Resolution 634

Adopting Updates to the City of Aurora Addendum to the Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan

Whereas, the City of Aurora recognizes the threat that natural hazards pose to people, property and infrastructure within our community; and

Whereas, undertaking hazard mitigation actions will reduce the potential for harm to people, property and infrastructure from future hazard occurrences; and

Whereas, an adopted Natural Hazards Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, the City of Aurora adopted the *City of Aurora Addendum to the Marion County Natural Hazards Mitigation Plan*, on November 10, 2009 by Resolution NO 594, and

Whereas, Marion County has subsequently completed an update to the *Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan* of which the City of Aurora is party to; and

Whereas, the City of Aurora has updated its addendum to the *Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan* to reflect new information contained therein through the creation of a new appendix (*Appendix E*), and

Whereas, the Oregon Office of Emergency Management and Federal Emergency Management Agency, Region X officials have reviewed the *Marion County, Multi-Jurisdictional Natural Hazard Mitigation Plan* and *Appendix E* of the *City of Aurora Addendum to the Marion County Natural Hazards Mitigation Plan* (both dated, January 2011) and pre-approved them (dated, April 21, 2011) contingent upon this official adoption of the participating governments and entities;

Now, therefore, be it resolved, that the City of Aurora adopts *Appendix E: City of Aurora Addendum to the Marion County Natural Hazards Mitigation Plan 2011 Amendments and Update*; and

Be it further resolved, with adoption of *Appendix E*, the *City of Aurora Addendum to the Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan* is updated to reflect the changes identified in said appendix, and

Be it further resolved, that the City of Aurora will submit this Adoption Resolution to the Oregon Office of Emergency Management and Federal Emergency Management

Agency, Region X officials to enable final approval of the *City of Aurora Addendum to the Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan.*

PASSED BY THE COUNCIL AND APPROVED BY THE MAYOR, THE 12 day of July, 2011

Jim Meirow, Mayor

ATTEST:

Kelly Richardson, City Recorder

RESOLUTION NO. 594

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

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

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

WHEREAS, the City of Aurora 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 of Aurora's representatives and staff have identified natural hazard risks and prioritized a number of proposed actions and programs needed to mitigate the vulnerabilities of the City of Aurora 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 COMMON COUNCIL OF THE CITY OF AURORA RESOLVES AS FOLLOWS:

Section 1. The Common Council of the City of Aurora 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 Aurora and Marion County,

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

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

Section 4. The City of Aurora 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 Aurora will further seek to encourage the businesses, industries and community groups operating within and/or for the benefit of the City of Aurora to also participate in the updating and expansion of the Marion County Multi-Jurisdiction Hazard Mitigation Plan in the years ahead.

PASSED BY THE CITY COUNCIL AND APPROVED BY THE MAYOR, the 10th day of November, 2009.

Jim Meirow, Mayor

ATTEST:

Laurie Boyce CMC

Laurie Boyce, CMC, City Recorder

Hi Laurie,

Please let me know if this one damaged & I will re-send.

Also, remember to include the adoption letter in this binder, along with FEMA's formal approval letter (when it comes).

-Megan

City of Aurora

Addendum to the Marion County Natural Hazards Mitigation Plan

Report for
City of Aurora
21420 Main Street N.E.
Aurora, OR 97002

Prepared by:
Oregon Partnership for Disaster Resilience
1209 University of Oregon
Eugene, OR 97403

November 2009

PARTNERSHIP FOR DISASTER RESILIENCE
WWW.OREGONSHOWCASE.ORG

Table of Contents

Section 1: Planning Process

Overview

Aurora 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 Aurora, 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 land use plans, storm water management plans, or water management conservation plans. The actions described in the addendum are intended to be implemented through existing plans and programs within the city.

How was the Addendum Developed?

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 two representatives served as steering committee members for the city of Aurora's natural hazard mitigation planning process.

- Laurie Boyce, Aurora City Recorder
- Kelly Richardson, Aurora Administrative Assistant

Because of the city's small size (population 970), the representatives listed above served as the city's primary contributors to the planning process. Additional stakeholders were incorporated at various points throughout the planning process to ensure representative contribution.

The planning process and associated resources used to create Aurora'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 addendums.

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 work session 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 subsequently developed Section 3 below for the city of Aurora. 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 Aurora. 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 Aurora'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. The following stakeholders were identified by Aurora's steering committee members, and contacted via email to participate in the survey:

- City of Aurora Finance Officer
- City of Aurora Police Chief
- Aurora Fire Chief (Aurora Rural Fire Protection District)
- City of Aurora Public Works Superintendant
- Aurora City Mayor
- North Marion School District – Public/Private Schools K-12
- G Cam, LTD-Building (Local Developers / Realtors)
- Canby Herald Reporter (Local Newspaper)

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.

In-Depth Interviews

Due to Aurora's limited number of steering committee members, the following people were contacted via email to participate in reviewing plan drafts, and more specifically, to comment on the city's risk assessment in Section 3 of the addendum. Stakeholders were identified by the city's steering committee as uniquely knowledgeable residents.

- Dick Johnson, Former Public Works Superintendant
- Karen Townsend, Aurora Historic Review Board Member
- Diane Anderson, Aurora Historic Review Board Chairman

Plan Review

The city's steering committee served as the primary plan reviewers. Upon completion of a final draft addendum, the city issued a press release that described the city's planning efforts, and requested public feedback on the final draft addendum. Please see Appendix A for a copy of the press release.

Press release language was also posted at the local General Store, in addition to the Aurora Post Office, and the Bulletin Board at City Hall. The public was given three weeks to read and comment on the plan. No comments were received.

Marion County's project webpage on *The Partnership* website (www.OregonShowcase.org) hosted plan drafts. The final adopted and approved addendum will be posted on the University of Oregon Libraries' Scholar's Bank Digital Archive.

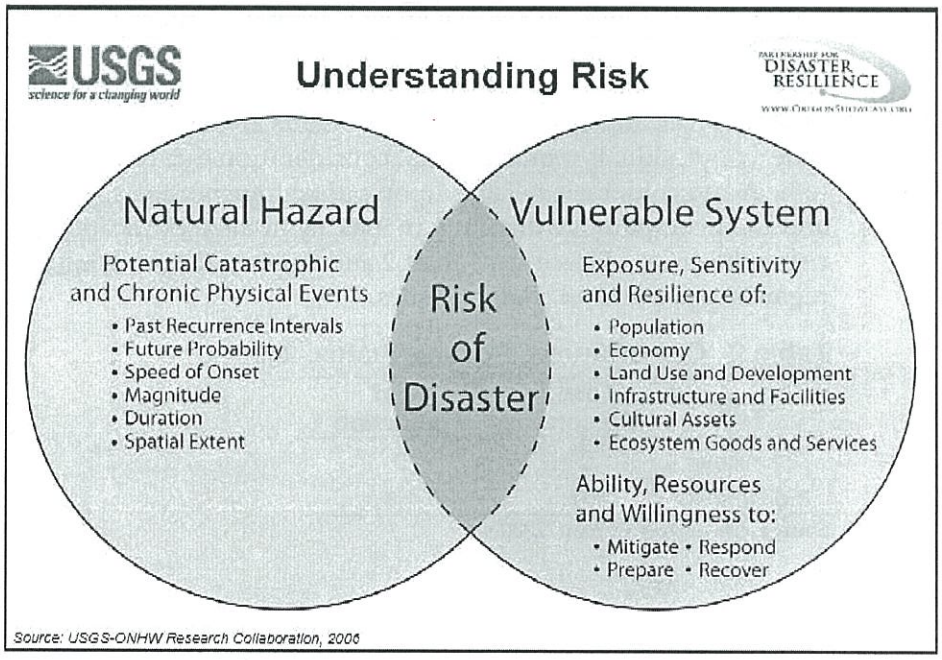
Adoption

The city of Aurora 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 Aurora 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 below, along with the risk assessments, should be used as the local level rationale for the city's risk reduction actions identified at the end of this addendum in Appendix D. 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 Risk[i]



Geography & Climate

The city of Aurora is located in the Willamette Valley in Marion County, Oregon, approximately 23 miles south of the city of Portland. Aurora experiences a moderate climate with an average high temperature of 82

degrees and low of 50 degrees in August, and an average high temperature of 45 and low of 32 in January.[ii] The city receives an average annual precipitation of 40.67 inches.[iii] Aurora is located on a gently sloping hill bordered by Mill Creek to the west and the Pudding River to the east. Surrounding the rural community is hilly farm and forest land.

Population & Demographics

Aurora has been a small community since it was incorporated in 1893, but over the past ten years, the city has grown significantly. In 2008, Aurora's population was estimated to be 970, an increase of 48 % since 2000 (see Table 1 below).

Table 1. Aurora Population Change, 2000-2008

Year	Population	% Change
2000	655	-
2008	970	48%

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, 80% of the disaster burden falls on the public. Of this number, a disproportionate burden is placed upon special needs groups, particularly children, the elderly, the disabled, minorities, and low income persons. Portions of Aurora's population fall into these special needs groups. Almost 4% of the city's population, or 22 people, speak English less than very well.[v] Additionally, 1.6% of all working individuals in 2000 were living below the federal poverty level, and 13% of the city's residents are 65 years of age or older. 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. Please see Tables 2 and 3 below for more information regarding population characteristics.

Table 2. City of Aurora Poverty Status, 2000

Type	Total Persons	% of Population
Families	0	0
Individuals	10	1.6

Source: US Census Bureau, 2000.[vi]

Table 3. City of Aurora Population by Age, 2000

Age Range	Total Persons	% of Population
Under 5 Years	47	7%
5-19 Years	128	20%
20-44 Years	213	33%
45-64 Years	181	28%
65+ Years	86	13%
Total	**655**	**100%**

Source: US Census Bureau, 2000.[vii]

Employment & Economics

Historically, Aurora's economy focused on agriculture and manufacturing, which remain major employment sectors today. The city also has large heritage tourism component, which capitalizes on Aurora's history as a religious colony and large number of historic buildings dating to the 1850s. Aurora is also known as the "Antique Capital," and the city's downtown has several large antiques retailers which draw a number of visitors to the community. Table 4 shows employment by major industry for the city of Aurora. Manufacturing, retail, and health and education services are Aurora's largest employment sectors.

Table 4. City of Aurora Employment by Major Industry

Industry	Total Persons Employed	% of Population
Educational, health and social services	61	20.7
Retail trade	54	18.3
Manufacturing	46	15.6
Construction	27	9.2
Public administration	22	7.5
Finance, insurance, real estate, and rental and leasing	21	7.1
Transportation and warehousing, and utilities	16	5.4
Professional, scientific, management, administrative, and waste management services	13	4.4
Agriculture, forestry, fishing and hunting, and mining	9	3.1
Information	8	2.7
Arts, entertainment, recreation, accommodation and food services	8	2.7
Wholesale trade	5	1.7
Other services (except public administration)	5	1.7

Source: US Census, 2000.[viii]

Median income can be used as an indicator of the strength of the region's stability. In 1999, the median household income in Aurora was $55,938, nearly $14,000 more than the national median household income, and $15,624 more than Marion County's median household income.[ix] Given

the high median incomes in Aurora, the city is relatively economically stable, but it may not be reflective of all residents. As noted in Table 2, 1.6% of the population is considered 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 2000, Aurora had 262 housing units. Of those, 95.4% were occupied (250) and 4.6% were vacant (12).[x] Of the occupied housing units, 84.8% (212) units were owner-occupied and 15.2% (38) units were renter-occupied.[xi]

Aurora also has a large number of older housing structures that may be vulnerable to earthquakes. 70% of the housing units were built before 1980 when more stringent seismic codes were put into place (see Table 5 below).

Table 5. City of Aurora Housing Structure Age, 2000

Year Built	Total Structures	% of Structures
1999 to March 2000	5	2.1
1995 to 1998	22	9.2
1990 to 1994	29	12.1
1980 to 1989	16	6.7
1970 to 1979	74	30.8
1960 to 1969	29	12.1
1940 to 1959	22	9.2
1939 or earlier	43	17.9

Source: US Census 2000.[xii]

In addition, Table 6 shows that 80% of the homes in Aurora are single-family housing units. Mobile homes represent 17% of Aurora's housing units. Mobile homes tend to be less disaster resistant, and thus warrant special attention in the city's risk assessment.

Table 6. City of Aurora Housing Type, 2000

Housing Type	Total Structures	% of Structures
Single-Family Unit	191	79.6
Duplex	2	0.8
Multi-Family 3 to 4 units	6	2.5
Mobile home	41	17.1
Boat, RV, van, etc.	0	0

Source: US Census 2000.[xiii]

Land Use & Development

The land area within the city of Aurora spans a total of 365.8 acres within the city limits and the UGB.[xiv] As of 2001, 160.65 acres are vacant and suitable for development.[xv] However, given the rapid population growth that occurred since 2001, this figure may be smaller. Within the city limits, land is zoned low-density residential, moderate density residential, commercial, and industrial. Approximately 19 acres of city land are in the floodplain, and 33 acres are outside the city limits but within the UGB.[xvi] The Comprehensive Plan states that development in the floodplain is inappropriate due to frequent flooding on Mill Creek and the Pudding River.[xvii]

Aurora is constrained by both natural and man-made boundaries that restrict future growth. In the southeast portion of the city, Mill Creek and the Union Pacific Railroad define the city's western boundary, and the Pudding River defines the eastern boundary, forcing the majority of future growth to occur in the south along Highway 99E. The northwest portion of the city is constrained to the east by Mill Creek, to the north by the Aurora State Airport, forcing future growth to occur to the west. The new sewer system completed in 2001 will likely facilitate continued growth in the city.

Transportation

Aurora is connected to several large cities by a number of highway connections that run through or near the city. Highway 99E is the major state highway that runs through the center of the town, connecting Aurora with Canby to the north and Woodburn to the south. Running parallel to Highway 99E is the Union Pacific Railroad. The east-west Ehlen Road links Aurora to Highway 551 and Interstate 5, which connects Aurora to Wilsonville and Portland to the north and Woodburn to the south. Aurora's accessibility has encouraged commercial and industrial development along Highway 99E.

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 7

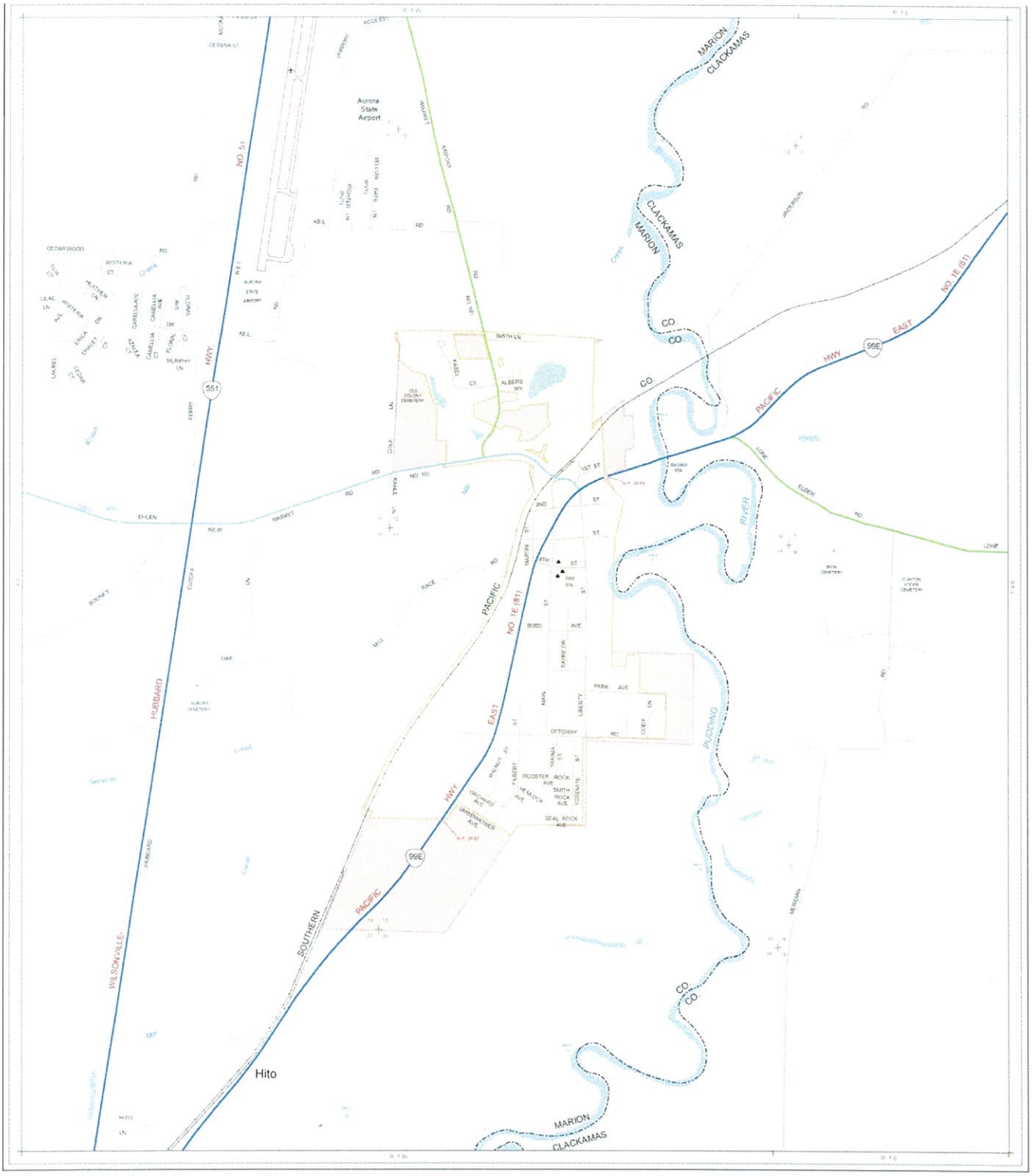
represents the different methods that city Aurora residents use to travel to work. Figure 2 shows the major transportation networks that run through Aurora.

Table 7. Transportation Mode Used to Commute to Work, Aurora, 2000.

Mode of Commute	Number of Residents	% of Residents
Car, truck, or van -- drove alone	223	76.4
Car, truck, or van -- carpooled	32	11
Worked at home	25	8.6
Walked	10	3.4
Other means	2	0.7
Public transportation (including taxicab)	0	0
Mean travel time to work (minutes)	**24.3**	-

Source: US Census 2000.[xviii]

Figure 2 Aurora Transportation Map



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, public works shops, and water and waste water treatment facilities. The city of Aurora houses the City Hall; a fire station for the Aurora Rural Fire Protection District; the Aurora Police Station; a wastewater treatment plant completed in 2001 with a maximum capacity of 2000 residents; and a water treatment plant that treats water drawn from 2 city wells. [xix]

Outside of the city limits but within the general vicinity of the city are the school buildings operated by the North Marion School District and the Aurora State Airport located north of the city. Health services are provided by Meridian Park Hospital in Tualatin, Willamette Falls Hospital in Oregon City, Silverton Hospital in Silverton, Providence Medical Center in Newburg, and the Salem General Hospital.

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.

The city of Aurora has a unique collection of historic buildings that date to its founding as a religious commune in 1856. Aurora established Oregon's first historic district in 1974 which encompasses 150 acres of the city and includes 21 buildings and historic sites.[xx] The Aurora Old Colony Historical Museum is the focal point of the historic district and hosts several annual events interpreting Aurora's history. Major events hosted by the museum include the Fiber Faire hosted by the Aurora Colony Hand-spinners Guild in March and the Strawberry Social held in June. The historic buildings and museum are significant to Aurora's identity and attract many tourists to the community.

Buildings listed on the National Register of Historic Places include the following:

1. Old Aurora Colony Museum
2. Giesy (Emma Wagner) House, or "Kraus House"
3. Steinbach Log Cabin
4. Keil Cemetery
5. Snyder (Andrew) House
6. Snyder House
7. Fty (William) House
8. Smith (Stephen) House
9. Small Board and Batten House
10. Octagonal Building

11. Colony Store and Hall (Aurora Food Market)
12. Keil (Frederick) House, Synonymous with Elias Keil House
13. Geisy (John) House
14. Miller (Jacob) House
15. Miller House
16. Colony Hotel Site
17. Colony Dam and Mill Pond Site
18. "California" Store Front
19. Sites of Colony Spinning, Lumber and Grist Mills
20. Site of Wilhelm Keil's Gras Haus
21. Site of Aurora Colony Church

Government Structure

The city of Aurora is governed by a mayor/council non-partisan form of government. City staff information is as follows:

City Staff - Office:
City Recorder
Administrative Assistant
Finance Officer

City Staff - Public Works
Public Works Superintendant
Public Works Assistant
Wastewater Treatment Plant Operator

City Staff - Police Department
Police Chief
Two full time police officers
Police Records Clerk

The Municipal Court is located at Aurora City Hall, but the court sessions are held at the American Legion Hall.

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. [xxi]

The city of Aurora'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 8 below lists the plans and policies already in place in Aurora.

Table 8. Aurora Plans and Policies

Name & Date of Last Revision	Author/ Owner	Description	Relation to Natural Hazard Mitigation
Comprehensive Plan, 2009 (Update)	City of Aurora	Establishes the city's authority to plan for and deal with issues related to the future development of Aurora.	• Explains the flood, steep slope, and erosion hazards found in Aurora. • 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.
Development Code, 2002	City of Aurora	Provides regulations for future development in the city of Aurora.	• The flood hazard zone (FH) provides guidance on development in the floodplain. Action items should be linked to regulations listed for this zone. • Chapter 16.48 provides regulations for steep slopes and other natural features. Action items can be linked to regulations listed for these areas.
Downtown Plan, 2000	City of Aurora	Includes recommendations for redesigning downtown Aurora.	Actions addressing roadways or hazard issues found in downtown Aurora can be linked to the downtown plan.
Transportation System Plan, 2009 (Update)	City of Aurora	The Transportation System Plan serves as a guide for the city of Aurora to manage their existing transportation facilities and to plan for the development of future transportation facilities.	Mitigation actions relating to improving transportation facilities should be linked with goals and policies found in the transportation system plan.
Water System Master Plan, March 2009 (Update)	City of Aurora	The Water System Master Plan provides the city with a comprehensive planning document that presents detailed water system information, engineering assessment, and planning guidance necessary for the successful management and operation of the city's water system.	Mitigation actions related to the infrastructural elements of the water system should be added to, and implemented in consideration of the city's Water System Master Plan.
Water Management and Conservation Plan, June 2009	City of Aurora	The Water Management and Conservation Plan strives to create a practical balance between the development of new sources of water, increasing population, and issues of conservation.	Mitigation actions related to drought, and/or water management and conservation should conform to the Water Management and Conservation Plan's mission and plan objective. Where possible, mitigation actions dealing with drought hazards and/or water management issues should be added to, and implemented in consideration of the city's Water Management and Conservation Plan.

Community Organizations & Programs

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

Table 9 below highlights community organizations and programs within the city that may be potential partners for implementing mitigation actions. The table includes information on each organization or program's service area, types of services offered, populations served, and how the organization or program could be involved in natural hazard mitigation. The three involvement methods include:

- 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 and/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.

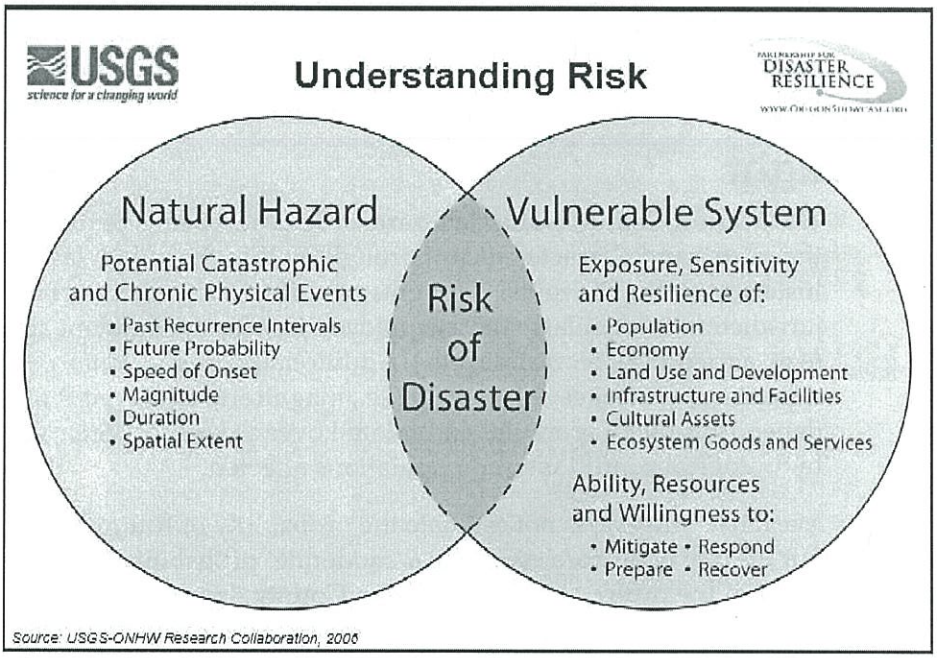
Table 9. Community Organizations and Programs

Name and Contact Information	Description	Service Area	Populations Served						Involvement with Natural Hazard Mitigation
			Businesses	Children	Disabled	Elders	Families	Low Income	
American Legion Hall 21510 Main St NE, Aurora, OR, 97002, phone: (503) 678-5793	Serves as a local community center.	City of Aurora		✓	✓	✓	✓	✓	• Education and outreach • Information dissemination
Aurora Colony Historical Society 15018 Second Street NE Aurora, OR 97002 (503) 678-5754	Interprets Aurora's history and manages historic buildings in the community.	City of Aurora		✓	✓	✓	✓	✓	• Education and outreach • Information dissemination
Aurora Chamber of Commerce 15018 2nd St NE, Aurora, OR 97002-9220, phone: (503) 678-2288	Represents the local businesses and disseminates information to businesses and visitors.	City of Aurora and surrounding Marion County	✓						• Education and outreach • Information dissemination

Section 3: Risk Assessment

This section expands on Marion County's Natural Hazards Mitigation Plan by addressing Aurora'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 Section 2: 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 the figure below.

Figure 3 Understanding Risk[xxii]



The following hazard assessments describe each hazard's probability of future occurrence within Aurora, 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 Aurora 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. Droughts 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 over a period of time, as well as hydrological conditions and populations affected.

Marion County does not estimate the probability of future drought events, but the city of Aurora estimates a 'moderate' probability that droughts will occur in the future. Likewise, Marion County does not estimate a specific level of vulnerability to drought events, but adequately describes common drought-related impacts. The city of Aurora estimates a 'moderate' vulnerability to droughts. Domestic water-users are the most likely populations to be affected by drought conditions, and could be subject to rationing and/or conservation measures in the future. The city of Aurora completed the development of a Water Management and Conservation Plan in June 2009, to prepare for and/or accommodate drought conditions when and if they occur.

Currently, the city draws water from two wells, and there's a 300,000 gallon water reservoir that was built in 1990. The aquifer that supplies Aurora's water is accessed regionally. An aquifer study was conducted for the city of Aurora in January 2005, but the city's steering committee has concerns that the supply may be inadequate for future growth projections (both in Aurora and neighboring communities). In the past, Aurora's water supply has been limited during events in which fire-fighting efforts draw significant portions of water from the storage reservoir and/or wells.

Following such events, the water table can go down quite a bit, and affect the city's water supply for up to several weeks. Additional drought-related impacts are adequately described within Marion County's NHMP.

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 4-7 further detail the city's earthquake-related landslide, amplification, and liquefaction risks. Earthquakes are fairly infrequent occurrences, but have affected Marion County and Aurora in the past. The city of Aurora agrees that the county's historical account is accurate, and noted that some older homes in Aurora experienced foundational damages in the 1993 Scotts Mills Earthquake. Across the region, the Scotts Mills Earthquake caused about $28 million in damages.

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 2005, 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.[xxiii] Crustal and deep intraplate earthquakes remain difficult to predict.

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 Aurora. The extent of structural damages, injuries and deaths will depend upon 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, dams, transportation systems, utility and communication networks, and lifelines including water, sewer, storm-water and gas lines are particularly at risk. Additionally, damages to roads and water systems will make it difficult to respond to post-earthquake fires. The following additional vulnerabilities were identified by the city's steering committee and stakeholders:

- Two bridges provide primary access to the city from Interstate 5 and Highway 99E: the Mill Creek Bridge, and the Pudding River Bridge. If either collapsed, transportation in and out of the city would require lengthy detours. This would be particularly concerning for residents requiring medical attention (e.g., hospitals in Oregon City, Silverton, Newberg, Tualatin, and Salem). Additionally, Aurora is essentially a bedroom community to larger nearby cities, and most residents rely on

transportation networks for access to employment, medical care, shopping, services, etc. Highway 99E and Interstate 5 are particularly important for travelers in and out of the community. The few local businesses in town also rely on tourists and out-of-town visitors.

- There are no certified red-cross shelters in Aurora, and the city has not identified any in-town evacuation sites. Likewise, the city is currently not capable of providing temporary shelter or housing, unless it's provided on an ad-hoc basis. The city's steering committee believes that the American Legion Building and North Marion High School could be potential [impromptu] evacuation sites, but the stability of these buildings is unknown.
- The city has several historic buildings, which are likely susceptible to ground-shaking motion including amplification and liquefaction (in parts). As shown in Table 5 above, approximately 70% of Aurora's housing units were built before 1980 when more stringent seismic codes were put into place.
- Areas and/or events with high concentrations of persons include the American Legion Hall, which holds court the first and third Tuesdays of every month and church services every Sunday morning; the Aurora Presbyterian Church & Christ Lutheran Church on Sundays; the McLaren Auction House (some evenings); City Hall on some weekday evening; the Aurora Historical Museum which holds the Strawberry Social in June, and the Colony Hand Spinners Guild in March; and finally, the city of Aurora sponsors the Aurora Colony Days Festival in August. The buildings that house these events would ideally be assessed for structural stability.
- City records, including finances, utility billing records, payroll accounts, etc. are located in City Hall. The city's steering committee identified City Hall as potentially unstable in earthquake events. City records are not backed-up, and there are no external hard drives. City staff is currently working on finding a back-up system that can happen off-site. Additionally, the city's Police Department is located in City Hall.
- The city currently does not have any policies in place to address post-disaster redevelopment.
- City Hall would likely shut down without power, even if the building did withstand seismic activity.
- The Aurora Rural Fire Protection District is located within city limits, but is separate in terms of jurisdictional boundaries. Several of the fire fighters' homes are located outside city limits; as such, they may not be able to access the city in an emergency that disrupts transportation networks & bridges.

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.[xxiv] Buildings were ranked for

their "probability of collapse" due to the maximum possible earthquake for any given area. Within the city of Aurora, the following buildings were rated:

- North Marion High School (High)
- North Marion Intermediate School (Low)
- North Marion Middle School (Low)
- North Marion Primary School (Low)
- Aurora Rural Fire Protection District Station (Moderate)
- Aurora Police Department (Moderate)

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

Figure 4 Amplification Hazards

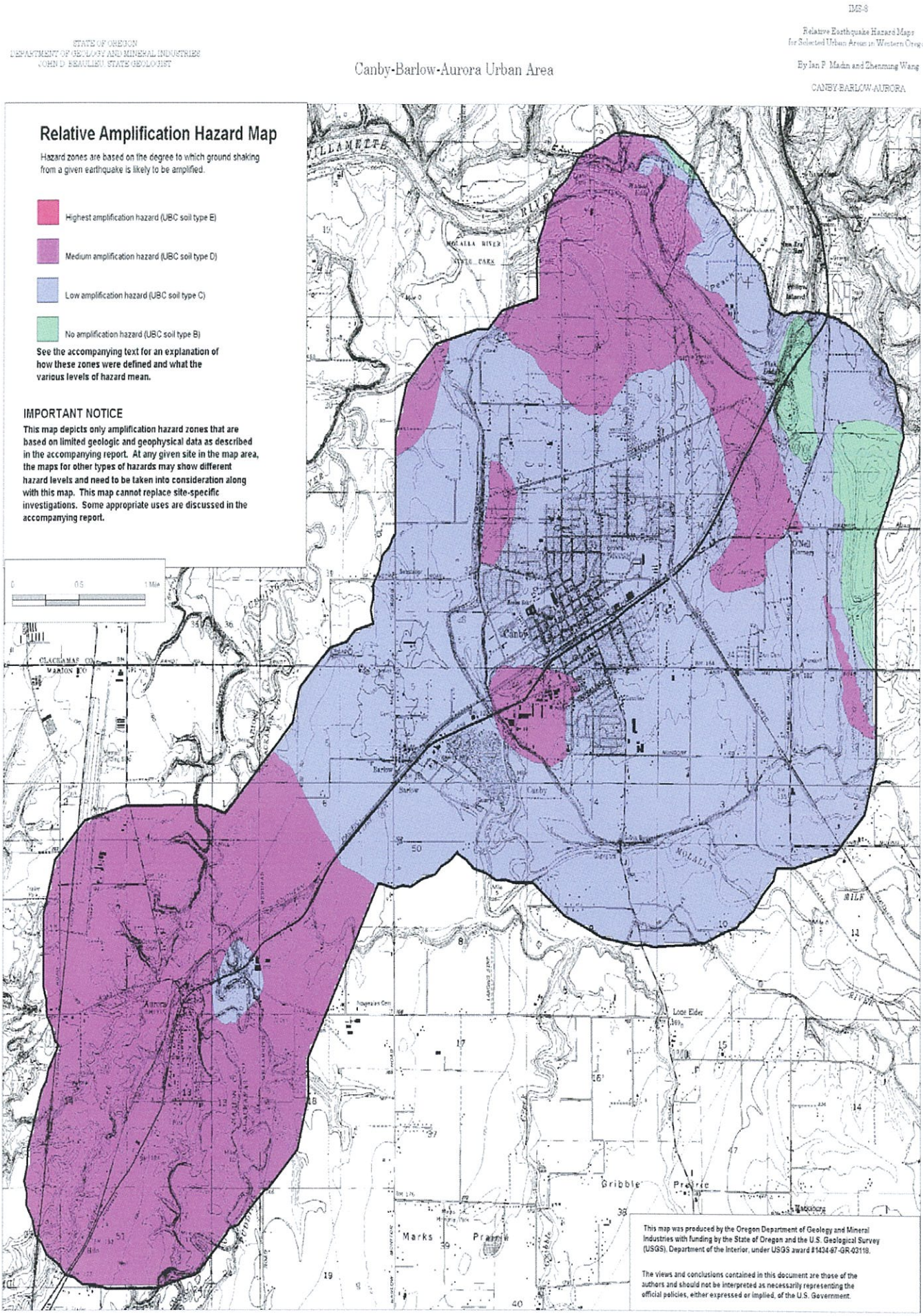


Figure 5 Liquefaction Hazards

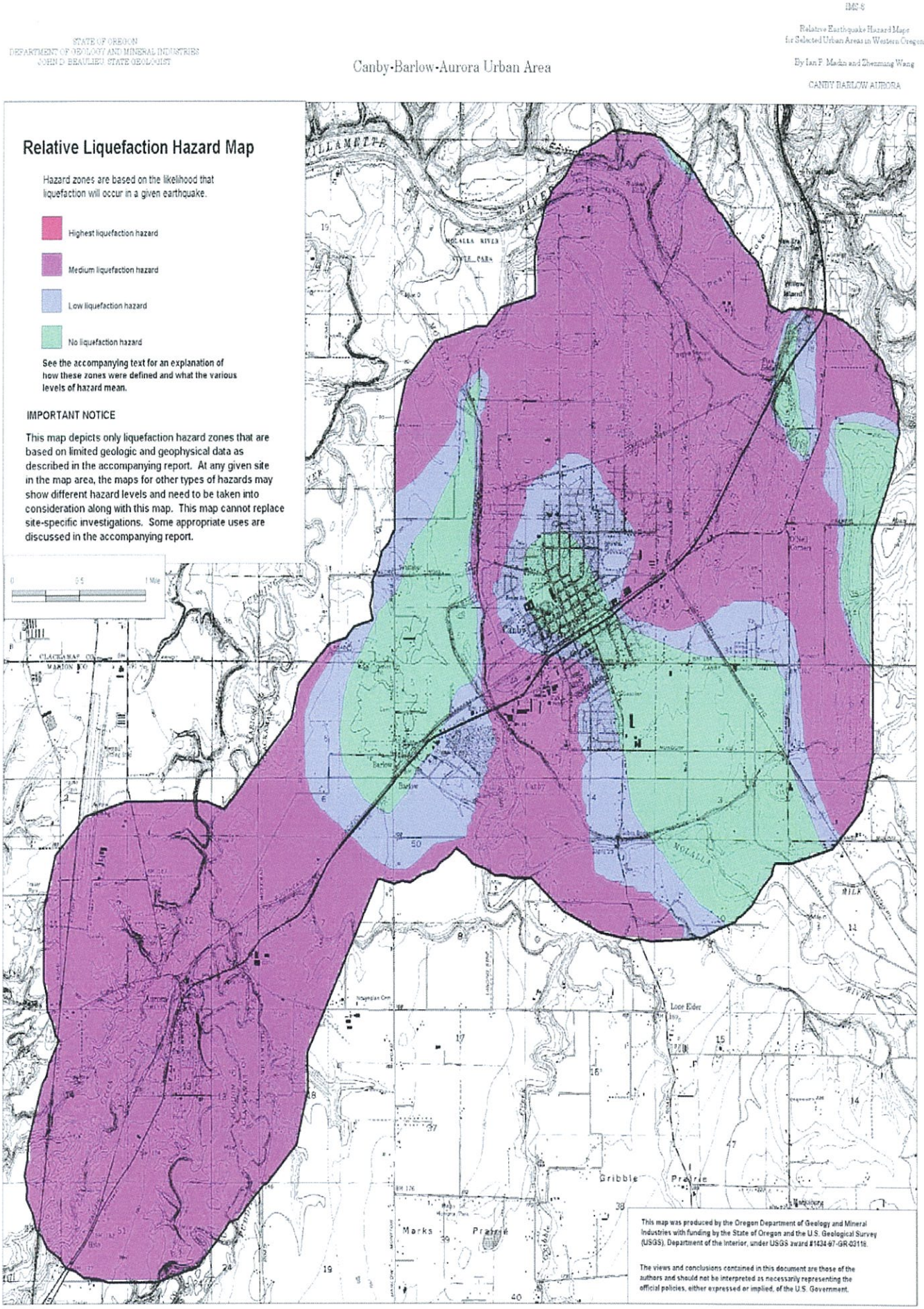


Figure 6 Earthquake-Induced Hazards

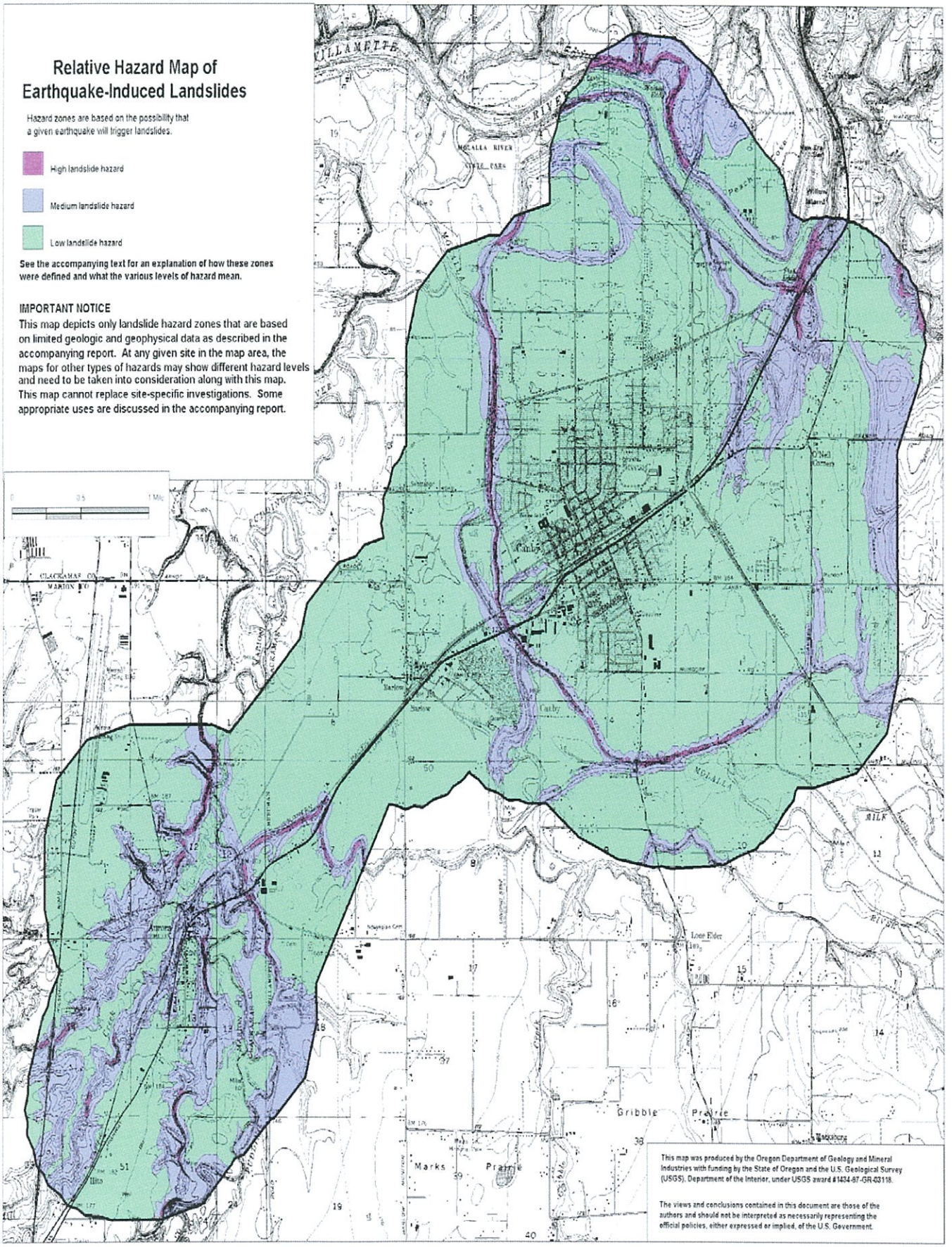
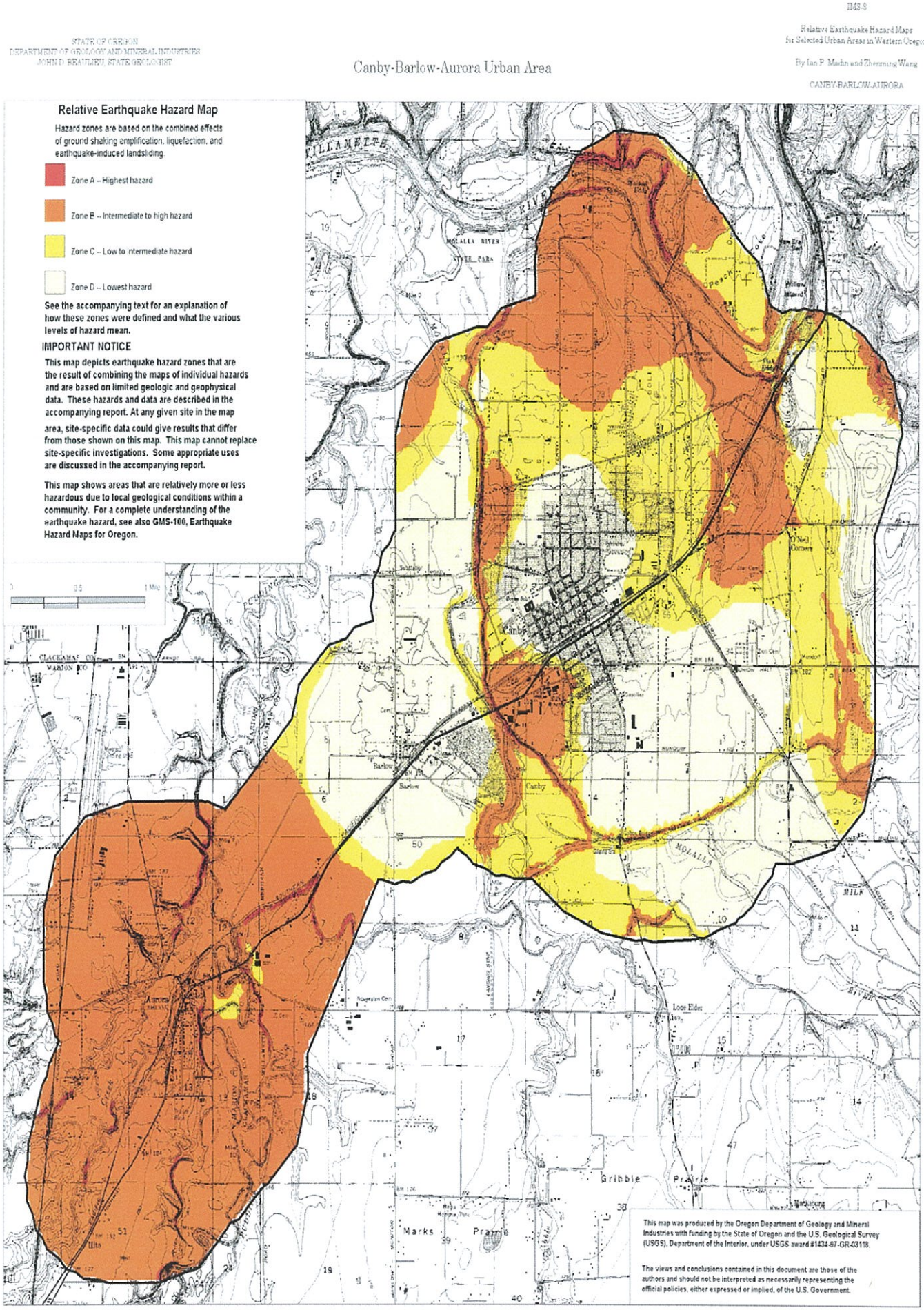


Figure 7 Relative Earthquake Hazard



Flood

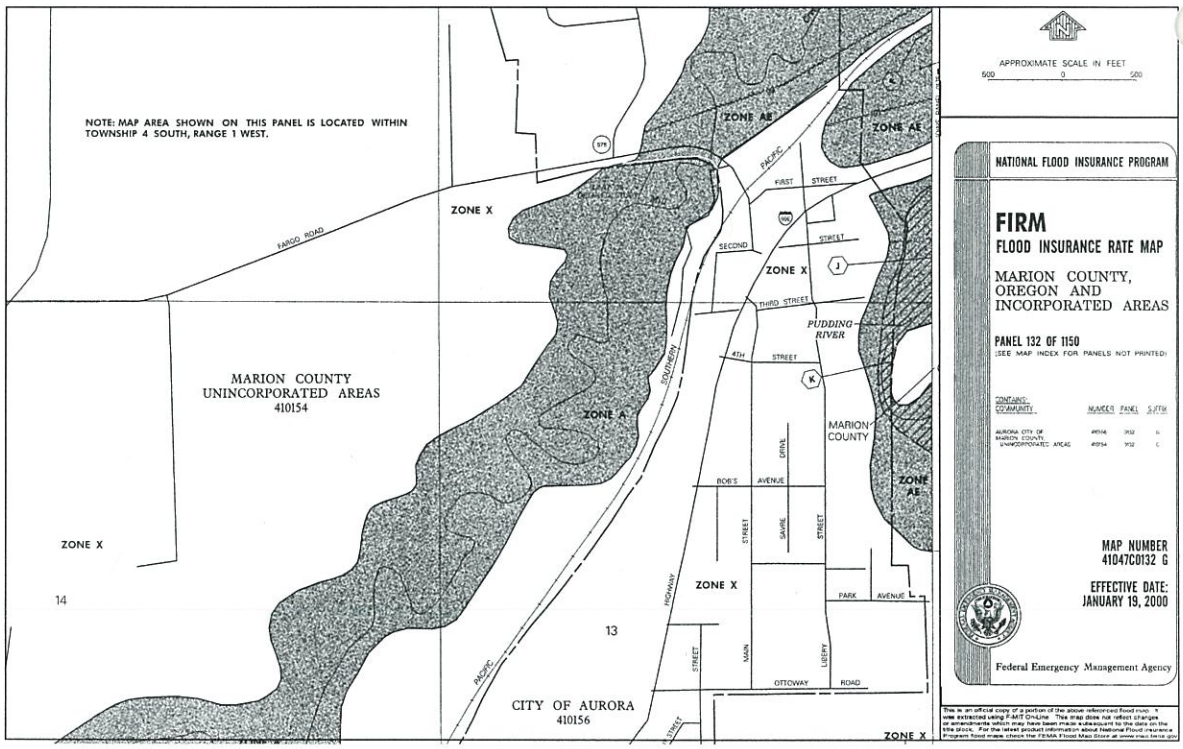
The Marion County NHMP adequately describes the causes and characteristics of flooding for the region, as well as the history of major flooding events. The location of Aurora's flooding hazard is best described within the city's Flood Insurance Rate Map (FIRM). In Figure 8, a portion of the city's FIRM shows areas within Aurora that could be impacted in a one-hundred year flood event (i.e., areas that have a 1% annual chance of flooding in an A or V zone). The primary flood sources in Aurora are Pudding River and Mill Creek. The extent of flooding hazards in Aurora primarily depends on climate and precipitation levels. Additionally, withdrawals for irrigation and drinking water, as well as stream and wetland modifications or vegetation removal can influence water flow.

Aurora has been a participant in the National Flood Insurance Program since August 1974, and the city's most current effective FIRM is dated January 2, 2003. As of May 26th, 2009 the city has 4 flood insurance policy holders. Aurora has had 0 property losses, 0 claims in a B, C, or X zone (i.e., not special flood hazard areas) and 0 repetitive flood losses. The community has not had a Community Assistance Visit (CAV), but has had a Community Assistance Contact (CAC), or a telephone 'audit' of a community's flood hazard program. Additionally, the city has had 2 Letters of Map Change, meaning map amendments and/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 Aurora as well. Although 0 claims have been made by Aurora's NFIP policy-holders, the city considers flooding to be one of its biggest natural hazards. In the past, the bridge over Mill Creek has been washed out.[xxv] In February 1986, the Pudding River crested at 24 ½, two and one-half feet above flood levels, and in February 1996, the Little Pudding River inundated secondary roads, homes, and farmlands. Flood damages from the 1996 event were estimated $2.6 million for the entire Pudding / Little Pudding River Basin.[xxvi]

Marion County's Natural Hazards Mitigation Plan adequately describes common flood issues, including property losses, and impacts to businesses/industries, public infrastructure, buildings, roads/bridges, storm water systems, and riparian areas/wetlands. While most of the potential impacts described within the county's NHMP are also true for Aurora, the city is particularly vulnerable to impacts associated with inaccessible transportation routes. Residents rely on roads in order to commute to work, and local businesses rely on the transportation of incoming goods/services, as well as tourists and/or passers-by. Additionally, the city's sewer pump station is vulnerable to Mill Creek flooding events, and the wastewater treatment plant could be vulnerable as well.

Figure 8. City of Aurora Flood Insurance Rate Map



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 and/or dates for Marion County[xxvii], and the same is true for the city of Aurora. The city is relatively flat, and the city's steering committee believes that landslides are not likely to occur within city limits.

As shown in Figure 6 above, Aurora'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, Aurora estimates a low probability that landslides will occur within city limits. Because landslides can have regional effects, the city of Aurora estimates a moderate vulnerability to landslides (with the assumption that they're more likely to occur outside of city limits, causing transportation-related

issues for city residents and businesses). As mentioned in the landslide chapter of Marion County's NHMP, 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. For Aurora's residents, landslides that occur within the region could create problems for people that commute outside of the city for work (although there's no record of this occurring in the past). Likewise, residents rely on hospitals outside of the city limits in Oregon City, Salem, Newberg, Silverton, and Tualatin. Please see Marion County's NHMP for a more comprehensive description of potential landslide-related community impacts.

Volcano

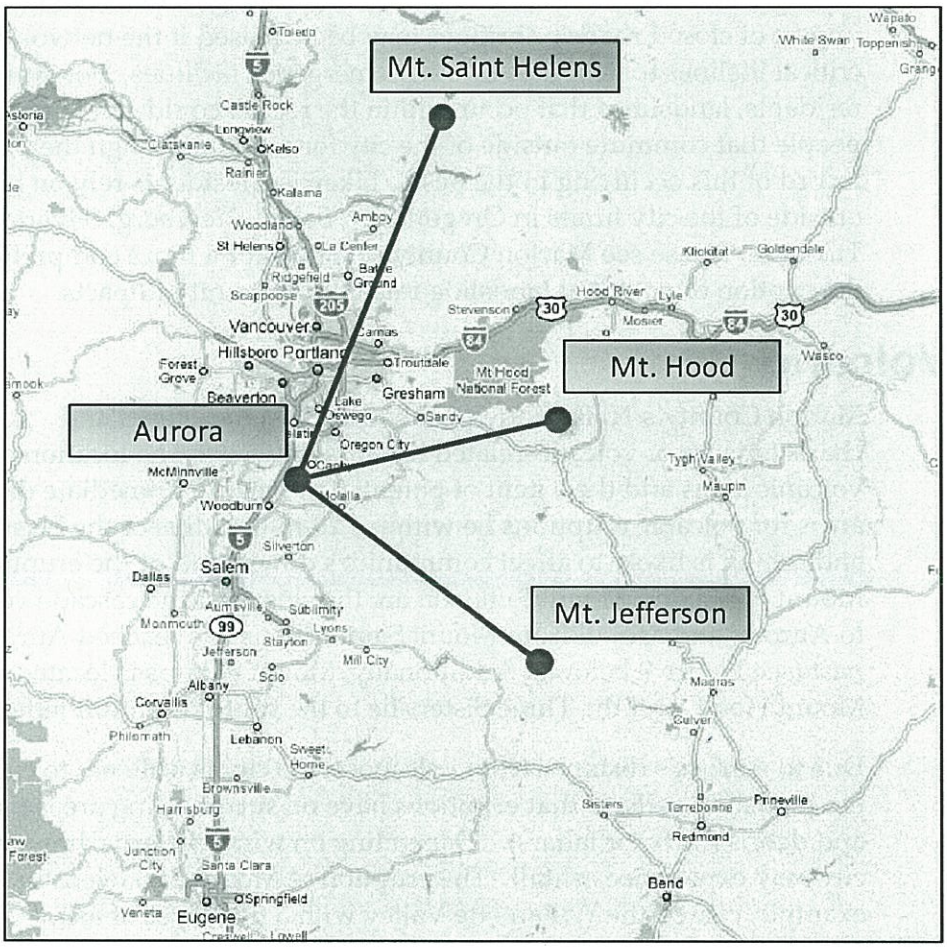
Marion County's NHMP adequately describes the causes and characteristics of volcano-related hazards, as well as the location of volcanic areas and the extent of potential damages. Immediate danger areas for volcanic eruptions lie within a 20-mile radius of the blast site,[xxviii] and ashfall is likely to affect communities downwind of the eruption. Mount Hood and Mount Jefferson are the closest of the cascade volcanoes to Aurora, and ashfall from Mount Saint Helens has reached Aurora in the past (see Figure 9 below). Additionally, Mount Adams is located north of Mount Hood, and the Three Sisters lie to the south of Mount Jefferson.

Due to Aurora'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.[xxix]

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.[xxx] Please see Marion County's NHMP for more details regarding Mt. Hood and Mt. Jefferson, as well as additional Cascade volcanoes.

Figure 9. Mt. Hood and Mt. Jefferson's Locations in Relation to the City of Aurora



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 Aurora as well.

Hazards related to volcanic eruptions (i.e., potential community impacts) are adequately described in the Marion County NHMP. Although the city of Aurora 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 Aurora, 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.[xxxi] Please see Marion County's NHMP for a more comprehensive description of the conditions that create and/or exacerbate wildfire events.

Within the Marion County Community Wildfire Protection Plan (CWPP), the city of Aurora is not listed as a "community at risk." Figure 10 is taken from the Marion County CWPP and shows overall risk ratings throughout the county. Note that Aurora is located in an area of "low" risk.[1] Likewise, Figure 10 shows locations in the county that have been affected by wildfires in the past. The city of Aurora is fairly removed from these areas.

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

Additionally, Marion County estimates a moderate vulnerability to wildfire events. Due to Aurora's isolation from the majority of at-risk areas, Aurora 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, Aurora'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. In Aurora, limited water supply would be a concern if wildfires (or even general house/building fires) occurred. As mentioned above in the Drought Risk Assessment (page 22 above), the city's steering committee has concerns regarding the reliability of its water supply. In the past, Aurora's water supply has been limited during events in which fire-fighting efforts drew significant portions of water from the storage reservoir and/or wells. Following such events, the water table can diminish quite a bit, and affect the city's water supply for up to several weeks. Please see Marion County's NHMP for additional information regarding potential wildfire-related community impacts.

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[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 10 Wildfire Risk Areas in Marion County

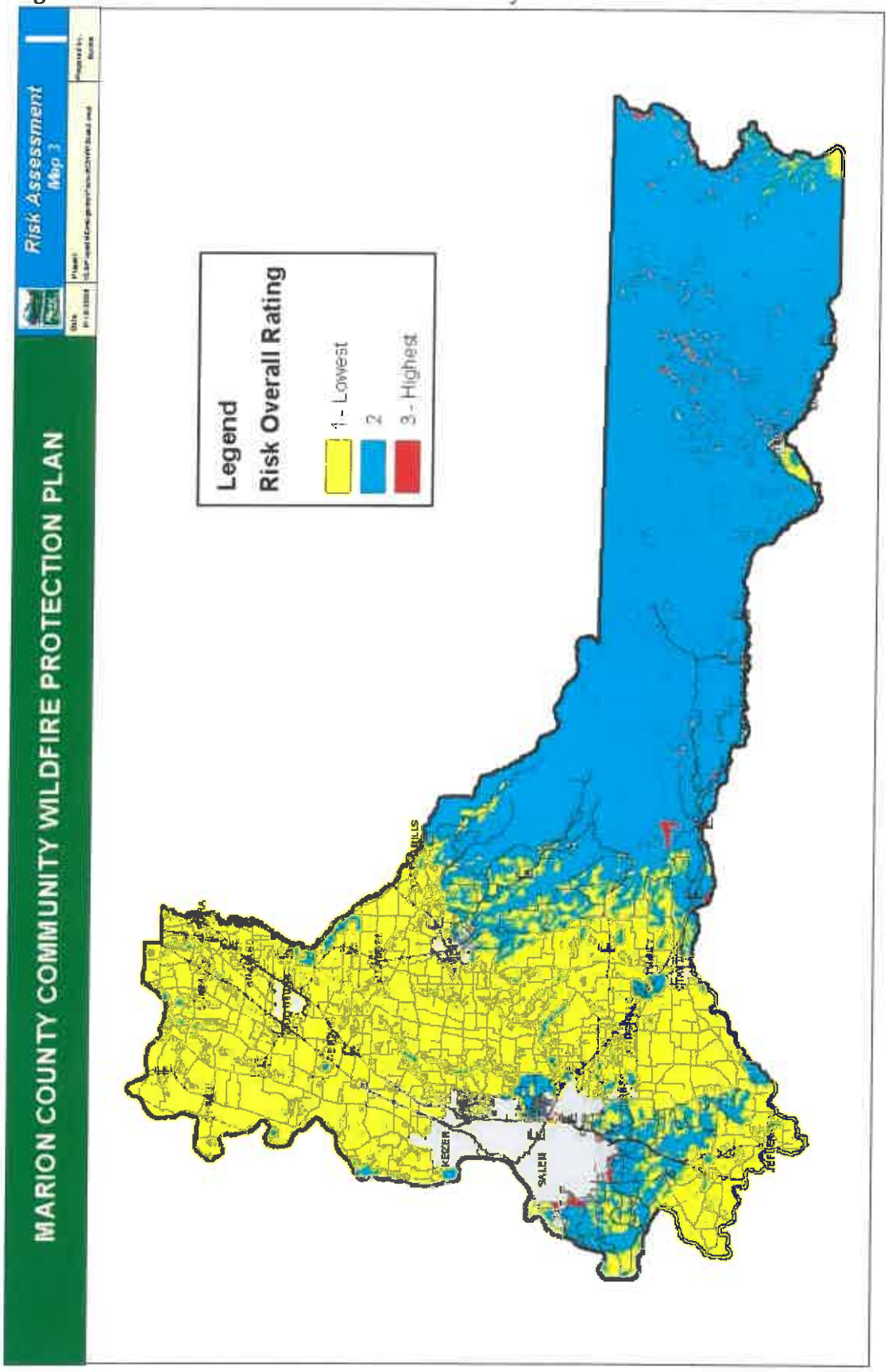
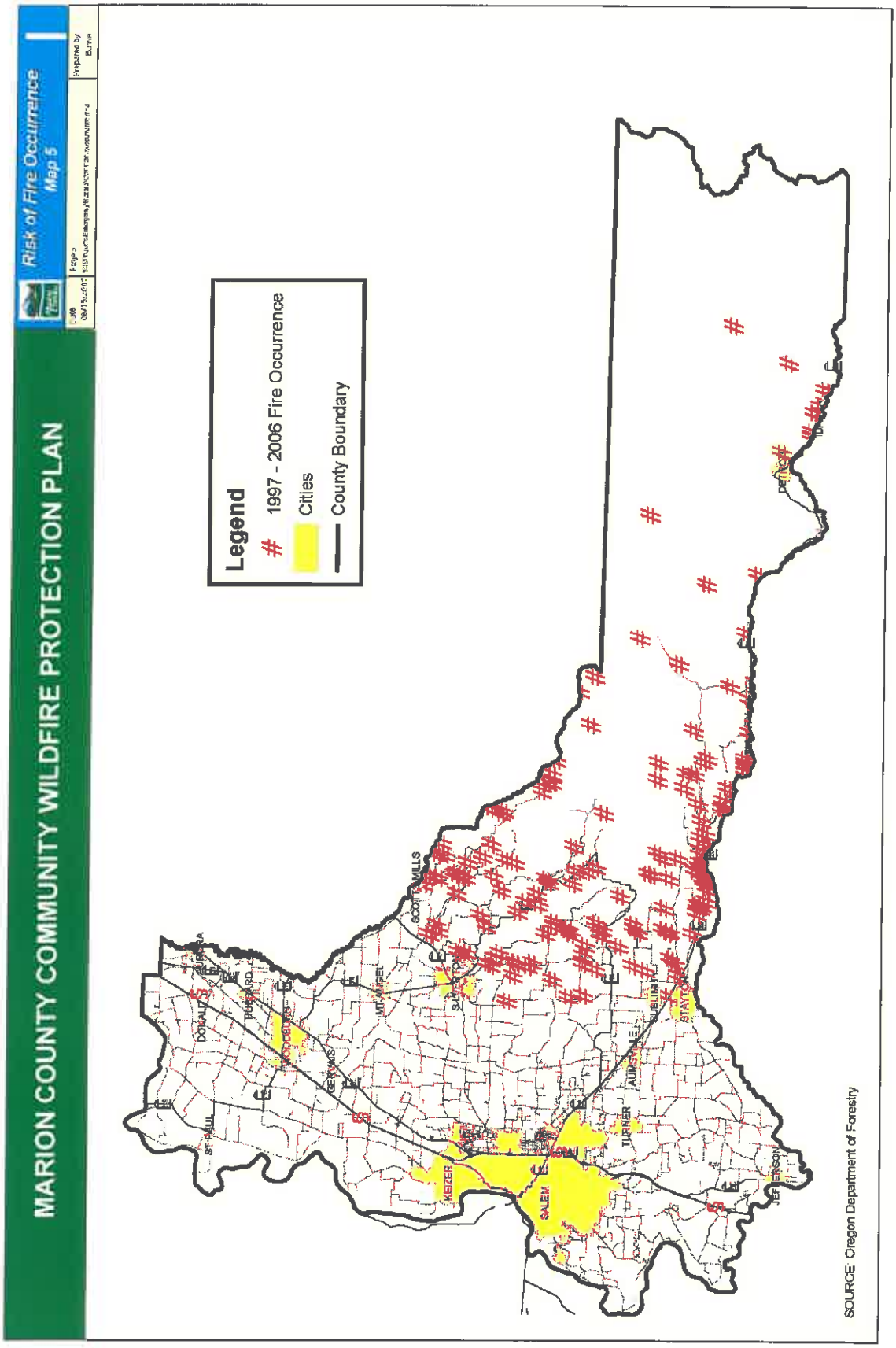


Figure 11 Locations of Past Wildfires in Marion County



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. Significant recent events that have impacted Marion County, including Aurora, are described in Table # below.

Table #. Historical Wind Storm Events

Date	Wind Storm Event
March 2008	Windstorm measured at 40 mph toppled trees in surrounding communities.
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 – one of which occurred near Aurora on August 26, 1984. The tornado destroyed a machine shop and scattered its pieces over a half-mile area.[xxxii]

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 Aurora as well.

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. Aurora's City Hall, for example, does not have backup systems in place to continue communications or services during a power outage. City staff members are currently looking into various backup methods that ideally would happen off-site. A sustained loss of power can also seriously strain provision of emergency services and the operation of water and sewer facilities and transportation systems. The city has a backup generator for two wells, and a generator for the sewer pump stations as well. 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 Aurora. 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.[xxxiii] Winter storms can happen throughout Marion County, including the city of Aurora, 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 Aurora. 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.
- December 2008-2009: Winter storm throughout the Willamette Valley, heavy snow and ice. State of emergency declared.

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 Aurora. The city has one generator that they'll pull around to various pump stations. There is no backup generator for city hall, and no emergency light systems. There's also no snow clearing, unless individuals volunteer to clear streets on their neighbors' behalf.

As mentioned in Marion County's NHMP, winter storms are deceptive killers. Inclement weather can cause prolonged and extreme traffic disruptions, and snow/ice events can lead to major traffic accidents. Because Aurora's residents must travel outside of the city for emergency and/or regular medical care, winter storms are one of the city's most concerning natural hazards. Additionally, power outages are possible during winter storms – particularly if ice is involved, and poorly insulated water pipes can rupture and cause extensive property damages. 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 Aurora 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 city of Aurora reviewed Marion County's goals on June 10th, 2009 and adopts the county's goals without modification.

Goal #1: PUBLIC AWARENESS

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

Goal #2: EDUCATION

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

Goal #3: PREVENTATIVE

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.

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 county and maximize effectiveness.

Goal #7: EMERGENCY SERVICES

Goal Statement: Coordinate and integrate natural hazard mitigation activities, where appropriate, 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 at the end of the addendum in Appendix D.

Drought

1. Implement actions identified in Aurora's Water System Master Plan, and the Water Management and Conservation Plan.
2. Partner with Marion County to support agencies' determination of locations for additional aquifer studies that might lead to greater water supplies and help determine funding sources for the studies.

Earthquake

1. Work with the Salem Red Cross to identify shelters within the city.
2. Inventory and assess the seismic stability of older buildings in the city.
3. Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices through public education.

4. Seek funding to further assess the 'probability of collapse' for Aurora City Hall.
5. Seek funding to further assess the "probability of collapse" for North Marion High School.

Flood

1. Continue compliance with the National Flood Insurance Program through the enforcement of local floodplain ordinances.
2. Identify strategies for mitigating and/or preventing flooding from impacting the city's wastewater lagoon system.

Volcano

1. Partner with the county to identify critical facilities or equipment that can be damaged by ashfall. Develop mitigation activities to prevent damage to these facilities.

Windstorm

1. Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.
2. Ensure that all critical facilities have backup power and/or emergency operations plans to deal with power outages.

Severe Winter Storm

1. Educate citizens about ways to weatherize their homes, as well as safe emergency heating equipment.

Multi-Hazard

1. Develop a post-disaster redevelopment plan.
2. Further assess the potential implications of various transportation route closures.
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 citizens to prepare and maintain 72-hour kits

Note: Due to Aurora's isolation from wildfire and landslide risk areas, Aurora'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. Aurora will partner with Marion County, however, on the implementation of mitigation strategies that benefit both jurisdictions.

Section 5: Plan Implementation and Maintenance

This section details the formal process that will ensure that Aurora's Addendum to the Marion County Natural Hazards Mitigation Plan remains an active and relevant document. The plan implementation and maintenance process includes a schedule for monitoring and evaluating the plan semi-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 city recorder 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, and the Flood Mitigation Assistance program.

The City Council will be responsible for adopting the city of Aurora'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, Aurora's steering committee identified the city recorder as the convener for Aurora's Addendum to the Marion County Natural Hazards Mitigation Plan. The convener's responsibilities include:

- Coordinating steering committee meeting dates, times, locations, agendas, and member notification;
- Documenting the discussions and outcomes of committee meetings;
- Serving as a communication conduit between the steering committee and the public / stakeholders;

- Identifying emergency management-related funding sources for natural hazards mitigation projects;
- Coordinating 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 29th, 2009, Aurora's steering committee identified itself as the future coordinating body for the mitigation plan. The committee also identified additional members to serve on the coordinating body. The full coordinating body will include the following members.

- City of Aurora City Recorder
- City of Aurora Administrative Assistant
- City of Aurora Wastewater Treatment Plant Operator
- City of Aurora Finance Officer
- City of Aurora Police Chief
- Fire Chief, Aurora Rural Fire Protection District
- North Marion School District – Public/Private Schools K-12
- Marion County Emergency Management Representative
- American Red Cross Representative
- CenturyTel Representative
- Willamette Broadband Representative

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;
- Updating the natural hazards mitigation plan in accordance with the county's five-year plan update schedule;
- Developing and coordinating ad hoc and/or standing subcommittees as needed; and
- Coordinating public involvement activities.

To make the coordination and review of the Aurora Addendum as broad and useful as possible, the steering committee 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 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 convener 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 on a semi-annual basis in April and October to complete the following tasks. During the first meeting of the year (April), 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/or 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 (October), the coordinating body will:

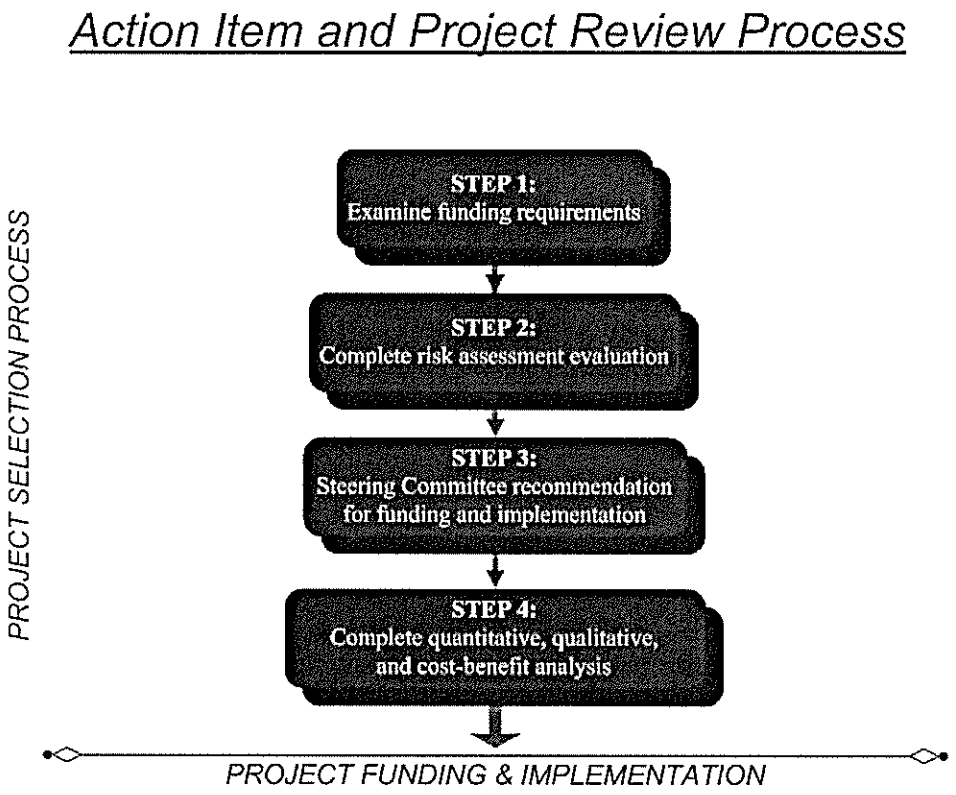
- Come prepared to discuss any new risk assessment data (i.e., from the Department of Geology and Mineral Industries or otherwise);
- Review the Oregon Partnership for Disaster Resilience's plan update toolkit (see page 51 below) and determine whether any ongoing plan update tasks can be accomplished 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 12 illustrates the project prioritization process.

Figure 12: Project Prioritization 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

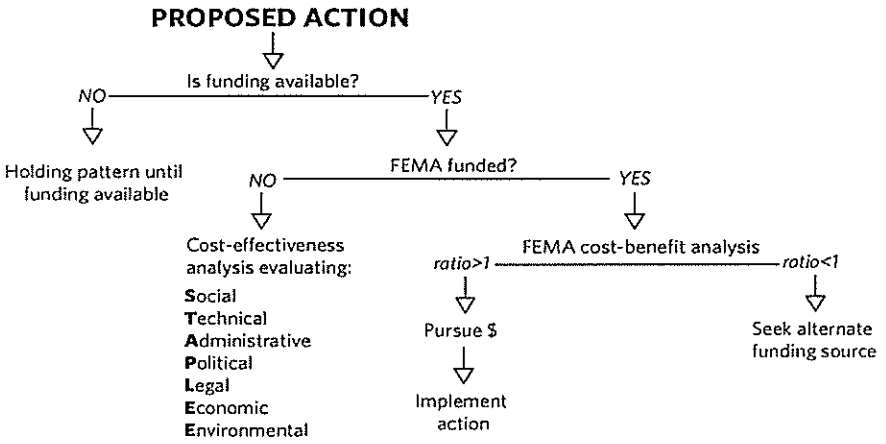
Based on the steps above, the coordinating body will recommend which mitigation activities should be moved forward. If the coordinating body decides to move forward with an action, the coordinating organization designated on the action item form will be responsible for taking further action and, if applicable, documenting success upon project completion. The coordinating body will convene a meeting to review the issues surrounding grant applications and to share knowledge and/or 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 13 shows decision criteria for selecting the appropriate method of analysis.

Figure 13: 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 committee 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 Aurora currently addresses statewide planning goals and legislative requirements through its Comprehensive Plan, Development Code, Downtown Plan, Transportation System Plan, Water System Master Plan, and Water Management and Conservation Plan. To the extent possible, Aurora will work to incorporate the recommended mitigation action items into these existing plans, programs and policies. Implementing the addendum's actions items through existing plans, programs and policies increases the likelihood of action items being

supported and increases the likelihood that the plan gets updated to remain current and efficiently utilize the city's existing resources. Where possible, opportunities for cross-plan implementation are noted in the full action item worksheets in Appendix D.

To ensure that actions are implemented in an efficient and timely manner, the city recorder will propose that city job descriptions are altered to include responsibilities related to the mitigation plan's maintenance and/or implementation. Job descriptions are listed in the city's employee handbook, and changes to the handbook must be approved by City Council.

Continued Public Involvement & Participation

The city of Aurora is dedicated to involving the public directly in the continual reshaping and updating of the Aurora Natural Hazard Mitigation Plan Addendum. Although members of the steering committee 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 Aurora will do the following:

- Post meeting minutes on the city's website when significant changes are made to the plan;
- Post notices regarding significant plan alterations at the General Store, the Aurora Post, and the Bulletin Board at City Hall. Notices will request feedback, if needed;
- Continue to involve stakeholder input in the five-year plan update processes. This includes any ongoing plan update processes that occur during the semi-annual meetings;
- Present significant plan updates to the City Council, Planning Commission, and/or Historic Review Board after semi-annual meetings;
- Keep a copy of the mitigation plan on hand at City Hall for public review; and
- Host public meetings and/or open houses when deemed necessary by the coordinating body, such as after a natural disaster event.

Additionally, the Partnership, with a commitment from the Institute for Business & Home Safety (IBHS) will provide 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 will be held in Marion County in October, 2009.

Lastly, 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/or 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 and/or the formation of sub-committees.

Mitigation Plan Update Toolkit			
Question	*Yes*	*No*	*Plan Update Action*
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
Have development patterns changed? Is there more development in hazard prone areas?			
Do future annexations include hazard prone areas?			
Are there new high risk populations?			
Are there completed mitigation actions that have decreased overall vulnerability?			

Mitigation Plan Update Toolkit			
Question	*Yes*	*No*	*Plan Update Action*
Did the plan document and/or 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, and/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, "Aurora Oregon," http://www.weatherbase.com, accessed January 26, 2009.

[iii] Western Regional Climate Center, "Aurora Oregon," http://www.wrcc.dri.edu/summary/Climsmor.html, accessed March 30, 2009.

[iv] Portland State University: Population Research Center, *2007 Oregon Population Report*, http://www.pdx.edu/prc/annualorpopulation.html, (March 2008), 12.

[v] US Census Bureau, "Profile of Selected Social Characteristics, 2000, Aurora City, OR," American Factfinder Quick Tables, www.census.gov.

[vi] US Census Bureau, "Profile of Selected Economic Characteristics, 2000, Aurora City, OR," American Factfinder Quick Tables, www.census.gov.

[vii] US Census Bureau, "Profile of Selected Economic Characteristics, 2000, Aurora City, OR," American Factfinder Quick Tables, www.census.gov.

[viii] US Census Bureau, "Profile of Selected Economic Characteristics, 2000, Aurora City, OR," American Factfinder Quick Tables, www.census.gov.

[ix] US Census Bureau, "Profile of Selected Economic Characteristics, 2000, Aurora City; Marion County, OR," American Factfinder Quick Tables, www.census.gov.

[x] US Census Burean, "Profile of General Demographic Characteristics, 2000, Aurora City, OR," American Factfinder Quick Tables, www.census.gov.

[xi] Ibid.

[xii] US Census Bureau, "Profile of Selected Housing Characteristics, 2000, Aurora City, OR," American Factfinder Quick Tables, www.census.gov.

[xiii] Ibid.

[xiv] City of Aurora, *Comprehensive Plan*, February 2002, 17.

[xv] Ibid., 49.

[xvi] Ibid. 35.

[xvii] Ibid.

[xviii] US Census Bureau, "Profile of Selected Economic Characteristics, 2000, Aurora City, OR," American Factfinder Quick Tables, www.census.gov.

[xix] City of Aurora, *Consumer Confidence Report, 2007*, http://www.ci.aurora.or.us/PDF/Aurora2007CCR.pdf

[xx] City of Aurora, *Comprehensive Plan*, February 2002, 25.

[xxi] Burby, Raymond J., ed. 1998. *Cooperating with Nature: Confronting Natural Hazards with Land-Use Planning for Sustainable Communities.*

xxii Source: USGS - Partnership for Disaster Resilience Research Collaborative, 2006.

[xxiii] NOAA, 1993. Tsunamis affecting the West Coast of the United States: 1806-1992.

[xxiv] 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-O07-02-SNAA-onscreen.pdf.

[xxv] Marion County Natural Hazards Mitigation Plan, Flood Chapter.

[xxvi] Marion County Natural Hazards Mitigation Plan, Flood Chapter.

[xxvii] Marion County Natural Hazards Mitigation Plan, Landslide Chapter.

[xxviii] Marion County Natural Hazards Mitigation Plan, Volcanic Eruptions Chapter.

[xxix] United States Geological Survey, Cascades Volcano Observatory. Vancouver, Washington. http://vulcan.wr.usgs.gov/

[xxx] United States Geological Survey, Cascades Volcano Observatory. Vancouver, Washington. http://vulcan.wr.usgs.gov/

[xxxi] Marion County Natural Hazards Mitigation Plan, Wildfire Chapter.

[xxxii] Marion County Natural Hazards Mitigation Plan, Windstorm Chapter.

[xxxiii] Marion County Natural Hazards Mitigation Plan, Severe Winter Storm Chapter.

Appendix A: Planning and Public Process

The following appendix documents Aurora's natural hazards mitigation planning and public involvement processes.

Work Sessions

Stakeholder Interviews

PARTNERSHIP FOR DISASTER RESILIENCE
WWW.OREGONSHOWCASE.ORG

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***)

Oregon Partnership for Disaster Resilience
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Eugene • Oregon • 97403-1209
Phone: 541.346.3588 • Fax: 541.346.2040

PARTNERSHIP FOR DISASTER RESILIENCE
WWW.OREGONSHOWCASE.ORG

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*

Oregon Partnership for Disaster Resilience
Community Service Center • 1209 University of Oregon
Eugene • Oregon • 97403-1209
Phone: 541.346.2305 • Fax: 541.346.2040

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 Barstad	City of Silverton - PW	rbarstad@silverton.or.us	
DARREL MATHEWS	CITY OF SILVERTON, SDF	bangsandburns@pngusa.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 Woodbuen	natalie.labossiere@ci.woodburn.or.us	
laurie 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@co.marion.or.us	
Julie Amicci	Tigard PETS PET EMERGENCY Program	Juliepdx@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. 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.

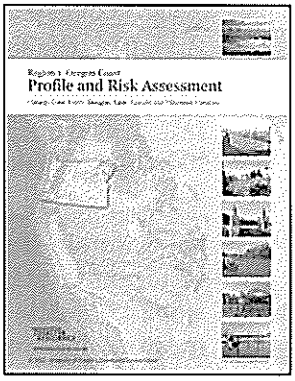
For more information, please contact Megan Findley, OPDR *Pre-Disaster Mitigation Program Manager*, at 541.346.2305 or mfindley@uoregon.edu.

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).

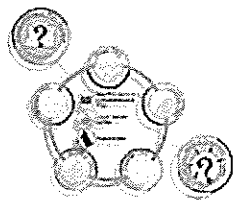


- Hazard Analysis Matrix
  Each county in Oregon has developed and is required to maintain a hazard analysis that includes risk scores for the hazards they face. These scores range from 24 (low) to 240 (high), and reflect the county's analysis for each particular hazard. By using this methodology consistently 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 = 7	Vulnerability WF = 5	Maximum Threat WF = 10	Probability WF = 7	Total Score
FLOOD	WF X SR	3 X 10	5 X 9	10 X 7	7 X 10	205
	Subscore	= 30	= 45	= 70	= 70	
WILDFIRE	WF X SR	3 X 10	5 X 8	10 X 5	7 X 10	180
	Subscore	= 30	= 40	= 50	= 70	
EARTHQUAKE	WF X SR	3 X 2	5 X 10	10 X 10	7 X 3	175
	Subscore	= 6	= 50	= 100	= 21	
WINDSTORM	WF X SR	3 X 6	5 X 6	10 X 6	7 X 8	162
	Subscore	= 18	= 30	= 60	= 56	
HAZMAT	WF X SR	3 X 7	5 X 5	10 X 6	7 X 8	141
	Subscore	= 14	= 25	= 60	= 42	
LANDSLIDE	WF X SR	3 X 10	5 X 4	10 X 3	7 X 9	133
	Subscore	= 30	= 20	= 30	= 63	
DAM FAILURE	WF X SR	3 X 1	5 X 5	10 X 2	7 X 2	61
	Subscore	= 3	= 25	= 20	= 14	

- 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/p/.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.coastalatlas.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, tsunami, 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/eqhazards.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

- <u>Flood</u>
  - 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.s

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/OFR97-487/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.keeporegongreen.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/htp/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

- <u>Other</u>
  - 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

PARTNERSHIP FOR DISASTER RESILIENCE
WWW.OREGONSHOWCASE.ORG

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*

Oregon Partnership for Disaster Resilience
Community Service Center • 1209 University of Oregon
Eugene • Oregon • 97403-1209
Phone: 541.346.2305 • Fax: 541.346.2040

Meeting Sign-In

Region 3 Cities Risk Assessment Workshop. April 15, 2009; 9 am-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	recorder@ci.aurora.or.us	
Kelly Richardson	City of Aurora	clerk@ci.aurora.or.us	52 round trip
Joseph Murray	OMD, Oregon Emergency Mngt.	jmurray@oem.state.or.us	N/A (already 50% Fed. Funded)
Bill Burns	DOGAMI		

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

Name	Representing	Email	Roundtrip mileage (if applicable)
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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	kubo@hawaii.edu	
Valerie Saiki	City County Insurance Services	Vsaiki@ICCSservices.com	16
KRISTEN MEYERS	FEMA RX	kristen.meyers@DHS.gov	

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Steve Kay	City of Silverton	skay@silverton.or.us	
Darrel Mathews	Silverton Small Business	bangsandburns@pngusa.net	
Rich Borstad	City of Silverton	rborstad@silverton.or.us	
Nita Marr	Woodburn Police/City of Woodburn	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

PARTNERSHIP FOR DISASTER RESILIENCE
WWW.OREGONSHOWCASE.ORG

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*

Oregon Partnership for Disaster Resilience
Community Service Center • 1209 University of Oregon
Eugene • Oregon • 97403-1209
Phone: 541.346.2305 • Fax: 541.346.2040

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)
Laurie Boyce	City of Aurora	recorder@ci.aurora.or.us	
Kelly Richardson	City of Aurora	Clerk@ci.aurora.or.us	52 miles
JASON TLUSTY	WOODBURN P. D.	jason.tlusty@ci.woodburn.or.us	
Natalie LABOSSIERE	WOODBURN PLANNING	natalie.labossiere@ci.woodburn.or.us	
DARREL MATHEWS	SILVERTON	bangsandburns@pngasa.net	
Nita Marr	Woodburn P.D.	nita.marr@ci.woodburn.or.us	34mi. R.T.
Bryon Cosgrove	City of Silverton	bcosgrove@silvertonor.us	24

Name	Representing	Email	Roundtrip mileage (if applicable)
Rick Lewis	City of Silverton	rlewis@silverton.or.us	NA
Genie Stoll	City of Silverton	dstoll@verizon.net	NA
Doreen Kelly	Silverton Together	doreen@silvertontogether.com	
Ed Grambusch	Silverton Fire District	edgrambusch@SilvertonFire.com	-NA-
DARREL MATHEWS	SILVERTON SMALL BUSINESS	bangsandburns@pngusa.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	watsonk@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 FY2 2010 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).

PARTNERSHIP FOR DISASTER RESILIENCE
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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*

Oregon Partnership for Disaster Resilience
Community Service Center • 1209 University of Oregon
Eugene • Oregon • 97403-1209
Phone: 541.346.2305 • Fax: 541.346.2040

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	Recorder@ci.aurora.or.us	
Kelly Richardson	City of Aurora	Clerk@ci.aurora.or.us	52
Bryan Cosgrove	City of Silverton	bcosgrove@Silvertonor.us	30
STEVE KAY	CITY OF SILVERTON	skay@silverton.or.us	30
DARREL MATHEWS	CITY/SILVERTON	N/A	N/A
Natalie Labossiere	Woodburn	natalie.labossiere@ci.woodburn.or.us	40
Genie Stoll	Silverton	dstoll@wericon.net	30

Name	Representing	Email	Roundtrip mileage (if applicable)
Rich Barstad	City of Silverton	rbarstad@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

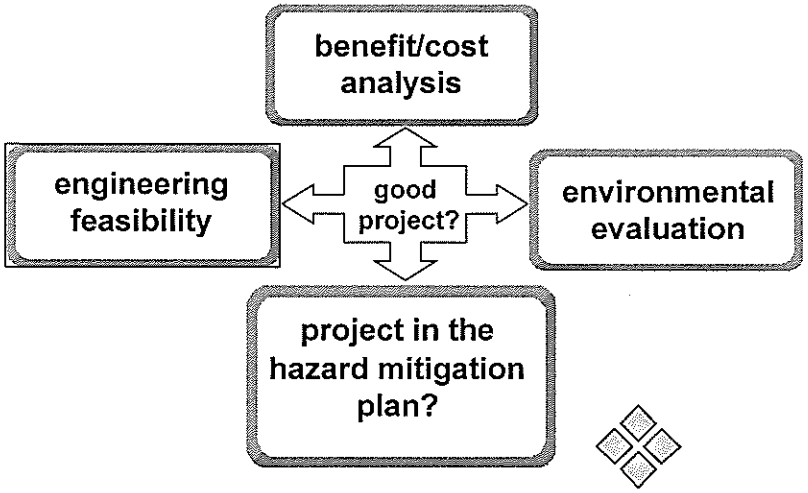
project useful lifetime – Is the estimated time period over which the mitigation project will maintain its effectiveness in preventing or reducing damages and losses from future disasters, e.g., 30, 50 or 100 years.

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:
  - 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?

PRESS RELEASE
FOR
THE HAZARD MITIGATION PLAN

Oregon is the 9th largest state in the Union encompassing approximately 98,000 square miles. Oregon has 36 counties and 242 cities. In February 2002, the Federal Emergency Management Agency's (FEMA) published interim final rule 44 CFR Part 201, which established the Pre-Disaster Mitigation Program and requires all states and communities to develop natural hazard mitigation, plans in order to apply for FEMA mitigation project funding.

Since 2000, the Partnership for Disaster Resilience at the University of Oregon's Community Service Center has been leading a statewide planning initiative to build capacity for the development of mitigation plans and projects. The planning initiative is in partnership with Oregon Emergency Management (OEM), Department of Land Conservation and Development (DLCD), Department of Geology and Mineral Industries (DOGAMI), FEMA Region X, and local governments.

OVERVIEW

Aurora developed this addendum to the Marion County multijurisdictional 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 Aurora.

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 preventive activities via land use plans, storm water management plans, or water management conservation plans. The actions described in the addendum are intended to be implemented through existing plans and programs within the city.

The other aspect to the Natural Mitigation Plan is that when FEMA has grants available, the City would then be able to apply for grant money to help the City achieve the tasks that are listed in this plan.

You can request a copy of the Natural Hazards Mitigation Plan for a cost of $18.00 or you can review the document on the Oregon Partnership website at http://www.oregonshowcase.org/projects/willamettecities.

The deadline for submitting written comments to Laurie Boyce, City Recorder is September 21, 2009 by 5:00 pm. If you have any questions, please call the City Recorder at 503-678-1283.

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.og) 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 Roesslier - 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 Starner - 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.

Answer Options	Response Count
	2
answered question	2
skipped question	2

Number	Response Text
1	Canby Herald Newspaper
2	Woodburn Mt Angel Silverton Ambulance Service

In which city is your organization located?

Answer Options	Response Frequency	Response Count
Aurora	100.0%	4
Keizer	0.0%	0
Silverton	25.0%	1
Woodburn	25.0%	1
Other (please specify)		3
answered question		4
skipped question		0

Number	Other (please specify)
1	Canby
2	Mt Angel
3	Canby

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	2	0	1	0	3
Earthquake	1	1	1	0	0	3
Flood	0	2	1	0	0	3
Landslide / Debris Flow	0	0	2	1	0	3
Wildfire	0	1	0	2	0	3
Volcanic Eruption	0	0	3	0	0	3
Wind Storm	1	1	1	0	0	3
Severe Winter Storm	0	2	1	0	0	3
					answered question	3
					skipped question	1

Do you recall any instances in which the following natural hazards affected your community?

Answer Options	Yes	No	Response Count
Drought	0	3	3
Earthquake	3	0	3
Flood	3	0	3
Landslide / Debris Flow	0	3	3
Volcanic Eruption	3	0	3
Wildfire	1	2	3
Wind Storm	3	0	3
Severe Winter Storm	2	1	3
		answered question	3
		skipped question	1

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	33.3%	1
Flood	100.0%	3
Earthquake	100.0%	3
Landslide / Debris Flow	33.3%	1
Volcanic Eruption	100.0%	3
Wildfire	66.7%	2
Wind Storm	100.0%	3
Severe Winter Storm	66.7%	2
answered question		3
skipped question		1

Responses to question above ("Do you recall any instances in which the following natural hazards affected your community?")

Drought: none

Flood

- We've had a couple heavy rain periods in the last 5 years that have closed some roads locally.
- 1996 evacuation of nursing homes
- 1991?

Earthquake

- Back in 1993, a huge earthquake near Molalla had things shut down for a couple days.
- 1992 caused chemical spill at area wal-mart, multiple injuries
- 3/1/1993

Landslide

- Occasionally, when there's a lot of rain, there's a danger of a slide, but it happens seldom around here.

Volcano

- Just the May 1980 St. Helens eruption.
- 1980 Ash fallout, respiratory problems and transportation disruption
- 5/1/1981

Wildfire

- Don't recall one
- Recent years wildfire threatened Silverton area, possible evacuation

Windstorm

- During the winter and spring we have a few big wind days and they knock down trees, shingles, etc.
- Common, often disrupts communication and roads
- Various times over the years

Winterstorm

- This past winter we had snow and ice all over the place. Really affected travel and work.

Does your organization have a plan in place to respond to / recover from natural disasters?		
Answer Options	**Response Frequency**	**Response Count**
Yes	33.3%	1
No	66.7%	2
Don't know	0.0%	0
answered question		3
skipped question		1

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	50.0%	1
Information dissemination	100.0%	2
Plan/project implementation	50.0%	1
Other (please specify)		0
answered question		2
skipped question		2

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)	2	0	0	0	0	2
Property Protection (Actions that involve the modification of existing buildings or structures to protect them from a hazard or removal from the hazard area)	0	1	0	0	0	1
Public Education & Awareness (Actions to inform and educate citizens, elected officials and property owners about hazards and mitigation strategies)	1	0	0	0	0	1
Natural Resource Protection (Actions that minimize hazard losses and also preserve or restore the functions of natural systems.)	1	0	0	0	0	1
Emergency Services (Actions that protect people and property during and immediately after a disaster or hazard event)	1	0	0	0	0	1
Structural Projects (Actions that involve the construction of structures to reduce the impact of a hazard.)	0	1	0	0	0	1
					answered question	2
					skipped question	2

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

Answer Options	Response Count
	1
answered question	1
skipped question	3

Number	Response Text
1	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.

Would you like to be contacted in the future to review plan drafts?

Answer Options	Response Frequency	Response Count
Yes	100.0%	1
No	0.0%	0
answered question		1
skipped question		3

Is there any additional information you would like to provide?

Answer Options	Response Count
	0
answered question	0
skipped question	4

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- in come 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 recorder, 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 recorder, 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.

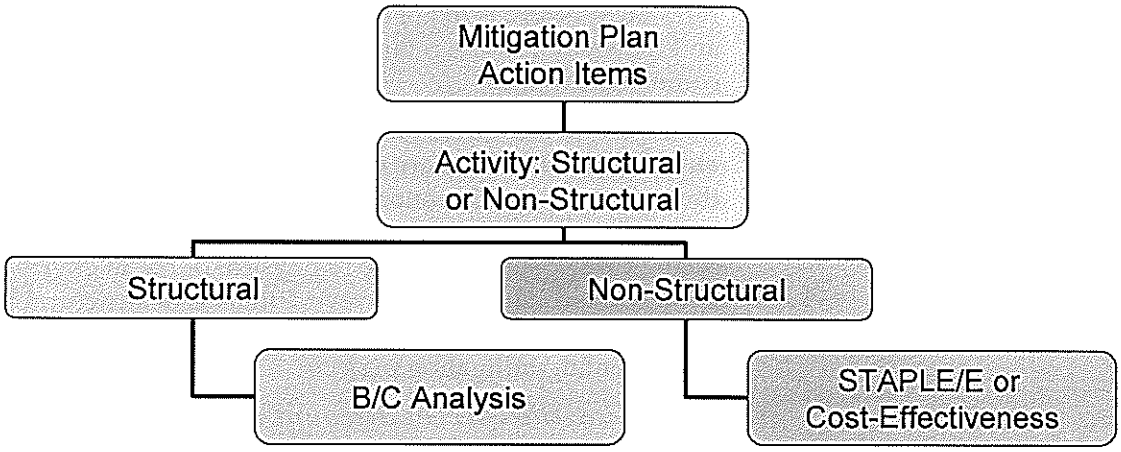
- How will the action impact the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

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, Ocbober 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:**
Implement actions identified in Aurora's Water System Master Plan, and the Water Management and Conservation Plan.	Goals 3 and 5

Rationale for Proposed Action Item:

Section 8 of the city's Water System Master Plan presents recommendations for water system improvements within a 20-year Capital Improvement Plan. Capital improvements are needed to address system inadequacies, in addition to allowing for future growth. The CIP calls attention to the deficiencies of the city's water system and provides a systematic approach to dealing with the short-term and long-term infrastructure needs.

To effectively provide for current and future water system needs within the city, public investments are required to be made annually. If the necessary system improvements are not made annually or within a reasonable timeframe, the condition of the city's water system infrastructure will deteriorate to the point that eventually it can no longer be ignored. It is at this point that a project cost will become much greater due to the size and scope of the needed improvements.

Implementing actions identified within Aurora's Water System Master Plan and the Water Management and Conservation Plan will assist the city in lessening its drought-related (and/or water level) concerns.

Ideas for Implementation:

The system recommendations presented in the Water System Master Plan include a water treatment system, additional storage facility and pump station, existing booster pump station capacity improvements, various distribution system modifications, and other system needs and improvements. Projects are prioritized based on importance.

Identify funding sources to implement actions identified in Aurora's Water System Master Plan on a regular schedule. The total cost for all recommended capital improvement projects identified including a 3% inflation factor over the planning period is approximately $5.68 million.

Coordinating Organization:	Aurora Public Works Superintendant, and Aurora City Council

Internal Partners:	**External Partners:**
City Recorder, City Engineer	Oregon Water Resources Department, Oregon Economic and Community Development Department
Timeline:	**If available, estimated cost:**
Short Term (0-2 years) / Long Term (2-4 or more years)	
Ongoing	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

Drought #2

Proposed Action Item:	**Alignment with Plan Goals:**
Partner with Marion County to support agencies' determination of locations for additional aquifer studies that might lead to greater water supplies and help determine funding sources for the studies.	Goals 3 and 5

Rationale for Proposed Action Item:

Studying aquifers may reveal under-utilized water resources and other information useful to water managers.

Currently, the city draws water from two wells, and there's a 300,000 gallon water reservoir that was built in 1990. The aquifer that supplies Aurora's water is accessed regionally. An aquifer study has been conducted for the city of Aurora, but the city's steering committee has concerns that the supply may be inadequate for future growth projections (both in Aurora and neighboring communities). In the past, Aurora's water supply has been limited during events in which fire-fighting efforts draw significant portions of water from the storage reservoir and/or wells. Following such events, the water table can go down quite a bit, and affect the city's water supply for up to several weeks.

Ideas for Implementation:

Assist in the determination of which aquifers in the county would benefit by detailed studies and also assist in the determination of how these studies can be funded.

Coordinating Organization:	Aurora City Mayor & Public Works Director, and the Aurora City Council

Internal Partners:	**External Partners:**
City Recorder, City Engineer	Marion County Public Works, Planning, GIS (see Marion County NHMP)
Timeline:	**If available, estimated cost:**
Short Term (0-2 years) / Long Term (2-4 or more years)	
3-5 years	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

Earthquake #1

Proposed Action Item:	**Alignment with Plan Goals:**
Work with the Salem Red Cross to identify shelters within the city.	Goals 1, 3, 5 and 7

Rationale for Proposed Action Item:

The most visible and well-known of Red Cross disaster relief activities are sheltering and feeding. The Red Cross opens shelters for those displaced by a disaster and provides meals and snacks to families and to emergency workers in affected areas.

There are no certified red-cross shelters in Aurora, and the city has not identified any in-town evacuation sites. Likewise, the city is currently not capable of providing temporary shelter or housing, unless it's provided on an ad-hoc basis. The city's steering committee believes that the American Legion Building and North Marion High School could be potential [impromptu] evacuation sites, but the stability of these buildings is unknown.

Ideas for Implementation:

Assess the seismic stability of the following buildings: North Marion High School, American Legion Building, and the Presbyterian or Lutheran Church.

Contact the Salem Red Cross and take steps toward identifying potential shelter sites within the city of Aurora.

Educate and/or inform citizens of shelter sites.

Research has shown that post-disaster temporary housing often becomes permanent because regulations about non-conforming uses have not been passed. In addition to identifying post-disaster temporary shelter and/or housing options, ensure that post-disaster redevelopment plans are in place.

Add this action to the Emergency Operations Plan, and implement within the EOP.

Coordinating Organization:	Aurora City Recorder

Internal Partners:	**External Partners:**
	Salem Red Cross, North Marion School District, Veterans, Churches

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
1-2 years		

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

Earthquake #2

Proposed Action Item:	Alignment with Plan Goals:
Inventory and assess the seismic stability of older buildings in the city.	Goals 3 and 4

Rationale for Proposed Action Item:

The city has several historic buildings, which are likely susceptible to ground-shaking motion including amplification and liquefaction (in parts). Approximately 70% of Aurora's housing units were built before 1980 when more stringent seismic codes were put into place. Several of the older buildings are comprised of unreinforced masonry.

Areas and/or events with high concentrations of persons include the American Legion Hall, which holds court the first and third Tuesdays of every month and church services every Sunday morning; the Aurora Presbyterian Church & Christ Lutheran Church on Sundays; the McLaren Auction House (some evenings); City Hall on some weekday evening; the Aurora Historical Museum which holds the Strawberry Social in June, and the Aurora Colony Days Festival in August. The buildings that house these events would ideally be assessed for structural stability.

A seismic event may negatively impact a local economy, especially if a community's businesses are located in unreinforced masonry buildings. Completing an inventory of commercial buildings that may be vulnerable to earthquake damage will assist a community in prioritizing buildings for seismic retrofit.

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. Buildings were ranked for their "probability of collapse" due to the maximum possible earthquake for any given area. Within the city of Aurora, North Marion High School was identified as having a high risk of collapse. Additionally, the Aurora Fire Protection District Building and the Aurora Police Department were given a 'moderate' rating.

The Disaster Mitigation Act of 2000 requires communities to identify actions and projects that reduce the effects of hazards on the community [201.6(c)(3)(ii)]. Inventorying and assessing the seismic stability of older buildings will allow the city to seek funding for seismic retrofit, thus increasing the city's overall resilience to earthquake hazards.

Ideas for Implementation:

Identify funding sources to conduct seismic assessment.

Prioritize buildings for seismic assessment. Contract with engineer to assess and produce reports for City Hall, potential Red Cross shelters, older multi-family residences and businesses (i.e., buildings of high priority).

Seek funding to seismically retrofit buildings identified at 'high' risk of collapse. Utilize FEMA's procedures document for developing scopes of work for seismic structural & non-structural retrofit projects.

Adopt an ordinance to conduct mitigation activities, such as seismic retrofits, to dangerous buildings. Adopting an ordinance for retrofitting buildings at risk from seismic hazards allows local communities to focus on individual buildings that may be structurally vulnerable or unsound. A Hazardous Building Abatement ordinance, usually based on the ICBO Code for abatement of Dangerous Buildings, allows the building official or local enforcement officer to require property owners to abate hazardous conditions.

Coordinating Organization:	Public Works Superintendant and Historic Review Board

Internal Partners:	External Partners:

		DOGAMI, OEM
Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	2-4 years	
Form Submitted by:	Aurora Steering Committee	
Status:	New Action, 2009	

Earthquake #3

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.	Goals 1, 2, and 3

Rationale for Proposed Action Item:

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:

- Securing water heaters, large appliances, bookcases, pictures and bulletin boards;
- Latching cabinet doors; and
- Using safety film on windows.

Ideas for Implementation:

Implement non-structural retrofit of City Hall offices and/or work spaces.

Distribute a "Homeowner's Guide to Non-Structural Retrofit" (or something similar) http://www.seattle.gov/DPD/cms/groups/pan/@pan/@emergprep/documents/web_informational/dpds_005877.pdf

Distribute information through the city's newsletter, which is sent out every 2 months with water bills.

Post information about individual mitigation opportunities on the city's website. Include recommendations regarding non-structural retrofits.

Coordinating Organization:	Aurora City Recorder and the Public Works Superintendant

Internal Partners:	External Partners:
Aurora Planning Commission	Institute for Business and Home Safety

Timeline:		If available, estimated cost:
Short Term (0-2 years)	Long Term (2-4 or more years)	
1-2 years (and ongoing)		

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

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

Earthquake #4

Proposed Action Item:	**Alignment with Plan Goals:**
Seek funding to further assess the 'probability of collapse' for Aurora City Hall.	Goal 3

Rationale for Proposed Action Item:

City records, including finances, utility billing records, payroll accounts, etc. are located in City Hall. The city's Steering Committee identified City Hall as potentially unstable in earthquake events. City records are not backed-up, and there are no external hard drives. City staff is currently working on finding a back-up system that can happen off-site. Additionally, the city's Police Department is located in City Hall.

"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." Ensuring continuous service will assist residents in recovering from a natural disaster as well as make the process easier.[2]

City County Insurance conducted an assessment of City Hall, and they are currently insuring the buildings contents (but not the cost of the building itself). Previous assessments have occurred, but documentation is not available.

Ideas for Implementation:

Identify funding sources to conduct structural integrity assessment. Contract with engineer to assess and produce a report for City Hall.

Seek funding to seismically retrofit City Hall. Utilize FEMA's procedures document for developing scopes of work for seismic structural & non-structural retrofit projects.

Coordinating Organization:	Aurora City Recorder

Internal Partners:		**External Partners:**
		OEM, DOGAMI, CIS
Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	2-3 years	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

[2] 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 North Marion High School.	Goal 3

Rationale for Proposed Action Item:

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. Buildings were ranked for their "probability of collapse" due to the maximum possible earthquake for any given area. Within the city of Aurora, North Marion High School was identified as having a high risk of collapse.

The city of Aurora would like to further assess the High School's potential as a Red Cross shelter. Verifying the building's "probability of collapse" (i.e., beyond the rapid visual screening that DOGAMI conducted in 2007) will assist in this determination.

Ideas for Implementation:

Identify funding sources to conduct structural integrity assessment. Contract with engineer to assess and produce a report for North Marion High School.

Seek funding to seismically retrofit North Marion High School. Utilize FEMA's procedures document for developing scopes of work for seismic structural & non-structural retrofit projects.

Coordinating Organization:	North Marion School District & Aurora City Recorder

Internal Partners:	**External Partners:**
	OEM, DOGAMI

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	3-5 years	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

Flood #1

Proposed Action Item:	**Alignment with Plan Goals:**
Continue compliance with the National Flood Insurance Program through the enforcement of local floodplain ordinances.	Goals 1, 3, and 5

Rationale for Proposed Action Item:

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:

- 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 and/or have the potential to flood. These areas include properties along Mill Creek and Pudding River.
- Update the city's Flood Insurance Rate Maps (FIRM) as funding becomes available.

Coordinating Organization:	Aurora Planner (Contracted through MCCOG)

Internal Partners:	**External Partners:**
Aurora City Recorder	FEMA, DLCD, Marion County Planning Department

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
	Ongoing	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

Flood #2

Proposed Action Item:	**Alignment with Plan Goals:**
Identify strategies for mitigating and/or preventing flooding from impacting the city's wastewater lagoon system.	Goals 3 and 6

Rationale for Proposed Action Item:

If Mill Creek floods, the city has concerns about whether the wastewater lagoon systems will be impacted.

Most treatment plants have primary treatment (physical removal of floatable and settleable solids) and secondary treatment (the biological removal of dissolved solids). Primary treatment involves one of three options (and basically serves to remove large objects), and secondary treatment also involves one of three methods, one of which is lagoons. Lagoons are slow, cheap, and relatively inefficient, but can be used for various types of wastewater. They rely on the interaction of sunlight, algae, microorganisms, and oxygen (sometimes aerated). Algae grow within the lagoons and utilize sunlight to produce oxygen, which is in turn used by microorganisms in the lagoon to break down organic material in the wastewater. Wastewater solids settle in the lagoon, resulting in effluent that is relatively well treated, although it does contain algae.

The most common option uses microorganisms in the treatment process to break down organic material with aeration and agitation, and then allows solids to settle out. Bacteria-containing "activated sludge" is continually re-circulated back to the aeration basin to increase the rate of organic decomposition.

Ideas for Implementation:

Determine the cost-effectiveness of converting the existing lagoon system to an 'activated sludge' water treatment system. It looks as though 'activated sludge' methods are not exposed to open air, meaning they could be more flood-proof.

Increase the height of the dikes surrounding the lagoon system.

Develop a flood mitigation strategy for the city's sewer pump station. The pump station occasionally floods during high rain events.

Coordinating Organization:	Aurora Public Works Superintendant

Internal Partners:		**External Partners:**
Aurora City Recorder, Wastewater System Operator		
Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

Volcano #1

Proposed Action Item:	**Alignment with Plan Goals:**
Partner with the county to identify critical facilities or equipment that can be damaged by ashfall. Develop mitigation activities to prevent damage to these facilities.	Goals 3, 5, and 7

Rationale for Proposed Action Item:

Due to Aurora'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.

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 Aurora, public health would be a primary concern, and keeping transportation routes open/accessible would be important as well.

The city of Aurora believes that the sewer lagoon aerators could be vulnerable to ashfall.

Ideas for Implementation:

Collaborate and exchange experiences and knowledge among facility managers of critical industries in the county to reduce the impact of ashfall on their sites (from the Marion County NHMP)

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.

Coordinating Organization:	Aurora Public Works Superintendant

Internal Partners:		**External Partners:**
Wastewater Treatment Plant Operator		Marion County Emergency Management, SEDCOR, Major Industries, DOGAMI, USFS, USGS-CVO
Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

Windstorm #1

Proposed Action Item:	Alignment with Plan Goals:
Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	Goals 3, 5, and 7

Rationale for Proposed Action Item:

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. Aurora's City Hall, for example, does not have backup systems in place to continue communications or services during a power outage. City staff members are currently looking into various backup methods that ideally would happen off-site. A sustained loss of power can also seriously strain provision of emergency services and the operation of water and sewer facilities and transportation systems.

Tree falls during wind or winter storm events can be a risk to overhead power lines. During a wind or winter storm, tree falls have the potential to down overhead power lines, causing electric power failures. Undergrounding utility extensions to reduce the effect of ice loading and tree falls can help mitigate a community's risk to wind or winter storms, and limit disruptions in service.

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.

The Disaster Mitigation Act of 2000 requires communities to develop comprehensive actions to reduce the impacts of natural hazards. [201.6(c)(3)(ii)]. Encouraging electrical utilities to use underground construction methods will reduce the city's vulnerability to power outages.

Ideas for Implementation:

Explore incentives to increase the use of underground utilities where possible; and

Encourage the use of underground utilities where possible. Contact PGE and CenturyTel to participate in future mitigation plan update processes. Document concerns, where applicable, and seek funding to underground utilities.

Develop a hazardous tree inventory for all community properties.

Coordinating Organization:	Aurora City Recorder / PGE / CenturyTel

Internal Partners:	External Partners:

Timeline:		If available, estimated cost:
Short Term (0-2 years)	Long Term (2-4 or more years)	
	2-3 years	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

Windstorm #2

Proposed Action Item:	Alignment with Plan Goals:
Ensure that all critical facilities have backup power and/or emergency operations plans to deal with power outages.	Goals 3 and 7

Rationale for Proposed Action Item:

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. Aurora's City Hall, for example, does not have backup systems in place to continue communications or services during a power outage. City staff members are currently looking into various backup methods that ideally would happen off-site. A sustained loss of power can also seriously strain provision of emergency services and the operation of water and sewer facilities and transportation systems.

"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." Ensuring continuous service will assist residents in recovering from a natural disaster as well as make the process easier.[3]

Destructive winter storms that produce heavy snow, ice, rain and freezing rain, and high winds have a long history in Oregon. Severe storms affecting Oregon with snow and ice typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from October through March.

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.

The Disaster Mitigation Act of 2000 requires communities to develop comprehensive actions to reduce the impacts of natural hazards. [201.6(c)(3)(ii)]. Ensuring that all critical facilities have backup power and/or emergency operations plans to deal with power outages will reduce the city's vulnerability to power outages.

Ideas for Implementation:

Seek funding to support the purchase of generators for City Hall, and an additional generator for the wells.

Coordinate with local equipment rental businesses on possibility of utilizing power generators in the event of a severe wind or winter storm.

Insert this action into the city's Emergency Operations Plan. This action should be implemented via the EOP.

Coordinating Organization:	Aurora Public Works

Internal Partners:	External Partners:
Aurora City Recorder	

Timeline:		If available, estimated cost:
Short Term (0-2 years)	Long Term (2-4 or more years)	
	2-3 years	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

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

Severe Winter Storm #1

Proposed Action Item:	Alignment with Plan Goals:
Educate citizens about ways to weatherize their homes, as well as safe emergency heating equipment.	Goal 2

Rationale for Proposed Action Item:

Destructive winter storms that produce heavy snow, ice, rain and freezing rain, and high winds have a long history in Oregon. Severe storms affecting Oregon with snow and ice typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from October through March.

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.

The average house–even when well-insulated–contains cracks and gaps between building materials that add up to a hole about 14 inches square (Fig. 1). In the winter, those gaps may make the house drafty and chilly. Weatherization measures can help keep the cold out during winter. Energy audits, cash rebates, and tax credits are available to help homeowners.

Ideas for Implementation:

Distribute information through the city's newsletter, which is sent out every 2 months with water bills.

Post information about weatherizing homes on the city's website. Include recommendations and tips, and alternate information if possible.

Coordinating Organization:	Aurora City Recorder and the Aurora Rural Fire Protection District

Internal Partners:		External Partners:
		Oregon Department of Energy, Building Codes Division
Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

Multi-Hazard #1

Proposed Action Item:	Alignment with Plan Goals:
Develop a post-disaster redevelopment plan.	Goal 7

Rationale for Proposed Action Item:

Achieving sustainability, which, in a disaster-related context, means the ability to survive future natural disasters with minimum loss of life and property, is the overarching goal of planning for post-disaster reconstruction. (Source: FEMA, "Policies for Guiding Planning for Post-Disaster Recovery and Reconstruction")

Public 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.. (Source: FEMA, "Policies for Guiding Planning for Post-Disaster Recovery and Reconstruction")

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, although it is often a major 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 local 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:

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's scheduled to occur in conjunction with Marion County.

Seek funding sources and/or outside assistance to help facilitate this process and the development of a post-disaster recovery plan.

Coordinating Organization:	Aurora City Recorder, Aurora Administrative Assistant

Internal Partners:	External Partners:
Aurora Public Works, Aurora Planning Commission	MCCOG, Department of Homeland Security, Oregon Emergency Management
Timeline:	**If available, estimated cost:**

Short Term (0-2 years)	Long Term (2-4 or more years)	
	4+ years	
Form Submitted by:	Aurora Steering Committee	
Status:	New Action, 2009	

Multi-Hazard #2

Proposed Action Item:	**Alignment with Plan Goals:**
Further assess the potential implications of various transportation route closures.	Goals 1, 3, and 7

Rationale for Proposed Action Item:

Two bridges provide primary access to the city from Interstate 5 and Highway 99E: the Mill Creek Bridge, and the Pudding River Bridge. If either collapsed, transportation in and out of the city would require lengthy detours. This would be particularly concerning for residents requiring medical attention (e.g., hospitals in Oregon City, Silverton, Newberg, Tualatin, and Salem). Additionally, Aurora is essentially a bedroom community to larger nearby cities, and most residents rely on transportation networks for access to employment, medical care, shopping, services, etc. Highway 99E and Interstate 5 are particularly important for travelers in and out of the community. The few local businesses in town also rely on tourists and out-of-town visitors.

For Aurora's residents, landslides that occur within the region could create problems for people that commute outside of the city for work (although there's no record of this occurring in the past). Likewise, residents rely on hospitals outside of city limits in Oregon City, Salem, Newberg, Silverton, and Tualatin.

Ideas for Implementation:

Further assess and/or identify locations that are susceptible to landslide activity.

Use Google's map service to find alternative transportation routes for various critical facilities (i.e., hospitals, nearby cities). Distribute maps to emergency service providers.

Coordinating Organization:	Police Department / Fire Department / Public Works Superintendant

Internal Partners:	**External Partners:**

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	
1 year		

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

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

Rationale for Proposed Action Item:

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:

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.

Add this action to the Emergency Operations Plan, and implement within the EOP.

Coordinating Organization:	Aurora City Recorder

Internal Partners:	**External Partners:**
Public works, Police, Fire	Cities of Canby, Hubbard, and Woodburn. Wilsonville Costco (or any regional grocery providers)

Timeline:		**If available, estimated cost:**
Short Term (0-2 years)	Long Term (2-4 or more years)	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009

Multi-Hazard #4

Proposed Action Item:	Alignment with Plan Goals:
Encourage citizens to prepare and maintain 72-hour kits	Goal 2

Rationale for Proposed Action Item:

Aurora is vulnerable to a number of natural hazards that could disrupt services. According to Aurora's risk assessment, the city has a high probability and vulnerability rating to floods, wind storms, and winter storms; 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 would be a way to keep the public informed of, and involved in, the city's actions to mitigate hazards.

Ideas for Implementation:

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:	Aurora Fire Department and the Aurora City Recorder

Internal Partners:	External Partners:
	Red Cross

Timeline:		If available, estimated cost:
Short Term (0-2 years)	Long Term (2-4 or more years)	
	2 years & ongoing	

Form Submitted by:	Aurora Steering Committee
Status:	New Action, 2009