natural hazards mitigation plan, a jurisdiction is *not* eligible to apply for these federal mitigation grant funds.

In order to access the federal mitigation grants described above, a city may either: 1) create a stand-alone natural hazards mitigation plan that is not tied to the county's plan; or 2) create an addendum to the county's plan. As outlined by the Disaster Mitigation Action of 2000 (DMA2K), a stand-alone plan must meet 20 FEMA requirements whereas an addendum must meet 4.² Creating an addendum is a much simpler process than creating a stand-alone plan. City addendum requirements are as follows:

1. Multi-jurisdictional Participation - *§201.6(a)(3) Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process*
 - a. Does the plan identify how each jurisdiction participated in the plan's development?²
2. Multi-jurisdictional Risk Assessment - *§201.6(c)(2) (iii): For multi-jurisdictional plans, the risk assessment must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*
 - a. Does the plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?

¹ Eligibility for FMA funds is dependent on the plan meeting several flood specific planning requirements.

² Cities only need to meet 4 requirements if the county's plan meets the remaining 16 on the city's behalf.

3. Multi-jurisdictional Mitigation Strategy - **§201.6(c)(3) (iv)**: *For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*
 - a. Does the plan include separate, identifiable action items for each jurisdiction requesting FEMA approval of the plan?
4. Multi-jurisdictional Plan Adoption - **§201.6(c)(5)** *For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*
 - a. Does the plan indicate the specific jurisdictions represented in the plan?
 - b. For each jurisdiction, has the local governing body approved the plan?
 - c. Are supporting documents, such as resolutions, included?

Planning Process

In an effort to assist each city in their addendum development process, the Oregon Partnership for Disaster Resilience (OPDR) will facilitate a series of four work-sessions. OPDR will be responsible for developing city addenda based on input from each work session. City representatives must attend work sessions in order to facilitate the plan development process.

Although work-sessions will have a strong information-gathering component, they will also be treated as opportunities to train communities in the plan development process. OPDR's intention with the work sessions is therefore twofold; in addition to developing effective and purposeful mitigation plans for each participating community, the Partnership will equip communities the tools and resources necessary for maintaining, implementing, and updating their plans in accordance with the Disaster Mitigation Act of 2000.

The following 'steps' outline the planning process that will occur between February 2009 and September 2009.

Step 1: Getting Started

OPDR will develop and facilitate a 'kick-off' work session with communities on February 25th, 2009. Meeting topics will include an overview of OPDR's programs and activities; a discussion of mitigation planning requirements; and exercises in identifying stakeholders, potential steering committee members, and public involvement strategies. Following the work session, cities will be asked to develop a steering committee that's composed of members from various sectors of the community. Steering committee members often include representatives from the city, such as public works staff, planners, and local emergency managers; representatives from the business community; representatives of neighborhood organizations that could be affected by natural hazards; and other concerned citizens. Steering committees for city addenda range from 4 to 8 members, but it is up to the community to decide the total number of committee members and who would be most knowledgeable about natural hazard events. Each city should additionally identify a 'point of contact' that can identify and invite committee members to the table.

All steering committee members should be prepared to attend 3 meetings between April and August, 2009. At each meeting, committee members should be able to provide OPDR with local knowledge about community processes, risks, and hazards. Additionally, the committee will be asked to review plan drafts, and to document the time they spend developing the plan (since the grant that funds this effort requires local in-kind match.) Lastly, a representative from the city's steering committee should inform the city's local governing body (i.e. city council) about the work the steering committee is doing to keep them informed of the planning process.

Following the first work session, OPDR will conduct interviews with stakeholders from each community. Interviews will serve as a public outreach component for the cities' planning processes, in the hopes that greater outreach will better inform each city's risk assessment and natural hazard mitigation strategies.

Step 2: Assessing Local Risks

A central component to any natural hazards mitigation plan is the risk assessment. OPDR will develop and facilitate a risk assessment workshop on April 15 in partnership with the U.S. Geological Survey and Oregon Emergency Management. Each city's full steering committee must be present at this workshop, which will last from 9am-5pm. Cities will be asked to review their county's mitigation plan, and to describe how the city's risks

are greater than (or simply differ from) the county's. Information gathered from these workshops will assist the city in developing mitigation, or risk reduction strategies.

Step 3: Developing City-Specific Action Items

Based on information gathered at the April risk assessment workshop, and information gathered from stakeholder interviews, OPDR will develop a set of proposed mitigation strategies (or 'action items') for each city. Action items are detailed recommendations for activities that local departments, citizens and others could engage in to reduce risk. Example actions include policy changes, such as updated ordinances; projects, such as seismic retrofits to critical facilities; and education and outreach to targeted audiences, such as Spanish speaking residents or the elderly. Steering committee members will be contacted for input in drafting actions as well.

In June (date TBD), steering committees will convene for an 'Action Item' workshop with OPDR. Steering committees will discuss OPDR's proposed mitigation strategies, and will develop a final set of actions for their city addenda.

Step 4: Adopting, Implementing, and Maintaining the Plan

In July (date TBD), OPDR will host a final work session to discuss strategies for implementing, maintaining, and updating the plan. Additionally, ODPR will be responsible for drafting a final addendum for each city. Committee members will be expected to review OPDR's final drafts, and provide comments and edits on the final document. On behalf of each city, OPDR will send final drafts to Oregon Emergency Management and FEMA for review.

FEMA review can take up to 45 business days. The plan will either be approved pending adoption, or require additional revisions, and OPDR will work with each city to identify how to meet the required revisions (if needed). If the city addendum is approved pending adoption, the city will need to adopt the plan via resolution. OPDR will support each city throughout the review process, and will provide the city with guidance and materials to begin the local adoption process.

Once approved at the local level, OPDR will send proof of local adoption to FEMA. FEMA will then send a final approval letter to Oregon Emergency Management and OPDR, who will then send the final letter to the city. The final approval letter acknowledges the community's eligibility for the Pre-Disaster Mitigation Grant Program, the Hazard Mitigation Grant Program, and the Flood Mitigation Assistance Grant Program.

Note: The approval letter will show that the city's addendum needs to be updated along with the county's plan by December, 2010.

For more information, please contact Megan Findley, OPDR *Pre-Disaster Mitigation Program Manager*, at 541.346.2305 or mfindley@uoregon.edu.

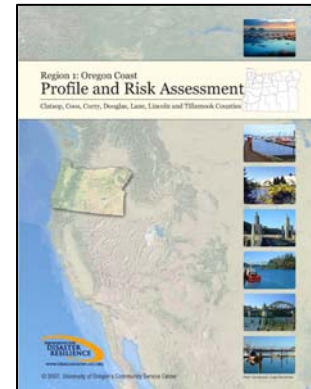
Hazard Resources

The following resources can help you locate information regarding natural hazards that may impact your community.

All Hazards

- State of Oregon Enhanced Natural Hazard Mitigation Plan

The State plan organizes the state into eight regions and it includes a Natural Hazard Risk Profile specific to each region. One component of the regional profile is the Natural Hazard Risk Assessments. The Hazard Risk Assessments provides the following information for each natural hazard: characteristics and a brief history, recurrence, and vulnerability. The State's Regional Natural Hazard Risk Assessments are a good starting place for identifying and profiling the hazards that are relevant to your community's risk assessment. The Regional Risk Assessments are available on the Partnership webpage (www.oregonshowcase.org).



- Hazard Analysis Matrix

Each county in Oregon has developed and is required to maintain a hazard analysis that includes risk scores for the hazards they face. These scores range from 24 (low) to 240 (high), and reflect the county's analysis for each particular hazard. By using this methodology consistently throughout the state one can compare the risk posed by a particular hazard from one county to the next, and each local jurisdiction can compare one hazard against others to establish priorities for planning, hazard mitigation, and capability development. Contact a County Emergency Manager to receive a copy of this document.

SAMPLE HAZARD ANALYSIS MATRIX

Hazards		History WF = 2	Vulnerability WF = 5	Maximum Threat WF = 10	Probability WF = 7	Total Score
FLOOD	WF X SR Subscore = 20	2 X 10 = 20	5 X 9 = 45	10 X 7 = 70	7 X 10 = 70	206
WILDFIRE	WF X SR Subscore = 20	2 X 10 = 20	5 X 8 = 40	10 X 5 = 50	7 X 10 = 70	180
EARTHQUAKE	WF X SR Subscore = 4	2 X 2 = 4	5 X 10 = 50	10 X 10 = 100	7 X 3 = 21	175
WINDSTORM	WF X SR Subscore = 18	2 X 8 = 18	5 X 6 = 30	10 X 6 = 60	7 X 8 = 56	162
HAZMAT	WF X SR Subscore = 14	2 X 7 = 14	5 X 5 = 25	10 X 6 = 60	7 X 6 = 42	141
LANDSLIDE	WF X SR Subscore = 20	2 X 10 = 20	5 X 4 = 20	10 X 3 = 30	7 X 9 = 63	133
DAM FAILURE	WF X SR Subscore = 2	2 X 1 = 2	5 X 5 = 25	10 X 2 = 20	7 X 2 = 14	61

- Technical Resource Guide

The Technical Resource Guide was developed by the Oregon Partnership for Disaster Resistance, with the assistance of the DLCD. The resource guide is a tool that can assist Oregon cities and counties in planning for, and limiting the effects of, threats posed by natural hazards. The TRG is available online at http://www.oregonshowcase.org/downloads/pdf/projects/UO-ONHW_Hazard_TRG_full_1999.pdf.



- Oregon's Regional Hazard Viewer:
http://mtjune.uoregon.edu/website/hazardmaps/webapp/hazardsViewer_content.html
 The interactive viewer visually displays perceived vulnerability per hazard for each county in Oregon, which allows communities and the state to compare the vulnerability of hazards across regions.
- Newspapers
 Local news stories often provide details on where and how past hazard events have impacted the community.
- Local Historical Society
 A visit to the local historical society can assist you in gathering hazard history data. Oftentimes, historical societies maintain information about past hazard events.
- DLCD Natural Hazard Minisite:
<http://www.lcd.state.or.us/LCD/HAZ/index.shtml>
- Hazard Maps
 All communities have Flood Insurance Rate Maps (FIRMs) that detail where the floodplain is. Your community may also have other localized hazard maps (e.g. slope/landslide risk). These maps highlight the areas within the community that are most at risk from a hazard event.
- FEMA
 - Federal Disaster Declarations: <http://www.fema.gov/news/disasters.fema>. Search for declared disasters by year and/or state.
 - Mapping information:
https://hazards.fema.gov/femaportal/wps/portal!/ut/pl.cmd/cs/.ce/7_0_A/.s/7_0_CM9/_s.7_0_A/7_0_CM9
 - Types of Disasters (hazard descriptions):
<http://www.fema.gov/hazard/types.shtm>
 - HAZUS: <http://www.fema.gov/plan/prevent/hazus/>. HAZUS-MH is a powerful risk assessment software program for analyzing potential losses from floods, hurricane winds and earthquakes. In HAZUS-MH, current scientific and engineering knowledge is coupled with the latest geographic information systems (GIS) technology to produce estimates of hazard-related damage before, or after, a disaster occurs.
- National Climatic Data Center: <http://www.ncdc.noaa.gov>. NCDC is the world's largest active archive of weather data. Under "Data and Products: Free Data," you can access climate maps, storm data, wind data, historic significant events, and freeze/frost data. Most links will open a PDF document; you will need to search (Control: F) for "Oregon" to find locally-relevant information.

Base Maps

- Oregon Coastal Atlas: www.coastalatlantlas.net. Click on the ‘maps’ toolbar to create a map of your community. Explore the “tools” and “learn” tabs for additional information.
- Oregon Department of Transportation: <http://www.oregon.gov/ODOT/maps.shtml>
- U.S. Geological Survey:
 - Digital Data: <http://edc2.usgs.gov/geodata/index.php>
[These data files are for use in geographical information systems (GIS) for analysis and integration with other geospatial data. The USGS offers free software for viewing some digital cartographic products.]
 - Geologic hazard maps: <http://geomaps.wr.usgs.gov/pacnw/map.html>
 - The National Map: <http://nmviewogc.cr.usgs.gov/viewer.htm>
 - To visualize available GIS data, ESRI offers a free GIS reader called “ArcExplorer” that may be helpful. <http://www.esri.com/software/arcexplorer/index.html>

Hazard-Specific Resources

- Coastal Erosion
 - Coastal Erosion Chapter, State Plan:
http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_coastal-erosion_chapter.pdf. The coastal erosion chapter of the state Natural Hazards Mitigation Plan provides a characterization of the coastal erosion hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
 - Oregon Coastal Management Program:
<http://www.oregon.gov/LCD/OCMP/index.shtml>
 - State of the Coast:
http://oceanservice.noaa.gov/websites/retiredsites/supp_sotc_retired.html
Includes a series of essays related to human-induced pressures on the environment and societal responses to environmental degradation. The essays are factual presentations; inferences are minimal.
 - HazNet, Sea Grant Natural Hazards Theme Team: <http://www.haznet.org/>. HazNet is the place to find out how Sea Grant programs nationwide are working together to better understand coastal natural hazards and develop ways to reduce their impacts on lives, property and coastal economies.
- Drought
 - Water Resources Department: Drought Page:
<http://www.wrd.state.or.us/OWRD/WR/drought.shtml>. On this page and associated links you will find data and other information concerning the availability of water in Oregon for the current year. During dry times there is information from watermasters concerning their specific districts, as well as links to other agencies and local governments. "Near real time" links provide water levels and flow data for particular streams and rivers.

- Drought Impact Reporter: <http://droughtreporter.unl.edu/>
Drought impacts are inherently hard to quantify, therefore there has not been a comprehensive and consistent methodology for quantifying drought impacts and economic losses in the United States. The Drought Impact Reporter is intended to be the initial step in creating a comprehensive database. The principal goal of the Drought Impact Reporter is to collect, quantify, and map reported drought impacts for the United States and provide access to the reports through interactive search tools.
Click on “Oregon” visual to access state information. Select a time period (you may search from 1850 to present day). Choose all “impact categories” and click “submit” to view reports.
 - National Drought Mitigation Center: <http://www.drought.unl.edu/dm/index.html>
 - Drought Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_drought_chapter.pdf. The Drought chapter of the state Natural Hazards Mitigation Plan provides a characterization of the drought hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
 - USGS Water Use in the United States: <http://water.usgs.gov/watuse/>
 - National Drought Mitigation Center: <http://www.drought.unl.edu/index.htm>. The National Drought Mitigation Center (NDMC) helps people and institutions develop and implement measures to reduce societal vulnerability to drought. The NDMC, based at the University of Nebraska – Lincoln, stresses preparation and risk management rather than crisis management.
 - NOAA’s Drought Information Center: <http://www.drought.noaa.gov/>
- Earthquake
 - Seismic Monitor: <http://www.iris.edu/seismon/>. Seismic Monitor allows you to monitor global earthquakes in near real-time, visit seismic stations around the world, and search the web for earthquake or region-related information.
 - USGS
 - Earthquake Hazards Program: <http://earthquake.usgs.gov>. Provides historic and up-to-date information on earthquakes around the world.
 - ‘Earthquakes:’ <http://pubs.usgs.gov/gip/earthq1/>
 - Cascadia Region Earthquake Workgroup: <http://www.crew.org/index.html>
 - DOGAMI: <http://www.oregongeology.com/sub/default.htm>. The mission of the Department of Geology and Mineral Industries is to serve a broad public by providing a cost-effective source of geologic information for Oregonians and to use that information in partnership to reduce the future loss of life and property due to potentially devastating earthquakes, tsunamis, landslides, floods, and other geologic hazards.
 - Geologic Hazards on the Oregon Coast
<http://www.oregon.gov/DOGAMI/earthquakes/Coastal/CoastalHazards>

Main.shtml: includes information about coastal landslides, tsunamis, and earthquakes.

- Earthquake Hazards Program: <http://earthquake.usgs.gov/>
 - National Earthquake Information Center: <http://earthquake.usgs.gov/regional/neic/>
 - Relative earthquake hazard maps for selected urban areas in western Oregon: <http://nwdata.geol.pdx.edu/DOGAMI/ims.html>
 - Earthquake Damage in Oregon: Preliminary estimates of future earthquake losses (HAZUS) <http://www.oregongeology.com/sub/earthquakes/SP29SUMMARY.pdf>
 - Oregon Seismic Safety Policy Advisory Commission: <http://www.wsspc.org/Members/OSSPAC/index.html>. The Oregon Seismic Safety Policy Advisory Commission (OSSPAC), otherwise known as the Earthquake Commission, has the unique task of promoting earthquake awareness and preparedness through education, research, and legislation. The mission of OSSPAC is to positively influence decisions and policies regarding pre-disaster mitigation of earthquake and tsunami hazards, increase public understanding of hazard, risk, exposure, and vulnerability through education seminars, etc., and be responsive to the new studies and/or issues raised around earthquakes and tsunamis.
 - Oregon Department of Consumer & Business Services – Building Codes Division: <http://www.cbs.state.or.us/bcd/>. The Building Codes Division (BCD) sets statewide standards for design, construction and alteration of buildings that include resistance to seismic forces. BCD is active on several earthquake committees and funds construction related continuing-education programs. BCD registers persons qualified to inspect buildings as safe or unsafe to occupy following an earthquake and works with OEM to assign inspection teams where they are needed.
 - Earthquake Chapter, State Plan: http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_earthquake_chapter.pdf. The Earthquake chapter of the state Natural Hazards Mitigation Plan provides a characterization of the earthquake hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
 - The Pacific Northwest Seismic Network: http://www.geophys.washington.edu/SEIS/PNSN/INFO_GENERAL/eqhazard.s.html. (All about earthquakes and geologic hazards of the Pacific Northwest).
 - The Seismic Retrofit of Historic Buildings: <http://www.nps.gov/history/hps/tps/briefs/brief41.htm>
- Flood
 - Department of Land Conservation and Development (DLCD): <http://www.lcd.state.or.us/>. DLCD administers the State's Land Use Planning Program. The program is based on 19 Statewide Planning Goals,

including Goal 7, related to natural hazards. DLCD also serves as Oregon's federally designated agency to coordinate floodplain management in Oregon. DLCD maintains contact with flood prone communities throughout the state in order to help them meet the requirements of the NFIP and to ensure that they are prepared in case of flood. DLCD offers information on the NFIP, CRS and other FEMA - related programs. They also offer training courses on various flood mitigation programs.

**Contact DLCD to request NFIP repetitive loss information (an FMA requirement of the natural hazard mitigation plan).

- FEMA Q3 Flood Data:
<http://www.esri.com/data/download/fema/description.html>. The Q3 Flood Data is developed by electronically scanning the current effective map panels of existing paper Flood Insurance Rate Maps (FIRMs). Certain key features are digitally captured and then converted into area features, such as floodplain boundaries. Using GIS software such as ArcGIS and ArcExplorer (Java Edition, ESRI's free data viewer) you can overlay the Q3 Flood Data with your own information (street networks, land parcels, customer addresses, etc.) to display potential flood risk zones and identify future marketing opportunities.
- Oregon Water Resources Department – Estimation of Peak Discharges:
http://www.wrd.state.or.us/OWRD/SW/peak_flow.shtml. A study of the magnitude and frequency of floods in Oregon has been completed by the Oregon Water Resources Department (OWRD) with financial assistance from the Federal Emergency Management Agency, Oregon Department of Transportation, and the Association of Oregon Counties and with the cooperation of the U.S. Geological Survey. The study was undertaken to provide engineers and land managers with the information needed to make informed decisions about development in or near watercourses.
- Oregon Emergency Management (OEM): <http://egov.oregon.gov/OOHS/OEM/>. OEM administers FEMA's Hazard Mitigation Grant Program, which provides monies for acquisition, elevation, relocation, and demolition of structures located in the floodplain. OEM also administers FEMA's Flood Mitigation Assistance Program. This program provides assistance for NFIP insured structures only. OEM also helps local jurisdictions to develop local hazard mitigation plans. OEM is heavily involved in flood damage assessment and works mainly with disaster recovery and hazard mitigation programs. OEM provides training for local governments through workshops on recovery and mitigation. OEM also helps implement and manage federal disaster recovery programs.
- Flood Chapter, State Plan:
http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_flood_chapter.pdf. The Flood chapter of the state Natural Hazards Mitigation Plan provides a characterization of the flood hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.

- Association of State Floodplain Managers:
<http://www.floods.org/home/default.asp>
 - Flood Damage in the United States:
<http://www.flooddamagedata.org/index.html>
 - National Association of Flood & Stormwater Management Agencies:
<http://www.nafsma.org/>
 - National Flood Determination Association: <http://www.nfdaflood.com/>
 - Association of State Dam Safety Officials: <http://www.damsafety.org>
 - River Management Society: <http://www.river-management.org/index.asp>
 - River Network: <http://www.rivernetwork.org/>
- Landslide
 - DOGAMI: Geologic Hazards on the Oregon Coast
<http://www.oregon.gov/DOGAMI/earthquakes/Coastal/CoastalHazardsMain.shtml>: includes information about coastal landslides, tsunamis, and earthquakes.
 - Landslide and Debris Flow Chapter, State Plan:
http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_landslide_chapter.pdf. The Landslide and Debris Flow chapter of the state Natural Hazards Mitigation Plan provides a characterization of the landslide and debris flow hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
 - USGS: Landslides <http://www.usgs.gov/hazards/landslides/>
 - American Planning Association, Landslide Research:
<http://www.planning.org/landslides/docs/main.html>. Although a number of successful techniques for identifying and mitigating landslide hazards have been developed through federal programs at USGS and FEMA, little of this information has reached planners and other public officials at the city, town, county, or regional levels who's incremental development decisions shape the landscape. The APA's research department embarked on a program to bring together solutions from multiple disciplines into a single source. It will help serve local planning efforts in identifying landslide hazards sufficiently early in the planning process so as to minimize exposure to landslide risks.
 - FEMA: Landslide and Debris Flows: <http://www.fema.gov/hazard/landslide/>
 - Tsunami
 - USGS: <http://pubs.usgs.gov/sir/2007/5283/>. Wood, N., 2007, Variations in city exposure and sensitivity to tsunami hazards in Oregon: Reston, Va., USGS Scientific Investigations Report 2007-5283.
 - DOGAMI: Geologic Hazards on the Oregon Coast
<http://www.oregon.gov/DOGAMI/earthquakes/Coastal/CoastalHazardsMain.shtml>

html: includes information about coastal landslides, tsunamis, and earthquakes.

- DOGAMI: Tsunami Evacuation Maps
<http://www.oregongeology.com/sub/earthquakes/Coastal/Tsubrochures.htm>
 - NOAA Center for Tsunami Research: <http://nctr.pmel.noaa.gov/index.html>
 - National Tsunami Hazard Mitigation Program: <http://nthmp.tsunami.gov/>
 - West Coast and Alaska Tsunami Warning Center:
<http://wcatwc.arh.noaa.gov/>
 - Tsunami Chapter, State Plan:
http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_tsunami_chapter.pdf. The Tsunami chapter of the state Natural Hazards Mitigation Plan provides a characterization of the tsunami hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
- Volcano
 - USGS
 - Cascades Volcano Observatory: <http://vulcan.wr.usgs.gov/>
 - Volcano Hazards Program: <http://volcanoes.usgs.gov/> , and <http://www.usgs.gov/hazards/volcanoes/>
 - Volcano-Monitoring Techniques
<http://volcanoes.usgs.gov/About/What/Monitor/monitor.html>
 - USGS Open-File Reports:
 - Crater Lake:
<http://vulcan.wr.usgs.gov/Volcanoes/CraterLake/Hazards/OFR97-7-487/framework.html>
 - Mt. Hood:
<http://vulcan.wr.usgs.gov/Volcanoes/Hood/Hazards/OFR97-89/framework.html>
 - Mt. Jefferson:
<http://vulcan.wr.usgs.gov/Volcanoes/Jefferson/Hazards/OFR99-24/framework.html>
 - Newberry Volcano:
<http://vulcan.wr.usgs.gov/Volcanoes/Newberry/Hazards/OFR97-513/framework.html>
 - Three Sisters Region:
<http://vulcan.wr.usgs.gov/Volcanoes/Sisters/Hazards/OFR99-437/framework.html>
 - Volcanic Hazards Chapter, State Plan:
http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_volcanic_chapter.pdf

- Wildfire
 - Oregon Department of Forestry: Oregon Department of Forestry seeks to promote environmental, economic, and community sustainability through the responsible management of Oregon's forests. <http://egov.oregon.gov/ODF/>
 - National Fire Plan Implementation in Oregon: Community Wildfire Protection Plans.
http://www.oregon.gov/ODF/FIRE/FirePlans.shtml#Community_Wildfire_Protection_Plans_CWPP_. See “Current CWPP Efforts in Oregon.”
 - InciWeb (Incident Information System): <http://www.inciweb.org/>
This website provides information about current (or very recent) wildfire incidents. It can provide information on past wildfire events, but only if you know the wildfire's name.
 - Oregon State Fire Marshal: <http://egov.oregon.gov/OSP/SFM/>. The Office of the State Fire Marshall seeks to protect people, their property and the environment from fires and hazardous materials.
 - Keep Oregon Green: <http://www.keepporengreen.org/>. Keep Oregon Green strives to prevent human-caused wildfires by educating the public about preventative measures.
 - WUI – Fire Chapter, State Plan:
http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_fire-wui_chapter.pdf. The WUI - Fire chapter of the state Natural Hazards Mitigation Plan provides a characterization of the wui - fire hazard in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
 - Firewise: <http://www.firewise.org/>
 - Pacific Northwest National Fire Plan: <http://www.nwfireplan.gov/>
 - National Interagency Fire Center: <http://www.nifc.gov/>
 - National Database of State and Local Wildfire Mitigation Projects:
<http://www.wildfireprograms.com/index.html>

- Windstorm / Winter Storm
 - Windstorms Chapter, State Plan:
http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_windstorms_chapter.pdf. The Windstorms chapter of the state Natural Hazards Mitigation Plan provides a characterization of windstorms in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
 - Pacific Northwest Chapter ISA Hazard Tree Prevention:
<http://www.pnwisa.org/http/index.html>
 - FEMA – Taking Shelter From the Storm: Building a Safe Room Inside Your House: <http://www.fema.gov/plan/prevent/saferoom/fema320.shtm>

- Texas Tech University – Wind Engineering Research Center:
<http://www.wind.ttu.edu/>
 - The Oregon Weather Book, A State of Extremes:
http://ocs.orst.edu/page_links/publications/weather_book/weather%20events/windstorms.pdf
 - Winter Storms Chapter, State Plan:
http://www.oregonshowcase.org/downloads/pdf/stateplan/OR-SNHMP_winterstorm_chapter.pdf. The Winter Storms chapter of the state Natural Hazards Mitigation Plan provides a characterization of winter storms in Oregon. Additionally, the chapter describes current state programs and strategies, highlights successes in mitigation, and proposes short and long-term actions for future mitigation in the state.
 - FEMA: Winter Storms and Extreme Cold:
<http://www.fema.gov/hazard/winter/index.shtm>
 - FEMA: During a Winter Storm:
http://www.fema.gov/hazard/winter/wi_during.shtm
 - NOAA's Winter Weather Internet References:
<http://www.noaanews.noaa.gov/stories/s300e.htm>
 - NOAA's National Weather Service: Winter Weather Safety and Awareness
<http://www.nws.noaa.gov/om/winter/index.shtml>
- Other
 - National Assessment of Coastal Vulnerability to Sea-Level Rise: Preliminary Results for the U.S. Pacific Coast: <http://pubs.usgs.gov/of/2000/of00-178/>
 - Oregon Office of State Fire Marshall Community Right-to-Know Hazardous Substance Information Search: <http://159.121.82.250/CR2k/cr2k.htm>

Meeting: Region 3 Cities Risk Assessment
Date: April 15, 2009
Time: 9:00 am – 5:00 pm
Location: Marion County Public Works Building, 5155 Silverton Rd NE, Salem, OR

AGENDA

1. Overview of Workshop Agenda **(10 minutes)**
 - *Megan Findley, OPDR*
 2. What is a Risk Assessment? **(30 minutes)**
 - *Andre LeDuc, OPDR*
 3. What Does FEMA Expect in Plans Regarding Vulnerability? **(20 minutes)**
 - *Kristen Meyers, FEMA*
 4. Assessing Natural Hazards & Community Vulnerability **(1 hour)**
 - *Nate Wood, USGS & Andre LeDuc, OPDR & Valerie Saiki, CIS*
-
- Break, 20 minutes*
-
5. Natural Hazards Overview & Discussion **(30 minutes)**
 - *Gregoor Passchier, OPDR*
 6. Exercise: Identifying Community Assets & Vulnerabilities **(4 hours + 1hr Lunch)**
 - *Nate Wood, USGS & Andre LeDuc, OPDR*
 - a. human population
 - b. economy, cultural & historic resources
 - c. environment
 - d. land use & development
 - e. infrastructure & critical facilities
 7. Mitigation Actions & Next Steps **(30 minutes)**
 - *Megan Findley, OPDR*

Meeting Sign-In

Region 3 Cities Risk Assessment Workshop. April 15, 2009; 9 am-5 pm
 Marion County Public Works Building. 5155 Silvertown Rd NE, Salem, OR.

Name	Representing	Email	Roundtrip mileage (if applicable)
Kaurie Boyce	City of Aurora	recorder@ci.aurora.or.us	
Kelly Richardson	City of Aurora	clerk@ci.aurora.or.us	52 round trip
JOSEPH MURRAY	OMS, OREGON EMERGENCY MNGT.	j.murray@oem.state.or.us	N/A (ALREADY 50% FED. FUNDED)
Bill Duvus	DDG AUST		

Name	Representing	Email	Roundtrip mileage (if applicable)
Sam Litke	City of Keizer	litkes@keizer.org	15
Kevin Watson	City of Keizer	watsonk@keizer.org	15
Julie Amicci	Tigard PETS	Julie.pdx@hotmail.com	50
Bruce Anderson	Keizer Chamber of Commerce - NW Natural	bruce.anderson@nwnatural.com	10

Name	Representing	Email	Roundtrip mileage (if applicable)
WILLIS HILL	CITY OF ALBANY	willis.hill@cityofalbany.net	
ROD CONWAY	Keizer Fire District	rconway@keizerfire.com	
Prof Frederick	City of Keizer	KISSLER R@KEIZER.ORG	
Laurel Reimer	Resource Assistance for Rural Environments - Clackamas County	lreimer@co.clackamas.or.us	80
NATE WOOD	U.S. Geological Survey	nwood@usgs.gov	
Louise Kubo	University of Hawaii National Disaster Preparedness Training Center	kubol@hawaii.edu	
Vaderine Saiki	City County Insurance	USAIKE@ccisources.com	16
KRISTEN MEYERS	FEMA RX	KRISTEN.MEYERS@DHS.GOV	

Name	Representing	Email	Roundtrip mileage (if applicable)
DAN DOLENE	CITY OF WOODBURN	dan.dolene@ci.woodburn.or.us	
Carrie Brennecke	City of Woodburn	carrie.brennecke@ci.woodburn.or.us	
Dan Brown	CITY OF WOODBURN	DAN.BROWN@CI.WOODBURN.OR.US	
Jim Hendryx	City of Woodburn	jim.hendryx@ci.woodburn.or.us	

Name	Representing	Email	Roundtrip mileage (if applicable)
Doreen Kelly	Silverton Together City of Silverton	dk@silverfalls.k12.or.us	
Ed Grambusch	SILVERTON FIRE DISTRICT	edgrambusch@silvertonfire.com	
Genie Stoll	Silverton Beverage Business	dstoll@verizon.net	
Rick Lewis	Silver Police Dept	News@Silverton.or.us	
Bryan Cosgrave	Silverton	bcosgrave@silverton.or.us	
Steve Kay	CITY OF SILVERTON	skay@silverton.or.us	
JAREZ MATHEWS	SILVERTON SMALL BUSINESS	bangsandburns@pngusa.net	
Rich Barstard	City of Silverton	barstard@silverton.or.us	

NITA MARR Woodburn Police/City of Union nita.marr@ci.woodburn.or.us

ANNEX TO MARION COUNTY BASIC EMERGENCY OPERATIONS PLAN

HAZARD ANALYSIS

I. PURPOSE

The purpose of this annex is to examine the range of hazards Marion County is subject to and makes an assessment to determine the relative risks associated with those hazards. It will also identify those hazards that would likely tax the ability of the County's emergency responders, "quantifying" them compared to one another to assist in establishing emergency planning priorities.

II. HAZARD ANALYSIS MATRIX

The hazards listed in the matrix below are the most likely to result in a disaster. This matrix is based on a hazard analysis system used nationally. It compiles a score for each of the identified hazards, and an explanation of the factors used in the scoring system. These scores indicate where the hazard should be ranked in emergency planning priorities. Following the table is a guide to the values used in the matrix.

HAZARD	HISTORY (WF=2)	VULNERABILITY (WF=5)	MAX THREAT (WF=10)	PROBABILITY (WF=7)	TOTAL
EARTHQUAKE	2 X 10 (H) 20	5 X 10 (H) 50	10 X 10 (H) 100	7 X 10 (H) 70	240
FLOOD	2 X 10 (H) 20	5 X 5 (M) 25	10 X 10 (H) 100	7 X 10 (H) 70	215
SEVERE WEATHER	2 X 10 (H) 20	5 X 10 (H) 50	10 X 10 (H) 100	7 X 10 (H) 70	240
CIVIL DISORDER/TERRORISM	2 X 1 (L) 2	5 X 10 (H) 50	10 X 10 (H) 100	7 X 5 (M) 35	187
DAM FAILURE	2 X 1 (L) 2	5 X 10 (H) 50	10 X 10 (H) 100	7 X 1 (L) 7	159
TRANSPORTATION. ACCIDENT HAZMAT	2 X 1 (L) 2	5 X 5 (M) 25	10 X 5 (M) 50	7 X 10 (H) 70	147
WILDLAND INTERFACE FIRE	2 X 1 (L) 2	5 X 5 (M) 25	10 X 5 (M) 50	7 X 5 (M) 35	112
VOLCANIC ERUPTION	2 X 1 (L) 2	5 X 5 (M) 25	10 X 5 (M) 50	7 X 1 (L) 7	84

Meeting: Goals & Action Item Work Session
Date: June 10, 2009
Time: 1:00 – 5:00 PM
Location: Marion County Public Works Building, 5155 Silverton Rd NE, Salem, OR

AGENDA

1. Overview of Day *(15 minutes)*
 - *Megan Findley, OPDR*

2. Mission & Goals *(30 minutes)*
 - *Gregoor Passchier, OPDR*

3. Actions Item Overview & Selection *(1 hour)*
 - *Megan Findley, OPDR & Group Discussions*

- *Break, 15 minutes*

4. Action Item Development *(1.5 hours)*
 - *Megan Findley, OPDR & Group Discussions*

5. Conclusion & Next Steps *(30 minutes)*
 - *Megan Findley, OPDR*

Meeting Sign-In

Region 3 Cities Action Item Development Workshop. June 10, 2009; 1 pm-5 pm
 Marion County Public Works Building. 5155 Silverton Rd NE, Salem, OR.

Name	Representing	Email	Roundtrip mileage (if applicable)
Mauree Boyce	City of Aurora	records@ci.aurora.or.us	
Kelly Richardson	City of Aurora	clerk@ci.aurora.or.us	52 miles
Jason Clusty	WOODBURN P.D.	jason.clusty@ci.woodburn.or.us	
Natalie Labossiere	WOODBURN Planning	natalie.labossiere@ci.woodburn.or.us	
DARREZ MATTHEWS	SILVERTON	bangsaudburns@p.ingus.net	
Nida Mann	Woodburn P.D.	nida.marreci.woodburn.or.us	34mi. R.T.
Bryon Cosgrove	City of Silverton	bcosgrove@silverton.or.us	24

Name	Representing	Email	Roundtrip mileage (if applicable)
Riot Lewis	City of Silverton	news@silverton.or.us	N/A
Ernie Stoll	City of Silverton	dstoll@verizon.net	N/A
Doreen Kelly	Silverton Together	doreen@silvertontogether.com	.
Ed Grambusch	SILVERTON FIRE DISTRICT	edgrambusch@silvertonfire.com	- N/A -
DARREZ MATHEWS	SILVERTON SMALL BUSINESS	bangsawd@burns@pugusa.net	N/A
Rich Barstad	City of Silverton	rbarstad@silverton.or.us	N/A

Name	Representing	Email	Roundtrip mileage (if applicable)
Kevin Watson	City of Keizer	watsouk@keizer.org	20
Sam Litke	City of Keizer	litkes@keizer.org	20

Eligible and Ineligible Mitigation Projects

(The following language is taken from the Federal Emergency Management Agency's FY2010 Hazard Mitigation Assistance (HMA) Unified Guidance. This is the guidance document for HMA applications submitted during the FY 2010 grant cycle and for disasters occurring on or after June 1, 2009). Please see the following link for more information: <http://www.fema.gov/library/viewRecord.do?id=3649>

D.1.1 [Eligible] Mitigation Projects

◆ **Property Acquisition and Structure Demolition** - The acquisition of an existing at-risk structure and, typically, the underlying land, and conversion of the land to open space through the demolition of the structure. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve the natural floodplain functions. For property acquisition and structure demolition projects, see Part IX A.

◆ **Property Acquisition and Structure Relocation** - The physical relocation of an existing structure to an area outside of a hazard-prone area, such as the Special Flood Hazard Area (SFHA) or a regulatory erosion zone and, typically, the acquisition of the underlying land. Relocation must conform to all applicable State and local regulations. The property must be deed-restricted in perpetuity to open space uses to restore and/or conserve the natural floodplain functions. For property acquisition and structure relocation projects, see Part IX A.

◆ **Structure Elevation** - Physically raising an existing structure to an elevation at or above the Base Flood Elevation (BFE) or higher if required by FEMA or local ordinance. Structure elevation may be achieved through a variety of methods, including elevating on continuous foundation walls; elevating on open foundations, such as piles, piers, posts, or columns; and elevating on fill. Foundations must be designed to properly address all loads, be appropriately connected to the floor structure above, and utilities must be properly elevated as well. FEMA encourages Applicants and subapplicants to design all structure elevation projects in accordance with the American Society of Civil Engineers (ASCE) 24-05 *Flood Resistant Design and Construction*. For additional information about the NFIP and structure elevation projects, see Part X C.1.

◆ **Mitigation Reconstruction** - The construction of an improved, elevated building on the same site where an existing building and/or foundation has been partially or completely demolished or destroyed. Mitigation reconstruction is only permitted if traditional structure elevation cannot be implemented and for structures outside of the regulatory floodway or coastal high hazard area (Zone V) as identified by the existing best available flood hazard data. Activities that result in the construction of new living space at or above the BFE will only be considered when consistent with the Mitigation Reconstruction requirements. Such activities are only eligible under the **SRL** Pilot program. For additional information about mitigation reconstruction projects, see Part IX D.

◆ **Dry Floodproofing** - Techniques applied to keep structures dry by sealing the structure to keep floodwaters out. For all dry floodproofing activities, FEMA

encourages Applicants and sub-applicants to design all dry floodproofing projects in accordance with ASCE 24-05 *Flood Resistant Design and Construction*.

- **Dry Floodproofing of Historic Residential Structures** is permissible only when other techniques that would mitigate to the BFE would cause the structure to lose its status as defined a Historic Structure in 44 CFR Part 59.1.
- **Dry Floodproofing of Non-residential Structures** must be performed in accordance with NFIP Technical Bulletin 3-93, *Non-Residential Floodproofing – Requirements and Certification*, and the requirements pertaining to dry floodproofing of nonresidential structures found in 44 CFR Parts 60.3(b)(5) and (c)(4).

◆ **Minor Localized Flood Reduction Projects** – These projects may include the installation or modification of culverts and floodgates, minor floodwall systems that generally protect an individual structure or facility, stormwater management activities such as creating retention and detention basins, and the upgrade of culverts to bridges. These projects must not duplicate the flood prevention activities of other Federal agencies and may not constitute a section of a larger flood control system.

- For **FMA**, **RFC**, and **SRL** at least 50 percent of the structures directly benefiting from this mitigation activity must be NFIP-insured. For **RFC** and **SRL**, these projects must primarily benefit RFC or SRL structures, respectively. Documentation must be provided in the sub-application that identifies all structures that will benefit from this mitigation activity.

◆ **Structural Retrofitting of Existing Buildings** – Modifications to the structural elements of a building to reduce or eliminate the risk of future damage and to protect inhabitants. The structural elements of a building that are essential to protect in order to prevent damage include foundations, load-bearing walls, beams, columns, structural floors and roofs, and the connections between these elements.

◆ **Non-structural Retrofitting of Existing Buildings and Facilities** – Modifications to the non-structural elements of a building or facility to reduce or eliminate the risk of future damage and to protect inhabitants. Non-structural retrofits may include bracing of building contents to prevent earthquake damage or the elevation of heating and ventilation systems.

◆ **Safe Room Construction** – Safe room construction projects are designed to provide immediate live safety protection for people in public and private structures from tornado and severe wind events, including hurricanes. For HMA, the term “safe room” only applies to extreme wind (combined tornado and hurricane) residential, non-residential, and community safe rooms; tornado community safe rooms; and hurricane community safe room. This type of project includes retrofits of existing facilities or new safe room construction projects, and applies to both single and multi-use facilities. For additional information, see Part IX C.

◆ **Infrastructure Retrofit** – Measures to reduce risk to existing utility systems, roads, and bridges.

◆ **Soil Stabilization** – Projects to reduce risk to structures or infrastructure from erosion and landslides, including installing geo-textiles, sod stabilization, installing vegetative buffer strips, preserving mature vegetation, decreasing slope angles, and stabilizing with rip rap and other means of slope anchoring. These projects must not duplicate the activities of other Federal agencies.

◆ **Wildfire Mitigation** – Projects to mitigate the risk to at-risk structures and associated loss of life from the threat of future wildfire through:

- **Defensible Space for Wildfire** – Projects creating perimeters around homes, structures, and critical facilities through the removal or reduction of flammable vegetation. For additional information, see Part IX B.3.1.

- **Application of Ignition-resistant Construction** – Projects that apply ignition resistant techniques and/or non-combustible materials on new and existing homes, structures, and critical facilities. For additional information, see Part IX B.3.2.

- **Hazardous Fuels Reduction** – Projects that remove vegetative fuels proximate to the at-risk structure that, if ignited, pose significant threat to human life and property, especially critical facilities. For additional information, see Part IX B.3.3.

◆ **Post-Disaster Code Enforcement** – Projects designed to support the post-disaster rebuilding effort by ensuring that sufficient expertise is on hand to ensure appropriate codes and standards, including NFIP local ordinance requirements, are utilized and enforced. For additional information, see Part VIII A.8.

◆ **5% Initiative Projects** – These projects provide an opportunity to fund mitigation actions that are consistent with the goals and objectives of the State and local Hazard Mitigation Plans and meet all HMGP program requirements, but for which it may be difficult to conduct a standard BCA to prove cost effectiveness. For additional information, see Part VIII A.10.

D.2 Ineligible Activities

- ◆ Projects that do not reduce the risk to people, homes, neighborhoods, structures, or infrastructure;
- ◆ Projects that are dependent on another phase of a project(s) in order to be effective and/or feasible (i.e., not a stand-alone mitigation project that solves a problem independently or constitutes a functional portion of a solution.);
- ◆ Projects for which actual physical work such as groundbreaking, demolition, or construction of a raised foundation has occurred prior to award. Projects for which demolition and debris removal related to structures proposed for acquisition or mitigation reconstruction has already occurred may be eligible when such activities were initiated or completed under the FEMA Public Assistance program to alleviate a health or safety hazard as a result of a disaster;
- ◆ Projects constructing new buildings or facilities with the exception of safe room construction and SRL mitigation reconstruction;
- ◆ Projects that create revolving loan funds;
- ◆ Activities required as a result of negligence or intentional actions, or the reimbursement of legal obligations such as those imposed by a legal settlement, court order, or State law;
- ◆ Projects located in a Coastal Barrier Resource System (CBRS) Unit, or in an Otherwise Protected Area;
- ◆ Activities on Federal lands or associated with facilities owned by another Federal entity;
- ◆ Major flood control projects related to the construction, demolition, or repair of dams, dikes, levees, floodwalls, seawalls, groins, jetties, breakwaters, and erosion projects related to beach nourishment or re-nourishment;
- ◆ Projects for hazardous fuels reduction in excess of 2 miles from structures;
- ◆ Projects that address unmet needs from a disaster that are not related to mitigation;
- ◆ Retrofitting facilities primarily used for religious purposes, such as places of worship (or other projects that solely benefit religious organizations). A place of worship may, however, be included in a property acquisition and structure demolition or relocation project provided that the project benefits the entire community, such as when the whole neighborhood or community is being removed from the hazard area;
- ◆ Projects that only address man-made hazards;
- ◆ Projects that address operation, deferred or future maintenance, repairs, or replacement (without a change in the level of protection provided) of existing structures, facilities, or infrastructure (e.g., dredging, debris removal, replacement of obsolete utility systems, bridges, and facility repair/rehabilitation);

- ◆ Projects to do the following:
 - Landscaping for ornamentation (trees, shrubs, etc);
 - Site remediation of hazardous materials (with the exception eligible activities such as, the abatement of asbestos and/or lead-based paint and the removal of household hazardous wastes to an approved landfill);
 - Water quality infrastructure;
 - Address ecological or agricultural issues;
 - Protection of the environment and/or watersheds;
 - Forest management;
 - Prescribed burning or clear-cutting;
 - Creation and maintenance of fire breaks, access roads, or staging areas; and
 - Irrigation systems;
- ◆ Mapping, flood studies, and planning activities, such as plan revisions/amendments or risk assessments, when they do not result in a FEMA-approved hazard mitigation plan;
- ◆ Studies not directly related to the design and implementation of a proposed mitigation project; and
- ◆ Preparedness measures and response equipment (e.g., response training, electronic evacuation road signs, interoperable communications equipment).

Meeting: Plan Implementation & Maintenance Work Session
Date: July 29, 2009
Time: 1:00 – 5:00 PM
Location: Marion County Public Works Building, 5155 Silverton Rd NE, Salem, OR

AGENDA

1. Workshop Overview (10 minutes)
 - Megan Findley, OPDR
 2. Grant Opportunities & Resources Overview (15 minutes)
 - Gregoor Passchier, OPDR
 3. Identifying Conveners & Members of the Coordinating Body (30 minutes)
 - Megan Findley, OPDR & Group Discussions
 4. Project Prioritization Process (30 minutes)
 - Megan Findley, OPDR
-
- Break, 15 minutes*
-
5. Plan Maintenance Scheduling & Five Year Updates (45 minutes)
 - Krista Dillon, OPDR & Group Discussions
 6. Continued Public Involvement (30 minutes)
 - Gregoor Passchier, OPDR & Group Discussions
 7. Moving Projects Forward (20 minutes)
 - Krista Dillon, OPDR
 8. Benefit Cost Analysis (45 minutes)
 - Dennis Sigrist, OEM

Meeting Sign-In

Region 3 Cities Plan Implementation and Maintenance Workshop. July 29, 2009; 1 pm-5 pm
Marion County Public Works Building. 5155 Silverton Rd NE, Salem, OR.

Name	Representing	Email	Roundtrip mileage (if applicable)
Laurie Boyce	City of Aurora	records@ci.aurora.or.us	
Kelly Richardson	City of Aurora	clerk@ci.aurora.or.us	52
Bryan Cozme	City of Silverton	bcozme@silverton.or.us	30
STEVE KAY	CITY OF SILVERTON	skay@silverton.or.us	30
DARREZ MATHEWS	CITY/SILVERTON	N/A	N/A
Natalie Labossiere	Woodburn	natalie.labossiere@ci.woodburn.or.us	40
Genie Stoll	Silverton	dstoll@verizon.net	30

Name	Representing	Email	Roundtrip mileage (if applicable)
Rich Berzofal	City of Silverton	rberzofal@silverton.or.us	
Rick Lewis	City of Silverton	rlewis@silverton.or.us	
Nita Marr	City of Woodburn	nita.marr@ci.woodburn.or.us	34mi.
Ed Grambusch	Silverton Fire Dist.	edgrambusch@silvertonfire.com	
Sam Little	City of Keizer	Slittle@keizer.org	

benefit/cost analysis

Dennis Sigrist
OMD-Oregon Emergency Management

July 29, 2009



What is benefit/cost analysis?



What is benefit/cost analysis?

Benefit/cost analysis is a way of determining if the anticipated benefits being computed on a net present value basis are greater than the cost of a project.

FEMA provides benefit/cost analysis software (standalone software application) for the following hazards: earthquake, flood, wildfire, wind and other.



factors to consider during a BCA

- total project cost
- life of the project
- maintenance costs
- displacement costs
- value of the property being protected
- Specific, documented past damages
- event frequency and severity/magnitude
- level of protection provided



benefit/cost analysis

**a cost-effective project will have a
benefit/cost ratio > 1.0**

benefit/cost = bc ratio (BCR)



Why conduct benefit/cost analysis?

- **meet statutory eligibility requirements required for federal grant funding**
- **determine whether or not a project is “worth” doing**
- **have a common basis on which to compare projects**
- **show that mitigation works (post-disaster loss avoidance studies)**



statutory and regulatory documents

Some of the legal and regulatory documents for benefit/cost analysis are:

OMB Circular A-94 – Benefit/Cost Analysis of Federal Programs

Federal Disaster Assistance – Stafford Act

Unified Hazard Mitigation Assistance (HMA)

– **All hazard: PDM and for flood: FMA, SRL and RFC**

– **Hazard Mitigation Grant Program - 44 CFR Part 206**



definition

benefits – Are the expected avoided damages and avoided losses over the lifetime of the mitigation project.



mitigation project benefits

The project benefit calculation is based on four key elements:

- **event frequency and severity**
- **damages and losses before mitigation**
- **damages and losses after mitigation**
- **economic factors including the discount rate and the mitigation project useful lifetime**



project benefits: direct damages and losses avoided

- **avoided damages to buildings and other facilities or infrastructure**
- **avoided damages to contents**
- **avoided loss of function costs**
- **avoided emergency response costs**



mitigation project costs

- **governed by OMB A-87, *Cost Principles for State, Local, and Indian Tribal Governments***
- **cost of entire project (not just the costs represented in the federal share of the application budget) must be considered in b/c analysis**



project costs

- **engineering/design fees and structural analysis**
- **construction/retrofit costs**
- **construction management costs**
- **project management costs**
- **property acquisition costs**
- **relocation expenses (URA)**
- **permit fees**



the benefit/cost model

economics terminology and concepts

- **net present value – Is the value today of money that you will receive in the future.**

- **discount rate – Is an interest rate used to determine the time value of money. For federally funded mitigation projects, the discount rate is established by the U.S. Office of Management and Budget (OMB) to be 7%. This number has not changed for some time.**



definitions

project useful lifetime – Is the estimated time period over which the mitigation project will maintain its effectiveness in preventing or reducing damages and losses from future disasters, e.g., 30, 50 or 100 years.

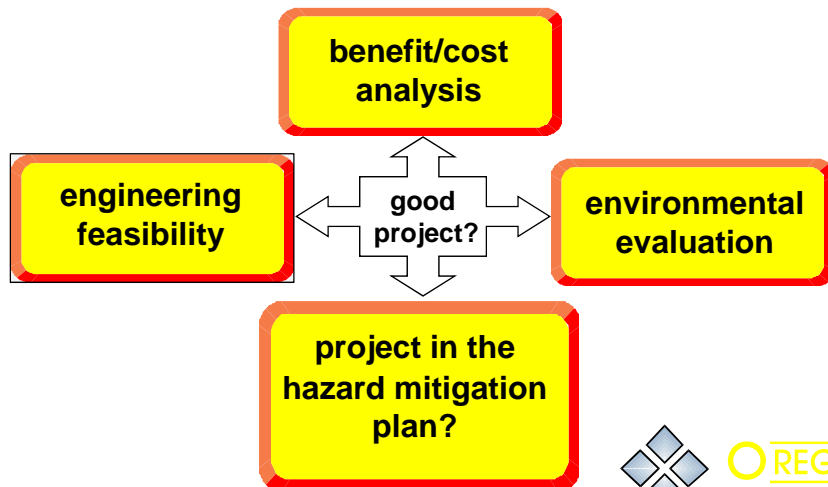
present value coefficient – The PVC expresses the combined effect of the discount rate and the project useful lifetime on the net present value of future benefits.



benefit/cost analysis example

Flood Depth (feet)	Expected Annual Damages Before Mitigation	Expected Annual Damages After Mitigation	Expected Annual Avoided Damages and Losses
0	\$1,312	\$ 0	\$1,312
1	\$1,765	\$ 0	\$1,765
2	\$2,124	\$ 0	\$2,124
3	\$ 673	\$ 0	\$ 673
4	\$ 315	\$63	\$ 252
5	\$ 123	\$49	\$ 74
Totals	\$6,312	\$112	\$6,200
			PVC (7% Discount Rate, 30 years) 12.41
			Net Present Value of Future Benefits \$76,942
			Costs \$20,000
			Benefit-Cost Ratio 3.85

project development



sources of information

- contractor support
- FEMA Internet
<http://www.bchelpline.com/BCAToolkit/>
- **BCA Toolkit version 4.5, which includes:** New
 - Downloadable software from FEMA
 - Runs under Windows XP/Vista
 - Standalone Application
 - Built-in Help/Guidance
 - Construction cost estimator
 - Damage-Frequency Assessment
 - Export/Import Capability
 - Project Portfolios

available free of charge via:
866-222-3580 or
web: www.bchelpline.com



questions or comments?



Survey Monkey Stakeholder Interview Questions

Greetings:

You have been selected to participate in a survey that will assist in your community's development of a natural hazards mitigation* plan. This survey is being distributed to a select group of stakeholders in the cities of Aurora, Keizer, Silverton and Woodburn. Your contributions will be reflected in your community's mitigation plan where possible. Please take a moment to review the information below, and to complete 8 questions on the following pages. This survey should take about 15 minutes to complete.

The questions that you will see on the following pages will ask about the natural hazards in your community, and natural hazards mitigation activities that you would like to see implemented. This survey was developed by the Oregon Partnership for Disaster Resilience at the University of Oregon. Please visit the Partnership's website (www.oregonshowcase.org) for more information regarding natural hazards mitigation in your community.

If you have any questions or concerns, please contact Megan Findley, Pre-Disaster Mitigation Program Manager, at mfindley@uoregon.edu or 541.346.2305.

*Natural hazards mitigation is defined as permanently reducing or alleviating the losses of life, property and injuries resulting from natural hazards through long and short-term strategies. Engaging in mitigation activities provides jurisdictions with a number of benefits, including reduced loss of life, property, essential services, critical facilities and economic hardship; reduced short-term and long-term recovery and reconstruction costs; increased cooperation and communication within the community through the planning process; and increased potential for state and federal funding for recovery and reconstruction projects. The natural hazards that will be addressed in the community mitigation plans include droughts, floods, wildfires, landslides, earthquakes, wind storms, winter storms, and volcanoes.

Questions

1. Please identify the organization that you represent.
 - Include a box for no organization and/or citizen representative
2. What is the primary mission and/or purpose of your organization?
 - Include a "does not apply" box
3. From your perspective, what hazard(s) pose the greatest threat to your community?
 - Give Matrix
4. What natural hazard events have affected your community in the past? Please explain the impacts and/or damages sustained from those events.
5. Does your organization have a plan in place to respond to/recover from natural hazards?
6. Natural hazard mitigation is the act of reducing or eliminating future loss of life, property, or injuries resulting from hazards through short term and long-term activities.
Mitigation actions can be grouped into the following six types:

- Prevention: government administrative or regulatory actions or processes that influence the way land and buildings are developed and built.
- Property Protection: actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area.
- Public Education & Awareness: actions to inform and educate citizens, elected officials and property owners about hazards and mitigation strategies.
- Natural Resource Protection: actions that minimize hazard losses and also preserve or restore the functions of natural systems.
- Emergency Services: actions that protect people and property during and immediately after a disaster or hazard event.
- Structural Projects: actions that involve the construction of structures to reduce the impact of a hazard.

What types of mitigation activities would you like to see happen within your community? Please provide examples if you have specific projects in mind:

7. Any interested persons, groups and/or organizations can assist in building the community's resilience to natural hazards. For example, neighborhood groups can teach residents in forested areas about how to reduce risk from wildfires by installing metal roofs or eliminating combustible materials around buildings.

Is your organization able and/or willing to assist with any of the following? Please check all that apply.

- Education and outreach
 - Information dissemination
 - Plan/Project Implementation
 - Other _____
8. Would you like to be contacted in the future to review plan drafts?
 - No, thanks
 - Yes, please
 9. Would you like to be contacted for further discussion?
 - No, thanks
 - Yes, please

Aurora Community Stakeholders

Organization

City of Aurora

Marion County

City of Aurora

Aurora Rural Fire Protection District

City of Aurora

City of Aurora

Chamber of Commerce/Aurora Colony Visitors Association

Aurora Colony Historical Society

Pudding River Watershed Council/Cascadia Planners

North Marion School District-Public/Private Schools K-12

Marion County

Aurora State Airport

Builders, Developers, and Realtors

Associated Press

KATU Channel 2

KGW Channel 8

KOIN Channel 6

KPTV Channel 12

Canby Herald

Keizer Community Stakeholders

Name	Job Title	Organization
Chris Eppley	City Manager	City of Keizer
Shannon Johnson	City Attorney	Lien & Johnson
Susan Gahlsdorf	Finance Director	City of Keizer
Jim Trussel	Building Inspector	Marion County
John Teague	Captain	City of Keizer Police
Nate Brown	Community Development Director	City of Keizer
Cathy Miles	Owner	Shelter Management Inc.
Christine Dierker	Director	Chamber of Commerce
Cheryl Lacom-Anderson	Executive Dir.	Avamere Court
David Fridenmaker	Planning Director	Salem/Keizer School District
Gene Bloom	Safety Officer	Salem/Keizer School District
John Sullivan	General Manager	Loren's Sanitation Service
Mary Kanz	Executive Dir.	Mid-Valley Garbage & Recycling
Jamie Pedersen	Office Manager	Mid-Valley Garbage & Recycling
Francis Kessler	Plant Manager	City of Salem Wastewater
Roger Kuhlman	Engineering & Operations Manager	Salem Electric
John Werst	Associate Pastor	Dayspring Fellowship Church
Mark Caillier	City Councilor	City of Keizer
Elizabeth Sagmiller	Stormwater Manager	City of Keizer
Ron Comcast	Key Customer Manager	Portland General Electric
Doug Wells	Manager	Emerald Pointe
Lyndon Zaitz	Owner	Keizer Times Newspaper
Rhonda Rich		West Keizer Neighborhood Association
Nancy	Assistant to the President	Marion Polk Food Share
Ron Hays	President	Marion Polk Food Share
Allen Prell		Gubser Neighborhood Association
Bill Lawyer	PW Superintendent	City of Keizer
Pat Taylor	Public Works	City of Keizer
Mike Griffin	Public Works	City of Keizer
Matt Reyes	Public Works	City of Keizer
Jenniffer Warner	Public Works	City of Keizer
Ray Hansen	Co-Coordinator	EVAK
Jacque Moir	Co-Coordinator	EVAK
Erica		Salem Clinic

Silverton Community Stakeholders

Name	Organization
Pete Paradis - Maintenance	Silverton School District
Craig Roessler - Superintendent	
Jamie Baxter - Emergency Man.	Silverton Hospital
Brian Van Smoorenburg	NW Natural Gas
Bill Burns	State Geology Dept
Rock Sander	PGE
Robyn Murbach	Allied Waste
Jeff Kresner	Red Cross
Stacy Palmer - Director	Chamber of Commerce
Ray Hunter	Historical Society
Steve Starnier - Sewer Plant	Watershed Council
Brenda Sturdevant - Director	Silverton Together
	Hispanis Unidas
	SACA
	Head Start
Pete Larson (Bruce Pac)	Large Business
Bill Cummins (also City Council)	Large Business
Darren Rybloom (Roths)	Large Business
Dixon Bledsoe	Realtor
Mason Branstetter	Realtor
Dennis Downey	Builder
Maurice Leach - SCAN Tv	Media
Gus Frederick	Silverton Grange
Stu Rasmussen	Mayor
	Service Club - Rotary
	Service Club - Kiwanis
	Service Club - Zenith Women
	Service Club - Lions
	Service Club - Elks
Oregon Garden	Community Organization
	Faith Community
Ken Hector	General Public
Michael Jesse	Small Business
Sam Sloper	Financial Institution
Capt. Appt - National Guard	State of Oregon

Woodburn Community Stakeholders

Name	Job Title	Organization
Charlie Blevins	Police Captian	City of Woodburn
Christine Vistica	Business Manager	St. Lukes Catholic Church
Deb Yager	Member	Woodburn Chamber of Commerce
Elias Villegas	Director	Chemeketa Community College- Woodburn
Eric Liljequist	Assistant City Engineer	City of Woodburn
Jim Row	Community Services Director	City of Woodburn
Kathy Figley	Mayor	City of Woodburn
Kevin Hendricks	Fire Chief	Woodburn Fire District
Matt Gwynn	Public Works Division Manger - Maintenance	City of Woodburn
Natalie Labossiere	Senior Planner	City of Woodburn
Randy Scott	Public Works Division Manger - Water Resources	City of Woodburn
Scott Derickson	City Administator	City of Woodburn
Shawn K. Baird	President	Woodburn Ambulance Services

Please identify the organization that you represent.

Number	Response Text
1	Woodburn Fire District
2	City of Woodburn Planning Division
3	City of Woodburn - Community Services Department
4	City of Woodburn
5	Silverton Hospital Network
6	Woodburn Mt Angel Silverton Ambulance Service
7	City of Woodburn Public Works Water Resources Division
8	City of Woodburn
9	St. Luke Catholic Church, School & Cemetery. St. Agnes Mission
10	City of Woodburn

What is the primary mission and/or purpose of your organization?

Number	Response Text
1	Our priority is to provide quality and caring services to those in need.
2	Community planning
3	Provide Parks, Recreation, and Library services to the public.
4	Local government for a community of 25,000+/- people
5	Healthcare
6	Provide emergency medical services and ambulance transport
7	Provide Water, Wastewater Treatment, Sanitary Sewer Collection Storm Sewer Conveyance.
8	To protect the health and welfare of the citizens of Woodburn.
9	The mission, hope and tradition of the St. Luke Catholic community is to proclaim and share the Good News of Jesus Christ with all people from the inception of life to death.

In which city is your organization located?		
Answer Options	Response Frequency	Response Count
Aurora	10.0%	1
Keizer	0.0%	0
Silverton	20.0%	2
Woodburn	100.0%	10
Other (please specify)		2
<i>answered question</i>		10
<i>skipped question</i>		0
Other (please specify)		
Mt Angel		
We have a Mission in Hubbard		

The following natural hazards are included within your community's natural hazards mitigation plan. Please estimate the level of risk that you think each hazard poses to your community.						
Answer Options	Extreme Risk	Some Risk	Little Risk	No Risk	Do Not Know	Response Count
Drought	0	4	5	0	1	10
Earthquake	6	4	0	0	0	10
Flood	0	6	4	0	0	10
Landslide / Debris Flow	0	0	7	3	0	10
Wildfire	0	2	7	1	0	10
Volcanic Eruption	0	2	5	3	0	10
Wind Storm	1	9	0	0	0	10
Severe Winter Storm	0	9	0	0	0	9
<i>answered question</i>						10
<i>skipped question</i>						0

Do you recall any instances in which the following natural hazards affected your community?			
Answer Options	Yes	No	Response Count
Drought	0	10	10
Earthquake	9	1	10
Flood	7	3	10
Landslide / Debris Flow	0	10	10
Volcanic Eruption	6	4	10
Wildfire	1	9	10
Wind Storm	7	3	10
Severe Winter Storm	10	0	10
<i>answered question</i>			10
<i>skipped question</i>			0

If you answered 'yes' to any of the hazards above, please describe the events that occurred (i.e., dates of events and/or a description of community impacts that occurred).		
Answer Options	Response Frequency	Response Count
Drought	0.0%	0
Flood	80.0%	8
Earthquake	90.0%	9
Landslide / Debris Flow	0.0%	0
Volcanic Eruption	60.0%	6
Wildfire	10.0%	1
Wind Storm	70.0%	7
Severe Winter Storm	100.0%	10
<i>answered question</i>		10
<i>skipped question</i>		0

Number	Flood	Earthquake	Volcanic Eruption	Wildfire	Wind Storm	Severe Winter Storm
1	Flooding conditions in 1996 & 1997	Spring Break Quake in 1993	Mt St Helens eruption 1980		Various high wind conditions over the past 18 years	
2		I've only been in the community for 2 years, but I've heard of the "Spring Break Quake."				The freezing weather this spring disrupted school and traffic.
3	1996 Flood. I presume there was some property damage.	1993 Spring Break Quake. Quite a bit of structural damage. Swimming Pool was destroyed.			1996 Wind Storm. I assume there was some damage. We have lost park trees in recent years.	December 2008 winter storm caused damage and inconvenience.
4	1996: flooding of creek areas in massive flood that affected entire region	1993: 5.7 magnitude quake centered nearby damaged unreinforced masonry and caused minor injuries	Mt. St. Helens ashfall in early 1980's - multiple minor events		1981, 1995, 2007: significant tree damage and scattered power outages	2006-07 and 2008-09: ice and snow of amount and duration making transportation difficult and clearing impossible with limited equipment
5	Feb 1996, Silver Creek flooded adjacent properties	Molalla quake caused minor damage to some buildings	Mt. St. Helen's in 1980? Ash accumulations caused minor problems		Columbus Day storm caused major damage, with power out for days	Dec 2008 storm - power out 5 days in some neighborhoods. Falling tree limbs caused significant damage
6	1996 evacuation of nursing homes	1992 caused chemical spill at area wal mart, multiple injuries	1980 Ash fallout, respiratory problems and transportation disruption	recent years wildfire threatened Silverton area, possible evacuation	common, often disrupts communication and roads	common, often disrupts communication and roads

Number	Flood	Earthquake	Volcanic Eruption	Wildfire	Wind Storm	Severe Winter Storm
7	Storm Water Conveyance System, Both Mill Creek and tributaries, minor property damage	Scotts Mill Fault quake, Damage to buildings, public infrastructure	1980, Mt Saint Helens. Ash		Tree Damage	Tree Damage, Street, Highway Clean Up
8	1996 Flood - water overtopping roads and bridges in some areas	1993 Earthquake - moderate damage to some structures				2008 - Icy and dangerous driving conditions
9		Spring Break Quake of 1993 and a few tremors since in the last 15 years. We had building damage and personal property damage and area wide panic and fear.	Mt. St. Helen's Eruption -March 1980 We were left to handle the aftermath of the ash fall out in the air, on the ground, in the storm drains and our waste water & rivers		We have had several storms where we have had fallen trees, downed power line and loss of power (Seems like at least once a year)	Last December was a good example. We had layers of snow and ice that crippled our city and rural area's. We had loss of power (for days in some area's) City of Woodburn does not have a snow plow so it made it extremely hard to get around even with 4 wheel drive.
10	From what I understand there was an earthquake that occurred in the late 90's. Several buildings were damaged					Recent winter storm of December 2008.

Does your organization have a plan in place to respond to / recover from natural disasters?		
Answer Options	Response Frequency	Response Count
Yes	60.0%	6
No	40.0%	4
Don't know	0.0%	0
<i>answered question</i>		10
<i>skipped question</i>		0

Any interested persons, groups and/or organizations can assist in building the community's resilience to natural hazards. For example, neighborhood groups can teach residents in forested areas about how to reduce risk from wildfires by installing metal roofs or eliminating combustible materials around buildings. Is your organization able and/or willing to assist with any of the following? Please check all that apply.		
Answer Options	Response Frequency	Response Count
Education and outreach	88.9%	8
Information dissemination	88.9%	8
Plan/project implementation	77.8%	7
Other (please specify)		3
<i>answered question</i>		9
<i>skipped question</i>		1
Number	Other (please specify)	
1	The hospital partners with local government in disaster planning	
2	We currently are involved with all of the above	
3	We can spread information through our weekly bulletins, We have the facilities available for gathering in case of emergencies.	

Natural hazard mitigation is the act of reducing or eliminating future loss of life, property, or injuries resulting from hazards through short term and long-term activities. Mitigation actions can be grouped into the following six categories. Please tell us how important each one is to you.

Answer Options	Very Important	Somewhat Important	Neither Important nor Unimportant	Not Very Important	Not Important	Response Count
Prevention (Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built)	4	5	0	0	0	9
Property Protection (Actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area)	1	8	0	0	0	9
Public Education & Awareness (Actions to inform and educate citizens, elected officials and property owners about hazards and mitigation strategies)	8	1	0	0	0	9
Natural Resource Protection (Actions that minimize hazard losses and also preserve or restore the functions of natural systems.)	2	5	2	0	0	9
Emergency Services (Actions that protect people and property during and immediately after a disaster or hazard event)	9	0	0	0	0	9
Structural Projects (Actions that involve the construction of structures to reduce the impact of a hazard.)	2	5	2	0	0	9
<i>answered question</i>						9
<i>skipped question</i>						1

Please provide examples of mitigation activities that you would like to see implemented within your community.

Answer Options		Response Count
		5
<i>answered question</i>		5
<i>skipped question</i>		5
Number	Response Date	Response Text
1	05/12/2009 17:36:00	Develop a program to educate the community on the various methods of making structures and their contents more disaster-resistant, which would include workshops, literature, public safety announcements, and the City's web site. Conduct vulnerability analyses of shelters and traditional housing serving vulnerable populations. Evaluate City buildings for structural integrity and ability to withstand natural hazards. Develop siting requirements for facilities built with City funds. Install automatic shut-off valves in all City facilities that use natural gas. Evaluate water system connectivity and identify needed looped connections. Evaluate the City computer system and network for its ability to function during an emergency. Identify mitigation projects that could be accomplished by volunteers or interns. Update the Flood Insurance Rate Maps (verify existing maps and extend mapped area into the expanded UGB.)
2	05/13/2009 22:00:00	Urban forestry program, including replacement of aging/sick trees with young specimens more likely to come through windstorms intact. Readily available information, including contractor information and payment options, for earthquake preparedness projects, such as automatic shutoff of gas connection, foundation bolts, securing water heater, etc. Undergrounding of utilities.
3	05/21/2009 17:59:00	continued development of CERT teams to ease the load on emergency services following a disaster. Identification of major transportation routes for use during emergencies and a plan to keep them open. A messaging system for 911 center to call out to community members with instruction/information. Move toward buried utilities to eliminate problems with lines down across roads, power disruptions.
4	05/22/2009 15:42:00	Protection of water and wastewater distribution systems. Emergency Action Plan that would be implemented in the event of a disaster.
5	05/27/2009 04:27:00	Right after the Spring Break Quake I organized (along with Mayor Kelly) a town hall meeting with the Red Cross that we also televised on Cable to educate the public on having their own disaster kits so that possibly you would not have to rely on others for a few day until help arrived. Education is a key element to Disaster Relief. Also getting out information on where people can gather during an emergency and also providing information on what is expected from those sites.

Would you like to be contacted in the future to review plan drafts?		
Answer Options	Response Frequency	Response Count
Yes	77.8%	7
No	22.2%	2
<i>answered question</i>		9
<i>skipped question</i>		1

Is there any additional information you would like to provide?	
Number	Response Text
1	Silverton is actively engaged in disaster planning with multiple agencies and partners. Although Woodburn is not as far along as Silverton, it is making strides toward a comprehensive disaster plan.

Appendix B: Grant Programs

Hazard Mitigation Programs

Post-Disaster Federal Programs

- Hazard Mitigation Grant Program
 - The Hazard Mitigation Grant Program (HMGP) provides grants to States and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.
 - <http://www.fema.gov/government/grant/hmgp/>
- Physical Disaster Loan Program
 - When physical disaster loans are made to homeowners and businesses following disaster declarations by the U.S. Small Business Administration (SBA), up to 20% of the loan amount can go towards specific measures taken to protect against recurring damage in similar future disasters.
 - <http://www.sba.gov/services/disasterassistance/index.html>

Pre-Disaster Federal Programs

- Pre-Disaster Mitigation Grant Program
 - The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.
 - <http://www.fema.gov/government/grant/pdm/index.shtm>
- Flood Mitigation Assistance Program
 - The overall goal of the Flood Mitigation Assistance (FMA) Program is to fund cost-effective measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other National Flood Insurance Program (NFIP) insurable structures. This specifically includes:
 - Reducing the number of repetitively or substantially damaged structures and the associated flood insurance claims;
 - Encouraging long-term, comprehensive hazard mitigation planning;
 - Responding to the needs of communities participating in the NFIP to expand their mitigation activities beyond floodplain development activities; and
 - Complementing other federal and state mitigation programs with similar, long-term mitigation goals.
 - <http://www.fema.gov/government/grant/fma/index.shtm>

Detailed program and application information for federal post-disaster and pre-disaster programs can be found in the FY10 Hazard Mitigation Assistance Unified Guidance, available at <http://www.fema.gov/library/viewRecord.do?id=3649>

For Oregon Emergency Management grant guidance on Federal Hazard Mitigation Assistance, visit: http://www.oregon.gov/OMD/OEM/plans_train/grant_info/hma.pdf

OEM contact: Dennis Sigrist, dsigrist@oem.state.or.us

State Programs

- Community Development Block Grant Program
 - Promotes viable communities by providing: 1) decent housing; 2) quality living environments; and 3) economic opportunities, especially for low and moderate income persons. Eligible Activities Most Relevant to Hazard Mitigation include: acquisition of property for public purposes; construction/reconstruction of public infrastructure; community planning activities. Under special circumstances, CDBG funds also can be used to meet urgent community development needs arising in the last 18 months which pose immediate threats to health and welfare.
 - <http://www.hud.gov/offices/cpd/communitydevelopment/programs/>
- Oregon Watershed Enhancement Board
 - While OWEB's primary responsibilities are implementing projects addressing coastal salmon restoration and improving water quality statewide, these projects can sometimes also benefit efforts to reduce flood and landslide hazards. In addition, OWEB conducts watershed workshops for landowners, watershed councils, educators, and others, and conducts a biennial conference highlighting watershed efforts statewide. Funding for OWEB programs comes from the general fund, state lottery, timber tax revenues, license plate revenues, angling license fees, and other sources. OWEB awards approximately \$20 million in funding annually.
 - <http://www.oweb.state.or.us/>

Federal Mitigation Programs, Activities & Initiatives

Basic & Applied Research/Development

- National Earthquake Hazard Reduction Program (NEHRP), National Science Foundation. Through broad based participation, the NEHRP attempts to mitigate the effects of earthquakes. Member agencies in NEHRP are the US Geological Survey (USGS), the National Science Foundation (NSF), the Federal Emergency Management Agency (FEMA), and the National Institute for Standards and Technology (NIST). The agencies focus on research and development in areas such as the science of earthquakes, earthquake performance of buildings and other structures, societal impacts, and emergency response and recovery. <http://www.nehrp.gov/>
- Decision, Risk, and Management Science Program, National Science Foundation. Supports scientific research directed at increasing the understanding and effectiveness of decision making by individuals, groups, organizations, and society. Disciplinary and interdisciplinary research, doctoral dissertation research, and workshops are funded in the areas of judgment and decision making; decision analysis and decision aids; risk analysis, perception, and communication; societal and public policy decision making; management science and organizational design. The program also supports small grants for exploratory research of a time-critical or high-risk, potentially transformative nature. http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5423&org=SES

Hazard ID and Mapping

- National Flood Insurance Program: Flood Mapping, FEMA. Flood insurance rate maps and flood plain management maps for all NFIP communities. <http://www.fema.gov/plan/prevent/fhm/index.shtm>
- National Digital Orthophoto Program, DOI – USGS. Develops topographic quadrangles for use in mapping of flood and other hazards. <http://www.ndop.gov/>
- Mapping Standards Support, DOI-USGS. Expertise in mapping and digital data standards to support the National Flood Insurance Program. <http://ncgmp.usgs.gov/ncgmpstandards/>
- Soil Survey, USDA-NRCS. Maintains soil surveys of counties or other areas to assist with farming, conservation, mitigation or related purposes. <http://soils.usda.gov/survey/>

Project Support

- Coastal Zone Management Program, NOAA. Provides grants for planning and implementation of non-structural coastal flood and hurricane hazard mitigation projects and coastal wetlands restoration. <http://coastalmanagement.noaa.gov/>
- Community Development Block Grant Entitlement Communities Program, HUD. Provides grants to entitled cities and urban counties to develop viable communities (e.g., decent housing, a suitable living environment, expanded economic opportunities), principally for low- and moderate- income persons. <http://www.hud.gov/offices/cpd/communitydevelopment/programs/entitlement/>
- National Fire Plan (DOI – USDA) Provides technical, financial, and resource guidance and support for wildland fire management across the United States. Addresses five key points: firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability. <http://www.forestsandrangelands.gov/NFP/index.shtml>
- Assistance to Firefighters Grant Program, FEMA. Grants are awarded to fire departments to enhance their ability to protect the public and fire service personnel from fire and related hazards. Three types of grants are available: Assistance to Firefighters Grant (AFG), Fire Prevention and Safety (FP&S), and Staffing for Adequate Fire and Emergency Response (SAFER). <http://www.firegrantsupport.com/>
- Emergency Watershed Protection Program, USDA-NRCS. Provides technical and financial assistance for relief from imminent hazards in small watersheds, and to reduce vulnerability of life and property in small watershed areas damaged by severe natural hazard events. <http://www.nrcs.usda.gov/programs/EWP/>
- Rural Development Assistance – Utilities, USDA. Direct and guaranteed rural economic loans and business enterprise grants to address utility issues and development needs. <http://www.usda.gov/rus/>
- Rural Development Assistance – Housing, USDA. Grants, loans, and technical assistance in addressing rehabilitation, health and safety needs in primarily low-income rural areas. Declaration of major disaster necessary. <http://www.rurdev.usda.gov/rhs/>
- Public Assistance Grant Program, FEMA. The objective of the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) Grant Program is to provide assistance to State, Tribal and local governments, and certain types of Private Nonprofit organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President. <http://www.fema.gov/government/grant/pa/index.shtm>

- National Flood Insurance Program, FEMA. Makes available flood insurance to residents of communities that adopt and enforce minimum floodplain management requirements.
<http://www.fema.gov/business/nfip/>
- HOME Investments Partnerships Program, HUD. Grants to states, local government and consortia for permanent and transitional housing (including support for property acquisition and rehabilitation) for low-income persons.
<http://www.hud.gov/offices/cpd/affordablehousing/programs/home/>
- Disaster Recovery Initiative, HUD. Grants to fund gaps in available recovery assistance after disasters (including mitigation).
<http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/driquickfacts.cfm>
- Emergency Management Performance Grants, FEMA. Helps state and local governments to sustain and enhance their all-hazards emergency management programs.
<http://www.fema.gov/government/grant/empg/index.shtm#0>
- Partners for Fish and Wildlife, DOI – FWS. Financial and technical assistance to private landowners interested in pursuing restoration projects affecting wetlands and riparian habitats.
<http://www.fws.gov/partners/>
- North American Wetland Conservation Fund, DOI-FWS. Cost-share grants to stimulate public/private partnerships for the protection, restoration, and management of wetland habitats.
<http://www.doi.gov/partnerships/wetlands.html>
- Federal Land Transfer / Federal Land to Parks Program, DOI-NPS. Identifies, assesses, and transfers available Federal real property for acquisition for State and local parks and recreation, such as open space. http://www.nps.gov/ncrc/programs/flp/flp_questions.html
- Wetlands Reserve program, USDA-NCRS. Financial and technical assistance to protect and restore wetlands through easements and restoration agreements.
<http://www.nrcs.usda.gov/Programs/WRP/>

More resources at: <http://www.oregonshowcase.org/stateplan/part4>

(Click on Appendix 5 of the State's Enhanced Natural Hazard Mitigation Plan: Hazard Mitigation Funding Programs)

Appendix C:

Economic Analysis of Natural Hazard Mitigation Projects

This appendix was developed by the Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center. It has been reviewed and accepted by the Federal Emergency Management Agency as a means of documenting how the prioritization of actions shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

The appendix outlines three approaches for conducting economic analyses of natural hazard mitigation projects. It describes the importance of implementing mitigation activities, different approaches to economic analysis of mitigation strategies, and methods to calculate costs and benefits associated with mitigation strategies. Information in this section is derived in part from: The Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police - Office of Emergency Management, 2000), and Federal Emergency Management Agency Publication 331, *Report on Costs and Benefits of Natural Hazard Mitigation*. This section is not intended to provide a comprehensive description of benefit/cost analysis, nor is it intended to evaluate local projects. It is intended to (1) raise benefit/cost analysis as an important issue, and (2) provide some background on how economic analysis can be used to evaluate mitigation projects.

Why Evaluate Mitigation Strategies?

Mitigation activities reduce the cost of disasters by minimizing property damage, injuries, and the potential for loss of life, and by reducing emergency response costs, which would otherwise be incurred. Evaluating possible natural hazard mitigation activities provides decision-makers with an understanding of the potential benefits and costs of an activity, as well as a basis upon which to compare alternative projects.

Evaluating mitigation projects is a complex and difficult undertaking, which is influenced by many variables. First, natural disasters affect all segments of the communities they strike, including individuals, businesses, and public services such as fire, police, utilities, and schools. Second, while some of the direct and indirect costs of disaster damages are measurable, some of the costs are non-financial and difficult to quantify in dollars. Third, many of the impacts of such events produce "ripple-effects" throughout the community, greatly increasing the disaster's social and economic consequences.

While not easily accomplished, there is value, from a public policy perspective, in assessing the positive and negative impacts from mitigation

activities, and obtaining an instructive benefit/cost comparison. Otherwise, the decision to pursue or not pursue various mitigation options would not be based on an objective understanding of the net benefit or loss associated with these actions.

What are some Economic Analysis Approaches for Evaluating Mitigation Strategies?

The approaches used to identify the costs and benefits associated with natural hazard mitigation strategies, measures, or projects fall into three general categories: benefit/cost analysis, cost-effectiveness analysis and the STAPLE/E approach. The distinction between the three methods is outlined below:

Benefit/Cost Analysis

Benefit/cost analysis is a key mechanism used by the state Office of Emergency Management (OEM), the Federal Emergency Management Agency, and other state and federal agencies in evaluating hazard mitigation projects, and is required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

Benefit/cost analysis is used in natural hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoiding future damages, and risk. In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. A project must have a benefit/cost ratio greater than 1 (i.e., the net benefits will exceed the net costs) to be eligible for FEMA funding.

Cost-Effectiveness Analysis

Cost-effectiveness analysis evaluates how best to spend a given amount of money to achieve a specific goal. This type of analysis, however, does not necessarily measure costs and benefits in terms of dollars. Determining the economic feasibility of mitigating natural hazards can also be organized according to the perspective of those with an economic interest in the outcome. Hence, economic analysis approaches are covered for both public and private sectors as follows.

Investing in Public Sector Mitigation Activities

Evaluating mitigation strategies in the public sector is complicated because it involves estimating all of the economic benefits and costs regardless of who realizes them, and potentially to a large number of people and economic entities. Some benefits cannot be evaluated monetarily, but still affect the public in profound ways. Economists have developed methods to evaluate the economic feasibility of public decisions which involve a diverse set of beneficiaries and non-market benefits.

Investing in Private Sector Mitigation Activities

Private sector mitigation projects may occur on the basis of one or two approaches: it may be mandated by a regulation or standard, or it may be economically justified on its own merits. A building or landowner, whether a private entity or a public agency, required to conform to a mandated standard may consider the following options:

1. Request cost sharing from public agencies;
2. Dispose of the building or land either by sale or demolition;
3. Change the designated use of the building or land and change the hazard mitigation compliance requirement; or
4. Evaluate the most feasible alternatives and initiate the most cost effective hazard mitigation alternative.

The sale of a building or land triggers another set of concerns. For example, real estate disclosure laws can be developed which require sellers of real property to disclose known defects and deficiencies in the property, including earthquake weaknesses and hazards to prospective purchases. Correcting deficiencies can be expensive and time consuming, but their existence can prevent the sale of the building. Conditions of a sale regarding the deficiencies and the price of the building can be negotiated between a buyer and seller.

STAPLE/E Approach

Considering detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity could be very time consuming and may not be practical. There are some alternate approaches for conducting a quick evaluation of the proposed mitigation activities which could be used to identify those mitigation activities that merit more detailed assessment. One of those methods is the STAPLE/E approach.

Using STAPLE/E criteria, mitigation activities can be evaluated quickly by steering committees in a synthetic fashion. This set of criteria requires the committee to assess the mitigation activities based on the Social, Technical, Administrative, Political, Legal, Economic and Environmental (STAPLE/E) constraints and opportunities of implementing the particular mitigation item in your community. The second chapter in FEMA's How-To Guide "Developing the Mitigation Plan - Identifying Mitigation Actions and Implementation Strategies" as well as the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process" outline some specific considerations in analyzing each aspect. The following are suggestions for how to examine each aspect of the STAPLE/E approach from the "State of Oregon's Local Natural Hazard Mitigation Plan: An Evaluation Process."

Social: Community development staff, local non-profit organizations, or a local planning board can help answer these questions.

- Is the proposed action socially acceptable to the community?
- Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- Will the action cause social disruption?

Technical: The city or county public works staff, and building department staff can help answer these questions.

- Will the proposed action work?
- Will it create more problems than it solves?
- Does it solve a problem or only a symptom?
- Is it the most useful action in light of other community goals?

Administrative: Elected officials or the city or county administrator, can help answer these questions.

- Can the community implement the action?
- Is there someone to coordinate and lead the effort?
- Is there sufficient funding, staff, and technical support available?
- Are there ongoing administrative requirements that need to be met?

Political: Consult the mayor, city council or county planning commission, city or county administrator, and local planning commissions to help answer these questions.

- Is the action politically acceptable?
- Is there public support both to implement and to maintain the project?

Legal: Include legal counsel, land use planners, risk managers, and city council or county planning commission members, among others, in this discussion.

- Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Are there legal side effects? Could the activity be construed as a taking?
- Is the proposed action allowed by the comprehensive plan, or must the comprehensive plan be amended to allow the proposed action?
- Will the community be liable for action or lack of action?
- Will the activity be challenged?

Economic: Community economic development staff, civil engineers, building department staff, and the assessor's office can help answer these questions.

- What are the costs and benefits of this action?
- Do the benefits exceed the costs?
- Are initial, maintenance, and administrative costs taken into account?
- Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private?)
- How will this action affect the fiscal capability of the community?

- What burden will this action place on the tax base or local economy?
- What are the budget and revenue effects of this activity?
- Does the action contribute to other community goals, such as capital improvements or economic development?
- What benefits will the action provide? (This can include dollar amount of damages prevented, number of homes protected, credit under the CRS, potential for funding under the HMGP or the FMA program, etc.)

Environmental: Watershed councils, environmental groups, land use planners and natural resource managers can help answer these questions.

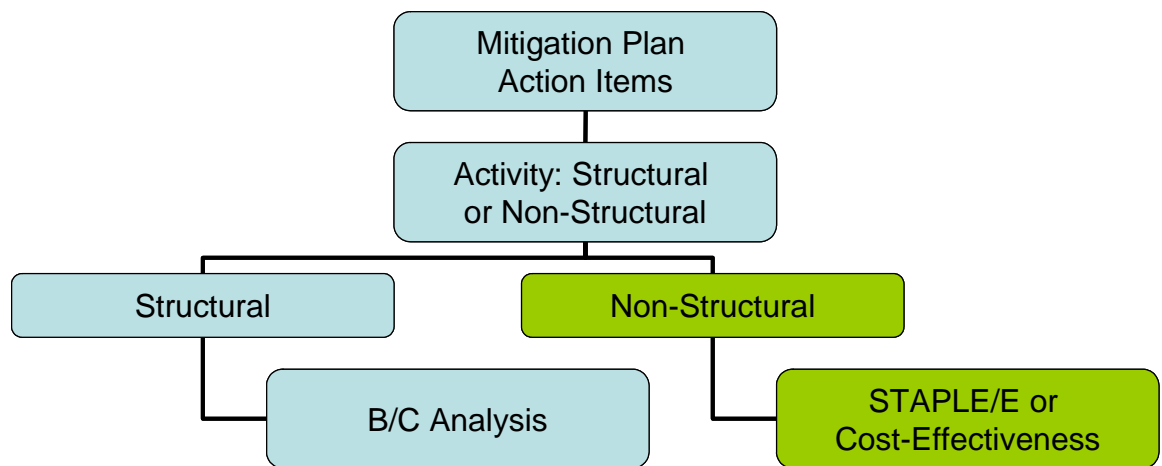
- How will the action impact the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

The STAPLE/E approach is helpful for doing a quick analysis of mitigation projects. Most projects that seek federal funding and others often require more detailed benefit/cost analyses.

When to use the Various Approaches

It is important to realize that various funding sources require different types of economic analyses. The following figure is to serve as a guideline for when to use the various approaches.

Figure A.1: Economic Analysis Flowchart



Source: Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center, 2005

Implementing the Approaches

Benefit/cost analysis, cost-effectiveness analysis, and the STAPLE/E are important tools in evaluating whether or not to implement a mitigation activity. A framework for evaluating mitigation activities is outlined below. This framework should be used in further analyzing the feasibility of prioritized mitigation activities.

1. Identify the Activities

Activities for reducing risk from natural hazards can include structural projects to enhance disaster resistance, education and outreach, and acquisition or demolition of exposed properties, among others. Different mitigation projects can assist in minimizing risk to natural hazards, but do so at varying economic costs.

2. Calculate the Costs and Benefits

Choosing economic criteria is essential to systematically calculating costs and benefits of mitigation projects and selecting the most appropriate activities. Potential economic criteria to evaluate alternatives include:

- ***Determine the project cost.*** This may include initial project development costs, and repair and operating costs of maintaining projects over time.
- ***Estimate the benefits.*** Projecting the benefits, or cash flow resulting from a project can be difficult. Expected future returns from the mitigation effort depend on the correct specification of the risk and the effectiveness of the project, which may not be well known. Expected future costs depend on the physical durability and potential economic obsolescence of the investment. This is difficult to project. These considerations will also provide guidance in selecting an appropriate salvage value. Future tax structures and rates must be projected. Financing alternatives must be researched, and they may include retained earnings, bond and stock issues, and commercial loans.
- ***Consider costs and benefits to society and the environment.*** These are not easily measured, but can be assessed through a variety of economic tools including existence value or contingent value theories. These theories provide quantitative data on the value people attribute to physical or social environments. Even without hard data, however, impacts of structural projects to the physical environment or to society should be considered when implementing mitigation projects.
- ***Determine the correct discount rate.*** Determination of the discount rate can just be the risk-free cost of capital, but it may include the decision maker's time preference and also a risk premium. Including inflation should also be considered.

3. Analyze and Rank the Activities

Once costs and benefits have been quantified, economic analysis tools can rank the possible mitigation activities. Two methods for determining the

best activities given varying costs and benefits include net present value and internal rate of return.

- ***Net present value.*** Net present value is the value of the expected future returns of an investment minus the value of the expected future cost expressed in today's dollars. If the net present value is greater than the projected costs, the project may be determined feasible for implementation. Selecting the discount rate, and identifying the present and future costs and benefits of the project calculates the net present value of projects.
- ***Internal rate of return.*** Using the internal rate of return method to evaluate mitigation projects provides the interest rate equivalent to the dollar returns expected from the project. Once the rate has been calculated, it can be compared to rates earned by investing in alternative projects. Projects may be feasible to implement when the internal rate of return is greater than the total costs of the project. Once the mitigation projects are ranked on the basis of economic criteria, decision-makers can consider other factors, such as risk, project effectiveness, and economic, environmental, and social returns in choosing the appropriate project for implementation.

Economic Returns of Natural Hazard Mitigation

The estimation of economic returns, which accrue to building or land owners as a result of natural hazard mitigation, is difficult. Owners evaluating the economic feasibility of mitigation should consider reductions in physical damages and financial losses. A partial list follows:

- Building damages avoided
- Content damages avoided
- Inventory damages avoided
- Rental income losses avoided
- Relocation and disruption expenses avoided
- Proprietor's income losses avoided

These parameters can be estimated using observed prices, costs, and engineering data. The difficult part is to correctly determine the effectiveness of the hazard mitigation project and the resulting reduction in damages and losses. Equally as difficult is assessing the probability that an event will occur. The damages and losses should only include those that will be borne by the owner. The salvage value of the investment can be important in determining economic feasibility. Salvage value becomes more important as the time horizon of the owner declines. This is important because most businesses depreciate assets over a period of time.

Additional Costs from Natural Hazards

Property owners should also assess changes in a broader set of factors that can change as a result of a large natural disaster. These are usually termed "indirect" effects, but they can have a very direct effect on the economic

value of the owner's building or land. They can be positive or negative, and include changes in the following:

- Commodity and resource prices
- Availability of resource supplies
- Commodity and resource demand changes
- Building and land values
- Capital availability and interest rates
- Availability of labor
- Economic structure
- Infrastructure
- Regional exports and imports
- Local, state, and national regulations and policies
- Insurance availability and rates

Changes in the resources and industries listed above are more difficult to estimate and require models that are structured to estimate total economic impacts. Total economic impacts are the sum of direct and indirect economic impacts. Total economic impact models are usually not combined with economic feasibility models. Many models exist to estimate total economic impacts of changes in an economy. Decision makers should understand the total economic impacts of natural disasters in order to calculate the benefits of a mitigation activity. This suggests that understanding the local economy is an important first step in being able to understand the potential impacts of a disaster, and the benefits of mitigation activities.

Additional Considerations

Conducting an economic analysis for potential mitigation activities can assist decision-makers in choosing the most appropriate strategy for their community to reduce risk and prevent loss from natural hazards. Economic analysis can also save time and resources from being spent on inappropriate or unfeasible projects. Several resources and models are listed on the following page that can assist in conducting an economic analysis for natural hazard mitigation activities.

Benefit/cost analysis is complicated, and the numbers may divert attention from other important issues. It is important to consider the qualitative factors of a project associated with mitigation that cannot be evaluated economically. There are alternative approaches to implementing mitigation projects. With this in mind, opportunity rises to develop strategies that integrate natural hazard mitigation with projects related to watersheds, environmental planning, community economic development, and small business development, among others. Incorporating natural hazard mitigation with other community projects can increase the viability of project implementation.

Resources

CUREe Kajima Project, *Methodologies for Evaluating the Socio-Economic Consequences of Large Earthquakes*, Task 7.2 Economic Impact Analysis, Prepared by University of California, Berkeley Team, Robert A. Olson, VSP Associates, Team Leader; John M. Eidinger, G&E Engineering Systems; Kenneth A. Goettel, Goettel and Associates, Inc.; and Gerald L. Horner, Hazard Mitigation Economics Inc., 1997

Federal Emergency Management Agency, *Benefit/Cost Analysis of Hazard Mitigation Projects*, Riverine Flood, Version 1.05, Hazard Mitigation Economics, Inc., 1996

Federal Emergency Management Agency, *Report on the Costs and Benefits of Natural Hazard Mitigation*. Publication 331, 1996.

Goettel & Horner Inc., *Earthquake Risk Analysis Volume III: The Economic Feasibility of Seismic Rehabilitation of Buildings in the City of Portland*, Submitted to the Bureau of Buildings, City of Portland, August 30, 1995.

Goettel & Horner Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects Volume V, Earthquakes*, Prepared for FEMA's Hazard Mitigation Branch, October 25, 1995.

Horner, Gerald, *Benefit/Cost Methodologies for Use in Evaluating the Cost Effectiveness of Proposed Hazard Mitigation Measures*, Robert Olsen Associates, Prepared for Oregon State Police, Office of Emergency Management, July 1999.

Interagency Hazards Mitigation Team, *State Hazard Mitigation Plan*, (Oregon State Police - Office of Emergency Management, 2000.)

Risk Management Solutions, Inc., *Development of a Standardized Earthquake Loss Estimation Methodology*, National Institute of Building Sciences, Volume I and II, 1994.

VSP Associates, Inc., *A Benefit/Cost Model for the Seismic Rehabilitation of Buildings*, Volumes 1 & 2, Federal Emergency management Agency, FEMA Publication Numbers 227 and 228, 1991.

VSP Associates, Inc., *Benefit/Cost Analysis of Hazard Mitigation Projects: Section 404 Hazard Mitigation Program and Section 406 Public Assistance Program, Volume 3: Seismic Hazard Mitigation Projects*, 1993.

VSP Associates, Inc., *Seismic Rehabilitation of Federal Buildings: A Benefit/Cost Model*, Volume 1, Federal Emergency Management Agency, FEMA Publication Number 255, 1994.

Appendix D: Action Item Worksheets

Drought # 1

Proposed Action Item:		Alignment with Plan Goals:	
Partner with Marion County to support local agencies' training on water conservation measures.		Goal 1: Public Awareness Goal 2: Education Goal 3: Preventative Goal 5: Partnerships and Coordination	
Rationale for Proposed Action Item:			
Droughts often affect entire regions, and partnering with Marion County's existing efforts on water conservation provides a unified approach to conserving water at a regional rather than a local level.			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Develop water conservation informational brochures in partnership with Marion County Public Works. • Disseminate water conservation brochures through water bills, the Woodburn website, local cable TV, and at the planning and public works counters, and local schools. • Bilingual information can be disseminated using city staff that serve as liaisons to the Hispanic community. Bilingual organizations that can disseminate information to Hispanics include Nuevo Amanecer, the Salud Medical Center, and the radio stations La Pantera and Radio Movimiento. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Economic & Development Services		Homeowners associations, Downtown Association, Woodburn School District, Nuevo Amanecer, Marion County Public Works, Salud Medical Center	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Ongoing	Ongoing		
Form Submitted by:		Woodburn Steering Committee	

Earthquake # 1

Proposed Action Item:		Alignment with Plan Goals:	
Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices through public education.		Goal 1: Public Awareness Goal 2: Education Goal 3: Preventative	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> Seismic hazards pose a real and serious threat to many communities in Oregon, requiring local governments, planners, and engineers to consider their community’s safety. Earthquake damage occurs because we have built structures that cannot withstand severe shaking. Buildings, ports, and lifelines (highways, telephone lines, gas, water, etc.) suffer damage in earthquakes. Damage and loss of life can be very severe if structures are not designed to withstand shaking, are on ground that amplifies shaking, or ground which liquefies due to shaking.¹ Nonstructural retrofits protect building contents with little cost and effort. Examples of retrofits include: <ul style="list-style-type: none"> * Securing water heaters, large appliances, bookcases, pictures and bulletin boards; * Latching cabinet doors; and * Using safety film on windows. The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Encouraging reduction of nonstructural and structural earthquake hazards will prevent damage to existing buildings and infrastructure. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Develop informational brochures about individual mitigation opportunities and post on the city’s website, include in the water bill, and make available on the front counters at the police and public works departments. Include recommendations regarding non-structural retrofits in these brochures. Other opportunities to disseminate information include advertising on Woodburn transit or putting information on the local cable station. Implement non-structural retrofit of City Hall offices and work spaces. Distribute a “Homeowner’s Guide to Non-Structural Retrofit” (or something similar) found here: http://www.seattle.gov/DPD/cms/groups/pan/@pan/@emergprep/documents/web_informational/dpds_005877.pdf 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Building Official (Economic & Development Services)		Building supply/home improvement businesses, Woodburn School District, cable station, Chamber of Commerce, Marion County	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Ongoing	Ongoing		
Form Submitted by:		Woodburn Steering Committee	

¹ State of Oregon Enhanced Natural Hazards Mitigation Plan, Earthquake Chapter.

Earthquake #2

Proposed Action Item:		Alignment with Plan Goals:	
Complete inventory of high-risk buildings, critical facilities, and infrastructure that may be particularly vulnerable to earthquake damage.		Goal 3: Preventative	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Woodburn has many unreinforced masonry buildings, especially in the historic downtown area, and older homes that may be vulnerable to earthquakes. Prominent historic buildings include the old City Hall, the Library, and the Settlemier House. The Woodburn Steering Committee also believes there are fragile water lines downtown that may disrupt water distribution to residents. Communication systems, transportation corridors, and business/industrial centers may also be vulnerable to seismic activity. Completing an inventory of high-risk buildings, critical facilities, and infrastructure will help to identify vulnerable systems and to prioritize new projects. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Completing an inventory of high-risk buildings, critical facilities, and infrastructure is the first step to identifying vulnerable resources in the community and potential mitigation strategies. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Develop a map of buildings over a certain age as a first step to developing an inventory. • Assess buildings visually to determine earthquake vulnerability. Consider using the methodology developed by the Department of Geologic and Mineral Industries (DOGAMI) to conduct rapid visual assessments of buildings. • Seek funding for buildings considered a high risk of collapse. Use FEMA's procedures document for developing scopes of work for seismic structural & non-structural retrofit projects. • If a building is in the urban renewal area, make UR funding available for retrofit and use it as an incentive for property owners. 			
Coordinating Organization:		Economic & Development Services	
Internal Partners:		External Partners:	
Public Works, Woodburn Fire District		Landlord associations, Downtown Association, Historical Society, Woodburn School District, Chemeketa (Resource center), FEMA, DOGAMI	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	2 years		
Form Submitted by:		Woodburn Steering Committee	

Earthquake #3

Proposed Action Item:		Alignment with Plan Goals:	
Evaluate the structural integrity of city-owned buildings.		Goal 3: Prevention	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The city of Woodburn owns approximately 8-10 buildings and has several rental properties. Evaluating the structural integrity of city-owned buildings will help to identify seismic issues and can inform new mitigation strategies to seismically retrofit buildings. City owned-buildings and facilities should be resilient to natural hazards to ensure continuous service during and after disasters. After Hurricane Katrina, the Harrison County, Alabama Recovery Plan noted the following: "It is important that critical facilities function during and after disasters. Local units of government want to insure continuous service by strengthening essential facilities such as fire stations, city halls, shelters, and police stations."² Evaluating the structural integrity of city-owned buildings can identify seismic issues and will help in developing mitigation strategies to prevent future damage to life and property and maintain continuous city services. The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Evaluating the structural integrity of existing city-owned buildings will assist in developing appropriate earthquake mitigation strategies for these buildings. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Identify structural evaluation as a project that should be included in the Woodburn Capital Improvements Plan. Use the inventory developed in earthquake action item # 2 to identify buildings to assess. Seek funding for buildings considered a high risk of collapse. Use FEMA's procedures document for developing scopes of work for seismic structural & non-structural retrofit projects. If a building is in the urban renewal area, make UR funding available for retrofit and use it as an incentive for property owners. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Building Official, all city departments and their occupants.		FEMA, DOGAMI	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Ongoing	Ongoing		
Form Submitted by:		Woodburn Steering Committee	

² Source: Harrison County Community Recovery Plan. August 2006. FEMA ESF-14 in support of the state of Mississippi. p. 61.

Earthquake # 4

Proposed Action Item:		Alignment with Plan Goals:	
Require new city facilities to exceed the minimum structural requirements for seismic loading.		Goal 3: Preventative	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • City owned-buildings and facilities should be resilient to natural hazards to ensure continuous service during and after disasters. After Hurricane Katrina, the Harrison County, Alabama Recovery Plan noted the following: "It is important that critical facilities function during and after disasters. Local units of government want to insure continuous service by strengthening essential facilities such as fire stations, city halls, shelters, and police stations."³ By requiring new city facilities to exceed the minimum structural requirements for seismic loading, the city of Woodburn will be more resilient to earthquake events. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new buildings and infrastructure [201.6(c)(3)(ii)]. Requiring new city facilities to exceed the minimum structural requirements for seismic loading can significantly reduce the city's vulnerability to earthquakes and prevent future damage to life and property. 			
Ideas for Implementation:			
Consult with Federal Emergency Management Agency (FEMA) and Oregon Emergency Management (OEM) to determine strategies for exceeding the minimum structural requirements for seismic loading.			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Economic & Development Services		FEMA, OEM, DOGAMI	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
2 years			
Form Submitted by:		Woodburn Steering Committee	

³ Source: Harrison County Community Recovery Plan. August 2006. FEMA ESF-14 in support of the state of Mississippi. p. 61.

Earthquake # 5

Proposed Action Item:		Alignment with Plan Goals:	
Seek funding to further assess the “probability of collapse” for Lincoln Elementary, Washington Elementary, Nellie Muir Elementary, French Prairie, and Woodburn High School.		Goal 3: Preventative Goal 4: Funding and Implementation Goal 7: Emergency Services	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> In 2007, the Department of Geology and Mineral Industries (DOGAMI) conducted a seismic needs assessment for public school buildings, acute inpatient care facilities, fire stations, police stations, sheriffs’ offices, and other law enforcement agency buildings.⁴ Buildings were ranked for their “probability of collapse” due to the maximum possible earthquake for any given area. Woodburn schools noted in the report include: Lincoln Elementary and Washington Elementary Schools (Very High); French Prairie Middle School and Nellie Muir Elementary (High); and Woodburn High School (Moderate). All these schools house hundreds of children during the day and several schools can serve as emergency shelters. Verifying a school’s “probability of collapse” will help to develop mitigation strategies that can prevent injuries and strengthen buildings that serve as community shelters. The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Further assessing the probability of collapse will help to address the vulnerability of existing school buildings. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Develop a bond measure to conduct structural integrity assessments. Contract with an engineer to assess and produce a report for each of the buildings. Publicize and improve awareness of the earthquake risk using existing education and outreach efforts. Use FEMA’s procedures document for developing scopes of work for seismic structural and non-structural retrofit projects. 			
Coordinating Organization:		Woodburn School District	
Internal Partners:		External Partners:	
Public Works, Economic & Development Services		OEM, DOGAMI, Marion County Building	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3-5 years		
Form Submitted by:		Woodburn Steering Committee	

⁴ McConnell, Vicki S. Department of Geology and Mineral Industries. *Statewide Seismic Needs Assessment: Implementation of Oregon 2005 Senate Bill 2 Relating to Public Safety, Earthquakes, and Seismic Rehabilitation of Public Buildings.* 2007. <http://www.oregongeology.com/sub/projects/rvs/OFR-007-02-SNAA-onscreen.pdf>.

Earthquake # 6

Proposed Action Item:		Alignment with Plan Goals:	
Update the city's Comprehensive Plan to reflect the latest information on seismic hazards.		Goal 3: Prevention Goal 5: Partnerships and Coordination Goal 6: Natural Resources Utilization	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> Woodburn's Comprehensive Plan provides the legal framework and long-term vision for implementing plans and land use regulations. Regarding natural hazards, the Comprehensive Plan includes policies that regulate development in the floodplain, but it does not include any information on earthquake hazards. Updating the plan to reflect the latest seismic hazard information will provide a policy framework for addressing the earthquake hazard. Statewide Planning Goal 2 (Land Use Planning) requires local governments to create comprehensive plans that "shall include identification of issues and problems, inventories, and other factual information for each applicable statewide planning goal..." Furthermore, Goal 7 of Oregon's Land Use Planning Goals requires that local governments "shall adopt comprehensive plans (inventories, policies, and implementing measures) to reduce risk to people and property from natural hazards." Updating Woodburn's Comprehensive Plan to address new seismic information will meet Oregon's statewide land use planning goal requirements. The Risk Assessment section of this mitigation plan estimates Woodburn has a high probability of an earthquake recurring and a high vulnerability to earthquakes. The vulnerabilities identified by the Woodburn Steering Committee include potential damage to school buildings, historic and unreinforced masonry buildings, and critical infrastructure such as roads and water pipelines. Updating the comprehensive plan to reflect this new information will establish a policy framework for addressing these issues. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Review latest vulnerability assessment information and policies that address seismic hazards. Information can be obtained from the risk assessment portion of this mitigation plan and from the Oregon Department of Geology and Mineral Industries (DOGAMI). Incorporate new seismic information during the period review of the Woodburn Comprehensive Plan. 			
Coordinating Organization:		Economic & Development Services	
Internal Partners:		External Partners:	
Public Works		DOGAMI, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
2 years			
Form Submitted by:		Woodburn Steering Committee	

Earthquake # 7

Proposed Action Item:		Alignment with Plan Goals:	
Encourage residents and commercial businesses to purchase earthquake insurance.		Goal 1: Public Awareness Goal 2: Education Goal 3: Preventative Goal 4: Funding and Implementation	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Earthquake insurance can minimize the overall monetary damage to property caused by an earthquake. By encouraging homeowners, commercial businesses, and the city government to purchase earthquake insurance, the monetary impact of an earthquake can be significantly reduced. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Encouraging residents and commercial businesses to purchase earthquake insurance can reduce the monetary impact to earthquake damage on new and existing buildings. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Provide earthquake insurance information to Woodburn residents and to the Chamber of Commerce. • Coordinate with insurance companies and organizations such as the Insurance Information Service of Oregon and Idaho (IISOI) to produce and distribute earthquake insurance information. • Make contacts with insurance industry representatives to keep current about their requirements, rates, and plans. • Work with real estate industry representatives to educate them about what types of structures are resistant to earthquakes. • Include information on the city's website. 			
Coordinating Organization:		Economic & Development Services	
Internal Partners:		External Partners:	
Public Works		Insurance Companies, Woodburn Chamber of Commerce	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Ongoing	Ongoing		
Form Submitted by:		Woodburn Steering Committee	

Earthquake # 8

Proposed Action Item:		Alignment with Plan Goals:	
Install automatic shut-off valves in all city facilities that use natural gas.		Goal 3: Prevention	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The city of Woodburn uses natural gas in many of its facilities and does not have automatic shut-off valves in these facilities. Installing automatic shut-off valves can prevent natural gas leaks if a gas line is broken in an earthquake, reducing the risk of damage to life and property. • The Risk Assessment section of this mitigation plan estimates Woodburn has a high probability of an earthquake recurring. The most recent earthquake that impacted Woodburn is the March 1993 Scotts Mills earthquake which damaged unreinforced masonry buildings, caused chemical spills when chemical products fell off store shelves and mixed together, and damaged the second story of Washington Elementary School. Another earthquake could cause similar damage to natural gas lines. Automatic shut-off valves could prevent future damage to buildings caused by natural gas leaks. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Installing automatic shut-off valves in all city facilities that use natural gas can prevent damage to existing buildings and infrastructure by reducing the likelihood of a gas leak. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Inventory all natural gas lines in city-owned facilities. • Identify manufacturers of automatic natural gas shut-off valves and investigate whether they are appropriate technologies for the city of Woodburn. • Use FEMA's procedures document for developing scopes of work for seismic structural and non-structural retrofit projects. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Economic & Development Services - Building Division		FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
2 years			
Form Submitted by:		Woodburn Steering Committee	

Flood #1

Proposed Action Item:		Alignment with Plan Goals:	
Widen culverts near Wyffel Park and Gatch Street between Lincoln Street and Hardcastle Avenue.		Goal 3: Preventative Goal 5: Partnerships and Coordination	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The Woodburn Steering Committee identified the culverts near Wyffel Park and Gatch Street, between Lincoln Street and Hardcastle Avenue, as being too small, which in heavy downpours can lead to localized flooding. In addition, yard debris can back up into the culverts further exacerbating flooding problems. Widening the culverts can significantly reduce the localized flooding hazard. The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Widening the culverts between Lincoln Street and Hardcastle Avenue will improve the local infrastructure and reduce the impact of flooding on surrounding properties and infrastructure. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Coordinate implementation of the action item with the Woodburn Public Facilities Plan guidelines. Seek funding from FEMA and Oregon Emergency Management to assist in widening culverts. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Community Services, Economic & Development Services		Corps of Engineers, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Ongoing	Ongoing		
Form Submitted by:		Woodburn Steering Committee	

Flood #2

Proposed Action Item:		Alignment with Plan Goals:	
Implement mitigation action items in the Public Facilities Plan.		Goal 5: Partnerships and Coordination	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The Woodburn Public Facilities Plan identifies major infrastructure projects necessary to serve the year 2020 projected population of 34,9191 and examines the effect on utility and transportation infrastructure resulting from 2005 expansion of the Urban Growth Boundary (UGB) of the city of Woodburn. The Public Facilities Plan also includes projects aimed at reducing the flood hazard in the city (see pages 29-30). Implementing projects in the Public Facilities Plan will further reduce the impact of floods on community. The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Implementing projects in the Public Facilities Plan will prevent floods from damaging existing buildings and infrastructure. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Coordinate steering committee efforts for implementing the Woodburn Natural Hazards Mitigation Plan with efforts to implement projects in the Public Facilities Plan. Incorporate new action items relating to floods in the city's Capital Improvement Plan 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Community Services, Economic & Development Services			
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Ongoing	Ongoing		
Form Submitted by:		Woodburn Steering Committee	

Flood #3

Proposed Action Item:		Alignment with Plan Goals:	
Partner with Marion County to conduct workshops for target audiences on National Flood Insurance Programs, mitigation activities, and potential assistance from FEMA’s Flood Mitigation Assistance and Hazard Mitigation Grant Programs.		Goal 1: Public Awareness Goal 2: Education Goal 3: Funding and Implementation Goal 5: Partnerships and Coordination	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The National Flood Insurance Program (NFIP), Flood Mitigation Assistance (FMA) Program, and Hazard Mitigation Grant Program (HMGP) provide financial assistance to property owners for reducing the impact of floods. The NFIP provides flood insurance to property owners, and the FMA and HMGP provide funding for flood mitigation projects. Partnering with Marion County to conduct workshops for target audiences on these programs will provide a coordinated county-wide effort to raise awareness of the flood hazard, and educate the public on mitigation strategies that will reduce the impact of floods. Partnering with Marion County can also reduce the cost involved in hosting these workshops. The city of Woodburn has 48 flood insurance policy holders and has experienced 3 property losses due to flooding. The claims for these three property losses totaled \$14,780. Furthermore, the city of Woodburn has a high probability of flood recurring and a moderate vulnerability to floods. Conducting workshops together with Marion County on the NFIP, FMA, and HMGP programs can further reduce property losses due to flooding in Woodburn and reduce the city’s vulnerability. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Have the Woodburn City Council promote this effort publicly. Bilingual information can be disseminated using city staff that serve as liaisons to the Hispanic community. Bilingual organizations that can disseminate information to Hispanics include Nuevo Amanecer, the Salud Medical Center, and the radio stations La Pantera and Radio Movimiento. Press releases into the paper can inform residents, property owners, and businesses. Include information about the financial aspects of building (and rebuilding) in the floodplain; Include information on using low-impact development standards on private property; Present information on how other communities have addressed building in the floodplain. Selected target audiences can include: realtors, lending institutions, surveyors, engineers, and government agencies. 			
Coordinating Organization:		City Administrator	
Internal Partners:		External Partners:	
Information Services, Economic & Development Services		Woodburn Independent, CERT Team, FEMA, Nuevo Amanecer, Salud Medical Center, La Pantera, PCUN/Radio Movimiento, OEM, Marion County	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	2 years		
Form Submitted by:		Woodburn Steering Committee	

Flood #4

Proposed Action Item:		Alignment with Plan Goals:	
<ul style="list-style-type: none"> Continue compliance with the National Flood Insurance Program (NFIP) through the enforcement of local floodplain ordinances. 		Goal 3: Preventative Goal 5: Partnerships and Coordination Goal 6: Natural Resources Utilization	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> The National Flood Insurance Program provides communities with federally backed flood insurance to homeowners, renters, and business owners, provided that communities develop and enforce adequate floodplain management ordinances. The benefits of adopting NFIP standards for communities are a reduced level of flood damage in the community and stronger buildings that can withstand floods. According to the NFIP, buildings constructed in compliance with NFIP building standards suffer approximately 80 percent less damage annually than those not built in compliance. The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Continued participation in the NFIP will help reduce the level of flood damage to new and existing buildings in communities while providing homeowners, renters and business owners additional flood insurance protection. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Community Assistance Visits (CAV) are scheduled visits to communities participating in the NFIP for the purpose of: 1) conducting a comprehensive assessment of the community's floodplain management program; 2) assisting the community and its staff in understanding the NFIP and its requirements; and 3) assisting the community in implementing effective flood loss reduction measures when program deficiencies or violations are discovered. Actively participate with DLCD and FEMA during Community Assistance Visits. Conduct an assessment of the floodplain ordinances to ensure they reflect current flood hazards and situations, and meet NFIP requirements. Coordinate with the county to ensure that floodplain ordinances and NFIP regulations are maintained and enforced. Continue to assess the need for updated ordinances. Mitigate areas that are prone to flooding or have the potential to flood. 			
Coordinating Organization:		Economic & Development Services	
Internal Partners:		External Partners:	
Public Works		FEMA, DLCD, Marion County Planning Department	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
Ongoing	Ongoing		
Form Submitted by:		Woodburn Steering Committee	

Flood #5

Proposed Action Item:		Alignment with Plan Goals:	
Update the city's Flood Insurance Rate Maps (FIRM) as funding becomes available.		Goal 3: Preventative Goal 5: Partnerships and Coordination Goal 6: Natural Resources Utilization	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Woodburn has Flood Insurance Rate Maps (FIRM) effective as of January 2003. While these FIRM maps are accurate, the city continues to grow into the Urban Growth Boundary into areas that have not been sufficiently mapped. Updating the FIRM when funding becomes available will help to understand the flood vulnerability to areas that have not yet been mapped. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and buildings and infrastructure [201.6(c)(3)(ii)]. Updating Woodburn's FIRM will help to reduce the impact of floods on new buildings and infrastructure in areas that have not been mapped or yet developed. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Coordinate with FEMA to identify areas that need to be mapped as the city grows into the urban growth boundary (UGB). • Seek funding from FEMA to update Woodburn's FIRMs. If there are areas that need to be revised for the flood map, complete the MT-2 Forms Package (Application Forms for Conditional Letters of Map Revision and Letters of Map Revision). The forms and instructions are designed to assist requesters (community officials or individuals via community officials) in gathering the data that the FEMA needs to determine whether the effective NFIP map and Flood Insurance Study report for a community should be revised. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Economic & Development Services		FEMA, Corps of Engineers OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3 years		
Form Submitted by:		Woodburn Steering Committee	

Volcano #1

Proposed Action Item:		Alignment with Plan Goals:	
Identify critical facilities and equipment that can be damaged by ashfall, and develop mitigation activities to prevent damage to these facilities.		Goal 3: Preventative Goal 7: Emergency Services	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Due to Woodburn’s distance from volcanoes, the city is unlikely to experience the immediate effects that eruptions have on surrounding areas (i.e., mud and debris flows, or lahars). Depending on wind patterns, however, the city may experience ashfall. The eruption of Mount St. Helens in 1980, for example, coated the Willamette Valley with a fine layer of ash. • Volcanic ash (tephra) is a public health threat, and can damage agriculture and transportation systems including aircraft and ground vehicles. Ash can also clog drainage systems and create major debris management problems. Within Woodburn, public health would be a primary concern, and keeping transportation routes open and accessible would be important as well. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and buildings and infrastructure [201.6(c)(3)(ii)]. Identifying critical facilities and equipment that can be damaged by ashfall and developing mitigation activities will reduce the impact of the volcanic hazard. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Collaborate and exchange experiences and knowledge among facility managers of critical industries in the city to reduce the impact of ashfall on their sites. • Review and upgrade existing Building Codes to address potential damage to structures from earthquake and volcanic eruption. • Evaluate capability of water treatment plant to deal with high turbidity from ashfall and upgrade treatment facility as necessary. • Coordinate mitigation efforts with the response plan. • Develop and inventory of filters for equipment. 			
Coordinating Organization:		Public Works-Facilities Maintenance	
Internal Partners:		External Partners:	
All city departments		Marion County Emergency Management, SEDCOR, Major industries, DOGAMI, USFS, USGS-CVO	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)			
<u>Long Term</u> (2-4 or more years)			
2 years			
Form Submitted by:		Woodburn Steering Committee	

Windstorm #1

Proposed Action Item:		Alignment with Plan Goals:	
Educate the public about the benefits of proper tree pruning and care in preventing damage during windstorms.		Goal 1: Public Awareness Goal 2: Education Goal 3: Preventative	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • High winds can topple trees and break limbs which in turn can result in power outages and disrupt telephone, computer, and TV and radio service. Street trees in downtown Woodburn are particularly vulnerable to damaging utilities and property. Educating property owners about how to properly prune their trees to prevent power outages and damage to their property can help reduce impacts of windstorm events. • Woodburn has experienced severe wind storm events in the past and is vulnerable to windstorm events. A major windstorm that occurred in March 2008 caused approximately \$15,000 in damage. Furthermore, the wind storm risk assessment notes that Woodburn’s probability of a windstorm recurring is high and the city’s vulnerability to windstorm events is also high. Educating the public about the benefits of proper tree pruning and care will help to reduce the city’s vulnerability to windstorm events. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address existing buildings and infrastructure [201.6(c)(3)(ii)]. Educating the public about the benefits of proper tree pruning and care will prevent damage to existing buildings and infrastructure such as power lines. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Coordinate efforts with Woodburn’s urban forest program. • Post information regarding tree pruning on the city’s website. • Do a public service announcement in the local newspaper. • Include videos on the city’s website on how to properly prune trees and care for them to prevent damage to property. • Partner with La Pantera and Radio Movimiento, Hispanic radio stations in Woodburn, to disseminate information to the Hispanic population in Woodburn. • Partner with businesses such as Al’s Garden Center to help educate people about pruning and proper tree care. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Economic & Development Services, Information Services		Homeowners associations, Landlords, Woodburn School District, Local media, Al’s Garden Center	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
2 years			
Form Submitted by:		Woodburn Steering Committee	

Windstorm #2

Proposed Action Item:		Alignment with Plan Goals:	
Educate the community about the risk of downed power lines, aerial power lines in the vicinity of trees, and preparedness measures to take in the event of a power outage.		Goal 1: Public Awareness Goal 2: Education Goal 3: Preventative	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • High winds can topple trees and break limbs which in turn can result in downed power lines and power outages. Street trees in downtown Woodburn are particularly vulnerable to damaging aerial power lines, putting community members at risk. Damaging windstorms that cause extended power outages can also disrupt businesses and critical facilities such as hospitals and care centers. Educating the community about the risk of downed power lines and preparedness measures community members can take in the event of a power outage will reduce the impact of power outages on the community. • Woodburn has experienced severe wind storm events in the past and is vulnerable to windstorm events. A major windstorm that occurred in March 2008 caused approximately \$15,000 in damage. Furthermore, the wind storm risk assessment notes that Woodburn’s probability of a windstorm recurring is high and the city’s vulnerability to windstorm events is also high. Given these high probability and vulnerability ratings, Woodburn is also susceptible to experiencing downed power lines and extended power outages. Educating the community about the risk of downed power lines and developing appropriate preparedness measures for power outages will raise awareness about the risks of downed power lines and reduce the community’s overall vulnerability to power outages. • The city has vulnerable youth and elderly populations, many of whom are especially vulnerable to power outages and lack backup sources of heat and water. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Use existing brochures and public outreach activities to disseminate information to community members. These include brochures available to the public in the Department of Economic & Development Services. • Post information on the city’s website about the risk of downed power lines and preparedness measures that community members can take in the event of a power outage. • Bilingual information can be disseminated using city staff that serve as liaisons to the Hispanic community. Bilingual organizations that can disseminate information to Hispanics include Nuevo Amanecer, the Salud Medical Center, and the radio stations La Pantera and Radio Movimiento. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Economic & Development Services		PGE, FEMA	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)			
<u>Long Term</u> (2-4 or more years)			
2 years			
Form Submitted by:		Woodburn Steering Committee	

Windstorm # 3

Proposed Action Item:		Alignment with Plan Goals:	
Require new city facilities to exceed the minimum structural requirements for wind loading.		Goal 3: Preventative	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Woodburn has experienced severe wind storm events in the past and is vulnerable to windstorm events. A major windstorm that occurred in March 2008 caused approximately \$15,000 in damage. Furthermore, the wind storm risk assessment notes that Woodburn’s probability of a windstorm recurring is high and the city’s vulnerability to windstorm events is also high. Requiring new city facilities to exceed the minimum structural requirements for wind loading will increase the ability of city facilities to withstand hazard events and reduce the city’s vulnerability. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Requiring new city facilities to exceed the minimum structural requirements for wind loading will reduce the vulnerability of new city facilities to windstorms. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Review the existing minimal structural requirements for wind loading on all city facilities and develop measures to increase the minimum structural requirements for wind loading. • Coordinate efforts with Woodburn Department of Economic & Development Services - Building Division to assess structural requirements for wind loading. • Consult with the Federal Emergency Management Agency or Oregon Emergency Management to develop strategies for increasing the minimum structural requirements for wind loading. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Economic & Development Services - Building Division		FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3 years		
Form Submitted by:		Woodburn Steering Committee	

Severe Winter Storm #1

Proposed Action Item:		Alignment with Plan Goals:	
Educate homeowners about choosing ice and windstorm-resistant trees and landscaping practices to reduce tree-related hazards in future ice storms.		Goal 1: Awareness Goal 2: Education Goal 3: Preventative	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The Woodburn risk assessment for severe winter storms notes that Woodburn has a high probability and high vulnerability to winter storm events. The most recent major winter storms occurred in January/February 2008 and in December 2008/January 2009. During both winter storms, the governor declared a state of emergency in Marion County and in surrounding counties. Trees are especially vulnerable to ice storms because ice buildup can cause tree limbs to break, downing power lines and blocking roadways. Educating homeowners about choosing ice and windstorm resistant trees, and implementing landscaping practices that reduce tree-related hazards in future ice storms, can reduce the likelihood of damage to trees in a severe winter storm event. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Educating homeowners about choosing ice and windstorm resistant trees and landscaping practices can reduce tree-related hazards to buildings and infrastructure. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Use existing brochures and public outreach activities to disseminate information to community members. These include providing brochures at the Department of Economic & Development Services. • Post information on the city’s website about ice and windstorm resistant trees and landscaping practices. • Post a public service announcement in the local newspaper and cable TV. • Partner with businesses such as Al’s Garden Center to help educate people about ice and windstorm resistant trees and landscaping practices. • Bilingual information can be disseminated using city staff that serve as liaisons to the Hispanic community. Bilingual organizations that can disseminate information to Hispanics include Nuevo Amanecer, the Salud Medical Center, and the radio stations La Pantera and Radio Movimiento. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Economic & Development Services - Planning Division		Al’s Garden Center, Local media organizations, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
2 years			
Form Submitted by:		Woodburn Steering Committee	

Severe Winter Storm #2

Proposed Action Item:		Alignment with Plan Goals:	
Educate residents about ways to weatherize their homes, as well as safe emergency heating equipment.		Goal 1: Public Awareness Goal 2: Education Goal 3: Preventative	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The Woodburn risk assessment for severe winter storms notes that Woodburn has a high probability and high vulnerability to winter storm events. The most recent major winter storms occurred in January/February 2008 and in December 2008/January 2009. During both winter storms, the governor declared a state of emergency in Marion County and in surrounding counties. Severe winter storms can bring extreme cold, snow, and ice, causing power outages and breaks in uninsulated water lines. Power outages can lead to heat loss, potentially harming people. Educating residents about ways to weatherize their homes, as well as safe emergency heating equipment, can reduce the effects of extreme cold and inform residents of how to heat their homes in the event of a power outage. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Educating residents about ways to weatherize their homes, as well as safe emergency heating equipment will improve the safety of community members but also protect existing buildings from damage due to severe winter storms. • Woodburn has vulnerable youth and elderly populations, many of whom are especially vulnerable to power outages and lack backup sources of heat and water. Educating these residents about ways to weatherize their homes and safe emergency heating equipment they can use will reduce the vulnerability of these populations. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Coordinate efforts with home improvement businesses to educate residents about weatherizing homes and providing safe emergency heating equipment. • Coordinate education efforts with Northwest Natural gas to educate residents about weatherization. • Coordinate with the Woodburn Fire District to develop a list of emergency heating information. • Provide Public Service Announcements on local cable TV and radio stations. • Advertise weatherization tax credits to serve as an incentive for people to weatherize their homes and reduce their heating bills. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Woodburn Fire District, Economic & Development Services - Planning Division		Chamber of Commerce, local building supply businesses, local media, Oregon Department of Energy, civic groups, Chemeketa Community College, Northwest Natural Gas	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3 years		
Form Submitted by:		Woodburn Steering Committee	

Multi-Hazard #1

Proposed Action Item:		Alignment with Plan Goals:	
Develop a voluntary registry of populations that may need particular assistance in an emergency situation.		Goal 1: Preventative Goal 7: Emergency Services	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Woodburn has a large population of seniors, the very young, and Hispanics, all of which may need special assistance in an emergency situation or require additional outreach efforts. Developing a voluntary registry of populations that may need particular assistance in an emergency will help in outreach and mitigation efforts for a variety of natural hazards. Furthermore, a registry would assist in communications between emergency responders. • Woodburn is vulnerable to a number of natural hazards. According to Woodburn’s risk assessment, the city has a high probability and vulnerability rating to wind storms and winter storms; a high probability and moderate vulnerability to flood; and a high probability to the earthquake hazard. Developing a voluntary registry of vulnerable populations can help to mitigate the impacts of these hazards on these populations and provide assistance in responding to these hazards. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Use teletend, a telephone service for the elderly, to develop an initial registry of elderly populations who are in need. • Work with churches, schools, and Nuevo Amanecer, a Hispanic housing development, to identify people who should be on the registry. • Use the registry information to develop a map of vulnerable populations and where they are located. 			
Coordinating Organization:		Community Services	
Internal Partners:		External Partners:	
Economic & Development Services - Planning Division, Woodburn Fire District, Police Department		Churches, Emergency Services, NORCOM, Chemeketa Community College	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
2 years			
Form Submitted by:		Woodburn Steering Committee	

Multi-Hazard #2

Proposed Action Item:		Alignment with Plan Goals:	
Further develop risk assessment maps to show areas at risk for all hazards.		Goal 3: Preventative Goal 6: Natural Resources Utilization	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> Developing risk assessment maps that show areas at risk for all hazards can improve land use planning efforts in the city of Woodburn and can prevent future damage to property caused by natural hazard events. Woodburn is growing into vacant farmland within the urban growth boundary and these areas have not been adequately mapped, especially for floods. Earthquake data also shows that Woodburn is vulnerable to earthquake events. Developing risk assessment maps to show areas at risk for hazards will prevent damage to buildings and infrastructure in these areas. The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new buildings and infrastructure [201.6(c)(3)(ii)]. Developing risk assessment maps showing the hazard risk for all hazards can reduce the impact to new buildings and infrastructure. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Coordinate with the Department of Geologic and Mineral Industries (DOGAMI), the Federal Emergency Management Agency (FEMA), and Oregon Emergency Management (OEM) to develop risk assessment maps. 			
Coordinating Organization:		Woodburn Public Works	
Internal Partners:		External Partners:	
Economic & Development Services - Planning Division, GIS		DOGAMI, FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	4 years		
Form Submitted by:		Woodburn Steering Committee	

Multi-Hazard #3

Proposed Action Item:		Alignment with Plan Goals:	
Establish mutual aid agreements between government agencies and commercial businesses in the event of an emergency (e.g., fuel, heavy equipment, food, etc.)		Goal 5: Partnerships and Coordination	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Mutual aid agreements and assistance agreements are agreements between agencies, organizations, and jurisdictions that provide a mechanism to quickly obtain emergency assistance in the form of personnel, equipment, materials, and other associated services. The primary objective is to facilitate rapid, short-term deployment of emergency support prior to, during, and after an incident. (Source: FEMA NIMS Resource Center) • Developing formal agreements with internal and external partners could assist the partners in collaborating and sharing the responsibility of natural hazard mitigation. Such actions to form collaborative partnerships and commitments to mitigation can assist the city in reducing its risk to the natural hazards addressed by the NHMP. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Develop a continuity of operations plan for city functions. Identify opportunities for mutual-aid where needed. • Develop formal agreements (such as Memorandums of Understanding, MOUs) with internal (departments) and external partners (e.g. non-profit organizations, cities, and state agencies) to work together on risk reduction efforts in the County. 			
Coordinating Organization:		Woodburn Public Works	
Internal Partners:		External Partners:	
City Administration, Police Department, Woodburn Fire District		Cities of Salem, Keizer, Silverton, Canby, Regional grocery providers (ie. Winco Foods)	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3 years		
Form Submitted by:		Woodburn Steering Committee	

Multi-Hazard #4

Proposed Action Item:		Alignment with Plan Goals:	
Encourage residents to prepare and maintain 72-hour kits.		Goal 1: Public Awareness Goal 2: Education Goal 3: Preventative	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Woodburn is vulnerable to a number of natural hazards that could disrupt services. According to Woodburn’s risk assessment, the city has a high probability and vulnerability rating to wind storms and winter storms; a high probability and moderate vulnerability to flood; and a high probability to the earthquake hazard. In a major disaster, utilities transportation networks, and businesses could be disrupted, and it may take days until vital services are restored. Preparing a 72 hour kit can help community members survive on their own without relying too heavily on emergency services. • The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Developing public education programs for hazard risk mitigation and preparedness would be a way to keep the public informed of, and involved in, the city’s actions to mitigate and prepare for hazards. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Provide educational material and examples of how to assemble 72 hour kits to residents of the city and employees. Outreach and awareness campaigns need to be carefully organized and developed to ensure that residents receive critical information. Distribute information through the city’s newsletter, which is sent out every 2 months with water bills. Alternatively, post information about 72 hour kits on the city’s website. • Information on preparing 72 hour kits can be found at www.72hours.org 			
Coordinating Organization:		Woodburn Fire District	
Internal Partners:		External Partners:	
Police Department, Economic & Development Services - Planning Division		FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1 year			
Form Submitted by:		Woodburn Steering Committee	

Multi Hazard # 5

Proposed Action Item:		Alignment with Plan Goals:	
Provide periodic first-aid and CPR classes to members of the public.		Goal 1: Public Awareness Goal 2: Education Goal 3: Preventative	
Rationale for Proposed Action Item:			
The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Providing periodic first-aid and CPR classes to members of the public will continually engage the public in the importance of emergency management in the community.			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Organize regular workshops for first-aid classes and CPR classes to teach the public basic skills. • Coordinate training efforts with Community Emergency Response Team (CERT) program to avoid duplication. • Include information about hazard mitigation, preparedness, response, and recovery to teach a holistic understanding of emergency management and describe how they are interconnected. • Consult with FEMA and Oregon Emergency Management (OEM) for training materials 			
Coordinating Organization:		Woodburn Fire District, Police Department	
Internal Partners:		External Partners:	
Economic & Development Services – Planning Division, Public Works		FEMA, OEM, Marion County, Red Cross	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
2 years			
Form Submitted by:		Woodburn Steering Committee	

Multi-Hazard #6

Proposed Action Item:		Alignment with Plan Goals:
Develop a post-disaster redevelopment plan.		Goal 7: Emergency Services
Rationale for Proposed Action Item:		
<ul style="list-style-type: none"> • Achieving sustainability (the ability to survive future natural disasters with minimum loss of life and property) is the overarching goal of planning for post-disaster reconstruction. • Decisions taken in the heat of the emergency period immediately following a disaster often compromise significant opportunities to rebuild a safer community for the future. The pressure exerted by residents and property owners to have their disaster-stricken community rebuilt to its pre-disaster form and condition as quickly as possible remains a powerful factor in local, state, and federal emergency management to this day. There are ways to restrain such pressures and maintain mitigation and other post-disaster goals as high priorities during the process of long-term reconstruction even as the ashes, the rubble, and the water are receding or being cleared away. The secret lies in identifying in advance those decisions that will need to be made after a disaster that are most likely to have long-term repercussions for hazard mitigation. • Pre-disaster and post-disaster mitigation should be two parts of a seamless whole in a sound plan for post-disaster recovery and reconstruction. The only difference is one of scale, of accelerating the pace with which existing mitigation plans are implemented, as a result of the influx of outside assistance. What is important about planning for post-disaster hazard mitigation is that the additional resources that facilitate hazard mitigation in the aftermath of a disaster do not materialize by accident. Local governments manage to secure such resources in large part because they have planned to do so. (Source: FEMA, “Policies for Guiding Planning for Post-Disaster Recovery and Reconstruction”) 		
Ideas for Implementation:		
<ul style="list-style-type: none"> • Utilize the city’s natural hazards mitigation plan as a starting point for developing a long-term post-disaster recovery plan. Both plans should work from the same information, mission, and goals. • Designate a recovery management team that is empowered to monitor the process and implement the community’s post-disaster recovery policies. This team should also serve as the post-disaster recovery planning team, and can/should include persons involved in pre-disaster mitigation planning efforts. Involve a wide range of stakeholders and community leaders/volunteers. Discuss post-disaster recovery planning at future mitigation plan meetings, including the 5-year update that is scheduled to occur in conjunction with Marion County. • Seek funding sources and outside assistance to help facilitate this process and the development of a post-disaster recovery plan. 		
Coordinating Organization:	Woodburn Natural Hazard Mitigation Steering Committee	
Internal Partners:		External Partners:
Public Works, Economic & Development Services – Planning Division, Police Department, Woodburn Fire District		FEMA, Oregon Emergency Management, Oregon Partnership for Disaster Resilience
Timeline:		If available, estimated cost:
Short Term (0-2 years)	Long Term (2-4 or more years)	
Ongoing	Ongoing	
Form Submitted by:	Woodburn Steering Committee	

Multi-Hazard #7

Proposed Action Item:		Alignment with Plan Goals:	
Continue development of CERT teams to ease the load on emergency services following a disaster.		Goal 5: Partnerships and Coordination Goal 7: Emergency Services	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The Community Emergency Response Team (CERT) Program educates people about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. Using the training learned in the classroom and during exercises, CERT members can assist others in their neighborhood or workplace following an event when professional responders are not immediately available to help. CERT members also are encouraged to support emergency response agencies by taking a more active role in emergency preparedness projects in their community. (Source: CERT website, http://www.citizencorps.gov/cert/). Woodburn has an active CERT program and further developing CERT teams can significantly ease the burden on emergency responders. • Continuing the development of CERT teams, and coordinating these efforts with other mitigation, preparedness, and response efforts can lead to a more holistic emergency management approach that will make Woodburn more resilient to natural hazards. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Seek funding to continue the development of CERT teams. • Continue to distribute information about CERT through the city’s website, and post public announcements in the local newspaper and cable TV channel. • Conduct outreach efforts to Hispanics to encourage more bilingual CERT members. Bilingual information can be disseminated using city staff that serve as liaisons to the Hispanic community. Bilingual organizations that can disseminate information to Hispanics include Nuevo Amanecer, the Salud Medical Center, and the radio stations La Pantera and Radio Movimiento. 			
Coordinating Organization:		Police Department	
Internal Partners:		External Partners:	
Woodburn Fire District, Economic & Development Services - Planning Division		FEMA, OEM, CERT Program,	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
2 years			
Form Submitted by:		Woodburn Steering Committee	

Multi-Hazard #8

Proposed Action Item:		Alignment with Plan Goals:	
Develop and equip emergency shelters to take care of residents and vulnerable populations such as the elderly, the very young, and visitors.		Goal 3: Preventative Goal 7: Emergency Services	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • In the event of a natural hazard emergency, residents as well as vulnerable populations, such as the very young, the elderly, and tourists, may need to seek shelter. The elderly, the very young, and tourists that visit the city are particularly vulnerable because they may require special accommodations. Developing and equipping emergency shelters for these populations are important to accommodate the broad range of populations found in Woodburn. • Woodburn is vulnerable to a number of natural hazards. According to Woodburn’s risk assessment, the city has a high probability and vulnerability rating to wind storms and winter storms; a high probability and moderate vulnerability to flood; and a high probability to the earthquake hazard. Any of these natural hazard events could prompt residents and visitors to seek emergency shelter. Appropriately equipping emergency shelters for these populations is important to accommodate Woodburn’s broad range of population. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Develop a list of emergency shelter needs for residents and vulnerable populations. Identify emergency shelters in the city and inventory the existing equipment and supplies in each shelter. Pre-position supplies at each city-owned public shelter, either within the structure or in a shipping container. • To ensure a reliable power supply, provide an emergency generator and fuel tank at each public shelter. • Coordinate efforts with the Red Cross. 			
Coordinating Organization:		Police Department	
Internal Partners:		External Partners:	
Woodburn Fire District, City Administration, Public Works, Economic & Development Services – Planning Division		Woodburn School District, Chemeketa Community College, Oregon Emergency Management, FEMA, Red Cross	
Timeline:		If available, estimated cost:	
Short Term (0-2 years)	Long Term (2-4 or more years)		
	4 years		
Form Submitted by:		Woodburn Steering Committee	

Multi Hazard #9

Proposed Action Item:		Alignment with Plan Goals:	
Educate businesses and governmental organizations about the importance of continuity of operations plans to make them more resilient to natural hazards.		Goal 3: Preventative Goal 5: Partnerships and Coordination	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Woodburn is vulnerable to a number of natural hazards that could affect the administration and management of local government and of local businesses. According to Woodburn’s risk assessment, the city has a high probability and vulnerability rating to wind storms and winter storms; a high probability and moderate vulnerability to flood; and a high probability to the earthquake hazard. Any of these natural hazard events could disrupt business and government activity. Educating businesses and governmental organizations about the importance of continuity of operations plans will encourage their development and assist in making local governments and businesses more disaster resilient. • Research conducted by Richard Wilson has shown that staff turnover is likely to occur after a disaster. Veteran staff is critical after a disaster. It is important to prevent turnover so that existing personnel do not have to take on extra responsibilities during an already stressful time. Continuity planning can also help lessen turnover by ensuring competitive salaries and benefits and by reducing the amount of stress staff will have to endure. • The Disaster Mitigation Act of 2000 requires communities to develop actions that reduce the impact of a natural hazard [201.6(c)(3)(ii)]. Educating businesses and governmental organizations about the importance of continuity of operations plans can encourage the development of plans and make businesses and governmental organizations more resilient to natural hazards. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Host an Open for Business training workshop, developed by the Institute for Business and Home Safety (IBHS), to educate businesses on the importance of continuity of operations plans and how to develop a plan for their business. • For governmental organizations, research and review completed continuity of operations plans to provide a foundation of expected content and issues to review. • The COOP should ensure shelter housing for critical staff and family members such as city officials, public works employees, emergency response, and others. • Assess and prioritize critical positions and resources vital to the continuance of important city functions. • Incorporate COOP into the existing Emergency Operations Plans where applicable. 			
Coordinating Organization:		Police Department, Woodburn Chamber of Commerce	
Internal Partners:		External Partners:	
All city departments		IBHS, OEM, Marion County, FEMA	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	3 years		
Form Submitted by:		Woodburn Steering Committee	

Multi Hazard #10

Proposed Action Item:		Alignment with Plan Goals:
Establish a template that documents the information FEMA wants on each hazard event.		Goal 7: Emergency Services
Rationale for Proposed Action Item:		
<p>In the event of a natural disaster, FEMA requires that a Preliminary Damage Assessment (PDA) be conducted to determine the impact and magnitude of damage. The PDA summarizes resulting needs of individuals, businesses, public sector, and the community as a whole. The PDA is considered, along with several other factors, in determining whether a disaster is of a sufficient magnitude that the response is beyond the capabilities of the State and of the local governments, and that Federal assistance is necessary. The PDA is also used as a basis for a State governor’s request for a major disaster or emergency declaration. (Source: “Preliminary Damage Assessments, www.fema.gov). Establishing a template that documents the information FEMA wants on each hazard event will assist in developing PDA’s and guiding city officials as to what they should be measuring. Furthermore, a template will provide easy access to information regarding declared disaster events and ensure that the information recorded is consistent.</p>		
Ideas for Implementation:		
<ul style="list-style-type: none"> • Coordinate development of a template with different city departments including Police, Fire, and Public Works. • Consult with Oregon Emergency Management and FEMA to determine whether the template meets the community’s and FEMA’s needs. 		
Coordinating Organization:	Economic & Development Services – Planning Division	
Internal Partners:	External Partners:	
Police, Fire, Public Works, Economic & Development Services – Planning Division	OEM, FEMA	
Timeline:	If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	
1 year		
Form Submitted by:	Woodburn Steering Committee	

Multi-Hazard #11

Proposed Action Item:		Alignment with Plan Goals:	
Obtain and use FEMA HAZUS-MH software.		Goal 7: Emergency Services	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> HAZUS-MH is a powerful risk assessment methodology for analyzing potential losses from floods, hurricane winds and earthquakes. In HAZUS-MH, current scientific and engineering knowledge is coupled with the latest geographic information systems (GIS) technology to produce estimates of hazard-related damage before, or after, a disaster occurs. Federal, State, and local government agencies can order HAZUS software free of charge from FEMA (Source: “HAZUS,” www.fema.gov). Using the HAZUS software can help to understand Woodburn’s vulnerability to floods and earthquakes and develop appropriate mitigation measures for the city. HAZUS-MH can also help to focus response and recovery efforts in the community as well. The Disaster Mitigation Act of 2000 requires communities to develop actions that reduce the impact of a natural hazard [201.6(c)(3)(ii)]. Obtaining and using FEMA HAZUS software will help to understand Woodburn’s vulnerability to floods and earthquakes and develop additional mitigation actions. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> Order the HAZUS-MH software free of charge from the FEMA Publication Warehouse. Information can be found at http://www.fema.gov/plan/prevent/hazus/index.shtm. Federal, State, and local government agencies and the private sector can order this information. Consult with the Department of Geology and Mineral Industries (DOGAMI) who has used HAZUS-MH software for several counties and cities across Oregon. Use the results from the HAZUS software to update Woodburn’s vulnerability assessment and develop appropriate mitigation actions as needed. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
Police Department, Woodburn Fire District, Economic & Development Services		OEM, FEMA, DOGAMI, Marion County	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	2 years		
Form Submitted by:		Woodburn Steering Committee	

Multi Hazard #12

Proposed Action Item:		Alignment with Plan Goals:	
Identify necessary warning system improvements.		Goal 7: Emergency Services	
Rationale for Proposed Action Item:			
<p>The Woodburn Steering Committee identified the need to improve warning systems in the city. These warning systems are necessary to let residents know of impending natural disasters or other emergency situations. Improving Woodburn’s warning systems should involve identifying the current warning systems, identifying areas where needs are not being met, and developing strategies for improving those systems or addressing those needs. Warning system evaluations should be conducted by the Police Department together with other departments to identify needs.</p>			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Conduct an evaluation of the warning system to determine needs that are not being met. • Consult with all city departments and with the county to develop recommendations for improvements. • Coordinate the Woodburn warning system with Marion County’s warning systems and with NORCOM. • Conduct public outreach efforts to make the public aware of warning systems in the community. 			
Coordinating Organization:		Police Department	
Internal Partners:		External Partners:	
Woodburn Fire District, Public Works		NORCOM, OEM, FEMA	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
2 years			
Form Submitted by:		Woodburn Steering Committee	

Multi hazard #13

Proposed Action Item:		Alignment with Plan Goals:
Improve communication equipment in City Hall and in city vehicles, and identify additional radio operators to serve as communication backup in an emergency.		Goal 7: Emergency Services
Rationale for Proposed Action Item:		
<ul style="list-style-type: none"> • The city of Woodburn has identified a number of communication equipment and staff needs to provide effective emergency communication in the city. These needs include the following: <ol style="list-style-type: none"> 1) Provide two-way radios in all city vehicles that do not current have them to provide reliable mobile communications links to the EOC. 2) Provide two-meter and 70 centimeter radio antennas at City Hall to enable amateur radio communications from City Hall and to allow City Hall to function as a backup or auxiliary EOC. 3) Provide a two-way radio at City Hall to secure a reliable communications link to city staff and the EOC and allow City Hall to function as a backup or auxiliary EOC. 4) Identify amateur radio operators who would be willing to provide communications in an emergency to provide a reliable communications link to the EOC or to report local conditions. • Implementing these needs will help to improve the communications capabilities of the city and assist in responding to an emergency. 		
Ideas for Implementation:		
<ul style="list-style-type: none"> • Seek state and federal funding to purchase radio equipment for City Hall. • Recruit amateur radio operators. • Coordinate efforts to improve communication services with the city's Emergency Operations Plan, currently being developed. • Coordinate communications efforts with the county and other communities to pool resources and avoid duplicating efforts. 		
Coordinating Organization:	Police Department	
Internal Partners:	External Partners:	
Woodburn Fire District, City Administration, Public Works	NORCOM, OEM, FEMA	
Timeline:		If available, estimated cost:
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)	
2 years		
Form Submitted by:	Woodburn Steering Committee	

Multi Hazard #14

Proposed Action Item:		Alignment with Plan Goals:	
Ensure that all critical facilities have backup power and emergency operations plans to deal with power outages.		Goal 7: Emergency Services	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • Woodburn is vulnerable to a number of natural hazards that can cause power outages. According to Woodburn’s risk assessment, the city has a high probability and vulnerability rating to wind storms and winter storms; a high probability and moderate vulnerability to flood; and a high probability to the earthquake hazard. Ensuring that all critical facilities have backup power and emergency operations plans to deal with power outages will allow for continuous service. • After hurricane Katrina, Harrison County Mississippi noted that "It is important that critical facilities function during and after disasters. Local units of government want to insure continuous service by strengthening essential facilities such as fire stations, city halls, shelters, and police stations. In addition, emergency backup generators should be provided to each critical facility."⁵ Ensuring that all critical facilities have backup power and emergency operations plans to deal with power outages will assist residents in recovering from a natural disaster as well as make the process easier. • The Disaster Mitigation Act of 2000 requires communities to identify mitigation actions that address new and existing buildings and infrastructure [201.6(c)(3)(ii)]. Ensuring that all critical facilities have backup power and emergency operations plans to deal with power outages will help protect existing buildings and infrastructure and allow for continuous service. • The Woodburn Steering Committee emphasized the need to replace the aging emergency generator at City Hall. Replacing the generator is necessary to ensure continuous emergency power to the data servers and the facilities located at City Hall. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Conduct an assessment of critical facilities to determine their priority in an emergency and whether they should have backup generators and emergency operations plans. • Seek funding from Federal and state resources to obtain generators and to develop emergency operations plans. • Coordinate obtaining generators with planning efforts for developing the Woodburn Emergency Operations Plan. 			
Coordinating Organization:		Public Works	
Internal Partners:		External Partners:	
All city departments		FEMA, OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
	4 years		
Form Submitted by:		Woodburn Steering Committee	

⁵ Source: Harrison County Community Recovery Plan. August 2006. FEMA ESF-14 in support of the state of Mississippi. p. 61.

Multi Hazard #15

Proposed Action Item:		Alignment with Plan Goals:	
Evaluate the city computer system, network, and website for the ability to function during an emergency.		Goal 7: Emergency Services	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The city's computer system, network, and website are important for allowing continuous emergency service among city staff. Conducting an evaluation of the city's computer system and its network to determine the system's ability to function during an emergency will help identify computer and network issues that may need to be resolved. Example evaluations could include assessing how the computers and network function under heavy use; whether the city's website, which is an important communication medium, can handle a large number of users; and how the computers and network will function under backup power. • After being hit by hurricane Katrina, Harrison County, MS, noted that "It is important that critical facilities function during and after disasters. Local units of government want to insure continuous service by strengthening essential facilities such as fire stations, city halls, shelters, and police stations. In addition, emergency backup generators should be provided to each critical facility."⁶ Evaluating the Woodburn's computer system, network, and website will ensure continuous service at the governmental level and will assist in providing an effective community response. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Coordinate with all departments to evaluate the city's computer system, network, and website functions under stressful situations. • Based on the evaluation, conduct a needs assessment for the city's computer and network systems. • Conduct regular evaluations to ensure continuous service. 			
Coordinating Organization:		Information Services	
Internal Partners:		External Partners:	
Public Works, Police Department, Woodburn Fire District		OEM	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
2 years			
Form Submitted by:		Woodburn Steering Committee	

⁶ Source: Harrison County Community Recovery Plan. August 2006. FEMA ESF-14 in support of the state of Mississippi. p. 61.

Multi Hazard #16

Proposed Action Item:		Alignment with Plan Goals:	
Identify mitigation projects that could be accomplished by volunteers or interns and involve them in the implementation process.		Goal 4: Funding and Implementation	
Rationale for Proposed Action Item:			
<ul style="list-style-type: none"> • The Woodburn Natural Hazards Mitigation Addendum to the Marion County Natural Hazards Mitigation Plan includes several natural hazards mitigation projects aimed at reducing Woodburn’s vulnerability. Furthermore, city staff have limited time and resources to implement these mitigation projects. Identifying mitigation projects that could be accomplished by volunteers or interns will reduce the workload on city staff and allow for more projects to be implemented. In addition, involving members of the public in mitigation can raise awareness of the importance of mitigation in saving lives and property. • The Disaster Mitigation Act of 2000 requires that communities continue to involve the public beyond the original planning process [201.6(c)(4)(ii)]. Identifying mitigation projects that could be accomplished by volunteers or interns and involving them in the implementation process will raise awareness of mitigation among members of the public and help in their implementation. 			
Ideas for Implementation:			
<ul style="list-style-type: none"> • Use the external partners listed in each mitigation action item as a starting point for identifying volunteers and interns or service organizations that could assist in implementation. • Create a volunteer coordinator position or use an existing volunteer coordinator to manage and train volunteers and interns. • Develop work plans with tasks and deadlines for each identified action item. 			
Coordinating Organization:		Economic & Development Services – Planning Division	
Internal Partners:		External Partners:	
Public Works, Police Department, Woodburn Fire District, Human Resources		OEM, Marion County, FEMA	
Timeline:		If available, estimated cost:	
<u>Short Term</u> (0-2 years)	<u>Long Term</u> (2-4 or more years)		
1 year			
Form Submitted by:		Woodburn Steering Committee	

Appendix E: Community Partners

The lists of community organizations, major housing providers, religious congregations, and medical care providers were compiled in November, 2009. These groups represent potential partners in the city’s efforts to educate and inform residents of natural hazards and appropriate preparedness measures. Contact information will become outdated over time, and the organizations serving Woodburn may change, so maintenance of these contact lists will be an ongoing task.

Table 1. Community Organizations

Organization’s Name and Contact Information	Description	Service Area	Populations Served						
			Businesses	Children	Disabled	Elders	Families	Low Income	Limited English
Chemeketa Community College 120 E. Lincoln Street Woodburn, OR 97071 (503) 981-8820	Regional Community College	City of Woodburn			✓	✓	✓		
Farmworker Housing Development Corporation 1274 Fifth Street, Suite 1-A Woodburn, OR 97071 (503) 981-1618	Local non-profit housing corporation	City of Woodburn		✓	✓	✓	✓	✓	✓
Head Start Preschool 950 Boones Ferry Road Woodburn, OR 97071 (503) 981-2963	Preschool	City of Woodburn		✓					
KCKX Cowboy Country Radio 1665 James Street Woodburn, OR 97071 (503) 769-1460	Radio station	City of Woodburn and Region	✓	✓	✓	✓	✓	✓	
La Pantera 1665 James Street Woodburn, OR 97071 (866) 981-5920	Spanish-language radio station	City of Woodburn and Region	✓	✓	✓	✓	✓	✓	✓
Mid-Willamette Valley United Way 455 Bliler Avenue NE Salem, OR 97303 (503) 363-1651	Community volunteer organization	Marion County		✓	✓	✓	✓	✓	

Organization's Name and Contact Information	Description	Service Area	Populations Served						
			Businesses	Children	Disabled	Elders	Families	Low Income	Limited English
North Willamette Valley Habitat for Humanity 225 Franklin Street Mt. Angel, OR 97362 (503) 873-0901	Regional community housing organization.	Marion County				✓	✓	✓	
Pineros y Campesinos Unidos del Noroeste (PCUN) 300 Young Street Woodburn, OR 97071 (503) 982-0243	Farmworker union	City of Woodburn and Region					✓	✓	✓
Radio Movimiento 300 Young Street Woodburn, OR 97071 (503) 981-7286	Spanish-language radio station of PCUN	City of Woodburn							✓
St. Luke Parochial School 529 Harrison Street Woodburn, OR 97071 (503) 981-7441	K-8 private school	City of Woodburn		✓					
Woodburn Chamber of Commerce 124 W. Lincoln Street PO Box 194 Woodburn, OR 97071 503-982-8221	Disseminates information to businesses and visitors	City of Woodburn	✓						
Woodburn Community Access TV 635 Glatt Circle, Suite B Woodburn, OR 97071 (503) 981-7735	Community access TV station	City of Woodburn	✓	✓	✓	✓	✓	✓	
Fraternal Order of Eagles Aerie 3284 371 S. Pacific Highway Woodburn, OR 97071 (503) 981-3011	Fraternal organization	City of Woodburn		✓	✓	✓	✓		
Woodburn Elks Lodge 2637 409 North Front Street Woodburn, OR 97071 (503) 982-2637	Fraternal organization	City of Woodburn		✓	✓	✓	✓		
Woodburn Family Learning Center 1440 Newberg Highway Woodburn, OR 97071 (503) 981-1309	Child care center	City of Woodburn		✓			✓		✓
Woodburn Fire District 1776 Newberg Highway Woodburn, OR 97071 (503) 982-2360	Local fire district	City of Woodburn	✓	✓	✓	✓	✓	✓	✓

Organization's Name and Contact Information	Description	Service Area	Populations Served						
			Businesses	Children	Disabled	Elders	Families	Low Income	Limited English
Woodburn Grange 79 425 N. Settlemier Avenue Woodburn, OR 97071	Agricultural organization	City of Woodburn							
Woodburn Independent 650 N. Lincoln Street P.O. Box 96 Woodburn, OR 97071 (503) 981-3441	Local newspaper	City of Woodburn and Region	✓	✓	✓	✓	✓	✓	
Woodburn Kiwanis (noon) P.O. Box 1046 Woodburn, OR 97071	Service organization	City of Woodburn		✓			✓		
French Prairie Kiwanis (morning) P.O. Box 374 Woodburn, OR 97071	Service organization	City of Woodburn		✓			✓		
Woodburn Latin American Club http://fiestamexicana.elhispanicnews.com	Local Latin American club	City of Woodburn	✓	✓	✓	✓	✓	✓	✓
Woodburn Masonic Lodge 3540 Myrtle Street Woodburn, OR 97071 (503) 982-4118	Fraternal organization	City of Woodburn	✓				✓		
Woodburn Proud Kelly Long - (503) 951-0321 Deb Yager – (503) 884-2246	Community organization	City of Woodburn					✓		
Woodburn Rotary Club 1475 Mt. Hood Avenue Woodburn, OR 97071 (503) 982-3937	Local community and business organization.	City of Woodburn	✓				✓	✓	
Woodburn School District 965 N. Boones Ferry Road Woodburn, OR 97071 (503) 981-9555	Local school district	City of Woodburn		✓			✓		
Woodburn Together 270 Montgomery Street Woodburn, OR 97071 (503) 982-7529	Non-profit community services youth organization.	City of Woodburn		✓			✓		

Table 2. Major Housing Providers

Housing Provider's Name and Contact Information	Description	Number of dwelling units
Barclay Square Apartments 2377 W. Hayes (503) 982-0919	Apartments	70
Belle Passi Mobile Home Park % Laura Cochran 1065 S. Pacific Highway PO Box 992 Newberg, OR 97132 (503) 554-8801	Mobile home park, outside City limits	19
Britewood Apartments 1398 E. Cleveland Street (503) 981-3210	Apartments	53
Burnwood Manor 601 Young Street (503) 981-8614	Low-income Apartments	28
Cascade Park Retirement Community 950 N. Cascade Drive (503) 981-0033	Assisted Living	141
Cascade View Apartments 311 S. Evergreen Road (503) 982-4549	Apartments	200
Chateau Mobile Village % Bradley Fleck Properties 16688 N. Pacific Highway 19390 SE Semple Road Damascus, OR 97089 (503) 981-3732	Mobile home park, outside City limits	70
Colonial Garden Assisted Living 1890 Newberg Highway (503) 982-4000	Retirement and assisted living center	47
Country Meadows Village 155 S. Evergreen Road (971) 983-1424	Independent Living	90
	Assisted Living	40
Driftwood Mobile Home Park 612 N. Cascade Drive, Space #28 (503) 982-6570	Mobile home park	94
Evergreen Estates Apartments 770 Evergreen Road (503) 982-4096	Apartments	65
Fairway Villa Apartments % Tom Wright 2103 Country Club Court 181 S. 2 nd Street Woodburn, OR 97071 (503) 951-0969	Apartments	20
Farmworker Housing Development Corporation 1274 Fifth Street, Suite 1-A	Nuevo Amanecer (1274 Fifth Street)	130 (170 planned)

Housing Provider's Name and Contact Information	Description	Number of dwelling units
(503) 981-1618	Esperanza Court (160 W. Cleveland Street)	12
French Prairie Care Center 601 Evergreen Road (503) 982-0111	Assisted Living	55
Garden View Manor 669-673 Young Street	Apartments	35
Harvard Meadow Apartments 300 S. Evergreen Road (503) 981-4600	Apartments	134
Hayesvilla Apartments 1315-1341 W. Hayes Street	Apartments	15
Heritage House 943 N. Cascade Drive (503) 982-1506	Assisted Living	15
Lazy Acres% Bradley Fleck Properties 1210 Brown Street 19390 SE Semple Road Damascus, OR 97089 (503) 981-3732	Mobile home park, outside City limits	30
Lincoln Park Condominiums 1030-1060 Park Avenue	Condominiums	26
Marion County Housing Authority 555 Court Street N.E. PO Box 14500 Salem, OR 97309 (503) 373-4448	Wood Park Terrace (1025 Park Avenue)	52
	Hazelwood Estates (675-955 Carol Street)	32
	Farmdale Apartments (1219-1233 W. Lincoln Street)	50
Panor 360 Condominiums 950 Evergreen Road (503) 981-6059	Retirement condominiums	90
Park Avenue Apartments 1469 Park Avenue (503) 981-3388	Apartments	26
Park View Village Condominiums 1740 Park Avenue	Condominiums	34
Parr Acres Mobile Home Park 863 Harvest Way (503) 981-7277	Mobile home park	115
Shalimar Estates 765 S. Pacific Highway (503) 981-1751	Mobile home park	52

Housing Provider's Name and Contact Information	Description	Number of dwelling units
Silver Creek Assisted Living 703 Evergreen Road (503) 981-4142	Assisted Living	52
Stonehedge Court 1601 N. Front Street #280 (503) 981-0054	Apartments	192
Twin Oaks Apartments 1560 Newberg Highway, Apt. #1 (503) 982-3324	Apartments	32
Villa Verdante 100 Gatch Street (503) 982-5205	Apartments	20
Village by The Green 1200 Country Club Road (503) 981-6058	Apartments	72
Woodburn Mobile Estates 11823 Carl Road N.E. (503) 981-6818	Mobile home park, outside City limits	39
Woodburn Senior Estates Mobile Park 1999 Jansen Way (503) 981-0967	Mobile home park	85
Woodburn West Mobile Estates 1 Juniper Circle (503) 981-6600	Mobile home park	81
Tierra Lynn Terrace 1375 Tierra Lynn Drive	Apartments	24
Victorian Apartments 1578A James Street (503) 982-0254	Apartments	24

Table 3. Religious Congregations

Congregation	Contact Information
Apostolic Assembly in the Faith of Christ Jesus / Free Methodist	280 Gatch Street (503) 981-1633
Apostolic Church of Jesus Christ	773 Bryan Street (503) 981-5207
Bahais of Woodburn	824 Harvest Way
Casa de Sión / House of Zion Christian Fellowship	438 Ogle Street (503) 981-9130 / (503) 981-8042

Congregation	Contact Information
Casa Metodista United Methodist Church / Woodburn Hispanic Ministry	612 4 th Street (503) 982-9364
Centro Cristiano / Assembly of God	255 W. Lincoln Street (503) 390-5231
Christian Science Society	195 E. Lincoln Street (503) 981-7471
Church of Christ	1560 W. Hardcastle Avenue (503) 981-1298
Church of God	1530 Mt. Hood Avenue (503) 981-1660 / (503) 981-1661
Church of Jesus Christ of Latter-Day Saints	1000 Country Club Road (503) 981-3354
Church of the Nazarene	3601 Newberg Highway (503) 981-9070
Community of Christ	1220 5 th Street (503) 981-9030
Faith Christian Fellowship / Assembly of God	602 Young Street (503) 981-7926
First Presbyterian Church	950 N. Boones Ferry Road (503) 981-9121
First Reformed Christian Molokan Church	995 Belle Passi Road NE P.O. Box 1056
Foursquare Gospel Church / Woodburn Worship Center	1175 E. Lincoln Street (503) 981-5581
Hope Lutheran Church	211 Parr Road (503) 981-0400
House of Zion Lutheran Church	1430 E. Cleveland Street (503) 981-8042
Iglesia Pentecostés	198 E. Lincoln Street (503) 981-7559
Immanuel Lutheran Church	1036 E. Lincoln Street (503) 981-1036
Jehovah's Witnesses	1490-1510 N. Pacific Highway (503) 981-6692 / (503) 981-3350
Mid-Valley Community Church	591 Gatch Street (503) 981-1911
Seventh Day Adventist Church	1253 5 th Street (503) 981-6216
Seventh Day Adventist Church (Spanish)	782 Willow Avenue (503) 981-6422

Congregation	Contact Information
St. Luke Catholic Church	417 Harrison Street (503) 981-5011
St. Mary's Episcopal Church	1560 W. Hayes Street (503) 982-6262
Theotokos Kursk Icon Chapel	1250 W. Hardcastle Avenue (503) 981-1627
United Methodist Church	700 N. Cascade Drive (503) 982-2891
Woodburn Christian Church	126 Workman Drive (503) 981-9423
Woodburn Evangelical Church	1420 Newberg Highway (503) 982-4266

Table 4. Medical and Veterinary Care Providers

Care Provider	Contact Information
Companion Pet Clinic	1683 Mt. Hood Avenue (503) 981-6709
DaVita Dialysis Center	2245 Country Club Road (current) 1840 Newberg Highway (after February, 2010) (503) 982-2005
Evergreen Family Care	685 Evergreen Road (503) 982-2212
Legacy Clinic	1002 N. Boones Ferry Road (503) 981-9526
Salud Medical Clinic	1175 Mount Hood Avenue (503) 982-2000
Tukwila Center for Health & Medicine	693 Ray J. Glatt Circle (503) 982-4878
Wellspring Medical Center	1475 Mount Hood Avenue (503) 982-1289
Woodburn Ambulance Service	1034 N. Boones Ferry Road P.O. Box 584 (503) 982-4699
Woodburn Family Medicine	1390 Meridian Drive (503) 982-2174
Woodburn Internal Medicine	693 Ray J. Glatt Circle (503) 982-0403
Woodburn Pet Hospital	985 Evergreen Road (503) 981-4622
Woodburn Veterinary Clinic	225 S. Pacific Highway (503) 982-2421