Marion County Multi-Jurisdictional Hazard Mitigation Plan

Marion County and the Cities of: Aumsville, Aurora, Detroit, Gates, Idanha, Keizer, Mill City, Silverton, Stayton, Turner and Woodburn

April 2017

Volume II: City Addenda

Prepared for:

Marion County Emergency Management

Prepared by:

University of Oregon
Community Service Center
Community Planning Workshop &
Oregon Partnership for Disaster Resilience

UNIVERSITY OF OREGON

CSC Community Service Center

CPW

OREGON PARTNERSHIP FOR DISASTER RESILIENCE

This Natural Hazard Mitigation Plan was prepared by:

CSC
Community Service Center

With support from:

UNIVERSITY OF OREGON

PPPM
Department of Planning, Public Policy and Management
School of Architecture and Allied Arts

Planning grant funding provided by:

FEMA

Federal Emergency Management Agency (FEMA)
Pre-Disaster Mitigation Program
Grant: EMS-2014-PC-0005
Sub-grant Application Reference: PDMC-PL-10-OR-2013-001, and

Additional Support Provided by:

SPECIAL THANKS & ACKNOWLEDGEMENTS

Marion County developed this Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) through a regional partnership funded by the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation (PDM) Competitive Grant Program: EMS-2014-PC-0011, Sub-grant Application Reference: PDMC-PL-10-OR-2014-002. This updated Hazard Mitigation Plan is a collaboration between Marion County and the Cities of Aumsville, Aurora, Detroit, Gates, Idanha, Keizer, Mill City, Silverton, Stayton, Turner and Woodburn. Planning process, plan templates and plan development support provided by the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center.

Special thanks to Ed Flick, Marion County Emergency Manager for his enterprise-wide vision for resilience in Marion County; and to Kathleen Silva, Marion County Emergency Preparedness Coordinator for her leadership in convening the steering committee and lifeline sector advisory committees.

Marion County HMP Update Steering Committees

Marion County

Name	Position	Organization
Bill Lawyer	Director	City of Keizer Public Works
Boyd Keyser	Superintendent	North Marion School District
Brandon Reich	Senior Planner	Marion County Planning
Brent Stevenson	Manager	Santiam Water Control District
Caitlin Esping	AmeriCorps VISTA	Marion County Emergency Management
Dale Huitt	Deputy Sheriff	Marion County Sheriff
Danielle Gonzalez	Management Analyst	Marion County Community Services
David Sawyer	Administrator	City of Turner
Derrel Lockard	Superintendent	City of Aurora Public Works
Dianne Hunt	Director	City of Silverton Administrative Services
Don Charpillon		East Salem Suburban Neighborhood Association
Ed Flick	Emergency Manager	Marion County Emergency Management
Jason Horton	Communications Coordinator	City of Woodburn
Jeff Fossholm	Chief of Police	City of Silverton Police Department
Jennifer Warner	Technician	City of Keizer Public Works
Jim Ferraris	Police Chief	Woodburn Police Department
Kathleen Silva	Emergency Preparedness Coordinator	Marion County Emergency Management
Kelly Richardson	Manager/City Recorder	City of Aurora City Hall Administration
Kris Sallee	Councilor	City of Aurora City Council
Mathias Reyes	Project Manager	City of Keizer Public Works
Matt Knudsen	Environmental Specialist	Marion County Public Works
Michael Johnson	Chair	East Salem Suburban Neighborhood Association
Randy Scott	Director	City of Woodburn Public Works
Rick Sebens	Chief of Police	City of Stayton Police Department
Roger Stevenson	Emergency Manager	City of Salem Emergency Management

City of Aumsville

- Richard Schmitz, Chief of Police
- Steve Oslie, Public Works Director

City of Aurora

- Kris Sallee, City Council
- Kelly Richardson, City Recorder
- Derrel Lockard, Public Works Superintendent
- Boyd Keyser, Marion County School District

City of Detroit

- Christine Pavoni, City Recorder
- Robert Bruce, Certified Water Technician

City of Gates

- Jerry Marr, Mayor
- Traci Archer, Recorder
- Leeroy Davis

City of Idanha

- Karen Clark, Mayor
- Robert Bruce, Certified Water Technician

City of Keizer

- Bill Lawyer, Public Works Director
- Jennifer Warner, Public Works Technician
- Mathias Reyes, Drinking Water Technician
- Nate Brown, Community Development Director
- Elizabeth Sagmiller, Environmental Division Manager
- Sam Litke, Senior Planner
- Shane Witham, Associate Planner

City of Mill City

- David Kinney, Planning Advisor
- Stacie Cook, City Recorder

City of Silverton

- Dianne Hunt, Emergency Manager
- Jeff Fossholm, Police Chief

City of Stayton

- Dan Fleishman, Planning & Development Director
- Henry Porter, Mayor
- Rich Sebens, Emergency Manager
- Lance Ludwick, Public Works

City of Turner

- David Sawyer, City Administrator
- Garry Tiffin, Mayor
- Richard Bates
- Chuck Roberts
- Larry Lullay
- John Taylor

City of Woodburn

- Jason Horton, Public Information Officer
- Randy Scott, Public Works Director
- Jim Ferraris, Chief of Police
- Paul Iverson, Fire District Chief

Community Service Center Team

- Robert Parker, Director
- Josh Bruce, Director OPDR
- Michael Howard, Assistant Program Manager
- Aniko Drlik-Muehleck, Project Director
- Craig Wiroll, Project Manager
- Amanda Kohn, Research Associate
- Bree Nicolello, Research Associate
- Dan Lokic, Research Associate
- Tyce Herrman, Research Associate
- Mugs Scherer, Research Associate

Additional Thanks:

To the Department of Geology and Mineral Industries for assistance with hazard data; the Department of Land Conservation and Development staff in the hazards for flood data, mapping and process support; to the Oregon Military Department Office of Emergency Management for grant administration and process support.

Special thanks to all of the local Marion County partner agencies and representatives who participated in the lifeline sector analysis:

- Communications: Capital Community Television (CCTV), Amateur Radio Emergency Service (ARES), Marion Area Multi-Agency Emergency Telecommunications Dispatch Center (METCOM 911), Santiam Canyon Phone, Willamette Valley Communications Center (WVCC), Frontier, Verizon, Oregon Statewide Interoperability Coordinator (SWIC), Service Master of Salem, Pacific Gas and Electric Company (PGE).
- Energy: Pacific Gas and Electric.
- Transportation: City of Salem, City of Woodburn, Marion County Public Works, Marion County Sherriff's Office, ODOT, Salem Public Works, Salem-Keizer School District, Salem-Keizer Transit, Woodburn Transit Service.
- Water: City of Stayton, City of Salem, City of Keizer, City of Turner, Marion County, North Santiam Watershed Council.

About the Community Service Center

The Community Service Center (CSC), a research center affiliated with the Department of Planning, Public Policy, and Management at the University of Oregon, is an interdisciplinary organization that assists Oregon communities by providing planning and technical assistance

to help solve local issues and improve the quality of life for Oregon residents. The role of the CSC is to link the skills, expertise, and innovation of higher education with the transportation, economic development, and environmental needs of communities and regions in the State of Oregon, thereby providing service to Oregon and learning opportunities to the students involved.

About the Oregon Partnership for Disaster Resilience

The Oregon Partnership for Disaster Resilience (OPDR) is a coalition of public, private, and professional organizations working collectively toward the mission of creating a disaster-resilient and sustainable state. Developed and coordinated by the Community Service Center at the University of Oregon, the OPDR employs a service-learning model to increase community capacity and enhance disaster safety and resilience statewide.

Plan Template Disclaimer

This Hazard Mitigation Plan is based in part on a plan template developed by the Oregon Partnership for Disaster Resilience. The template is structured to address the requirements contained in 44 CFR 201.6; where language is applicable to communities throughout Oregon, OPDR encourages the use of standardized language. As part of this regional planning initiative, OPDR provided copies of the plan templates to communities for use in developing or updating their hazards mitigation plans. OPDR hereby authorizes the use of all content and language provided to Marion County in the plan template.

This page left intentionally blank.

Table of Contents

Volume I: Basic Plan

Volume II: City Addenda

Volume III: Appendices

CITY OF AUMSVILLE ADDENDUM

Purpose

This document serves as the City of Aumsville's Addendum to the Marion County Multi-Jurisdictional Hazards Mitigation Plan (MHMP, HMP). This addendum supplements information contained in Volume I (Basic Plan) of this HMP. The Basic Plan serves as the foundation for this jurisdiction's addendum. Volume III (Appendices) provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the HMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer and fall of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with the Oregon Military Department's Office of Emergency Management (OEM), and Marion County cities, including Aumsville, to update their addendum to the Marion County HMP, which expired July 8, 2016. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County HMP, locally adopting it, and having it approved by FEMA, the City of Aumsville will gain eligibility for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County HMP, and Aumsville addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing the plan. For more information on the composition of the steering committee see the *Acknowledgements*, *Plan Summary*, and *Plan Process* (Volume III, Appendix B).

The Aumsville City Administrator is the designated local convener of this addendum. The Convener will take the lead in implementing, maintaining, and updating the addendum to the HMP in collaboration with Marion County Emergency Management.

Representatives from the City of Aumsville steering committee met formally on one occasion: October 12, 2016 (see Appendix B for more information).

The city's addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with OPDR.

The City of Aumsville Steering Committee is comprised of representatives from the following departments:

- Convener, City Administrator
- Police representative
- Fire representative
- Public Works Director
- School District
- Marion County Emergency Management (as necessary)
- Marion County Public Works representative (as necessary)

Aumsville used multiple approaches to engage the public. First, the City established steering committee representatives from across the city. Next, the city actively participated in countywide community engagement activities described in Volume I, Section 4 and in Appendix B. City staff also presented the draft plan to the City Council during an open public council session. The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process (see Appendix B for more information).

The Marion County HMP was approved by FEMA on August 17, 2017 and the Aumsville addendum was adopted via resolution on June 12, 2017. This HMP is effective through August 16, 2022.

Mitigation Strategy

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

During the 2016 Marion County and Aumsville update process, OPDR and a representative from Marion County Emergency Management assisted the steering committee with developing mitigations that will meet Aumsville's unique situation. The proposed actions were then re-reviewed by the steering committee to finalize. Aumsville developed a list of priority actions (Appendix A-1), any actions that were not prioritized were placed in the Action Item Pool (Appendix A-2) and will be considered during the semi-annual meetings.

Priority Actions

The city is listing a set of high priority actions in an effort to focus attention on an achievable set of high leverage activities over the next five-years. The city's priority actions are listed in Table AM-1 on the following page.

Action Item Pool

Table AM-2 on the following pages presents a pool of mitigation actions. This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available.

Table AM-1. Aumsville Priority Action Items

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Priority Actions					
P-1	Flood	Remove culvert on 1st and Gordon and replace with a bridge.	Public Works	City Administration/	Short-Term
P-2	Flood	Upsize culverts on Bishop Rd.	Public Works	City Administration/	Short-Term
P-3	Flood	Create an agreement for flood mitigation along Beaver Creek and Mill Creek/Highberger Ditch (agreement would have to be regional). Aumsville could do the following: *Use city property as a water detention space *Increase the detention capacity to accommodate effects of new development *Update the Stormwater Mangement Plan	City Administration	Public Works, State Representatives, regional partners	Ongoing
P-4	Earthquake	Assess the seismic vulnerability of the City's reservoir (as described in the 2015 Water Plan). Retrofit facility as funding becomes available.	Public Works	City Administration/ City Council	Short-Term/ Long Term

Source: City of Aumsville HMP Steering Committee, 2016.

Table AM-2. Aumsville Action Item Pool

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Multi-Hazard					
MH-1	Multi-Hazard	Develop memorandum of understanding with the gas station that gives emergency services first access to station's stored fuel.	City Administration		Short-Term
MH-2	Multi-Hazard	Update the City's Emergency Operations Plan. Important components to include are: *A list of vulnerable populations *Fuel management and access plan *Detailed asset inventory	Police Chief and City staff	Marion Co.	Short-Term
MH-3	Multi-Hazard	Identify and purchase materials the City needs to operate successfully in an emergency situation.	City Administration	Police, Fire	Short-Term
MH-4	Multi-Hazard	Develop a communications plan between the City, Police, and Fire. This will include purchasing more radios so all key personnel can be in contact during an emergency.	Public Works	Police, Fire	Short-Term
MH-5	Multi-Hazard	Develop memoranda of understanding with facilities that could function as emergency shelters during a hazard event.	City Administration	Red Cross	Long-Term
MH-6	Multi-Hazard	Update the Aumsville Comprehensive Plan to reflect statewide land use Goal 7 language surrounding natural hazards.	City Administration	Mid-Willamette Valley Council of Governments	Long-Term
MH-7	Multi-Hazard	Include emergency preparedness resources in the City's monthly newsletter.	City Executive Office	Marion Co.	Ongoing
MH-8	Multi-Hazard	Hold an annual preparedness fair.	City Executive Office		Ongoing
MH-9	Multi-Hazard	Participate in Maron County's MORE Agreement.	City Administration	Marion Co.	Ongoing
MH-10	Multi-Hazard	Develop stronger connections with the business community and encourage businesses to develop continuity of operations plans.	City Administration	Businesses	Ongoing
Drought					
DT-1	Drought	Partner with Marion County to support local agencies' training on water conservation measures.	Public Works	Marion Co.	Ongoing
DT-2	Drought	Participate in Marion Co Drought Contingency Plan.	Public Works	Marion Co.	Short-Term/ Ongoing

Source: City of Aumsville HMP Steering Committee, 2016.

Table AM-2. Aumsville Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Earthquake					
EQ-1	Earthquake	Complete seismic assessment on criticial facilities (water tower assessment currently underway). Retrofit facilities based on recommendations of the assessment.	Public Works	City Administration/ City Council	Short-Term
EQ-2	Earthquake	School seismic retrofitting action - need to talk to school district representative.	School District	Business Oregon - IFA	Short-Term
EQ-3	Earthquake	Purchase a 4-wheel drive vehicle that could provide transportation if major access points to the city are not passable.	Public Works	City Council	Short-Term
EQ-4	Earthquake	Consider requiring new city facilities to exceed the minimum structural requirements for seismic loading.	City Council	Marion Co. Building Inspection	Long-Term
EQ-5	Earthquake	Install automatic shut-off valves in all city facilities that use natural gas.	Public Works	City Council	Long-Term
EQ-6	Earthquake	Develop dam inundation maps.	Risk MAP		Long-Term
EQ-7	Earthquake	Encourage residents to prepare and maintain 2-week survival kits.	City Executive Office	Marion Co.	Ongoing
EQ-8	Earthquake	Send city employees to Marion County's ATC 20 training.	City Administration	Marion Co.	Ongoing
Flood					
FL-1	Flood	Develop updated floodplain maps.	Risk MAP		Long-Term
FL-2	Flood	Host an educational event targeted at flood-vulnerable residents that provides information about participating in the National Flood Insurance Program and other flood mitigation activities.	Public Works	City Executive Office	Ongoing
Severe Weather					
SW-1	Severe Storm	Require new development to put power lines underground.	City Administration		Short-Term
SW-2	Severe Storm	Encourage Pacific Power to underground lines as they are able.	City Administration		Ongoing

Source: City of Aumsville HMP Steering Committee, 2016.

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Aumsville addendum to the Marion County HMP. This addendum designates a convener and a coordinating body to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional HMP, the city will look for opportunities to partner with the county. The city's steering committee will convene after adoption of the City of Aumsville addendum on an annual schedule; the county meets on a semi-annual basis. The City of Aumsville convener will participate in the Marion County HMP meetings and will report on city specific activities as appropriate. The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the city's mitigation strategy (actions). The convener will also remain active in the county's implementation and maintenance process (see Volume I, Section 4 for more information).

The city will utilize the same prioritization process as the county (See Volume I, Section 4: Plan Implementation and Maintenance and Volume IV, Appendix D: Economic Analysis of Hazard Mitigation Projects for more information).

Implementation through Existing Programs

Many of the Hazards Mitigation Plan's recommendations are consistent with the goals and objectives of the city's existing plans and policies. Where possible, the City of Aumsville will implement the HMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the HMP's action items through such plans and policies increases their likelihood of being supported and implemented.

The Aumsville Comprehensive Plan was first acknowledged by Oregon Land Conservation and Development Commission in 1977. The City most recently updated the entire plan, including updates to the Natural Hazards section, in December of 1999.[1] The Aumsville Comprehensive plan (Chapter 5, Goal 7) calls out floods and seismic hazards as the two hazards likely to impact Aumsville. The plan does not mention landslide or wildfire in the natural hazards section (Chapter 5, Goal 7). The plan does contain a general goal "to protect life and property of area residents from natural disasters and hazards." In addition, the plan contains two specific policies related to the flood hazard and two related to seismic hazard. There are no other hazard-related policies listed. The City implements the plan through regulatory controls found in the Development Ordinance. The City first adopted the Development Ordinance in 1986 and has completed numerous updates since, with the most recent occurrence in May of 2016.[2]

[1] Aumsville Comprehensive Plan (1999). Chapter 5: Resources. Goal 7: Natural Disasters and Hazards, p. 19-21; p. 24-25.

[2] Ordinance No. 323. "An Ordinance establishing comprehensive planning regulations for the City of Aumsville, Oregon." http://www.aumsville.us/files/Ord-323--Dev-Reg-8-1_4o8kcqk2.pdf

Aumsville also implements elements of the Comprehensive Plan related to natural hazards through the following Plans:

- City of Aumsville Visioning Plan, August 2015, updated April 2016[3]
- Aumsville Water Master Plan, April 2015[4]
- City of Aumsville Transportation System Plan, October 2010[5]

Continued Public Participation

Keeping the public informed of the City's efforts to reduce the risk associated with future hazards events is important for successful plan implementation and maintenance. The City is committed to involving the public in the plan review and updating process. The City will add all-hazard mitigation activities to the City of Aumsville Visioning Plan which is reviewed monthly by the City Council. This will give the public an opportunity to remain aware of efforts surrounding mitigation and create a regular space for input. Also see Volume I, Section 4, for more information about the public input process for this Multi-Jurisdictional Hazards Mitigation Plan.

Plan Maintenance

The Marion County Multi-Jurisdictional Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the city will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

---

[3] This document guides the City in day-to-day operations and is revisited regularly by the City Council. Related to natural hazards, the Plan includes goals and projects around water, sewer, street and storm drainage, police, public works, transportation, and emergency management. http://www.aumsville.us/files/April-2016-Visioning-Plan.pdf

[4] http://www.aumsville.us/files/Aumsville-WMP.pdf

[5] http://www.aumsville.us/files/Aumsville-TSP-ORD-603.pdf

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

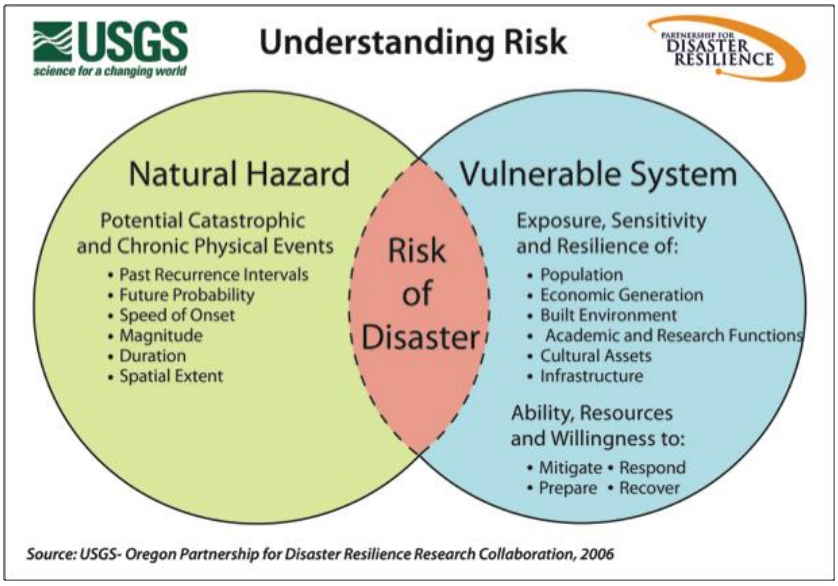
Risk Assessment

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

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein, and within Section 2, *Risk Assessment*, and Appendix C, *Community Profile*. The risk assessment process is graphically depicted in Figure AM-1 below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure AM-1. Understanding Risk



Risk Assessment Approach

A risk assessment is intended to provide the, "factual basis for activities proposed in the strategy to reduce loses from identified hazards."[6] To complete the risk assessment, the

[6] 44 CFR 201.6(2)(i)

HMP update team first updated the description, type, location and extent of each hazard. Next, the team updated the vulnerability information based on each hazard's potential impact on the community.

The Marion County Basic Plan (Volume I, Section II) Risk Assessment describes in detail the methods used to assess risk. In summary, Marion County has prepared a Threat Hazard Identification and Risk Assessment as a formal annex to the Marion County Emergency Operation Plan. The assessment uses a method developed by BOLD Planning[7]. This city addendum builds on the county level assessment to produce a similar assessment for the City of Aumsville. The assessment specifically examines:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

Refer to Page 2-4 of the Marion County Basic HMP for a description of the scoring values for each ranking category.

Hazard Analysis

The assessment identifies three levels of risk: High, Moderate and Low.

High - High probability of occurrence; at least 50 percent or more of population at risk from hazard; significant to catastrophic physical impacts to buildings and infrastructure; major loss or potential loss of functionality to all essential facilities (hospital, police, fire, EOC and shelters).

Moderate - Less than 50 percent of population at risk from hazard; moderate physical impacts to buildings and infrastructure; moderate potential for loss of functionality to essential facilities.

Low - Low probability of occurrence or low threat to population; minor physical impacts.

A summary of the risk assessment findings and rankings is presented in Table AM-3.

[7] BOLD Planning is a consulting firm specializing in the development of actionable emergency plans. For more information, visit: http://www.boldplanning.com/

Table AM-3. Hazard and Vulnerability Assessment Summary

Hazard Profile Summary for Aumsville Usinging Bold Planning Analysis Scoring							
Natural Hazard	Probability	Warning Time	Magnitude	Duration	CPRI	Local Planning Significance	County Planning Significance
Weight Factor	0.45	0.3	0.15	0.1			
Earthquake*	4	4	4	4	4.00	High	High
Severe Weather/Storm**	4	1	3	3	2.85	Moderate	High
Flood	3	2	3	4	2.80	Moderate	High
Drought	3	1	3	4	2.50	Moderate	High
Extreme Weather - High Temperature	3	1	2	4	2.35	Moderate	Moderate
Wildland Interface Fire	1	4	2	2	2.15	Moderate	Moderate
Dam or Levee Failure	1	2	4	4	2.05	Moderate	Moderate
Landslide	1	2	2	2	1.55	Low	High
Volcanic Eruption	1	1	1	4	1.30	Low	Low
*Note: Earthquake probability listed to match county level analysis. See below for more detailed probability assessment.							
**Note: Includes tornado hazard							

Source: BOLD Planning Risk Assessment Method; Analysis by UO Community Service Center.

Community Asset Identification

This section provides information on city specific assets. For additional information on the characteristics of Aumsville, in terms of geography, environment, population, demographics, employment and economics, as well as housing and transportation see Volume III, Appendix C, *Community Profile*. Many of these community characteristics can affect how hazards impact communities and how communities choose to plan for all-hazard mitigation. Considering the city specific assets during the planning process can assist in identifying appropriate measures for hazard mitigation.

Community Characteristics

The city of Aumsville is located in Marion County, Oregon, southeast of Salem, just south of Hwy 22 at Exit 9. Aumsville is located in Oregon's Willamette Valley, which experiences a moderate climate. In August, the average high temperature is 80 degrees and the average low temperature is 52 degrees. Wintertime temperatures in January range from an average high of 47 degrees to an average low of 33 degrees. The average annual precipitation is 39.6 inches. Aumsville is bordered on the north by Beaver Creek and on the south by Mill Creek. Mill Creek has a small offshoot on the southeastern side of town called Highberger Ditch. Aumsville is almost completely flat.

The Population Research Center at Portland State University lists Aumsville's 2015 population at 3,945. This represents a 26% increase from 2000. For more demographic information, refer to Appendix C.

Economy

Historically, Aumsville was an agricultural community. Although agriculture is still an important industry in the surrounding areas, almost three-quarters of the labor force in Aumsville are now employed in construction, services, and retail trade.[8] Median household

[8] Business Oregon – Oregon Prospector. Total Employees by Major SIC (2016) for Aumsville, OR. http://oregon.zoomprospector.com/

income in Aumsville in 2014 was $50, 319. For more economic information, refer to Appendix C.

Critical and Important Facilities

Aumsville's critical and important facilities include the following:

Transportation

- Highway OR-22 (North Santiam Highway)
- Shaw Hwy overpass on Hwy 22
- Aumsville Highway SE
- Mill Creek Bridge on W. Stayton Rd.
- Mill Creek Bridge on W end of Mill Creek Rd (this bridge hosts a fiber optic cable)
- Beaver Creek Bridge on Aumsville Hwy
  Note: City of Aumsville is not responsible for any of these highways or bridges – they are all managed by Marion County or ODOT

Energy

- Electricity Source: Pacific Power
  - All transmission lines, no substations
- Fuels used by the City:
  - City does not have a fuel station – fuel bought retail (note that the local fuel station probably does not have a back-up power source to pump gas from underground tanks)
  - City Hall back-up fuel: diesel generator for a well, City Hall/Police, and Fire Department – diesel will last for 24 hours
  - Public Works back-up fuel: 500 gallons of diesel, up to 1000 gallons of gas above ground – there are electric pumps now, but fuel could be manually pump if necessary
  - Wastewater Treatment Plan back-up fuel: diesel generator – diesel will last for 24 hours
  - Well site #1 back-up fuel: diesel generator – diesel will last for 24 hours
- School District has propane and diesel back-up

Water

- Drinking water sources:
  - Reservoir – 1 million gallons
  - Tower Well, located at 195 N. 5th St. (has back-up generator) – 100,000 gallons
  - Boone Well #1, located at 1105 Main St. (has back-up generator)
  - Reservoir Well, located at 9313 Mill Creek Rd.
  - Boone Well #2, located at 1105 Main St.
  - Church Well, located at 675 Grizzly St.
  - Two water filters that will filter 3,000 gallons per day (pumped from surface water sources)
- Wastewater Treatment Plant, 955 Olney St.: pond system

Communication

- Water Tower, 195 N. 5th St.: hosts 4 cellular providers
- Wastewater Treatment Plant, 955 Olney St.: hosts one cell tower (owned by a cellular provider) with a diesel generator with back-up fuel for 24 hours
- Telephone (ground line) switching station, 980 Main St.: has a diesel generator with back-up fuel for 24 hours
- City-owned vehicle mounted radios provide the ability to interconnect Police and Fire
- Police and Fire can dispatch out of the Police and Fire stations
- 1 amateur radio, located off of Cedar Lane

Emergency Services

- Police:
  - Police Department, 597 Main St.
- Fire: Aumsville Rural Fire Protection District
  - 490 Church St.
  - Shaw Station, 5604 Shaw Highway SE
- Medical
  - Aumsville Medical Clinic, 205 Main St. (note this is really just a doctor's office)

Cultural/Historical Resources

- Old City Hall is the Historic Museum, 599 Main St.
- Events that may have large crowds:
  - June: Emergency Preparedness fair/School Carnival
  - June – August, Mondays & Fridays: Kids summer parks program (run by the City)
  - August: Aumsville Corn Festival (10,000 – 12,000 attendance)
  - November: Saturday before Thanksgiving: Turkey Bingo (500-600 attendance)

Functional and Access Needs (Vulnerable Populations)

- Schools:
  - Aumsville Elementary School, 572 N. 11th St. (3 separate buildings)
  - Willamette Valley Baptist Church and School, 650 N. 1st St.
  - Kuntry Kids (Daycare), 200 Main St.
- Lower-income areas:
  - S 5th St next to Mill Creek
  - 11th St and Olney

See hazard sections below and Section 2, *Risk Assessment*, for potential hazard vulnerabilities to these facilities.

Hazard Characteristics

Drought

The characteristics of drought in Aumsville are the same for the county as a whole.

Table AM-4. Drought Summary

Hazard	Drought
Type	Climatic
Speed of Onset	Slow
Location	Varies, County Wide
Extent	Moderate to Severe Drought*
Prior Occurance	Three > 6 months duration since 1982
Probability	~9%

*Defined as between -2 and -4 on the National Resource Conservation Service (NRCS) Surface Water Supply Index (SWSI)

Sources: Oregon NHMP; NRCS; analysis by OPDR

The probability of drought in Aumsville is likely, the same as for the county as a whole. The City's water supply comes primarily from subsurface sources, making vulnerability to drought moderate. Overall, the planning significance of drought is moderate, slightly lower than the county.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of drought hazards, as well as the location and extent of a potential event. Due to a cool, wet climate, past and present weather conditions have generally spared Marion County communities from the effects of drought. Governor Kate Brown declared a drought emergency for all of Marion County in September 2015.

According Aumsville's 2015 Water Master Plan, Aumsville's five wells deposit water into a 1-million-gallon reservoir. Water is treated in the reservoir with chlorine and then distributed out via a booster pump station to water customers. In the future, water will receive additional filtration before entering the reservoir.

The 2015 Water Master Plan includes a section on water conservation, including a list of exiting or proposed water conservation programs. The Plan also provides a Water Curtailment Plan with accompanying curtailment actions.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Earthquake

The characteristics of both a crustal earthquake and a Cascadia Subduction Zone (CSZ) earthquake are similar to the county as a whole.

Table AM-5. Earthquake Summary Crustal

Hazard	Earthquake - Crustal
Type	Geologic
Location	Multiple active faults; Willamette Valley
Speed of Onset	Rapid
Extent	Very Strong to Severe shaking ~ 500 yrs*
Prior Occurance	One over Magnitude 5 last 100 yrs**
Probability	Approximately 1% annual

*DOGAMI HazVu; ** PNSN - 1993 Scotts Mills just north of Marion County

Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

Table AM-6. Earthquake Summary Subduction

Hazard	Earthquake - Subduction
Type	Geologic
Location	Primarily west of the Cascades; CA - BC
Speed of Onset	Rapid
Extent	Catastrophic
Prior Occurance	One over Magnitude 9 last 500 yrs
Probability	Magnitude 9+ is 7% - 12% over 50 yrs**

*DOGAMI HazVu; **Oregon Natural Hazard Mitigation Plan, anlysis by Oregon Department of Geology and Mineral Industries.

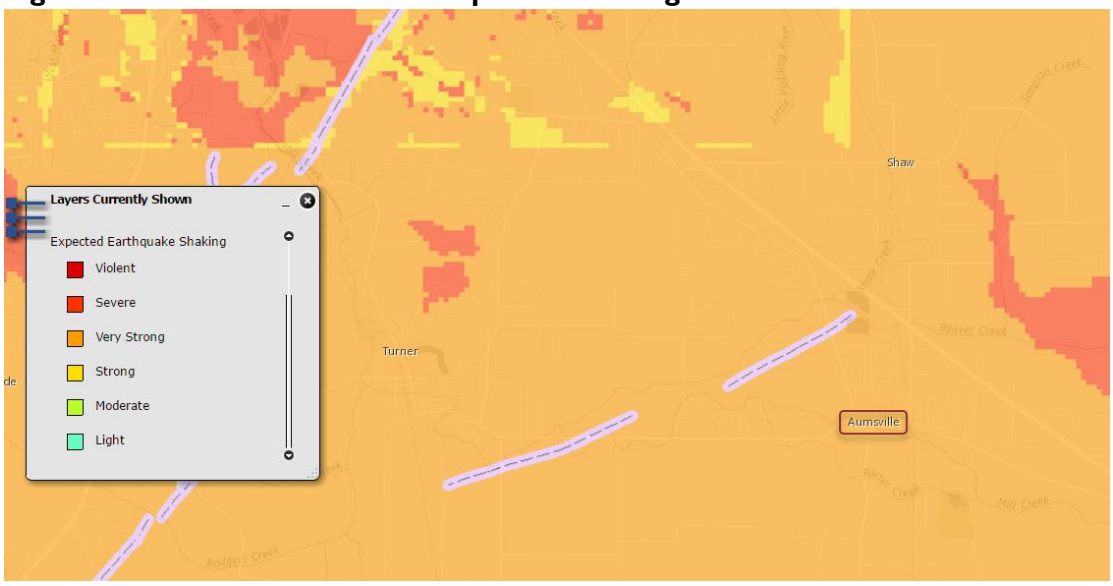
Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

Aumsville's probability for a Crustal Earthquake event is "possible" and their vulnerability to a Crustal Earthquake event is "limited". The county steering committee determined that the probability for a Cascadia Subduction Zone (CSZ) Earthquake event is "highly likely" and that the vulnerability to a Cascadia Earthquake event is "catastrophic". This hazard was not rated as distinct CSZ and crustal events in the previous HMP. There is one locally active fault within the Aumsville city limits, one crossing over on the far northwest corner of the town. Other active faults also exist about six miles to the northwest and west. The 1993 Scott Mills quake caused $28 million in damages to cities throughout Marion County. No damaging earthquake events occurred during the previous five years.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of earthquake hazards, history, as well as the location and extent of a potential event. Generally, an event that affects the county is likely to affect Aumsville as well. Previous occurrences are well-documented within the county's plan, and the community impacts described by the county would generally be the same for Aumsville as well.

Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any particular site. In many major earthquakes, damages have primarily been caused by the behavior of the soil. Figure AM-2 shows that ground shaking in Aumsville for both crustal and subduction earthquakes are expected to be very strong.

Figure AM-2. Active Faults and Expected Shaking



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

The Aumsville steering committee identified liquefaction as a primary concern related to the earthquake hazard. The committee suggested conducing analysis of the city's critical facilities to understand how they will be impacted by earthquake. As a top priority identified in the 2015 Water Master Plan, the City would like to assess the seismic vulnerability of the 1-million-gallon reservoir that contains the City's entire drinking water supply.

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 the "probability of collapse" due to the maximum possible earthquake for any given area. This report assigned a "low" probability of collapse to Aumsville's police station and rural fire protection district station. The report did not rate the probability of collapse for Aumsville Elementary School, originally built in 1910 and remodeled in 1987. In the future, the school district should conduct a seismic assessment to identify any structural issues that should be addressed to reduce potential for collapse. It is possible that after City employees attend the ATC 20 training, they may have the capacity and ability to help perform a preliminary assessment of the school facility.

In an effort to prepare residents for a potentially devastating seismic event, the Aumsville Executive Office will begin to encourage residents to prepare 2-week survival kits through various outreach events.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Flood

Table AM-7. Flood Summary

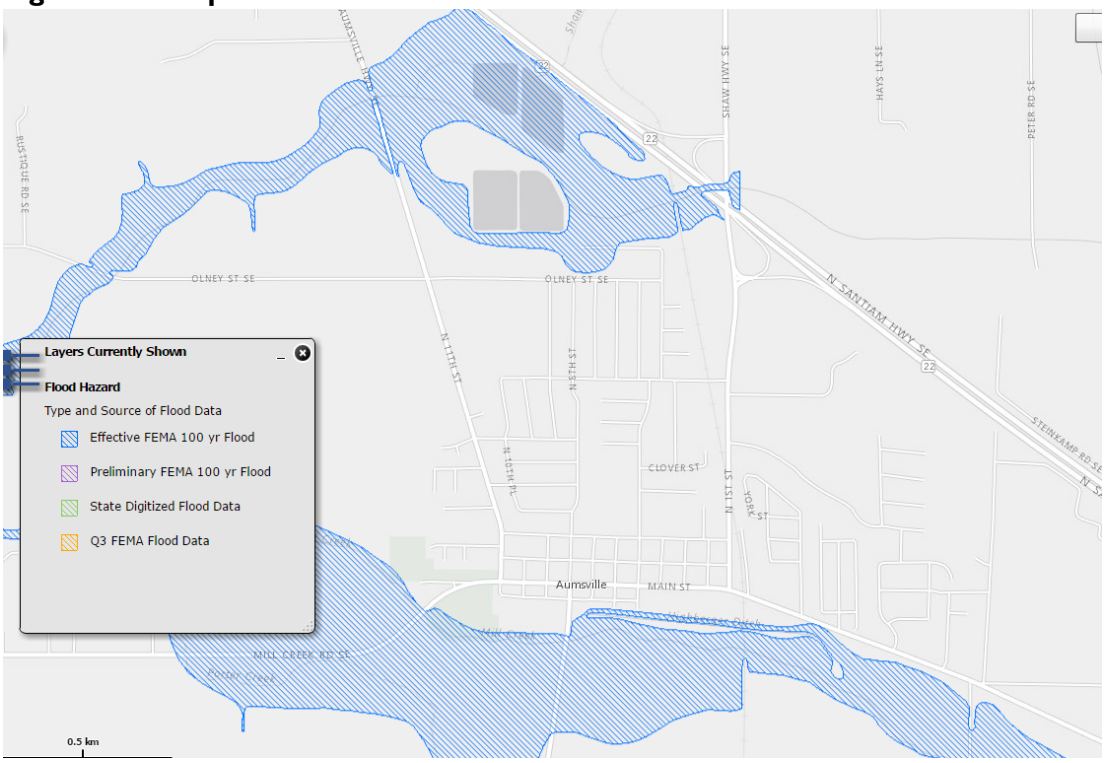
Hazard	Flood
Type	Climatic
Speed of Onset	Slow to moderate
Location	Mapped flood zones, floodplain
Extent	Moderate to severe
Prior Occurance	Four significant events since 1964
Probability	1% annual within SFHA

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, Risk Assessment, describes the causes and characteristics of flooding hazards within the region. Aumsville's probability for riverine flood is likely and vulnerability to flood is critical.

Portions of Aumsville have areas of flood plains (special flood hazard areas). These include areas along Mill Creek and the Highberger Ditch, and Beaver Creek (see Figure AM-3). Furthermore, other portions of Aumsville, outside of the mapped floodplains, are also subject to significant, repetitive flooding from local storm water drainage.

Figure AM-3. Special Flood Hazard Area



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

Historically, Aumsville has experienced major floods in 1996, around 2000, and in 2011. Since then, no major floods have affected the population, but Aumsville continues to experience regular localized flooding during the wet season. In particular, the steering

committee noted issues along Bishop Road, 1st Street, and in the Highberger Ditch area. The steering committee also noted that Porter Boone and Mill Creek Parks often flood during the winter. According to the steering committee, many of the flooding issues affecting Aumsville can be attributed to poor ditch maintenance.

National Flood Insurance Program (NFIP)

FEMA modernized the Aumsville Flood Insurance Rate Maps (FIRMs) in January of 2000. The table below shows that as of October 2016, Aumsville has 19 National Flood Insurance Program (NFIP) policies in force. Of those, 7 are for properties that were developed before development of the initial FIRM. Aumsville has not had any Community Assistance Visit (CAV) and is not a member of the Community Rating System (CRS). Table AM-8 shows that all of the flood insurance policies are for single-family residential structures. There have been no paid flood claims in Aumsville.

The Community Repetitive Loss record for Aumsville identifies no Repetitive Loss Properties[9] and no Severe Repetitive Loss Properties[10].

Table AM-8. Flood Insurance Detail

Jurisdiction	Effective FIRM and FIS	Initial FIRM Date	Total Policies	Pre-FIRM Policies	Policies by Building Type: Single Family	2 to 4 Family	Other Residential	Non-Residential	Minus Rated A Zone	Minus Rated V Zone
Marion County	-	-	2,067	1,239	1,614	115	105	232	97	0
Aumsville	1/19/2000	3/1/1979	19	7	19	0	0	0	2	0

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-FIRM Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss	CRS Class Rating	Last Community Assistance
Marion County	$ 514,268,700	298	226	16	$ 5,732,543	11	2	-	-
Aumsville	$ 4,515,700	0	0	0	$ -	0	0	N/A	none

Source: Information compiled by Department of Land Conservation and Development, October, 2016.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

[9] A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

[10] A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Landslide

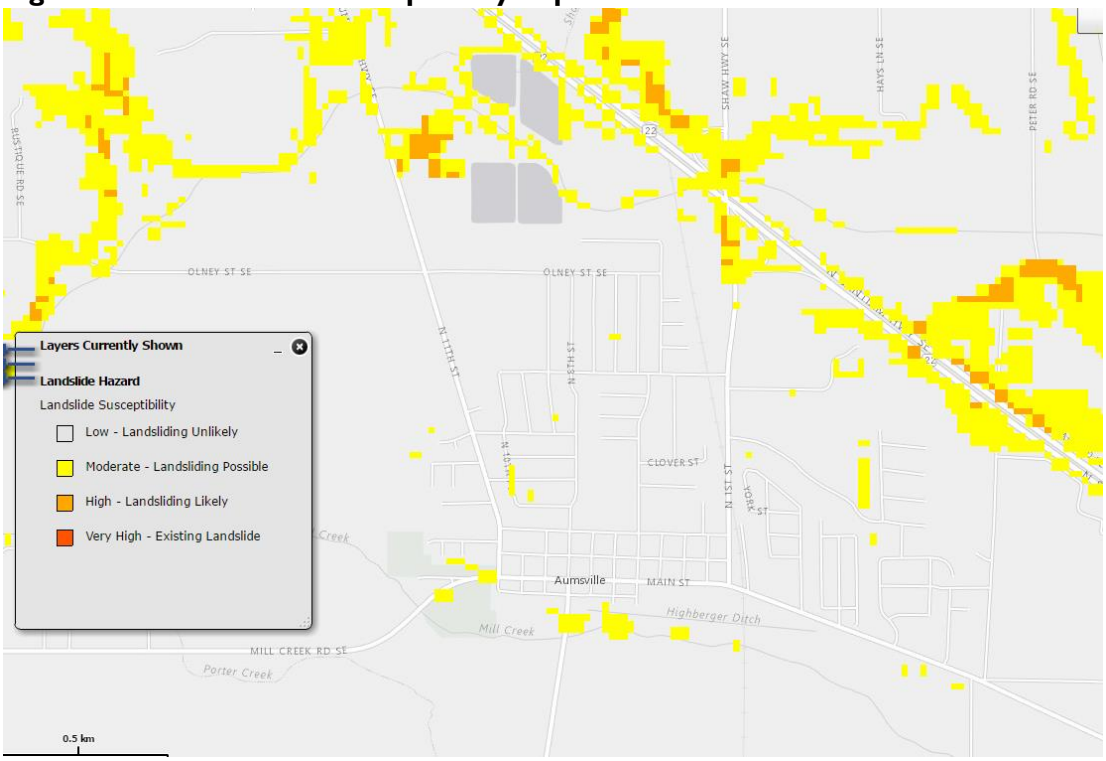
Table AM-9: Landslide Summary

Hazard	Landslide
Type	Climatic/Geologic
Speed of Onset	Slow to rapid
Location	Waterways (banks) and transportation facilities
Extent	Minor
Prior Occurance	No major events
Probability	Low for minor events; less than 5% major events

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of landslides, and appropriately identifies previous landslide occurrences within the region. Aumsville has a relatively flat topography. Aumsville's probability for landslide is unlikely (which is lower than the county's rating) and their vulnerability to landslide is limited (which is also lower than the county's rating). Figure AM-4 shows that landslide risk in Aumsville is very low.

Figure AM-4. Landslide Susceptibility Exposure



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Volcano

Table AM-10: Volcano Summary

Hazard	Volcano
Type	Geologic
Speed of Onset	Slow to rapid
Location	Cascade Mountains
Extent	Minor
Prior Occurance	One significant event since 1916 (Mount St. Helens)
Probability	<1% annual

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes Aumsville's risk to volcanic events. The steering committee determined that the city's probability for volcanic event is unlikely and their vulnerability to volcano is negligible.

The causes and characteristics of a volcanic event are appropriately described within the county's plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county's plan. Aumsville is very unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in 1980, the city was not impacted.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Wildfire

Table AM-11: Wildfire Summary

Hazard	Wildfire
Type	Climatic, Human Caused
Speed of Onset	Moderate to rapid
Location	Outside city limit
Extent	Minor to moderate
Prior Occurance	No history inside city limit
Probability	<1% annual

Sources: Marion County NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of wildfires, as well as the county and city's history of wildfire events. The City's probability for wildfire is unlikely and the vulnerability to wildfire is limited. Aumsville is surrounded on all sides by open farmland and waterways, and there are no forests within the city limits. Due to its location, Aumsville faces minimal risk of experiencing wildfires. There is no history of wildfire events in Aumsville.

The County updated the Community Wildfire Protection Plan in 2016 and Aumsville is not listed as a "Community at Risk."

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Severe Weather

Table AM-12: Severe Weather Summary

Hazard	Severe Weather/Storm
Type	Climatic
Speed of Onset	Slow to moderate
Location	Countywide
Extent	Minor to severe
Prior Occurance	Minor events occur annually; ~30 moderate to severe events countywide over the past 130 years
Probability	100% for minor events, 23% for moderte to severe events

Sources: Marion County NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of windstorms and severe winter storms, as well as the location and extent of these hazards. Aumsville's probability for windstorm and severe winter storms is highly likely and vulnerability is critical.

Significant wind events occur in Aumsville each year, sometimes interrupting services, downing trees, and causing power outages. In December 2010, a tornado touched down in Aumsville, causing around $1.2 million dollars in damage.[11] Since this event, Aumsville has not experienced wind events that were quite as severe. Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and very rarely, snow.

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting Aumsville typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from November through March.

Major winter storms can and have occurred in the Aumsville area, and while they typically do not cause significant damage, they are frequent and have the potential to impact economic activity. During a storm in the winter of 2012-13, the steering committee reported that residents experienced power outages for 4 days, accompanied by numerous downed tree limbs. The most recent winter storms (December 2016 – January 2017) included snow and ice and resulted in transportation and power interruptions combined with government office and school closures. A disaster declaration is currently pending.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

[11] Joseph Rose (2010). "Aumsville Tornado: 'Amazingly, no one was seriously hurt.'" *The Oregonian*. http://www.oregonlive.com/weather/index.ssf/2010/12/aumsville_tornado_amazingly_no.html

CITY OF AURORA ADDENDUM

Purpose

This document serves as the City of Aurora's Addendum to the Marion County Multi-Jurisdictional Hazards Mitigation Plan (MHMP, HMP). This addendum supplements information contained in Volume I (Basic Plan) of this HMP. The Basic Plan serves as the foundation for this jurisdiction's addendum. Volume III (Appendices) provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the HMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer and fall of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with the Oregon Military Department's Office of Emergency Management (OEM), and Marion County cities, including Aurora, to update their addendum to the Marion County HMP, which expired July 8, 2016. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County HMP, locally adopting it, and having it approved by FEMA, the City of Aurora will gain eligibility for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County Multi-Jurisdictional HMP, and Aurora addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing the plan. For more information on the composition of the steering committee see the *Acknowledgements*, *Plan Summary*, and *Plan Process* (Volume III, Appendix B).

The Aurora City Recorder is the designated local convener of this addendum. The Convener will take the lead in implementing, maintaining, and updating the addendum to the HMP in collaboration with Marion County Emergency Management.

Representatives from the City of Aurora steering committee (including representatives from the North Marion School District) met formally on one occasion: October 12, 2016 (see Appendix B for more information).

The city's addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with OPDR.

The City of Aurora Steering Committee is comprised of representatives from the following departments:

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

Aurora used multiple approaches to engage the public. First, the City established steering committee representatives from across the city. Next, the city actively participated in countywide community engagement activities described in Volume I, Section 4 and in Appendix B. City staff also presented the draft plan to the City Council during an open public council session. The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process (see Appendix B for more information).

The Marion County HMP was approved by FEMA on August 17, 2017 and the Aurora addendum was adopted via resolution on June 13, 2017. This HMP is effective through August 16, 2022.

Mitigation Strategy

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

During the 2016 Marion County and Aurora update process, OPDR and a representative from Marion County Emergency Management assisted the steering committee with developing mitigations that will meet Aurora's unique situation. The proposed actions were then re-reviewed by the steering committee to finalize. Aurora developed a list of priority actions (Appendix A-1), any actions that were not prioritized were placed in the Action Item Pool (Appendix A-2) and will be considered during the annual meetings. For a status update on each of Aurora's 2009 mitigation actions, see Appendix A-2.

Priority Actions

The City is listing a set of high priority actions in an effort to focus attention on an achievable set of high leverage activities over the next five-years. The City's priority actions are listed in Table AR-1 on the following page.

Action Item Pool

Table AR-2 on the following pages presents a pool of mitigation actions. This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available.

Table AR-1. Aurora Priority Action Items

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Priority Actions					
P-1	Multi-Hazard	Create and publicize alternative transportation routes in the event of road closures.	City Planner	Public Works	Short-Term
P-2	Earthquake	Seek funding to further assess the "probability of collapse" for North Marion High School.	N. Marion School District		Short-Term
P-3	Earthquake	Work with the Salem Red Cross to identify potential shelters within the city. Create MOUs and partner with Red Cross to make it official.	City Recorder	Administrative Assistant	Short-Term
P-4	Windstorm	Identify backup power needs and acquire new backup generators (not propane) for the School District (which serves as the Emergency Shelter).	N. Marion School District		Short-Term
P-5	Windstorm	Acquire emergency backup generators for all critical facilities (including City Hall and 2 wells). Do not purchase generators fueled by propane.	Public Works	Administrative Assistant	Short-Term

Source: City of Aurora HMP Steering Committee, 2016.

Table AR-2. Aurora Action Item Pool

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Multi-Hazard					
MH-1	Multi-Hazard	Publicize and sign residents up for the reverse 911 system.	Fire District	City of Aurora, N. Marion School District	Short-Term/ Ongoing
MH-2	Multi-Hazard	Publicize/educate residents about signing up for the Aurora Alerts email system/expand to include text and social media.	City Recorder	Administrative Assistant	Short-Term/ Ongoing
MH-3	Multi-Hazard	Expand the emergency communication system to include text and social media.	N. Marion School District		Short-Term
MH-4	Multi-Hazard	Build relationships with sister counties/jurisdictions/districts and create mutual aid agreements.	City Recorder	N. Marion School District	Long-Term/ Ongoing
MH-5	Multi-Hazard	Partner with private sector and create mutual aid agreements.	City Recorder	N. Marion School District	Long-Term/ Ongoing
MH-6	Multi-Hazard	Develop a multi-agency emergency response team for northern Marion Co.	Marion County Emergency Management	N. Marion School District	Short-Term
Drought					
DT-1	Drought	Update the Water Conservation Plan.	Public Works	City Planner	Long-Term
DT-2	Drought	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.	City Council	Marion County	Long-Term
Earthquake					
EQ-1	Earthquake	Send city employees to the County's ATC 20 training.	Public Works	City Recorder	Short-Term/ Ongoing
EQ-2	Earthquake	Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices through public education.	City Recorder	Administrative Assistant	Ongoing
EQ-3	Earthquake	Seek funding to further assess the 'probability of collapse' for Aurora City Hall.	Public Works	City Recorder	Long-Term
EQ-4	Earthquake	Continue to run earthquake drills.	N. Marion School District		Ongoing
EQ-5	Earthquake	Encourage residents to prepare and maintain 2-week survival kits. Publicize through City newsletter, website, and the resilience and preparedness trainings the School District is creating.	City Recorder/ Administrative Assistant	N. Marion School District	Short-Term/ Ongoing

Source: City of Aurora HMP Steering Committee, 2016.

Table AR-2. Aurora Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Flood					
FL-1	Flood	Create a Stormwater Master Plan.	Public Works	City Planner	Long-Term
FL-2	Flood	Continue compliance with the National Flood Insurance Program through the enforcement of local floodplain ordinances.	Public Works		Ongoing
FL-3	Flood	Identify strategies for mitigating and/or preventing flooding from impacting the city's wastewater lagoon system.	Public Works		Long-Term/ Ongoing
FL-4	Flood	Work with property owners who regularly experience flooding along the Pudding River to mitigate their risks.	Public Works		Long-Term
Severe Weather					
SW-1	Severe Storm	Educate citizens about ways to weatherize their homes, as well as safe emergency heating equipment.	City Recorder	Administrative Assistant	Short-Term/ Ongoing
SW-2	Windstorm	Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	Public Works		Ongoing
SW-3	Windstorm	Review code and revise to require new developments to underground utilities if requirement doesn't currently exist.	City Planner	City Recorder	Long-Term
SW-4	Windstorm	Outreach to PGE about undergrounding power lines that run along Grim (serving the School District).	N. Marion School District		Short-Term
Wildfire					
WF-1	Fire	Outreach to residents on the hillside at the end of 4th Street adjacent to Pudding River about performing fuel reduction projects.	Fire District		Short-Term
WF-2	Fire	Check with the fireworks storage facility at the end of Ottaway to make sure they have a safety plan.	Fire District		Short-Term

Source: City of Aurora HMP Steering Committee, 2016.

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Aurora addendum to the Marion County HMP. This addendum designates a convener and a coordinating body to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional HMP, the city will look for opportunities to partner with the county. The city's steering committee will convene after adoption of the City of Aurora addendum on an annual schedule (in late-July or early-August before the school year begins); the county meets on a semi-annual basis. The City of Aurora convener will participate in the Marion County HMP meetings and will report on city specific activities as appropriate. The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the city's mitigation strategy (actions). The convener will also remain active in the county's implementation and maintenance process (see Volume I, Section 4 for more information).

The city will utilize the same prioritization process as the county (See Volume I, Section 4: Plan Implementation and Maintenance and Volume IV, Appendix D: Economic Analysis of Hazard Mitigation Projects for more information).

In the near future, the City of Aurora would like to transition to updating the city addendum via a North Marion County Coordinating Board, which will include members of the current steering committee, in addition to representatives from surrounding communities. When first formed, the North Marion County Coordinating Board will meet two to three times to establish relationships and a mission, and thereafter meet once or twice per year. By bringing together representatives from multiple jurisdictions and agencies, the North Marion County Coordinating Board aims to better align mitigation actions that will benefit the entire region.

Implementation through Existing Programs

Many of the Hazards Mitigation Plan's recommendations are consistent with the goals and objectives of the city's existing plans and policies. Where possible, the City of Aurora will implement the HMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the HMP's action items through such plans and policies increases their likelihood of being supported and implemented.

Aurora's Comprehensive Plan: 2009 – 2029 was first acknowledged by the Oregon Land Conservation and Development Commission in 1980. The City most recently updated the entire plan, including updates to the Natural Hazards section, in November of 2009.[1] The Aurora Comprehensive Plan (Part V, Section B(4)) calls out floods, soil instability, and earthquakes as the hazards likely to impact Aurora. The plan does not mention directly

[1] Aurora Comprehensive Plan (2009). Ordinance 458. Part V: Resources, Section B(4), p. 71-72. Part IX: Policies, Section G: Natural Hazards (Goal 7), p. 91-92.

mention drought, severe storms, or wildfire in the natural hazards sections. The plan does contain a general objective "to protect life and property from natural hazards due to flood or landslides." In addition, the plan contains two policies and three implementing actions. The policies prohibit development within the 100-year flood plain and require special consideration for structures that will be built on slopes. The City implements the plan through regulatory controls found in the Land Development Ordinance. The City's latest update to the Land Development Ordinance occurred in December of 2016.[2]

Aurora also implements elements of the Comprehensive Plan related to natural hazards through the following Plans:

- City of Aurora Transportation System Plan, updated in 2009
- City of Aurora Water System Master Plan, updated in March 2009
- City of Aurora Water Management and Conservation Plan, updated in June 2009

Continued Public Participation

Keeping the public informed of the City's efforts to reduce the risk associated with future hazard events is important for successful plan implementation and maintenance. The city is committed to involving the public in the plan review and updated process. See Volume I, Section 4, for more information.

Plan Maintenance

The Marion County Multi-Jurisdictional Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the City will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

[2] Ordinance No. 484. "Title 16: Land Development." http://www.ci.aurora.or.us/images/stories/amc-pdf/or-aurora-t16a.pdf

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

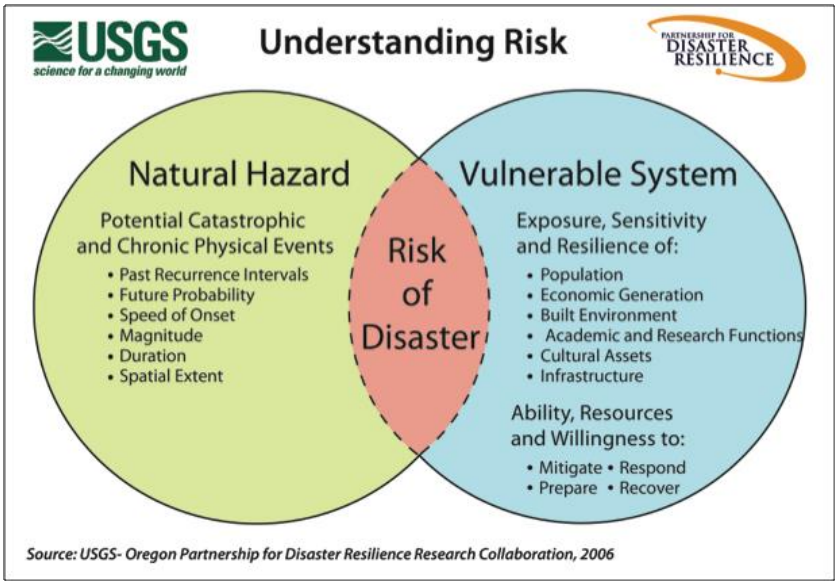
Risk Assessment

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

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein, and within Section 2, *Risk Assessment*, and Appendix C, *Community Profile*. The risk assessment process is graphically depicted in Figure AR-1 below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure AR-1. Understanding Risk



Risk Assessment Approach

A risk assessment is intended to provide the, "factual basis for activities proposed in the strategy to reduce loses from identified hazards."[3] To complete the risk assessment, the

[3] 44 CFR 201.6(2)(i)

HMP update team first updated the description, type, location and extent of each hazard. Next, the team updated the vulnerability information based on each hazard's potential impact on the community.

The Marion County Basic Plan (Volume I, Section II) Risk Assessment describes in detail the methods used to assess risk. In summary, Marion County has prepared a Threat Hazard Identification and Risk Assessment as a formal annex to the Marion County Emergency Operation Plan. The assessment uses a method developed by BOLD Planning[4]. This city addendum builds on the county level assessment to produce a similar assessment for the City of Aurora. The assessment specifically examines:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

Refer to Page 2-4 of the Marion County Basic HMP for a description of the scoring values for each ranking category.

Hazard Analysis

The assessment identifies three levels of risk: High, Moderate and Low.

High - High probability of occurrence; at least 50 percent or more of population at risk from hazard; significant to catastrophic physical impacts to buildings and infrastructure; major loss or potential loss of functionality to all essential facilities (hospital, police, fire, EOC and shelters).

Moderate - Less than 50 percent of population at risk from hazard; moderate physical impacts to buildings and infrastructure; moderate potential for loss of functionality to essential facilities.

Low - Low probability of occurrence or low threat to population; minor physical impacts.

A summary of the risk assessment findings and rankings is presented in Table AR-3.

[4] BOLD Planning is a consulting firm specializing in the development of actionable emergency plans. For more information, visit: http://www.boldplanning.com/

Table AR-3. Hazard and Vulnerability Assessment Summary

Hazard Profile Summary for Aurora Usinging Bold Planning Analysis Scoring							
Natural Hazard	Probability	Warning Time	Magnitude	Duration	CPRI	Local Planning Significance	County Planning Significance
Weight Factor	0.45	0.3	0.15	0.1			
Earthquake*	4	4	4	4	4.00	High	High
Severe Weather/Storm**	4	1	3	3	2.85	Moderate	High
Flood	3	2	3	4	2.80	Moderate	High
Drought	3	1	3	4	2.50	Moderate	High
Extreme Weather - High Temperature	3	1	2	4	2.35	Moderate	Moderate
Wildland Interface Fire	1	4	2	2	2.15	Moderate	Moderate
Dam or Levee Failure	1	2	4	4	2.05	Moderate	Moderate
Landslide	2	2	2	2	2.00	Moderate	High
Volcanic Eruption	1	1	1	4	1.30	Low	Low
*Note: Earthquake probability listed to match county level analysis. See below for more detailed probability assessment.							
**Note: Includes tornado hazard							

Source: BOLD Planning Risk Assessment Method; Analysis by UO Community Service Center.

Community Asset Identification

This section provides information on city specific assets. For additional information on the characteristics of Aurora, in terms of geography, environment, population, demographics, employment and economics, as well as housing and transportation see Volume III, Appendix C, *Community Profile*. Many of these community characteristics can affect how hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Community Characteristics

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 54 degrees in August, and an average high temperature of 47 and low of 35 in January.[5] The city receives an average annual precipitation of 40.67 inches.[6] 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.

The Population Research Center at Portland State University lists Aurora's 2015 population at 950. This represents a 30% increase from 2000. For more demographic information, refer to Appendix C.

Economy

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

[5] Weatherbase.com, "Aurora Oregon," http://www.weatherbase.com, accessed 2/21/17.

[6] Western Regional Climate Center, "Aurora Oregon," http://www.wrcc.dri.edu/summary/Climsmor.html, accessed 2/21/17.

downtown has several large antiques retailers which draw a number of visitors to the community. Median household income in Aurora in 2014 was $72,656. For more economic information, refer to Appendix C.

Critical and Important Facilities

Aurora's critical and important facilities include the following:

Transportation

- Two bridges provide primary access to the city from I-5 and Hwy 99E:
  - Mill Creek Bridge (County-owned) – City sewer and water co-located
  - Pudding River Bridge (ODOT-owned)
  - If either collapsed, transportation in and out of the city would require lengthy detours.
- Aurora State Airport, 22801 Airport Rd NE, Aurora
- School district: contracts out bus service to Canby (diesel)
- Canby CAT bus runs along Hwy 99E between Canby and Woodburn
  Note: Hwy 99E and Ehlen Rd are the only 2 entrances to town (if bridges are out, it would be difficult to get in and out).
  Note: Intersection of Ehlen Rd. and the railroad tracks is dangerous.
  Note: The wastewater treatment plant is across a bridge – in the event of a train derailment or bridge collapse, the wastewater treatment plant would not be accessible.

Energy

- PGE – electricity (all above ground lines)
- NW Natural – natural gas
- City gets fuel from Shell Station in town
- Fire gets fuel from various gas stations
- City Hall (21420 Main St.) would likely shut down without power, even if the building did withstand seismic activity. City Hall does not currently have a backup generator.
- Fire Station (21390 Main St.) has a generator that would run the whole station. Generator runs on natural gas, but could also run on propane. The fire station does not keep reserves of natural gas or propane.

Water

- City Water and Wastewater:
  - Water treatment plant (14682 Ottaway Rd.) – Includes filtration system and a reservoir that treats water drawn from 5 city wells. Water from the treatment plant is then pumped back to residents.
  - Three city wells have generators, 2 do not, and there is 1 traveling diesel generator.
  - Wastewater treatment plant (21496 Mill Race Rd.) – Completed in 2001 with a maximum capacity of 2000 residents.
    Note: Sewer pump station is vulnerable to Mill Creek flooding events, and the wastewater treatment plant could be vulnerable as well.
    Note: The water tower in town does not have water, just communications.

- North Marion School District Water and Wastewater:
    - Two wells and a 355,000-gallon water tank with its own filtration system. This system is equipped with a propane back-up generator. Propane is stored in a 100-gallon above ground storage tank.
    - Sewer system, equipped with a propane back-up generator.

Communication

- City Communications:
    - The City has a server with a backup system, but the three hard drives with backed-up data are stored on-site.
    - All City records, including finances, utility billing records, payroll accounts, etc., are stored at City Hall.
    - Public Works has a cell phone but no radio capabilities.
    - Fire and Sheriff have radio communications with each other.
- Water Tower (this is actually a communications tower; it does not hold water):
    - The Fire District has their communications located on the water tower. They also have a backup generator.
    - The Sheriff has communications equipment located on the water, but it is currently turned off.
    - Three cell phone companies – Verizon, Sprint, AT&T – use the water tower and they all have backup generators.
- North Marion School District:
    - The School District has a radio connection with the County and other emergency responders, along with emergency backup power.

Emergency Services

- Police:
    - Located at City Hall (21420 Main St.) – the Marion County Sheriff provides police services.
- Fire: Aurora Fire District
    - Located at 21390 Main S.
    - The building is in the process of seismic upgrades (about 90% complete).
- Medical (none in Aurora):
    - Woodburn and Canby have immediate care facilities (Providence in Canby – sometimes not staffed by doctors, Legacy in Woodburn)
    - Meridian Park Hospital in Tualatin
    - Willamette Falls Hospital in Oregon City
    - Silverton Hospital in Silverton
    - Providence Medical Center in Newberg
    - Salem General Hospital
    - Ambulance is out of Woodburn, secondary out of Canby, third out of Wilsonville or Tualatin

Cultural/Historical Resources

- Historic district encompasses 150 acres of the city and includes buildings and historic sites, including the Aurora Old Colony Historical Museum (1538 2nd St.).
- Events that may have large crowds:

- City Hall – court held here Wednesdays every 3 months; monthly 3 evening meeting held
- American Legion Hall: church services on Sundays
- Aurora Presbyterian Church & Christ Lutheran Church: services on Sundays
- McLaren Auction House: some evening events
- Aurora Historical Museum: Colony Hand Spinners Guild in March and Strawberry Social in June
- Mothers' Day weekend: wine and chocolate walk
- August: Aurora Colony Days Festival – biggest event of the year with a couple thousand visitors
- Summer: Music in the Park on Wednesday nights
- School District events

Functional and Access Needs (Vulnerable Populations)

- Schools:
  - North Marion Primary School
  - North Marion Middle School
  - North Marion Intermediate School
  - North Marion High School
  - 2,000 students and 250 staff on the 55-acre North Marion School District property (20246 Grim Rd.)
- Lower-income areas:
  - Deer Creek Trailer Park (southwest of the airport)
  - Walnut St. and Filbert St.

  Note: Aurora is a retirement community, so there may be residents with special medical needs.

See hazard sections below and Section 2, *Risk Assessment*, for potential hazard vulnerabilities to these facilities.

Hazard Characteristics

Drought

The characteristics of drought in Aurora are the same for the county as a whole.

Table AR-4. Drought Summary

Hazard	Drought
Type	Climatic
Speed of Onset	Slow
Location	Varies, County Wide
Extent	Moderate to Severe Drought*
Prior Occurance	Three > 6 months duration since 1982
Probability	~9%

*Defined as between -2 and -4 on the National Resource Conservation Service (NRCS) Surface Water Supply Index (SWSI)

Sources: Oregon NHMP; NRCS; analysis by OPDR

The probability of drought in Aurora is likely, the same as for the county as a whole. The City's water supply comes primarily from subsurface sources, making vulnerability to drought moderate. Overall, the planning significance of drought in Aurora is moderate.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of drought hazards, as well as the location and extent of a potential event. Due to a cool, wet climate, past and present weather conditions have generally spared Marion County communities from the effects of drought. According to the steering committee, Aurora has twice implemented their water curtailment ordinance, first in 2010 and then in 2014. Governor Kate Brown declared a drought emergency for all of Marion County in September 2015.

Aurora has five wells that send water through a filtration system and into a reservoir, located on Ottaway Rd. Water from the reservoir is then pumped back to residential and commercial customers in Aurora.

Aurora has a Water Management and Conservation Plan, last update in 2009. The Plan will be updated again soon to more directly address drought issues. The City also has a water curtailment ordinance.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Earthquake

The characteristics of both a crustal earthquake and a Cascadia Subduction Zone (CSZ) earthquake are similar to the county as a whole.

Table AR-5. Earthquake Summary Crustal

Hazard	Earthquake - Crustal
Type	Geologic
Location	Multiple active faults; Willamette Valley
Speed of Onset	Rapid
Extent	Very Strong to Severe shaking ~ 500 yrs*
Prior Occurance	One over Magnitude 5 last 100 yrs**
Probability	Approximately 1% annual

*DOGAMI HazVu; ** PNSN - 1993 Scotts Mills just north of Marion County

Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

Table AR-6. Earthquake Summary Subduction

Hazard	Earthquake - Subduction
Type	Geologic
Location	Primarily west of the Cascades; CA - BC
Speed of Onset	Rapid
Extent	Catastrophic
Prior Occurance	One over Magnitude 9 last 500 yrs
Probability	Magnitude 9+ is 7% - 12% over 50 yrs**

*DOGAMI HazVu; **Oregon Natural Hazard Mitigation Plan, anlysis by Oregon Department of Geology and Mineral Industries.

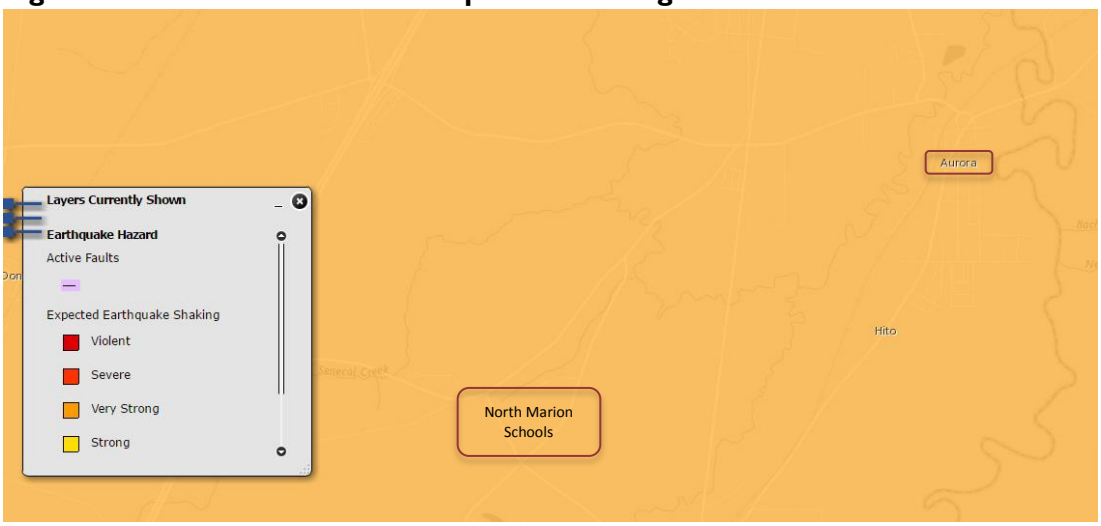
Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

Aurora's probability for a Crustal Earthquake event is "possible" and their vulnerability to a Crustal Earthquake event is "limited". The county steering committee determined that the probability for a Cascadia Subduction Zone (CSZ) Earthquake event is "highly likely" and that the vulnerability to a Cascadia Earthquake event is "catastrophic". This hazard was not rated as distinct CSZ and crustal events in the previous HMP. There are no locally active faults within the Aurora city limits. The nearest active fault runs northwest to southeast just outside of Canby, about five miles away from Aurora. The 1993 Scott Mills quake caused $28 million in damages to cities throughout Marion County. No damaging earthquake events occurred during the previous five years.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of earthquake hazards, history, as well as the location and extent of a potential event. Generally, an event that affects the county is likely to affect Aurora as well. Previous occurrences are well-documented within the county's plan, and the community impacts described by the county would generally be the same for Aurora as well.

Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any particular site. In many major earthquakes, damages have primarily been caused by the behavior of the soil. Figure AR-2 shows that ground shaking in Aurora and the North Marion School District's property for both crustal and subduction earthquakes are expected to be very strong.

Figure AR-2. Active Faults and Expected Shaking



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)

The Aurora steering committee identified liquefaction as a primary concern related to the earthquake hazard. The committee indicated that many critical facilities and transportation routes might not withstand a high magnitude earthquake. In particular, the committee expressed concerns over City Hall, the two bridges in the north of town, and the North Marion High School. The committee identified mitigation efforts to address these vulnerabilities as "priority actions" in this plan.

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.[7] Buildings were ranked for the "probability of collapse" due to the maximum possible earthquake for any given area. This report assigned a "moderate" probability of collapse to Aurora's fire district station, which has since undergone seismic retrofits. The report assigned a "moderate" probability of collapse to Aurora's police department (located at City Hall). The report rated the schools owned by the North Marion School District as low, with the exception of North Marion High School, which received a high rating. The North Marion School District intends to perform a seismic assessment of the high school in the near future.

In an effort to prepare residents for a potentially devastating seismic event, the Aurora City Recorder and Administrative Assistant will begin to encourage residents to prepare 2-week survival kits through various outreach events.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

[7] Lewis, Don (2007). "Statewide Seismic Needs Assessment: Implementation of Oregon 2005 Senate Bill 2 Relating to Public Safety, Earthquakes, and Seismic Rehabilitation of Public Buildings." Department of Geology and Mineral Industries, Open-File Report O-07-02.

Flood

Table AR-7. Flood Summary

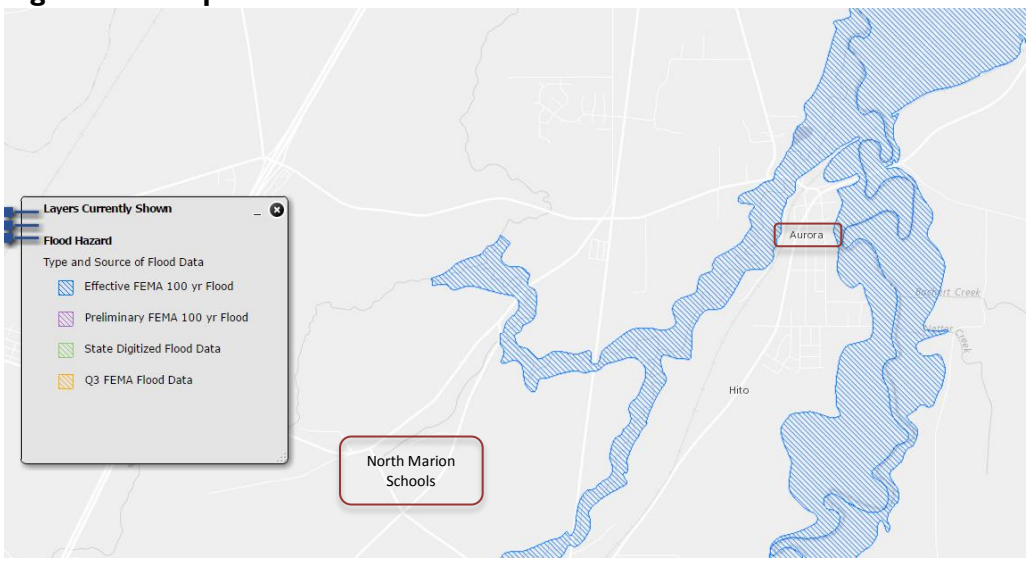
Hazard	Flood
Type	Climatic
Speed of Onset	Slow to moderate
Location	Mapped flood zones, floodplain
Extent	Moderate to severe
Prior Occurance	Four significant events since 1964
Probability	1% annual within SFHA

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, Risk Assessment, describes the causes and characteristics of flooding hazards within the region. Aurora's probability for riverine flood is likely and vulnerability to flood is critical.

Portions of Aurora have areas of flood plains (special flood hazard areas). These include areas along Mill Creek and the Pudding River (see Figure AR-3). Historically, Aurora has experienced major floods in 1986, 1996, and in 2011 on the Pudding River. Since then, no major floods have affected the population, but Aurora continues to experience regular localized flooding during the wet season. According to the steering committee, properties along the Pudding River experience the most regular flooding. In these instances, structures are rarely affected. In the past, Mill Race Rd. (the gravel road leading to the Wastewater Treatment Plant) experienced flooding issues, but these issues have been resolved.

Figure AR-3. Special Flood Hazard Area



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

National Flood Insurance Program (NFIP)

FEMA modernized the Aurora Flood Insurance Rate Maps (FIRMs) in January of 2000. The table below shows that as of October 2016, Aurora had 2 National Flood Insurance Program (NFIP) policies in force. Of those, 1 was for a property that was developed before

development of the initial FIRM. Aurora has not had any Community Assistance Visit (CAV) and is not a member of the Community Rating System (CRS). Table AR-8 shows that one flood insurance policy is for single-family residential structure and the other is for a 2-4 family residential structure. There have been no paid flood claims in Aurora.

The Community Repetitive Loss record for Aurora identifies no Repetitive Loss Properties[8] and no Severe Repetitive Loss Properties[9].

Table AR-8. Flood Insurance Detail

Jurisdiction	Effective FIRM and FIS	Initial FIRM Date	Total Policies	Pre-FIRM Policies	Policies by Building Type: Single Family	2 to 4 Family	Other Residential	Non-Residential	Minus Rated A Zone	Minus Rated V Zone
Marion County	-	-	2,067	1,239	1,614	115	105	232	97	0
Aurora	1/19/2000	6/5/1997	2	1	1	1	0	0	0	0

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-FIRM Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss	CRS Class Rating	Last Community Assistance
Marion County	$ 514,268,700	298	226	16	$ 5,732,543	11	2	-	-
Aurora	$ 700,000	0	0	0	$ -	0	0	N/A	none

Source: Information compiled by Department of Land Conservation and Development, October, 2016.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Landslide

Table AR-9: Landslide Summary

Hazard	Landslide
Type	Climatic/Geologic
Speed of Onset	Slow to rapid
Location	Waterways (banks) and transportation facilities
Extent	Minor
Prior Occurance	No major events
Probability	Low for minor events; less than 5% major events

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

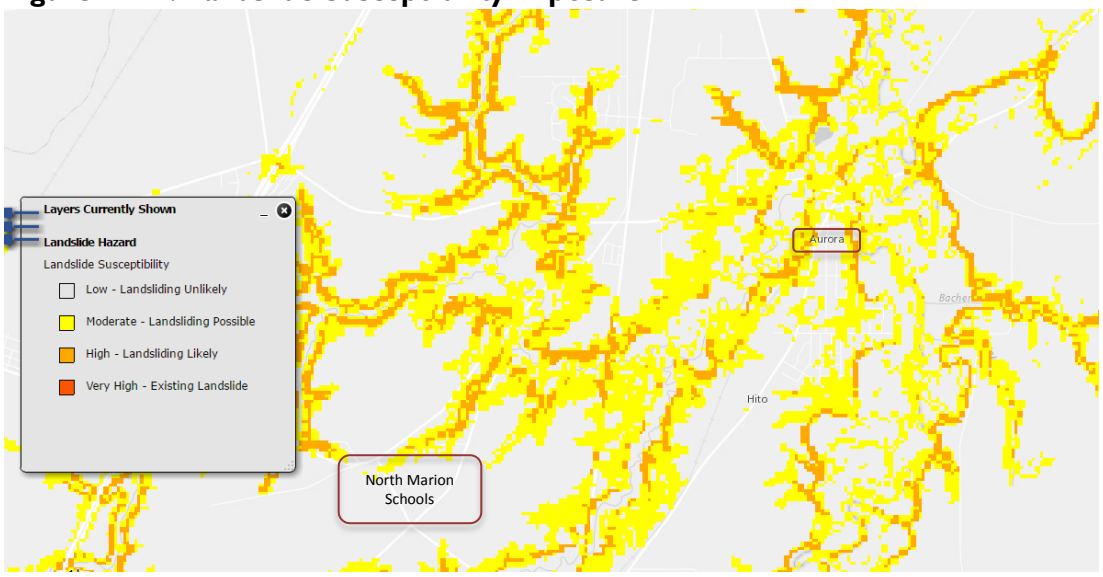
Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of landslides, and appropriately identifies previous landslide occurrences within the region. Aurora has a relatively flat topography. Aurora's probability for landslide is possible (which is lower than the county's rating) and their vulnerability to landslide is limited (which is also lower than the county's rating). Figure AR-4 shows that landslide risk in Aurora is low to

[8] A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

[9] A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

moderate in most populated areas, but moderate to high in other areas, particularly along Mill Creek and the Pudding River.

Figure AR-4. Landslide Susceptibility Exposure



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Volcano

Table AR-10: Volcano Summary

Hazard	Volcano
Type	Geologic
Speed of Onset	Slow to rapid
Location	Cascade Mountains
Extent	Minor
Prior Occurance	One significant event since 1916 (Mount St. Helens)
Probability	<1% annual

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes Aurora's risk to volcanic events. The steering committee determined that the city's probability for volcanic event is unlikely and their vulnerability to volcano is negligible.

The causes and characteristics of a volcanic event are appropriately described within the county's plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county's plan. Aurora is very unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in 1980, the city was impacted only by falling ash.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Severe Weather

Table AR-11: Severe Weather Summary

Hazard	Severe Weather/Storm
Type	Climatic
Speed of Onset	Slow to moderate
Location	Countywide
Extent	Minor to severe
Prior Occurance	Minor events occur annually; ~30 moderate to severe events countywide over the past 130 years
Probability	100% for minor events, 23% for moderte to severe events

Sources: Marion County NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of windstorms and severe winter storms, as well as the location and extent of these hazards. Aurora's probability for windstorm and severe winter storms is highly likely (which is the same as the county's rating) and that their vulnerability is critical (which is lower than the county's rating).

Significant wind events occur in Aurora each year, sometimes interrupting services, downing trees, and causing power outages. 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. More recently, windstorms in April 2010, May 2014, and July 2015 toppled trees in the Aurora Municipal Park, with one tree causing damage to a nearby house.

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting Aurora typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from November through March.

Major winter storms can and have occurred in the Aurora area, and while they typically do not cause significant damage, they are frequent and have the potential to impact economic activity. During a storm in April 2009, snow and ice caused City Hall to lose power for one day and debilitated the City's water tanks. During the winter of 2012-13, the steering committee reported that residents experienced power outages. These power outages also affected the pump stations used to transfer water to customers. The most recent winter storms (December 2016 – January 2017) included snow and ice and resulted in transportation and power interruptions combined with government office and school closures. A state of emergency was declared on January 11 and a Presidential Disaster was declared for the State of Oregon on January 25, 2017.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Wildfire

Table AR-12: Wildfire Summary

Hazard	Wildfire
Type	Climatic, Human Caused
Speed of Onset	Moderate to rapid
Location	Outside city limit
Extent	Minor to moderate
Prior Occurance	No history inside city limit
Probability	<1% annual

Sources: Marion County NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of wildfires, as well as the county and city's history of wildfire events. The City's probability for wildfire is unlikely and the vulnerability to wildfire is limited (lower probability and vulnerability ratings than for the county). 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. Although there is no history of wildfire events in Aurora, the steering committee identified the hillside above the Pudding River at the end of 4th St. as a potential issue. As part of the action items for this plan, the committee wanted to reach out to the property owner to encourage fuel-reduction projects.

The County updated the Community Wildfire Protection Plan in 2016 and Aurora is not listed as a "Community at Risk."

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

CITY OF DETROIT ADDENDUM

Purpose

This document serves as Detroit 's Addendum to the Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan (MNHMP, NHMP). This addendum seeks to supplement information contained in Volume I (Basic Plan) of this multi-jurisdictional NHMP which serves as the foundation for this jurisdiction's addendum and Volume III (Appendices) which provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the NHMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with Marion County and Santiam Canyon cities, including Detroit, to create the first region-specific NHMP. Part of the Santiam Canyon Regional Hazard Mitigation Plan (RHMP) required the creation of city addenda which would be adopted into the 2016 Marion County NHMP. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County NHMP, locally adopting it, and having it approved by FEMA, Detroit will gain eligibility for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County NHMP, and Detroit addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing this addendum, and was composed of city staff, county representatives, and emergency service management.

The Detroit city recorder is the designated convener of the NHMP and will take the lead in implementing, maintaining, and updating the addendum to the Marion NHMP in collaboration with the Santiam Canyon liaison for Marion County Emergency Management.

Representatives from the City of Detroit steering committee, along with Marion County Emergency Manager Ed Flick, had a formal discussion on one occasion: October 14, 2016, but

also communicated electronically throughout the creation of this document. The city's addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with OPDR.

The Detroit Steering Committee was comprised of the following representatives:

- Christine Pavoni; City Recorder, Detroit
- Robert Bruce; Certified Water Technician, Detroit
- Kathleen Silva; Santiam Canyon Liaison, Marion County

Public participation was achieved with the establishment of the steering committee, which was comprised of city officials and county representatives.

The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process.

The Marion County NHMP was approved by FEMA on August 17, 2017 and the Detroit addendum was adopted via resolution on June 13, 2017. This NHMP is effective through August 16, 2022.

Mitigation Strategy

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

During 2016, Marion County and OPDR evaluated the Action Items set by the county and their particular relevance to the Santiam Canyon region. Following the review, actions with relevance to the region were added into the RHMP, noting what accomplishments had been made, and whether the actions were still relevant; any new action items were identified at this time. Detroit developed a list of priority actions (Table A-1), any actions that were not prioritized were placed in the Action Item Pool (Table A-2) and will be considered during the semi-annual meetings.

Priority Actions

The city is listing a set of high priority actions in an effort to focus attention on an achievable set of high leverage activities over the next five-years. The city's priority actions are listed below in the following table. Detailed implementation information for each action is listed in within (Table A-1).

Action Item Pool

This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available.

Many actions carry forward from prior versions of the Marion County NHMP and other local planning documents including the Community Wildfire Protection Plan, Drought Contingency Plan, and Mid-Willamette Economic Development study.

(Table A-1) Detroit Priority Action Items

Action Item	Cost and Process of Implementation	Funding Options	Approximate Date of Completion
Planning & City Staff	*Update planning documents (comprehensive plan, development code) to reflect new hazard information.*	*General Fund*	*September 2017*
(e.g) *Multi-Hazard*	*City staff should assess the amount of KWH needed to run city facilities. City staff should purchase propane storage accordingly to run their generator*	*General Fund, MWCOG grants/loans,*	*December 2017*

-ONGOING-

(Table A-2) Detroit Action Item Pool

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Earthquake #1	Promote Great Oregon Shakeout Awareness month in October. Participate in activities for schools, business, and industry. Participating with the Mid-Willamette Emergency Communications Collective on initiatives that are focused on household preparedness.	Marion County Emergency Management	Public Works, Safety Committee, Marion County Risk, Red Cross, OEM and Media	Ongoing every October	X	X			X		
Earthquake #2	Collaborate with GROW EDC to develop relevant public-private partnerships with businesses that can contribute to response and recovery. (Multi-Hazard 4)	Detroit , Marion County Emergency Management	GROW EDC	Ongoing	X	X	X	X	X		X
Multi-Hazard #1	Develop an Energy Assurance Plan. (Multi-Hazard 2)	Detroit , Marion County Emergency Management	Department of Energy, Whole Community	Ongoing revisions			X	X	X		X

Source: City of Detroit NHMP Steering Committee, 2015.

-SHORT TERM-

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Multi-Hazard #2	Incentivize and assist local fueling stations to purchase diesel generators capable of pumping fuel from in-ground storage tanks.	Detroit , Marion County Emergency Management	Public Works	Short Term			X		X		
Multi-Hazard #3	Conduct an assessment of the short and long term needs for sheltering access and functional needs populations for all hazards.	Detroit , Marion County Emergency Management	Marion County Public Health, Red Cross, Cities, NGO's, Oregon Public Health	Short Term					X		X
Multi-Hazard #4	Develop a MOU with community fuel stations to utilize fuel resources found in below-ground tanks after a hazard event.	Detroit , Marion County Emergency Management	Santiam Quick Mart, RFPD	Short Term			X		X		
Multi-Hazard #5	Establish a Detroit CERT team.	Marion County Emergency Management, Detroit	CERT, Whole Community	Short Term	X	X			X		

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Multi-Hazard #6	Develop a community education program - such as an all hazard community outreach forum for students and residents.*	Marion County Emergency Management, Detroit	Public Works and Whole Community	Short Term	X	X	X				X
Multi-Hazard #7	Expand auxiliary radio capabilities by developing a team of HAM Radio operators for EMS and interested public.	Marion County Emergency Management, Detroit	ARES, CERT, Private partners, Whole Community	Short Term	X	X	X		X		

*Identified in Marion County Community Wildfire Protection Plan (Action Plan & Priorities)

**Identified in North Santiam Watershed Drought Contingency Plan (Priority Drought Mitigation Actions)

***Identified in Mid-Willamette Valley Council of Governments Comprehensive Economic Development Study (Appendix C)

-LONG TERM-

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Drought #1	Monitor economic impacts on recreation, tourism and agriculture communities.	Detroit, Marion County Emergency Management	Community Services	Long Term	X	X	X	X	X		X
Drought #2	Collaborate with NSWC to complete WMCP's and improve community understanding of water usage and opportunities to increase efficiencies.**	NSWC, Detroit	North Santiam Watershed DCP Partners	Long Term		X	X		X		X
Drought #3	Collaborate with Detroit Lake Recreation Area Business Association (DLRABA) to create a Detroit Lake Master Recreation Plan focused on economic drought resiliency.**	Detroit, DLRABA	USACE, USFS, Marion County Community Services/Board of Commissioners	Long Term	X		X		X	X	X
Drought #4	Collaborate with local Marina's and DLRABA to excavate marinas and allow for use at low water levels.**	Detroit, Kane's Marina, Detroit Lake Marina, DLRABA	USACE, USFS, Marion County Community Services/Board of Commissioners	Long Term			X	X	X	X	X

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Drought #5	Collaborate with Detroit Ranger Station to extend boat ramps that are usable year-round.**	Detroit, Detroit Ranger Station	Marion County Community Services/Board of Commissioners	Long Term			X	X	X	X	X
Drought #6	Conduct leak detection surveys for the water system to increase efficiency and prevent further water loss.**	Detroit, Marion County Public Works	NSWC	Long Term			X		X	X	
Multi-Hazard #8	Designate evacuation routes outside of Hwy 22 for EMS.	Detroit , Marion County Emergency Management	RFPD	Long Term			X		X		
Multi-Hazard #9	Collaborate with Marion County to connect to a more resilient regional water/sewer system.***	Marion County Community Services Department/Board of Commissioners, Detroit	Marion County Emergency Management	Long Term			X	X	X		X
Multi-Hazard #10	Gather community support for the installation of resilient fiber communication infrastructure throughout the community.***	Detroit	Marion County Community Services Department/Board of Commissioners	Long Term	X		X		X		X
Wildfire #1	Collaborate with Detroit Ranger District, ODF, and BLM to conduct fuel hazard reduction along the Wildland	ODF, BLM, Detroit Ranger District, Idanha-Detroit RFD	Marion County Emergency Management	Long Term			X		X		X

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
	Urban interface and Hwy 22.*										
Wildfire #2	Collaborate with ODF and Detroit RFD to develop strategic community fuel breaks.*	ODF, BLM, Detroit Ranger District, Idanha-Detroit RFD	Marion County Emergency Management	Long Term			X		X		X
Wildfire #3	Collaborate with ODF and Idanha- Detroit RFD on the North Santiam River acres project to develop defensible space.*	ODF, BLM, Detroit Ranger District, Idanha-Detroit RFD	Marion County Emergency Management	Long Term			X		X		X
Landslide #1	Integrate new DOGAMI landslide hazard information into land use zoning/development codes.	Detroit	Environmental Services, Engineering, ODOT, DLCD	Long Term			X				X
Flood #1	Collaborate with Marion County to survey and assess current culvert infrastructure most susceptible to natural hazards	Detroit	Marion County Emergency Management/Public Works	Long Term			X		X	X	

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Detroit addendum to the Marion County NHMP. This addendum designates a coordinating body and a convener to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional NHMP, the city will look for opportunities to partner with the county. The city's steering committee will convene after re-adoption of the City of Detroit addendum on a semi-annual schedule; the county is also meeting on a semi-annual basis and will provide opportunities for the cities to report on NHMP implementation and maintenance during their meetings. The City Recorder will serve as the convener and will be responsible for assembling the steering committee (coordinating body). The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the city's mitigation strategy (actions). The convener will also remain active in the county's implementation and maintenance process.

Implementation through Existing Programs

Many of the NHMP's recommendations are consistent with the goals and objectives of the city's existing plans and policies. Where possible, the City of Detroit will implement the NHMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the NHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

Detroit 's acknowledged comprehensive plan is the Detroit Comprehensive Plan. The Oregon Land Conservation and Development Commission first acknowledged the plan on July 11, 2002. The City last completed a transportation update to the plan on July 20, 2009, but no major update of the plan has occurred since. The City implements the plan through regulatory ordinances.

Detroit currently has the following plans that relate to natural hazard mitigation. For a complete list visit the city website for planning and public works:

- Comprehensive Plan
- Development Code
- Transportation System Plan

Continued Public Participation

Keeping the public informed of the city's efforts to reduce the city's risk to future natural hazards events is important for successful plan implementation and maintenance. The city is committed to involving the public in the plan review and updated process. This includes:

- Annual briefings to city council
- Articles and information in The Canyon Weekly
- Postings and media on social media/website.

Plan Maintenance

The Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the city will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

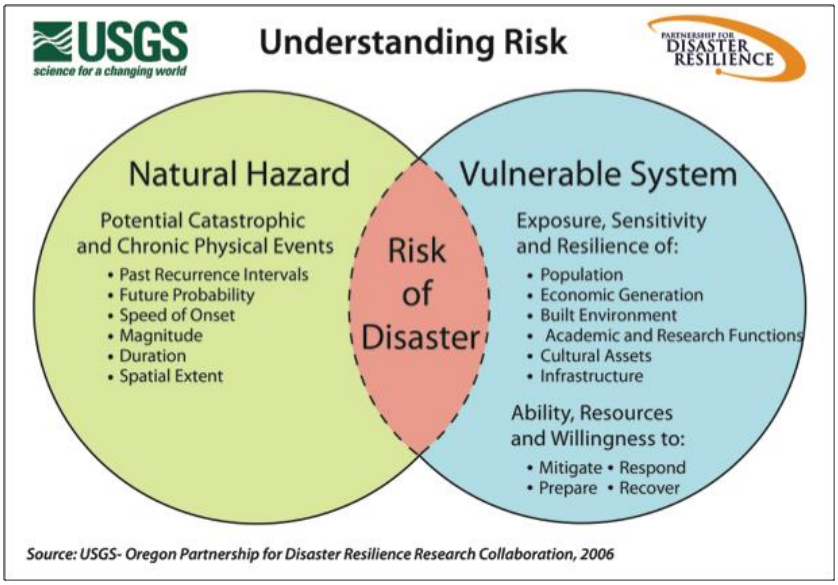
Risk Assessment

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

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein. The risk assessment process is graphically depicted in (Figure B-1) below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

(Figure B-1) Understanding Risk



Hazard Analysis Methodology

This NHMP utilizes a Threat Hazard Identification and Risk Assessment methodology that is consistent with the Marion County Multi Jurisdictional Hazard Mitigation Plan. Mill City developed this assessment from historical data of events that have occurred in Marion County. The assessment uses the calculated priority risk index (CPRI) methodology to specifically examine:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

Table (A-3) below shows the scoring values for each ranking category.

Table (A-3) Risk Assessment Hazard Ranking Scoring Values

Score	Probability	Warning Time	Magnitude/Severity	Duration
4	Highly Likely	Less than 6 hours	Catastrophic	More than 1 week
3	Likely	6-12 hours	Critical	Less than 1 week
2	Possible	12-24 hours	Limited	Less than 1 day
1	Unlikely	24+ hours	Negligible	Less than 6 hours

Source: Marion County Emergency Management; BOLD Planning

Hazard Analysis

For emergency management planning purposes, this critical analysis is an assessment of the consequences of each hazard, including potential areas of impact, population exposed and impacted, duration of the hazard, and potential economic consequences. These rankings utilize the criteria laid out in THIRA to weigh them proportionally between historic data as well as future projections based on economic, demographic, the critical infrastructure information.

These rankings were reviewed and revised by steering committee members to reflect specific community attributes and risks.

(Table A-4) Probability and Vulnerability Comparison

Hazard Profile Summary for Emergency Operations Plan						
Hazard	Probability	Magnitude	Warning Time	Duration	CPRI	Planning Significance
Earthquake	4	4	4	4	4.00	**High**
Severe Weather/Storm	4	4	2	3.5	3.65	**High**
Power Failure	3	4	3.5	3	3.38	**High**
Drought	3.5	4	1	4	3.33	**High**
Wildland Interface Fire	3.5	3.5	2	3	3.23	**High**
Extreme Weather - High Temperature	3.5	2.5	1	4	2.88	**Moderate**
Transportation Accident/Train Derailment	3	3	1	3	2.70	**Moderate**
School & Workplace Violence	1.5	4	4	2	2.68	**Moderate**
Epidemic	2	4	1	4	2.65	**Moderate**
Pandemic	2	4	1	4	2.65	**Moderate**
Volcanic Eruption	2	4	1	4	2.65	**Moderate**
Landslide	2	2.5	4	2.5	2.50	**Moderate**
Animal Disease Outbreak	2	3	2	4	2.50	**Moderate**
Dam or Levee Failure	2	1	4	4	2.20	**Moderate**
Biological Chemical, Sabotage and Cyber Incident and Explosives Radiological Attack-Terrorism	1	4	1	3	2.10	**Moderate**
Hazardous Materials Incident	1.5	3	1	3	2.03	**Moderate**
Civil Disorder / Terrorism	1	2	4	3	1.95	**Low**
Radiological Release	1	2	4	3	1.95	**Low**
Flood	1	2	2	2	1.55	**Low**
Tornado	1	1	1	1	1.00	**Low**

Source: Detroit NHMP Steering Committee and Marion County NHMP Steering Committee, 2016.

Hazard Characteristics

Drought

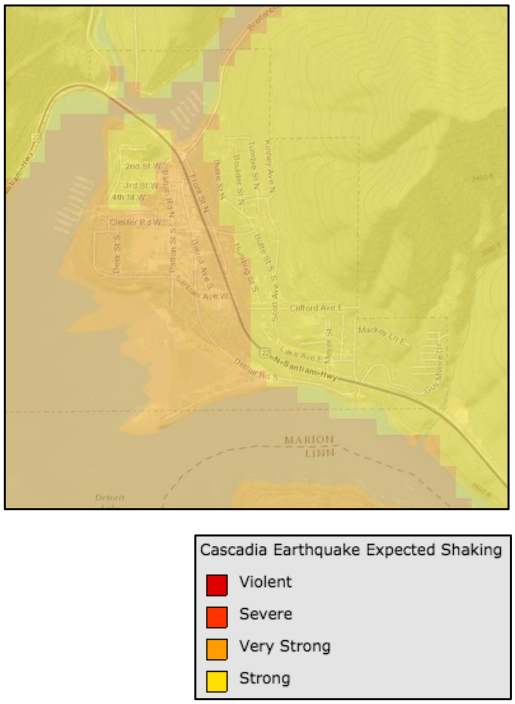
The steering committee determined that the city's probability for drought is **moderate** and their vulnerability to drought is **high**.

Although dryer conditions in the summer months have impacted the North Santiam Canyon as a whole, Detroit has experienced major impacts from drought. Detroit's economy relies heavily upon the recreation provided by the water levels of Detroit Lake, which can experience low levels during years of major drought.

Dry conditions throughout 2001 caused Detroit Lake water levels to recede below 1,546 feet (min. elev. for moorage), contributing to a Detroit Area Economic loss of over $5 million dollars.[1] Recently during the 2015 drought, similar economic impacts were experienced with additional damage caused by tree and vegetation die off. This has created an increased risk of wildfire hazards. If dryer conditions become the new norm, Detroit could experience timber die-off, making them more susceptible to wildfires, as well as economic hardships if their current seasonal economy does not expand.

Earthquake

The steering committee determined that the city's probability for a Cascadia Subduction Zone (CSZ) Earthquake event is **high** and that their vulnerability to this event is **moderate**. The steering committee determined that the city's probability for a Crustal Earthquake event is **moderate** and that their vulnerability to this event is **moderate**.



Historically, Detroit has experienced one crustal earthquake on August 19, 1961. A 4.5 magnitude earthquake struck 6 miles from Mill City, with shaking felt throughout the Santiam Canyon, up to Detroit.

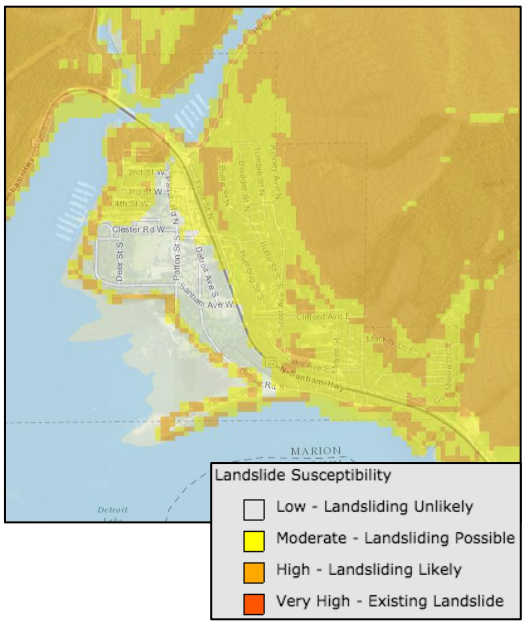
If another larger and more substantial earthquake occurs (Cascadia), Detroit could experience damage to buildings, utility (electric power, communication, water, wastewater, natural gas) and transportation systems (ex. bridges, and pipelines).

Flood

The steering committee determined that the city's probability for flooding is **low** and that their vulnerability to flooding is **low**.

[1] http://agsci.oregonstate.edu/sites/agsci.oregonstate.edu/files/ruralstudies/pub/pdf/detroitlake-sr1071.pdf (Table 5)

Historically, Detroit experienced one major flooding event in 2006. Heavy rains and high winds created a multitude of damage in the Detroit, Idanha, and Breitenbush area. Impacts included roofing damage, flooding of public facilities, sinkholes, erosion, and water facility intake-clogging due to turbidity.



Landslide

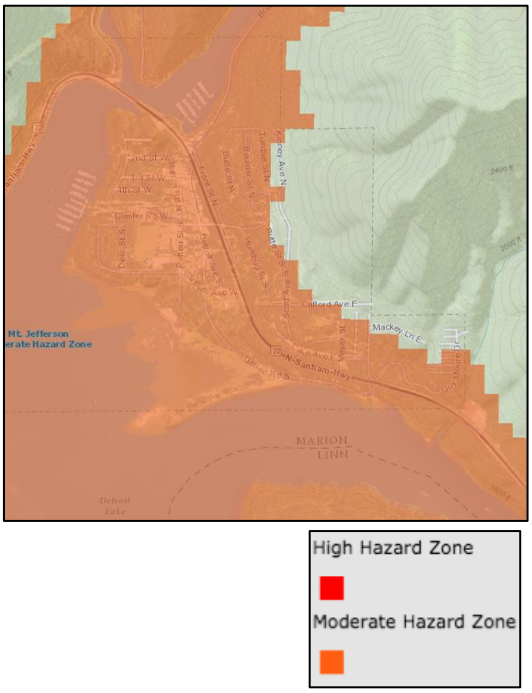
The steering committee determined that the city's probability for landslide is **moderate** and that their vulnerability to landslide is **moderate**.

Historically, Detroit has not experienced major impacts from landslides within city limits. Areas in the east and northern portion of the city are susceptible because of steep mountainous terrain. The western portion and remainder that border Detroit Lake are also at higher risk.

Potential landslide-related impacts are adequately described within the county's plan, and include infrastructural damages, economic impacts (due to isolation and/or arterial road closures), property damages, and obstruction to evacuation routes. Rain-induced landslides and debris flows can potentially occur during any winter in Marion County; thoroughfares beyond city limits are susceptible to obstruction as well.

Volcano

The steering committee determined that the city's probability for volcanic event is **low** and that their vulnerability to volcanic event is **moderate**.



Detroit has not been impacted previously by volcanic activity, however Mount Jefferson is located east of the city into the cascade mountains, and could produce problems if an eruption occurs. The city sits in the Mount Jefferson Moderate Hazard Zone and could experience ash fall, debris avalanches, pyroclastic flows, lahars and slow-moving lava flows. City residents should be evacuated before an eruption begins in case of impassible roads and dangerous conditions.

Wildfire

The steering committee determined that the city's probability for wildfire is **high** and that their vulnerability to wildfire is **high**.

In 2001 the "breitenbush fire" threatened city residents creating road closures and hazardous conditions. In 2002 and 2004, Detroit was impacted by wildfire's which caused closure of Hwy 22. This impacted local residents, restricting travel, and negatively impacting the local economy.

In 2011, the "nasty fire" threated the Opal Creek Wilderness, while the 2014 "Bingham complex fire" restricted travel and required Detroit Ranger Station response.

Detroit could experience more fires as dryer conditions occur in the North Santiam Canyon. Less rainfall and snowpack can kill of tree's dependent on large amounts of water, which could ultimately lead to an increase of wild fire fuels.

Marion County updated the Community Wildfire Protection Plan (CWPP) in 2016, which mapped wildland urban interface (WUI) areas and developed actions to mitigate wildfire risk. The city is a participant in the CWPP, and has included hazard mitigation action items directly in line with the CWPP actions.

Windstorm

The steering committee determined that the city's probability for windstorms is **high** and that their vulnerability to windstorms is **high**.

In April of 1931, winds in the Santiam Canyon region felled hundreds of trees causing road closures between Mill City and Detroit. The winds also caused several devastating fires throughout the Santiam Canyon. On December of 1995, high wind gusts of up to 60mph downed trees and disrupted power and communication services in the lower Santiam. In 2002, a windstorm caused similar damages, blowing down trees onto roads and power lines.

About once or twice per year the city will experience a windstorm event that can interrupt services, down trees, and cause power outages. Typically, windstorms occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and very rarely, snow.

Winter Storm (Snow/Ice)

The steering committee determined that the city's probability for winter storm is **moderate** and that their vulnerability to winter storm is **high**.

Major winter storms have occurred in the Detroit area; in January of 1937, heavy snowfall of over 2 feet caused property damage. Major roads were closed and residents of Detroit were stranded for five days as heavy snow and a landslide blocked Hwy 22. In 1950, A large snow event caused 54 inches of snow in Detroit, while 122 inches blanketed Detroit Dam. During that storm, the cities Rod-and-Gun Club's roof collapsed under the weight of 20 inches of snow.[2] In January of 1957, cold temperatures brought eleven inches of snow to Detroit, as well as icy roads throughout the Santiam Canyon. Cold temperatures also caused the Bonneville Power Authority to cut interruptible power to the regions' industrial customers because ice behind the dam slowed water flow and limited the ability to generate power.[3] In January of 1963, Detroit recorded 13 inches of snow, while cold temperatures created hazardous road conditions.[4]

During the last couple days of December 2003, the Detroit/Idanha area received an accumulation of 4-5 feet of snow. Both cities declared a State of Emergency as the City of Idanha lost power between December 29th and January 6th; Detroit lost power between January 1st and January 4th. In early 2008, Detroit received over 12 feet of snow in a two-month period. Three

[2] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/14_severewinterstorm.pdf
[3] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/14_severewinterstorm.pdf
[4] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/14_severewinterstorm.pdf

dozen Oregon National Guard personnel were called in to help with snow removal. Damage included collapsed roofs and cracked walls, mostly impacting homeowners.[5]

Record and Near Record Snow, Landslides and Mudslides occurred in Oregon between December 20, 2008 and December 26, 2008. By December 22, Detroit already measured 4 feet of new snow and experienced power outages. Between December 18 and December 30, the City of Detroit spent $10,407 (or 129 hours) for contracted snow removal services, which created a financial hardship to the city's budget for the second time in one year.

Winter storm conditions starting late December 2016 and lasting into January, 2017 left Detroit and Idanha with approximately four feet of snow that quickly turned into ice due to low temperatures. Residents, especially the elderly, were unable to shovel the heavy snow to get in and out of their driveways. Large, heavy snow berms quickly became a hazard throughout both cities and also blocked hydrants, water meters and water pipes. The water supply in Idanha was at risk because of blocked access to water meters to detect multiple leaks. The two cities declared an emergency with Marion County, who sent crews up to remove and relocate the piles of snow, dig out water meters and hydrants, and help the elderly and sick where needed. Freres Lumber continued the snow removal work on a volunteer basis or an additional couple of days. A sudden temperature upswing started a slow melting process, but created pure ice conditions on steep city streets. On January 19, 2017 ODOT was approached to sand the most affected roads under a Mutual Service Agreement, which was accepted immediately. The sanding took place the same night.

Winter storms are more frequent hazards in Detroit and usually cause transportation issues and communication failures from downed trees and icy/snow filled roads. The ability to respond to these hazards quickly and effectively determines the potential impacts these regular occurrences will have in the community.

Community Asset Identification

This section provides information on city specific assets. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for all types of hazard mitigation. Considering the city specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Community Characteristics

Detroit is located approximately 50 miles east of Salem, bordering the Detroit Reservoir. It is the third largest community in the North Santiam River Canyon with a population of 210. With an elevation of 1630 feet, the climate of Detroit is moderate; the average monthly temperatures range from 51 – 79 degrees in July and August, and 31-42 degrees in December and January. Detroit receives approximately 68 inches of rain and 10 inches of snow each year. The city's topography is relatively flat, but does possess terrain attributed to Detroit Reservoir. Outside of city limits, steep slopes surround the city on all sides.

[5] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/14_severewinterstorm.pdf

Economy

Detroit benefits from its location along Hwy 22, a major east-to-west transportation route connecting Salem to Bend. It serves as a recreation hub with two marinas, restaurants, and lodging, for residents of the North Santiam Canyon and the traveling public along the Hwy 22 corridor. Historically, Detroit prospered from the development of the railroad and dam, which helped spur growth in manufacturing and logging. Today, the economy relies upon the recreational opportunities available through state/federal lands, and Detroit Lake.

Critical and Important Facilities/Infrastructure

Communication/Information Technology

There is currently one communication provider in Detroit. Frontier provides phone service, and broadband internet with limited fiber infrastructure adjacent to Hwy 22.

Strengths:

- Limited fiber internet infrastructure already present along Hwy 22.
- Cellular Tower (AT&T/Verizon) east of Detroit, past the ranger station, with diesel generator backup.
- AT&T cellular tower at entrance of town.
- Public Works possesses low range walk-talkie access (>1/2) mile.

Weaknesses:

- Limited communication access including internet and phone.
- Currently no known HAM radio operators in the community.
- Main communication line runs down highway 22, and is susceptible to tree's and wind.
- Phone lines are both buried and overhead; which could prove difficult for maintenance.

Water

The City of Detroit has two water sources which include Mackie creek and the Breitenbush intake. Mackie Creek is Detroit's main water source in the winter months, located approximately 1/3 mile uphill from the water treatment plant. The Breitenbush intake, located approximately 1/3 mile up from Breitenbush Road, is utilized in the summer months.

Detroit's water treatment facility is located at the top of Gaymore, with a backup propane generator. The generator is accompanied by a 500-gallon propane storage tank, and can power water facilities for approximately one week.

Detroit has two treated water storage tanks equaling 440,000 gallons (200,000 and 240,000). The city also has one un-treated water storage tank which holds 35,000 gallons. This tanks water level is maintained from the Breitenbush intake and is gravity fed from the treatment plant.

Waste Water

Detroit does not have any municipal waste-water infrastructure. The city's residents and business owners rely on individual septic tanks. These septic tanks can be up to 60-years old and could be leaching hazardous material into the ground water/ Detroit Reservoir.

Dams

Two dams sit below Detroit, *Detroit Dam* and *Big Cliff Dam.* Previous steering committee's have concluded that the likelihood of Dam Failure is ***Low***[6]***.*** Current conditions still represent the previous decision. If Dam failure occurred in either dams, Detroit would most likely lose access to the western portion of Hwy 22.

Strengths:

- (2) water intake sources (Mackie & Breitenbush).
- (1) Backup propane generator on-site.
- (2) Above-ground storage tanks located near water treatment facility.
    - Equivalent to (440,000) gallons or 3-4 days of water storage in summer months or 4-8 days in winter months.

Weaknesses:

- Current backup generator runs on propane.
- Water intake sources are susceptible to wildfire damage.
- The city is losing approximately 40% of water distributed through leaky pipes. Roughly 40% of the water travelling through the water pipes is lost due to deficient infrastructure.
- Water usage estimates are 60,000 gallons in the Winter and 120,000 in the Summer.

Transportation Systems

Oregon Route 22 is the major transportation route for auto, public transit, and emergency vehicle access throughout the Santiam Canyon. Hwy 22 spans about 50 miles west, connecting Detroit to Salem and the remainder of the Willamette Valley. To the east, the highway connects to Idanha, and ends at the Santiam Pass interchange.

The Cherriots Canyon Connector is the only existing public transit service in the entire Santiam Canyon. This route has three total roundtrips with buses running approximately every (5) hours. Detroit residents are forced to drive to Gates to utilize these services, as the canyon connector does not reach Detroit or Idanha.

In case of a major Oregon Route 22 closure, Detroit residents will have to rely on alternate routes to reach supplies or safety. The cities alternate routes are limited with Breitenbush Road and French Creek Road. Depending on weather conditions, these roads may be unpassable.

[6] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/6_damfailure.pdf

Bridges

Structure Name	Year Built	Structural Condition
Tumble Creek	1949	Fair
Breitenbush River	1949	Fair

Strengths:

- Proximity to ODOT facility may increase access to public works services.
- Docked boats along Detroit Lake can be utilized to transport residents to safety during concentrated hazard events (ex. hazardous materials, and wildfire).
- Fuels reduction measures have been taken along Weber Street to minimize risk to water system infrastructure.

Weaknesses:

- Loss of Breitenbush river bridge would isolate Detroit from the remainder of the Santiam Canyon and the Willamette Valley.
- Alternate routes are long, and most likely impassible in winter months.
- Hwy 22 closures could make travel outside of North Santiam Canyon extremely difficult.
- Public transportation options are limited and only reach to the city of Gates.
- City's drain and culvert infrastructure is old and getting to the point where some won't flush a lot of water away anymore (street maintenance person keeps them in best shape and unclogs them at all times).

Energy & Utilities

Detroit receives energy and utility services from Consumer Power Inc. There are no substations located in Detroit. One main power line runs along Hwy 22, connecting to Gates and Mill City.

Strengths:

- Gas stations with fuel storage exist within Detroit and possess both gasoline and diesel fuel.
- An electric car powering station and a Tesla electric car powering station exists within city limits; the capability to utilize this infrastructure is unknown.

Weaknesses:

- Gas stations possess below ground tanks which cannot be pumped without electricity.
- Gas stations do not currently possess backup diesel generators to pump fuel from storage tanks.
- No alternate sources of energy (wind, solar) exist to power basic services.
- Citizen rely on propane and there is limited access to propane during a disaster.

Agriculture and Food

Although Detroit possesses the "Detroit Market" and "Mountain High Grocery" the closest large-scale grocery exists down Hwy 22 in Stayton, Oregon. While other restaurants and lounges exist on Detroit's Main street, the loss of Hwy 22 as a transportation route would cause serious concern for residents and food accessibility. The city is surrounded by steep slopes that are state and federal land. There is no agricultural capability other than small-scale "urban" farms within city limits.

Strengths:

- Private sector entities possess limited (1-2 days) food supplies.

Weaknesses:

- No major (full service) grocery store inside of city limits.
- Surrounding land not suitable for agricultural purposes.

Banking and finance

Detroit's nearest option for banking services is located in Mill City. This one-story structure sits along Hwy 22 and could be utilized for emergency financial services during a hazard event. Detroit does not have any financial services within city-limits.

Strengths:

- Cash flow from nearby businesses could possibly be utilized.

Weaknesses:

- Lack of banking/financing institutions within city limits.
- Full "urban" financial services unavailable.

Hazardous Materials

The cities reliance on propane as a backup fuel source can be hazardous in certain conditions. These above ground propane tanks can be susceptible to leaking after an earthquake, or explode during a wildfire.

Detroit does not possess any large manufacturing firms that possess hazardous materials. The city has identified current brownfields which may be susceptible to leaching or are unsuitable for development. The Kanes Marina, Detroit Lake, and Detroit School Tank brownfields currently require no further action.

Brownfields

DEQ ID	Facility Name	Location
2267	Kanes Marina	530 Clester Road

771	Breitenbush Hot Springs	4688 Forest Road
1204	Detroit Forest Service	Hwy 22
3770	Detroit Lake	MP 46, Hwy 22
5652	Detroit School Tank	110 Patton
1094	Heidgerken Property	Forest Road 46

Strengths:

- There are currently not enough known hazardous materials to cause major concern.
- Brownfield sites could be utilized and attract privates sector development.

Weaknesses:

- Current brownfields maybe susceptible to leaching of unknown materials.
- Propane tanks within city limits can be extremely hazardous.

Emergency Services

Detroit receives emergency service support from Marion County Sheriffs and the Idanha-Detroit Rural Fire Protection District.

- Detroit Police Department (Marion County Sheriffs), 160 Detroit Ave
- Idanha-Detroit Rural Fire Protection District, 160 Detroit Ave

Strengths:

- Detroit possesses emergency services for fire and law enforcement.
- An emergency propane generator with 70-gallons of storage exists inside City Hall; utilized by both fire and law enforcement.

Weaknesses:

- Fire and law enforcement rely on City Hall facilities to operate.
- Ambulance services must travel from the City of Lyons.
- First responders are very limited to basic life monitoring services.
- Currently, emergency services do not have trained HAM radio operators.

Government Facilities

Detroit City Hall contains the office space for all city services as well as the headquarters for the Detroit Fire Department and Marion County Sheriffs. The city has a generator that assures continuance of city business, and also provides power to the meeting hall (emergency center). This includes outlets for electric heaters and lights only.

- Detroit City Hall, 160 Detroit Ave
- Post Office, 170 Detroit Ave

Strengths:

- City Hall facility has (1) kitchen, (2) bathrooms, and (1) emergency generator with (2) 25-gallon propane storage tanks that work in unison.

Weaknesses:

- City Hall is small with space already utilized by other emergency services.
- Propane fuel maybe limited, and could only power City Hall for a couple of days.

Environmental/Historical Preservation Sites

Detroit is surrounded by environmental preservation sites including federal land, state parks and designated wilderness areas. The housing stock in Detroit was built after the 1950s and does not contain any sites of historical significance. The city does possess the Detroit Ranger Station, Detroit State Park, and Detroit Lake, which help to bring in a high volume of recreational tourism in the summer months.

Strengths:

- Proximity to pristine state and federal land could attract residents or business.
- Some remnants remain of the old Detroit location (now at the bottom of Detroit Lake)

Weaknesses:

- Detroit lacks buildings with historical “timber”.

Education

Detroit is part of the Santiam School District. This district encompasses all cities in the Santiam Canyon including Mill City, Gates, and Idanha. This district includes the Santiam Elementary School, and the Santiam Junior/Senior High School.

- Santiam School District
    - Santiam Elementary School, 450 SW Evergreen St.
    - Santiam Junior/Senior High School, 265 SW Evergreen St.

Strengths:

- School facilities could be utilized to shelter a large amount of community residents including Access and Functional Needs populations.
- School facilities possess needed infrastructure for a shelter which includes restrooms, showers and a kitchen.
- School buses could be utilized for transportation after an emergency or disaster.

Weaknesses:

- Detroit is over 20 miles from school services.
- There are no current agreements or MOU’s between the City and School District to utilize facilities after an emergency or disaster.

Healthcare & Public Health

Detroit's nearest medical services are located in Mill City which possesses one clinic with limited services. The nearest hospital and full service health clinic is located in Stayton, Oregon.

- Santiam Medical Clinic, 280 S 1st Ave.
- Emergency Medical Technician (EMT) services are located in the City of Lyons.

Strengths:

- A clinic with minor services exists within the North Santiam Canyon.

Weaknesses:

- Closest health services are located over 20 miles.
- No facilities with major life-saving equipment currently exist within city limits.
- Emergency health supplies are limited to what exists within the community.

Access and Functional Needs

Detroit's vulnerable population consists of the elderly and those that may have mobility issues. About 5% of Detroit's population is characterized as being elderly, and over 20% of full-time residents are considered low-income. The City is quickly turning into a 2nd home community, increasing actual population to 1000+ (210 full-time, 790+ part-time).

Strengths:

- Over 65% of full-time residents are over the age of 45, this older populous can volunteer and promote social cohesion in the community.

Weaknesses:

- No medical services exist for aging population.

CITY OF GATES ADDENDUM

Purpose

This document serves as Gates's Addendum to the Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan (MNHMP, NHMP). This addendum seeks to supplement information contained in Volume I (Basic Plan) of this multi-jurisdictional NHMP which serves as the foundation for this jurisdiction's addendum and Volume III (Appendices) which provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the NHMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with Marion County and Santiam Canyon cities, including Gates, to create the first region-specific NHMP. Part of the Santiam Canyon Regional Hazard Mitigation Plan (RHMP) required the creation of city addenda which would be adopted into the 2016 Marion County NHMP. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County NHMP, locally adopting it, and having it approved by FEMA, Gates will gain eligibility for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County NHMP, and Gates addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing this addendum, and was composed of city staff, county representatives, and emergency service management.

The Gates city recorder is the designated convener of the NHMP and will take the lead in implementing, maintaining, and updating the addendum to the Marion NHMP in collaboration with the Santiam Canyon liaison for Marion County Emergency Management.

Representatives from the City of Gates steering committee met formally on one occasion: September 22, 2016, but communicated electronically throughout the creation of this

document. The city's addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with OPDR.

The Gates Steering Committee was comprised of the following representatives:

- Leroy Davis; Community Member, Gates
- Greg Benthin, Public Works Superintendent, Gates
- Jerry Marr; Mayor, Gates
- Traci Archer; City Recorder, Gates
- Kathleen Silva; Santiam Canyon Liaison, Marion County
- Gates City Council

Public participation was achieved with the establishment of the steering committee, which was comprised of city officials, county representatives, and the general public.

The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process.

The Marion County NHMP was approved by FEMA on August 17, 2017 and the Gates addendum was adopted via resolution on October 19, 2017. This NHMP is effective through August 16, 2022.

Mitigation Strategy

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

During 2016, Marion County and OPDR evaluated the Action Items set by the county and their particular relevance to the Santiam Canyon region. Following the review, actions with relevance to the region were added into the RHMP, noting what accomplishments had been made, and whether the actions were still relevant; any new action items were identified at this time. Gates developed a list of priority actions (Table A-1), any actions that were not prioritized were placed in the Action Item Pool (Table A-2) and will be considered during the semi-annual meetings.

Priority Actions

The city is listing a set of high priority actions in an effort to focus attention on an achievable set of high leverage activities over the next five-years. The city's priority actions are listed below in the following table. Detailed implementation information for each action is listed in within (Table A-1).

Action Item Pool

This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available.

Many actions carry forward from prior versions of the Marion County NHMP and other local planning documents including the Community Wildfire Protection Plan, Drought Contingency Plan, and Mid-Willamette Economic Development study.

(Table A-1) Gates Priority Action Items

Action Item	Cost and Process of Implementation	Funding Options	Approximate Date of Completion
Planning & City Staff	*Update planning documents (comprehensive plan, development code) to reflect new hazard information.*	*General Fund*	*September 2017*
(e.g) *Multi-Hazard*	*City staff should assess the amount of KWH needed to run city facilities. City staff should purchase propane storage accordingly.*	*General Fund, MWCOG grants/loans,*	*December 2017*

-ONGOING-

(Table A-2) Gates Action Item Pool

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Earthquake #1	Promote Great Oregon Shakeout Awareness month in October. Participate in activities for schools, business, and industry. Participating with the Mid-Willamette Emergency Communications Collective on initiatives that are focused on household preparedness.	Marion County Emergency Management	Public Works, Safety Committee, Marion County Risk, Red Cross, OEM and Media	Ongoing every October	X	X			X		
Earthquake #2	Collaborate with GROW EDC to develop relevant public-private partnerships with businesses that can contribute to response and recovery. (Multi-Hazard 6-9)	Gates, Marion County Emergency Management	GROW EDC	Ongoing	X	X	X	X	X		X
Multi-Hazard #1	Develop an Energy Assurance Plan. (Multi-Hazard 2-4)	Gates, Marion County Emergency Management	Department of Energy, Whole Community	Ongoing revisions			X	X	X		X

Source: City of Gates NHMP Steering Committee, 2015.

-SHORT TERM-

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Multi-Hazard #2	Conduct an assessment of the short and long term needs for sheltering access and functional needs populations for all hazards.	Gates, Marion County Emergency Management	Marion County Public Health, Red Cross, Cities, NGO's, Oregon Public Health	Short Term					X		X
Multi-Hazard #3	Develop a MOU with the Santiam School District to utilize facilities for sheltering residents.	Gates, Marion County Emergency Management	Santiam School District, RFPD	Short Term			X		X		
Multi-Hazard #4	Develop a MOU with First Student to utilize buses during/after hazard events	Gates, Marion County Emergency Management	First Student	Short Term			X		X		
Multi-Hazard #5	Develop a MOU with Frank & Ferris Lumber to share fuel resources after a hazard event.	Gates, Marion County Emergency Management	Franks Lumber, RFPD	Short Term			X		X		

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Multi-Hazard #6	Purchase and store emergency rescue rafts for EMS to allow for the use of the North Santiam River as an emergency transportation option.	Gates, Marion County Emergency Management	RFPD	Short Term					X	X	
Multi-Hazard #7	Continue to train and expand Gates CERT team.	Marion County Emergency Management, Gates	CERT, Whole Community	Short Term	X	X			X		
Multi-Hazard #8	Develop a community education program - such as an all hazard community outreach forum for students and residents.*	Marion County Emergency Management, Gates	Public Works Whole Community	Short Term	X	X	X				X
Multi-Hazard #9	Expand auxiliary radio capabilities by developing a team of HAM Radio operators for EMS and interested public.	Marion County Emergency Management, Gates	ARES, CERT, Private partners, Whole Community	Short Term	X	X	X		X		

*Identified in Marion County Community Wildfire Protection Plan (Action Plan & Priorities)

**Identified in North Santiam Watershed Drought Contingency Plan (Priority Drought Mitigation Actions)

***Identified in Mid-Willamette Valley Council of Governments Comprehensive Economic Development Study (Appendix C)

-LONG TERM-

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Drought #1	Monitor economic impacts on recreation, tourism and agriculture communities.	Gates, Marion County Emergency Management	Community Services	Long Term	X	X	X	X	X		X
Drought #2	Collaborate with NSWC to complete WMCP's and improve community understanding of water usage and opportunities to increase efficiencies.**	NSWC, Gates	North Santiam Watershed DCP Partners	Long Term		X	X		X		X
Flood #1	Create partnerships and strategic plans with NSWC to conduct leak detection surveys.**	Marion County Environmental Services, Gates	Marion County Parks Department, Oregon Department of Fish and Wildlife,	Long Term			X		X	X	X

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Flood #2	Create partnerships and strategic plans with NSWC to explore alternative water supply sources.**	Marion County Environmental Services, Gates	Marion County Parks Department, Oregon Department of Fish and Wildlife,	Long Term			X		X	X	X
Multi-Hazard #10	Conduct road improvements on Gates Hill Road and Hudel Road as identified in the CWPP*	RFPD, Gates, Marion County Public Works	Marion County Emergency Management	Long Term			X		X		
Multi-Hazard #11	Collaborate with Marion County to connect to a more resilient regional water/sewer system.***	Marion County Community Services Department/Emergency Management, Gates	Marion County Emergency Management	Long Term			X	X	X		X
Multi-Hazard #12	Gather community support for the installation of resilient fiber communication infrastructure throughout the community.***	Gates	Marion County Community Services Department/Board of Commissioners	Long Term	X		X		X		X
Wildfire #1	Collaborate with Detroit Ranger District, ODF, and BLM to conduct fuel hazard reduction along the Wildland Urban interface.*	ODF, BLM, Detroit Ranger District	Marion County Emergency Management	Long Term			X		X		X

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Landslide #1	Integrate new DOGAMI landslide hazard information into land use zoning/development codes.	Gates	Environmental Services, Engineering, ODOT, DLCD	Long Term			X				X

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Gates addendum to the Marion County NHMP. This addendum designates a coordinating body and a convener to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional NHMP, the city will look for opportunities to partner with the county. The city's steering committee will convene after re-adoption of the City of Gates addendum on a semi-annual schedule; the county is also meeting on a semi-annual basis and will provide opportunities for the cities to report on NHMP implementation and maintenance during their meetings. The City Recorder will serve as the convener and will be responsible for assembling the steering committee (coordinating body). The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the city's mitigation strategy (actions). The convener will also remain active in the county's implementation and maintenance process.

Implementation through Existing Programs

Many of the NHMP's recommendations are consistent with the goals and objectives of the city's existing plans and policies. Where possible, the City of Gates will implement the NHMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the NHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

Gates's acknowledged comprehensive plan is the Gates Comprehensive Plan. The Oregon Land Conservation and Development Commission first acknowledged the plan in 1977. The City last completed a major update of the plan in 2009. The City implements the plan through Gates regulatory ordinances.

Gates currently has the following plans that relate to natural hazard mitigation.

- Comprehensive Plan
- Zoning Ordinance
- Water Master Plan

Continued Public Participation

Keeping the public informed of the city's efforts to reduce the city's risk to future natural hazards events is important for successful plan implementation and maintenance. The city is committed to involving the public in the plan review and updated process. This includes:

- Annual briefings to City Council
- Articles and information in The Canyon Weekly
- Postings and media on social media/website.

Plan Maintenance

The Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the city will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

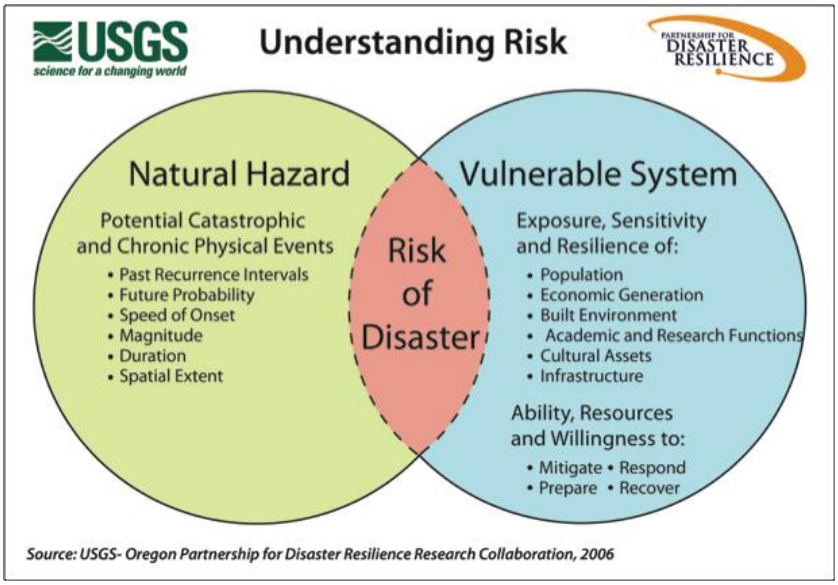
Risk Assessment

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

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein. The risk assessment process is graphically depicted in (Figure B-1) below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

(Figure B-1) Understanding Risk



Hazard Analysis Methodology

This NHMP utilizes a Threat Hazard Identification and Risk Assessment methodology that is consistent with the Marion County Multi Jurisdictional Hazard Mitigation Plan. Mill City developed this assessment from historical data of events that have occurred in Marion County. The assessment uses the calculated priority risk index (CPRI) methodology to specifically examine:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

Table (A-3) below shows the scoring values for each ranking category.

Table (A-3) Risk Assessment Hazard Ranking Scoring Values

Score	Probability	Warning Time	Magnitude/Severity	Duration
4	Highly Likely	Less than 6 hours	Catastrophic	More than 1 week
3	Likely	6-12 hours	Critical	Less than 1 week
2	Possible	12-24 hours	Limited	Less than 1 day
1	Unlikely	24+ hours	Negligible	Less than 6 hours

Source: Marion County Emergency Management; BOLD Planning

Hazard Analysis

For emergency management planning purposes, this critical analysis is an assessment of the consequences of each hazard, including potential areas of impact, population exposed and impacted, duration of the hazard, and potential economic consequences. These rankings utilize the criteria laid out in THIRA to weigh them proportionally between historic data as well as future projections based on economic, demographic, the critical infrastructure information.

These rankings were reviewed and revised by steering committee members to reflect specific community attributes and risks.

(Table A-4) Probability and Vulnerability Comparison

Hazard Profile Summary for Emergency Operations Plan						
Hazard	Probability	Magnitude	Warning Time	Duration	CPRI	Planning Significance
Earthquake	4	4	4	4	4.00	**High**
Severe Weather/Storm	4	4	2	3.5	3.65	**High**
Landslide	3	3	4	3	3.15	**High**
Power Failure	2.5	4	3.5	3	3.15	**High**
Wildland Interface Fire	3.5	3	2	3	3.08	**High**
Drought	3	3	1	4	2.80	**Moderate**
Flood	2	4	2.5	3	2.78	**Moderate**
Extreme Weather - High Temperature	3.5	2	1	4	2.73	**Moderate**
Transportation Accident/Train Derailment	3	3	1	3	2.70	**Moderate**
School & Workplace Violence	1.5	4	4	2	2.68	**Moderate**
Epidemic	2	4	1	4	2.65	**Moderate**
Pandemic	2	4	1	4	2.65	**Moderate**
Dam or Levee Failure	1	4	4	4	2.65	**Moderate**
Animal Disease Outbreak	2	3	2	4	2.50	**Moderate**
Biological Chemical, Sabotage and Cyber Incident and Explosives Radiological Attack-Terrorism	1	4	1	3	2.10	**Moderate**
Hazardous Materials Incident	1.5	3	1	3	2.03	**Moderate**
Civil Disorder / Terrorism	1	2	4	3	1.95	**Low**
Radiological Release	1	2	4	3	1.95	**Low**
Volcanic Eruption	1	2.5	1	4	1.75	**Low**
Tornado	1	1.5	1	1	1.15	**Low**

Source: Gates NHMP Steering Committee and Marion County NHMP Steering Committee, 2016.

Hazard Characteristics

Drought

The steering committee determined that the city's probability for drought is **moderate** and their vulnerability to drought is **low**.

Although dryer conditions in the summer months have impacted the North Santiam Canyon as a whole, Gates has not experienced major impacts from drought. Recently during the 2015 drought, many tree's and vegetation died off which has created increased risk of wildfire hazards. If dryer conditions become the new norm, Gates could experience timber die-off, making them more susceptible to wildfires.

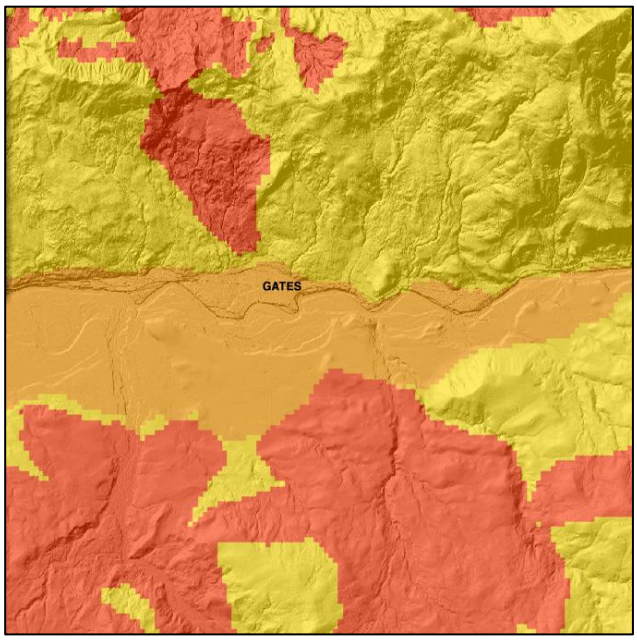
While the Detroit and Big Cliff dams control the flow of water into the North Santiam river, (required to meet minimum cubic-feet-per-second standards for salmon/steelhead populations) years of substantial drought can lower water levels, threatening the water intake system.

Earthquake

The steering committee determined that the city's probability for a Cascadia Subduction Zone (CSZ) Earthquake event is **high** and that their vulnerability to this event is **moderate**. The steering committee determined that the city's probability for a Crustal Earthquake event is **moderate** and that their vulnerability to this event is **moderate**.

Historically, Gates has experienced one crustal earthquake on August 19, 1961. A 4.5 magnitude earthquake struck 6 miles from Mill City, with shaking felt throughout the Santiam Canyon, up to Detroit.

If another larger and more substantial earthquake occurs (Cascadia), Gates could experience damage to buildings, utility (electric power, water, wastewater, and natural gas) and transportation systems (bridges and pipelines).



Flood

The steering committee determined that the city's probability for flooding is **low** and that their vulnerability to flooding is **high**.

Historically, Gates experienced minor flooding events in 1964 and 1996. This was due to a specific weather pattern named "Pineapple Express", which blows warm, most air from the southwest into the Pacific Northwest. In February 1996, A combination of snowpack, warm temperatures, and record-breaking rain caused streams including the North Santiam to rise near

or above all-time flood record levels. Gates experienced significant impacts as high/dirty water levels prevented their water facility from operating properly. Gates had no water from February 7-12. With assistance from the National Guard, Gates used a portable generator and pump to transfer water from a pond outside of city limits until February 27th

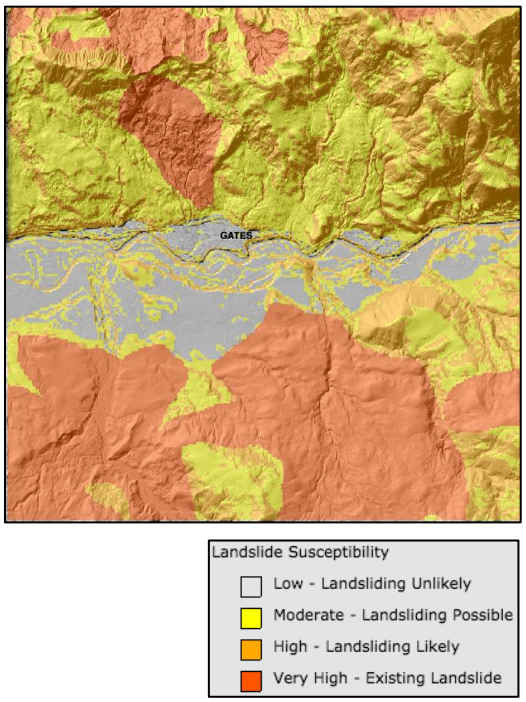
In December of 2007, heavy rain hits the Santiam Canyon with 6.39 inches of rain recorded by the Detroit Dam monitoring station.[1] In January of 2011, heavy rain combined with snowmelt runoff in Eastern Marion County produced flooding on the North Santiam River. The North Santiam River near Mehama crested at 11.7 feet, and flooded homes in Lyons and Mehama.[2]

Landslide

The steering committee determined that the city's probability for landslide is **moderate** and that their vulnerability to landslide is **moderate**.

Historically, Gates has not experienced major impacts from landslides within city limits. Areas near Hwy 22 and the northern edge of the city are more susceptible to this hazard because of steep slopes.

Potential landslide-related impacts are adequately described within the county's plan, and include infrastructural damages, economic impacts (due to isolation and/or arterial road closures), property damages, and obstruction to evacuation routes. Rain-induced landslides and debris flows can potentially occur during any winter in Marion County, and thoroughfares beyond city limits are susceptible to obstruction as well.



Volcano

The steering committee determined that the city's probability for volcanic event is **low** and that their vulnerability to volcanic event is **moderate**.

Gates has not been impacted previously by volcanic activity, however Mount Jefferson is located east of the city, further into the cascade mountains, and could produce problems if an eruption occurs.

Wildfire

The steering committee determined that the city's probability for wildfire is **high** and that their vulnerability to wildfire is **high**.

[1] http://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=72206

[2] http://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=278644

In 2002 and 2004, Gates was impacted by wildfire's which caused closure of Hwy 22. This impacted local residents, restricting travel, and negatively impacting the local economy. Gates could experience more fires as dryer conditions occur in the North Santiam Canyon. Less rainfall and snowpack can kill of tree's dependent on large amounts of water, which could ultimately lead to an increase of fuels and wild fire ignition probability.

Marion County updated the Community Wildfire Protection Plan (CWPP) in 2016, which mapped wildland urban interface (WUI) areas and developed actions to mitigate wildfire risk. The city is a participant in the CWPP, and has included hazard mitigation action items directly in line with the CWPP actions.

Windstorm

The steering committee determined that the city's probability for windstorms is **high** and that their vulnerability to windstorms is **high**.

In April of 1931, winds in the Santiam Canyon region felled hundreds of trees causing road closures between Mill City and Detroit. The winds also caused several devastating fires. In December of 1995, high wind gusts of up to 60mph downed tree's and disrupted power and communication services in the lower Santiam. Gates residents reported power and phone outages. In 2002, gusts of up to 70mph caused similar damages, blowing down tree's onto roads and power lines.

About once or twice per year the city will experience a windstorm event that can interrupt services, down trees, and cause power outages. Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and very rarely, snow.

Winter Storm (Snow/Ice)

The steering committee determined that the city's probability for winter storm is **moderate** and that their vulnerability to winter storm is **high**.

Major winter storms have occurred in the Gates area; in January of 1937, heavy snowfall of over 2 feet caused property damage. Major roads were closed and residents of Detroit and Gates were stranded for five days as heavy snow and a landslide blocked Hwy 22. In the winter of 2006-07 ice storms caused the city to lose power for 2-3 days. In 2012, a winter storm accompanied by flooding and landslides left Gates residents without electricity for 3-5 days. Downed trees and power lines obstructed Hwy 22, requiring emergency vehicles to restore regular access. In 2014, a similar storm knocked down tree's and caused hazardous road conditions. These types of storms are more frequent and usually cause transportation issues and communication failures from downed trees and icy/snow filled roads.

Community Asset Identification

This section provides information on city specific assets. Many of these community characteristics can affect how natural hazards impact communities and how communities

choose to plan for all types of hazard mitigation. Considering the city specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Community Characteristics

Gates is nestled along the North Santiam River bordering both Marion and Linn Counties. With a population of 474, it is the second largest city in the Santiam Canyon. Its elevation, at 945', creates a moderate climate. Summer temperatures hover between 51-76 degrees, while winter brings near freezing temperatures usually ranging from 32-44 degrees. Gates receives approximately 64 inches of rain and 10 inches of snow each year. The city's topography is relatively flat, but does possess terrain attributed to the North Santiam River. Outside of city limits, steep slopes surround the city on the North and South sides.

Economy

Gates benefits from its location along Hwy 22, a major east-to-west transportation route connecting Salem to Bend. Existing businesses types include hospitality, restaurants, and service stations. Most residents in the community still rely on resource extraction employment which includes agriculture, forestry, fishing, or hunting. Gates economy is limited because of its small population size and lack of infrastructure capacity, which has caused the regression of non Hwy 22 frontage development.

Critical and Important Facilities/Infrastructure

Communication/Information Technology

There are currently two communication providers in Gates. Wave provides broadband internet and phone services, while Frontier provides phone services and broadband internet with limited fiber infrastructure adjacent to Hwy 22.

Strengths:

- Fiber internet infrastructure already present along Hwy 22
- Cellular Tower 1 mile east of Gates

Weaknesses:

- Unknown extent and availability of fiber infrastructure
- Currently limited/none certified HAM radio operators

Water

The City of Gates has a membrane water treatment facility located on the North Santiam River at 117 Riverview Street. The facility has a diesel generator with a 400-gallon storage tank. Although the city replaced its main water lines in 2015, 40% of the water distributed is being lost through leaky pipes. Two intake lines exist on the North Santiam as well as an intake wet well. The city has two storage tanks that total 500,000 gallons (150,000 and 350,000 tanks). This above ground storage can last the city and its residents for approximately 4-5 days.

The city continues to invest in the water system to date one mile of waterlines were upgraded and in October 2016 a study was conducted on the water system to assess the vulnerable infrastructure. The city also maintains a Water Conservation Plan and is updated by the Water Resource Department; last updated in 2015.

There are currently no alternative water sources available. If power is lost, propane powered generators are available for fire lines, and submersible pumps are available for municipal water.

Waste Water

Gates does not have a municipal wastewater treatment system. Residents and commercial businesses utilize individual septic tanks. Many residential septic tanks have never been replaced and could be over 50 years old. City staff believes that many of these tanks may be leaching biohazardous waste into the surrounding soil.

Dams

Two dams sit above Gates, *Detroit Dam* and *Big Cliff Dam.* Previous steering committee's have concluded that the likelihood of Dam Failure is ***Low***[3]***.*** Current conditions still represent the previous decision. If Dam failure occurred in either dams, Gates would experience catastrophic impacts from a surge of water expelled from either Detroit or Big Cliff lake.

Strengths:

- (1) Backup diesel generator with 400-gallon storage tank
- (2) Above-ground storage tanks
    - Equivalent to (500,000) gallons or 4-5 days of water storage

Weaknesses:

- Inefficient water lines and leaks equate to higher stress on water system components
- Propane powered generators for fire lines
- Water system is susceptible to North Santiam water turbidity and flooding.
- North Santiam PH has risen to 8, and Blue-Green Algae has been spotted.

Transportation Systems

Oregon Route 22 is the major transportation route for auto, public transit, and emergency vehicle access throughout the Santiam Canyon. Hwy 22 spans about 32 miles west, connecting Gates to Salem and the remainder of the Willamette Valley. To the east, the highway connects to Mill City, Gates, Detroit, Idanha, and ends at the Santiam Pass interchange.

The Cherriots Canyon Connector is the only existing public transit service in the entire Santiam Canyon. This route has three total roundtrips with buses running approximately every (5) hours.

In case of a major Oregon Route 22 closure, Gates residents will have to rely on alternate routes to reach supplies or safety in the Willamette Valley. In case of a catastrophic event, Gates could utilize the North Santiam River as an alternate transportation option.

[3] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/6_damfailure.pdf

Bridges

Structure Name	Year Built	Structural Condition
East Sorbin Street Bridge	1994	Good

Strengths:

- Bridge is in good condition and was built relatively recently.
- Lyons/Gates Drive serves as an additional evacuation route

Weaknesses:

- Hwy 22 closures could make travel outside of North Santiam Canyon extremely difficult.

Energy & Utilities

Gates receives energy and utility services from Pacific Power. There is one main power line that runs south of Gates, connecting to the main substation in Lyons.

Strengths:

- Gas stations with fuel storage exist near Gates within Mill City.
- Businesses including Ferris & Frank Lumber possess fuel storage that could be shared with Mill City and Gates.
- City Hall propane generators?

Weaknesses:

- Mill City gas stations possess below ground tanks which cannot be pumped without electricity.
- Mill City gas stations do not currently possess backup diesel generators to pump fuel from storage tanks.
- No alternate sources of energy (wind, solar) exist to power basic services.

Agriculture and Food

Although Gates is near Mill City which possesses the "Mill City MarketPlace" and "J&S Deli & Pub" the closest large-scale grocery exists down Hwy 22 in Stayton, Oregon. While other restaurants and cafés exist on the north side of the river in Gates, the loss of Hwy 22 as a transportation route would cause serious concern for residents and food accessibility. Although some farm land exists outside of city limits, a large majority is not used for substantial food production.

Strengths:

- Private sector entities which possess limited (>1 days) food supplies.
- Agricultural land availability near Gates.

Weaknesses:

- No major (full service) grocery store inside of city limits.

- Surrounding agriculture currently not used for food production.

Banking and finance

The closest banking services exist in Mill City, where a U.S Bank exists on the north side of the North Santiam river. This one-story structure sits along Hwy 22 and could be utilized for emergency financial services during a hazard event.

Strengths:

- Presence of a banking/financing institution within nearby in Mill City

Weaknesses:

- Full "urban" financial services unavailable.

Hazardous Materials

Gates does not possess any large manufacturing firms that possess hazardous materials. The city has identified current brownfields which may be susceptible to leaching. DEQ has recently discovered items from the Detroit and Big Cliff Damn builds, none of which are currently a large concern.

Brownfields

DEQ - ID	Facility Name	Location
5820	Detroit Lake (Remedial Action)	MP 42; Hwy 22

Strengths:

- There are currently not enough known hazardous materials to cause major concern.
- Brownfield sites could be utilized and attract privates sector development.

Weaknesses:

- Current brownfields maybe susceptible to leaching of unknown materials.

Emergency Services

Gates does not receive any police support. Emergency service support relies heavily on the Gates Rural Fire Protection District and the local Marion County CERT team.

- Gates Rural Fire Protection District, 101 E. Sorbin St

Strengths:

- Gates possess community specific emergency services for fire enforcement.
- The community possesses a trained CERT team.

Weaknesses:

- Lack of any police presence or services.
- Emergency services do not have trained HAM radio operators.
- Emergency services do not possess rescue rafts for North Santiam River access.

Government Facilities

Gates Hall contains the office space for the administration, finance, permits, planning, public works, municipal court. A Marion County owned antenna is located on top of the building. The building possess a backup propane generator with a capacity of 250 gallons.

- Gates City Hall, 101 W. Sorbin St.

Strengths:

- Marion County owned antenna on top of City Hall.
- Propane Generator with 250 gallons of storage capacity.

Weaknesses:

- Generator relies on propane instead of readily available diesel fuel.
- Backup storage of propane does not exist.

Environmental/Historical Preservation Sites

Gates is surrounded by environmental preservation sites including state parks and designated wilderness areas. The housing stock in Gates was built between the 1940s-1950s and may contain some residential home sites of historical significance.

Strengths:

- Proximity to pristine state and federal land could attract residents or business.

Weaknesses:

- No major buildings of historical significance that could attract economic development/preservation dollars.

Education

Just like the remainder of the Santiam Canyon cities, Gates utilizes the Santiam School District. This district encompasses all cities in the Santiam Canyon including Gates, Detroit, and Idanha. This district includes the Santiam Elementary School, and the Santiam Jr/Sr High school located in Mill City.

- Santiam School District
    - Santiam Elementary School, 450 SW Evergreen St. Mill City
    - Santiam Jr/Sr High School, 265 SW Evergreen St. Mill City

Strengths:

- School facilities could be utilized to shelter a large amount of community residents including functional needs populations.
- School facilities already possess needed infrastructure for a shelter which includes restrooms, showers and a kitchen.
- School buses could be utilized for transportation after a hazard event.

Weaknesses:

- There are no current agreements or MOU's between the Gates, Mill City and school district to utilize facilities after a hazard event
- School buildings exist outside of Gates city limits.

Healthcare & Public Health

Gates does not currently possess any health services. The nearest clinic is located in Mill City with limited services. The nearest hospital and full service health clinic is located in Stayton, Oregon.

- Santiam Medical Clinic, 280 S 1st Ave.

Strengths:

- A clinic with minor services exists near Gates in Mill City.

Weaknesses:

- No facilities with major life-saving equipment currently exist within city limits.
- Emergency health supplies are limited to what exists within the community.

Access and Functional Needs

Gates vulnerable population consists of the elderly and those that are medically dependent and require life safety equipment. About 50% of Gates population is characterized as being elderly, 15 children utilize school buses to Mill City, and 2 residents require life safety equipment.

Strengths:

- Over 60% of residents are over the age of 45, this older populous can volunteer and promote social cohesion in the community.

Weaknesses:

- Full medical services do not exist nearby for aging population.

CITY OF IDANHA ADDENDUM

Purpose

This document serves as Idanha's Addendum to the Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan (MNHMP, NHMP). This addendum seeks to supplement information contained in Volume I (Basic Plan) of this multi-jurisdictional NHMP which serves as the foundation for this jurisdiction's addendum and Volume III (Appendices) which provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the NHMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with Marion County and Santiam Canyon cities, including Idanha, to create the first region-specific NHMP. Part of the Santiam Canyon Regional Hazard Mitigation Plan (RHMP) required the creation of city addenda which would be adopted into the 2016 Marion County NHMP. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County NHMP, locally adopting it, and having it approved by FEMA, Idanha will gain eligibility for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County NHMP, and Idanha addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing this addendum, and was composed of city staff, county representatives, and emergency service management.

The Idanha city recorder is the designated convener of the NHMP and will take the lead in implementing, maintaining, and updating the addendum to the Marion NHMP in collaboration with the Santiam Canyon liaison for Marion County Emergency Management.

Representatives from the City of Idanha steering committee met formally on one occasion: September 22, 2016, but communicated electronically throughout the creation of this

document. The city's addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with OPDR.

The Idanha Steering Committee was comprised of the following representatives:

- Karen Clark; Resident, Idanha
- Mr. Clark; Resident, Idanha
- Kathleen Silva; Santiam Canyon Liaison, Marion County
- Idanha City Council

Public participation was achieved with the establishment of the steering committee, which was comprised of city officials and county representatives.

The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process.

The Marion County NHMP was approved by FEMA on August 17, 2017 and the Idanha addendum was adopted via resolution on November 8, 2017. This NHMP is effective through August 17, 2022.

Mitigation Strategy

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

During 2016, Marion County and OPDR evaluated the Action Items set by the county and their particular relevance to the Santiam Canyon region. Following the review, actions with relevance to the region were added into the RHMP, noting what accomplishments had been made, and whether the actions were still relevant; any new action items were identified at this time. Idanha developed a list of priority actions (Table A-1); any actions that were not prioritized were placed in the Action Item Pool (Table A-2) and will be considered during the semi-annual meetings.

Priority Actions

The city is listing a set of high priority actions in an effort to focus attention on an achievable set of high leverage activities over the next five-years. The city's priority actions are listed below in the following table. Detailed implementation information for each action is listed in within (Table A-1).

Action Item Pool

This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available.

Many actions carry forward from prior versions of the Marion County NHMP and other local planning documents including the Community Wildfire Protection Plan, Drought Contingency Plan, and Mid-Willamette Economic Development study.

(Table A-1) Idanha Priority Action Items

Action Item	Cost and Process of Implementation	Funding Options	Approximate Date of Completion
Planning & City Staff	*Update planning documents (comprehensive plan, development code) to reflect new hazard information.*	*General Fund*	*September 2017*
(e.g) *Multi-Hazard*	*City staff should assess the amount of KWH needed to run city facilities. City staff should purchase a diesel generator with additional storage accordingly.*	*General Fund, MWCOG grants/loans,*	*December 2017*

-ONGOING-

(Table A-2) Idanha Action Item Pool

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Earthquake #1	Promote Great Oregon Shakeout Awareness month in October. Participate in activities for schools, business, and industry. Participating with the Mid-Willamette Emergency Communications Collective on initiatives that are focused on household preparedness.	Marion County Emergency Management	Public Works, Safety Committee, Marion County Risk, Red Cross, OEM and Media	Ongoing every October	X	X			X		
Earthquake #2	Collaborate with GROW EDC to develop relevant public-private partnerships with businesses that can contribute to response and recovery. (Multi-Hazard 4)	Idanha, Marion County Emergency Management	GROW EDC	Ongoing	X	X	X	X	X		X
Multi-Hazard #1	Develop an Energy Assurance Plan.	Idanha, Marion County Emergency Management	Department of Energy, Whole Community	Ongoing revisions			X	X	X		X

Source: City of Idanha NHMP Steering Committee, 2015.

-SHORT TERM-

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Multi-Hazard #2	Conduct an assessment of the short and long term needs for sheltering access and functional needs populations for all hazards.	Idanha, Marion County Emergency Management	Marion County Public Health, Red Cross, Cities, NGO's, Oregon Public Health	Short Term					X		X
Multi-Hazard #3	Establish a strategic plan to utilize community resident amenities. (Hill brothers) – Kubota Tractor, Skidder	Idanha	Marion County Emergency Management	Short Term	X	X	X		X		
Multi-Hazard #4	Establish an Idanha CERT team.	Marion County Emergency Management, Idanha	CERT, Whole Community	Short Term	X	X			X		
Multi-Hazard #5	Develop a community education program, such as an all hazard community outreach forum for students and residents.*	Marion County Emergency Management, Idanha	Public Works Whole Community	Short Term	X	X	X				X

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Multi-Hazard #6	Expand auxiliary radio capabilities by developing a team of HAM Radio operators for EMS and interested public.	Marion County Emergency Management, Idanha	ARES, CERT, Private partners, Whole Community	Short Term	X	X	X		X		

*Identified in Marion County Community Wildfire Protection Plan (Action Plan & Priorities)

**Identified in North Santiam Watershed Drought Contingency Plan (Priority Drought Mitigation Actions)

***Identified in Mid-Willamette Valley Council of Governments Comprehensive Economic Development Study (Appendix C)

-LONG TERM-

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Drought #1	Monitor economic impacts on recreation, tourism and agriculture communities.	Idanha, Marion County Emergency Management	Community Services	Long Term	X	X	X	X	X		X
Drought #2	Collaborate with NSWC to complete WMCP's and improve community understanding of water usage and opportunities to increase efficiencies.**	NSWC, Idanha	North Santiam Watershed DCP Partners	Long Term		X	X		X		X
Drought #3	Conduct leak detection surveys for the water system to increase efficiency and prevent further water loss.**	Idanha, Marion County Public Works	NSWC	Long Term			X		X	X	
Drought #4	Develop water storage tanks to hold treated water for	Idanha, Marion County Public Works	NSWC, Marion County Emergency	Long Term			X	X	X	X	

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
	municipal use.		Management								
Multi-Hazard #7	Collaborate with local residents and NSWC to mitigate risks from the Idanha revetment/floodplain project.	Idanha, NSWC	USFS, FEMA, NRCS, Marion County Emergency Management	Long Term	X		X	X	X	X	
Multi-Hazard #8	Conduct a fatigue test on Church St. bridge to ensure its structural integrity in case of a hazard event	Idanha, Marion County Public Works	Marion County Emergency Management	Long Term			X	X	X		
Multi-Hazard #9	Designate evacuation routes outside of Hwy 22 for EMS.	Idanha, Marion County Emergency Management	RFPD	Long Term			X		X		
Multi-Hazard #10	Collaborate with Marion County to connect to a more resilient regional water/sewer system.***	Marion County Community Services Department/Board of Commissioners, Idanha	Marion County Emergency Management	Long Term			X	X	X		X
Multi-Hazard #11	Gather community support for the installation of resilient fiber communication infrastructure throughout the community.***	Idanha	Marion County Community Services Department/Board of Commissioners	Long Term	X		X		X		X

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Wildfire #1	Collaborate with Detroit Ranger District, ODF, and BLM to conduct fuel hazard reduction along the Wildland Urban interface and Hwy 22.*	ODF, BLM, Idanha Ranger District, Idanha RFD	Marion County Emergency Management	Long Term			X		X		X
Wildfire #2	Collaborate with ODF and Idanha-Detroit RFD to develop strategic community fuel breaks.*	ODF, BLM, Idanha Ranger District, Idanha-Detroit RFD	Marion County Emergency Management	Long Term			X		X		X
Landslide #1	Integrate new DOGAMI landslide hazard information into land use zoning/development codes.	Idanha	Environmental Services, Engineering, ODOT, DLCD	Long Term			X				X
Flood #1	Widen the North Santiam River and reassess the dike and jetty to minimize flooding within the North Santiam River Project	Idanha, NSWC	Marion County Emergency Management	Long Term			X		X	X	

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Idanha addendum to the Marion County NHMP. This addendum designates a coordinating body and a convener to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional NHMP, the city will look for opportunities to partner with the county. The city's steering committee will convene after re-adoption of the City of Idanha addendum on a semi-annual schedule; the county is also meeting on a semi-annual basis and will provide opportunities for the cities to report on NHMP implementation and maintenance during their meetings. The City Recorder will serve as the convener and will be responsible for assembling the steering committee (coordinating body). The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the city's mitigation strategy (actions). The convener will also remain active in the county's implementation and maintenance process.

Implementation through Existing Programs

Many of the NHMP's recommendations are consistent with the goals and objectives of the city's existing plans and policies. Where possible, the City of Idanha will implement the NHMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the NHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

Idanha 's acknowledged comprehensive plan is the Idanha Comprehensive Plan. The Oregon Land Conservation and Development Commission first acknowledged the plan in XXX. The City last completed a major update of the plan in XXX. The City implements the plan through regulatory ordinances.

Idanha currently has the following plans that relate to natural hazard mitigation. For a complete list visit the city website for planning and Public works:

- Comprehensive Plan
- Development Code
- Transportation System Plan

Continued Public Participation

Keeping the public informed of the city's efforts to reduce the city's risk to future natural hazards events is important for successful plan implementation and maintenance. The city is committed to involving the public in the plan review and updated process. This includes:

- Annual briefings to city council
- Articles and information in The Canyon Weekly
- Postings and media on social media/website.

Plan Maintenance

The Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the city will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

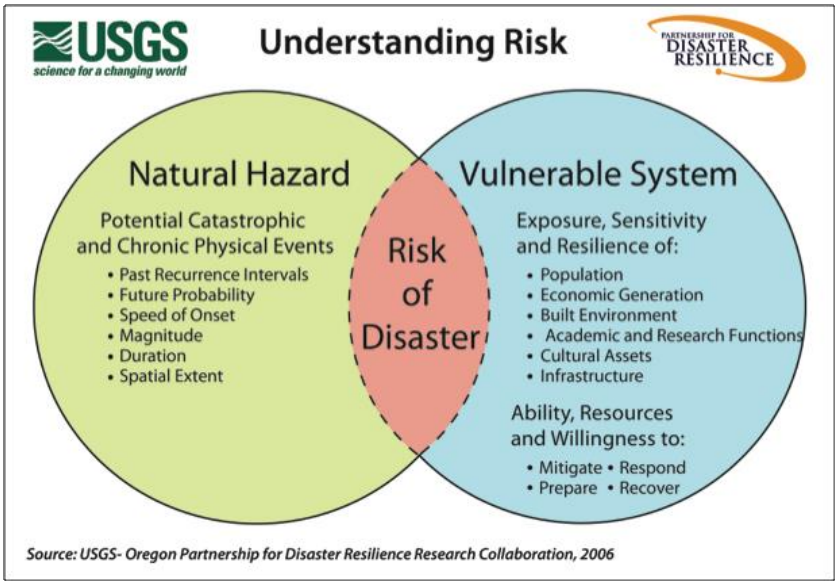
Risk Assessment

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

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein. The risk assessment process is graphically depicted in (Figure B-1) below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

(Figure B-1) Understanding Risk



Hazard Analysis Methodology

This NHMP utilizes a Threat Hazard Identification and Risk Assessment methodology that is consistent with the Marion County Multi-Jurisdictional Hazard Mitigation Plan. Mill City developed this assessment from historical data of events that have occurred in Marion County. The assessment uses the calculated priority risk index (CPRI) methodology to specifically examine:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

Table (A-3) below shows the scoring values for each ranking category.

Table (A-3) Risk Assessment Hazard Ranking Scoring Values

Score	Probability	Warning Time	Magnitude/Severity	Duration
4	Highly Likely	Less than 6 hours	Catastrophic	More than 1 week
3	Likely	6-12 hours	Critical	Less than 1 week
2	Possible	12-24 hours	Limited	Less than 1 day
1	Unlikely	24+ hours	Negligible	Less than 6 hours

Source: Marion County Emergency Management; BOLD Planning

Hazard Analysis

For emergency management planning purposes, this critical analysis is an assessment of the consequences of each hazard, including potential areas of impact, population exposed and impacted, duration of the hazard, and potential economic consequences. These rankings utilize the criteria laid out in THIRA to weigh them proportionally between historic data as well as future projections based on economic, demographic, the critical infrastructure information.

These rankings were reviewed and revised by steering committee members to reflect specific community attributes and risks.

(Table A-4) Probability and Vulnerability Comparison

Hazard Profile Summary for Emergency Operations Plan						
Hazard	Probability	Magnitude	Warning Time	Duration	CPRI	Planning Significance
Earthquake	4	4	4	4	4.00	**High**
Severe Weather/Storm	4	4	2	3.5	3.65	**High**
Power Failure	3	4	3.5	3	3.38	**High**
Wildland Interface Fire	3.5	3.5	2	3	3.23	**High**
Transportation Accident/Train Derailment	3	3.5	1	3	2.85	**Moderate**
Drought	3.5	2	1	4	2.73	**Moderate**
Extreme Weather - High Temperature	3.5	2	1	4	2.73	**Moderate**
School & Workplace Violence	1.5	4	4	2	2.68	**Moderate**
Epidemic	2	4	1	4	2.65	**Moderate**
Pandemic	2	4	1	4	2.65	**Moderate**
Landslide	2	2.5	4	2.5	2.50	**Moderate**
Animal Disease Outbreak	2	3	2	4	2.50	**Moderate**
Volcanic Eruption	1	4	1	4	2.20	**Moderate**
Hazardous Materials Incident	1.5	3.5	1	3	2.18	**Moderate**
Biological Chemical, Sabotage and Cyber Incident and Explosives Radiological Attack-Terrorism	1	4	1	3	2.10	**Moderate**
Civil Disorder / Terrorism	1	2	4	3	1.95	**Low**
Radiological Release	1	2	4	3	1.95	**Low**
Dam or Levee Failure	1	1	4	4	1.75	**Low**
Flood	1	2	2	2	1.55	**Low**
Tornado	1	1	1	1	1.00	**Low**

Source: Gates NHMP Steering Committee and Marion County NHMP Steering Committee, 2016.

Hazard Characteristics

Drought

The steering committee determined that the city's probability for drought is **moderate** and their vulnerability to drought is **moderate**.

Although dryer conditions in the summer months have impacted the North Santiam Canyon as a whole, Idanha has experienced major impacts from drought. Idanha's economy relies heavily upon the recreation provided by the water levels of Detroit Lake, which can experience low levels during years of major drought.

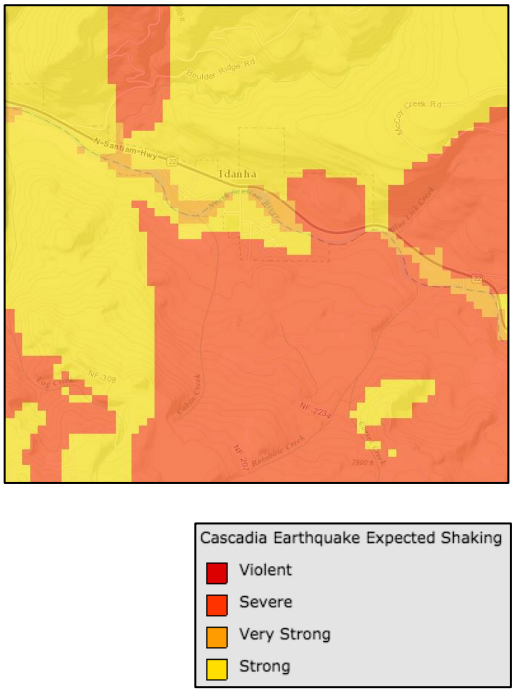
Dry conditions throughout 2001 caused Detroit Lake water levels to recede below 1,546 feet (min. elev. for moorage), contributing to a Detroit area (including Idanha) economic loss of over $5 million dollars.[1] Recently during the 2015 drought, similar economic impacts were experienced with additional damage caused by tree and vegetation die off which has created an increased risk of wildfire hazards. If dryer conditions become the new norm, Idanha could experience timber die-off, making them more susceptible to wildfires, as well as economic hardships if their current seasonal economy does not expand.

Earthquake

The steering committee determined that the city's probability for a Cascadia Subduction Zone (CSZ) Earthquake event is **high** and that their vulnerability to this event is **moderate**. The steering committee determined that the city's probability for a Crustal Earthquake event is **moderate** and that their vulnerability to this event is **moderate**.

Historically, Idanha has experienced one crustal earthquake on August 19, 1961. A 4.5 magnitude earthquake struck 6 miles from Mill City, with shaking felt throughout the Santiam Canyon, up to Idanha.

If another larger and more substantial earthquake occurs (Cascadia), Idanha could experience damage to buildings, utility (electric power, communication, water, wastewater, and natural gas) and transportation systems (bridges and pipelines).

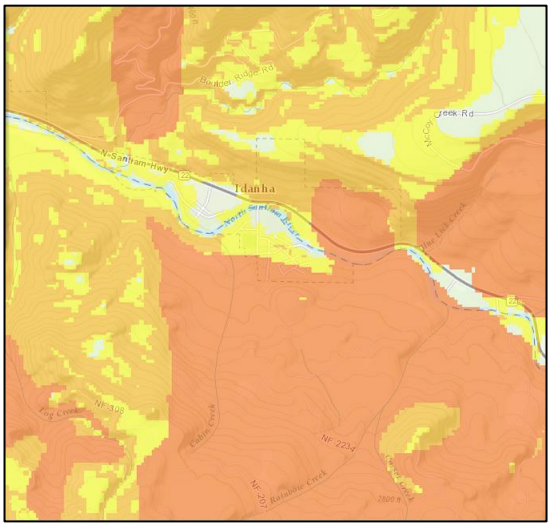


Flood

The steering committee determined that the city's probability for flooding is **low** and that their vulnerability to flooding is **low**.

[1] http://agsci.oregonstate.edu/sites/agsci.oregonstate.edu/files/ruralstudies/pub/pdf/detroitlake-sr1071.pdf (Table 5)

Historically, Idanha experienced one major flooding event in 2006. Heavy rains and high winds created a multitude of damage in the Detroit, Idanha, and Breitenbush area. Impacts included roofing damage, flooding of public facilities, sinkholes, erosion, and water facility intake-clogging due to turbidity.



Landslide

The steering committee determined that the city's probability for landslide is **moderate** and that their vulnerability to landslide is **moderate**.

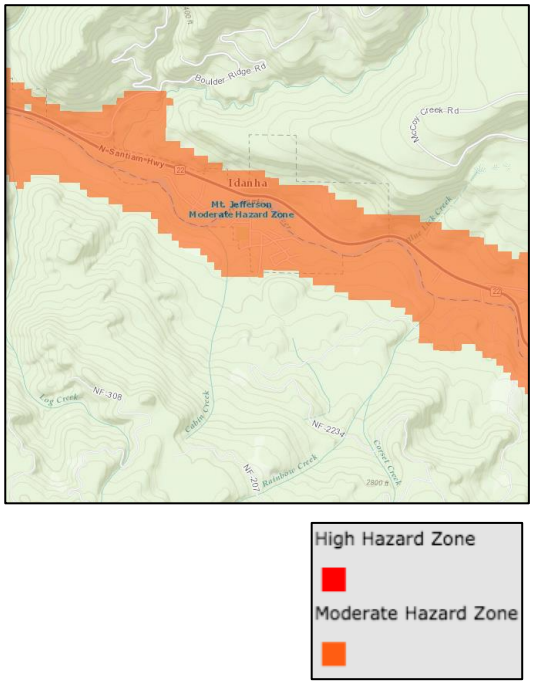
Historically, Idanha has not experienced major impacts from landslides within city limits. Areas in the east and northern portion of the city are susceptible because of steep mountainous terrain.

Potential landslide-related impacts are adequately described within the county's plan, and include infrastructural damages, economic impacts (due to isolation and/or arterial road closures), property damages, and obstruction to evacuation routes. Rain-induced landslides and debris flows can potentially occur during any winter in Marion County, with evacuation routes beyond city limits susceptible to obstruction as well.

Volcano

The steering committee determined that the city's probability for volcanic event is **low** and that their vulnerability to volcanic event is **moderate**.

Idanha has not been impacted previously by volcanic activity, however Mount Jefferson is located east of the city into the Cascade Mountains, and could produce problems if an eruption occurs. The city sits in the Mount Jefferson Moderate Hazard Zone and could experience ash fall, debris avalanches, pyroclastic flows, lahars and slow-moving lava flows. City residents should be evacuated before an eruption begins in case of impassible roads and dangerous conditions.



Wildfire

The steering committee determined that the city's probability for wildfire is **high** and that their vulnerability to wildfire is **high**.

In 2001 the "Breitenbush fire" threatened city residents creating road closures and hazardous conditions. In 2002 and 2004, Idanha was impacted by wildfire's which caused closure of Hwy 22. This impacted local residents, restricting travel, and negatively impacting the local economy. In 2011, the "Nasty Fire" threatened the Opal Creek Wilderness, while the 2014 "Bingham Complex Fire" restricted travel and required Detroit Ranger Station response.

Idanha could experience more fires as dryer conditions occur in the North Santiam Canyon. Less rainfall and snowpack can kill of tree's dependent on large amounts of water, which could ultimately lead to an increase of fuels and wild fire ignition probability.

Marion County updated the Community Wildfire Protection Plan (CWPP) in 2016, which mapped wild land urban interface areas and developed actions to mitigate wildfire risk. The city is a participant in the CWPP, and has included hazard mitigation action items directly in line with the CWPP actions.

Windstorm

The steering committee determined that the city's probability for windstorms is **high** and that their vulnerability to windstorms is **high**.

In April of 1931, winds in the Santiam Canyon region felled hundreds of trees causing road closures between Mill City and Idanha. The winds also caused several devastating fires throughout the Santiam Canyon. On December of 1995, high wind gusts of up to 60mph downed tree's and disrupted power and communication services in the lower Santiam. In 2002, a windstorm caused similar damages, blowing down tree's onto roads and power lines.

About once or twice per year the city will experience a windstorm event that can interrupt services, down trees, and cause power outages. Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and very rarely, snow.

Winter Storm (Snow/Ice)

The steering committee determined that the city's probability for winter storm is **moderate** and that their vulnerability to winter storm is **high**.

Major winter storms have occurred in the Idanha area; in January of 1937, heavy snowfall of over 2 feet caused property damage. Major roads were closed and residents of Detroit/Idanha area were stranded for five days as heavy snow and a landslide blocked Hwy 22. In 1950, a large snow event caused 54 inches of snow in Detroit/Idanha area, while 122 inches blanketed Detroit Dam. In January of 1957, Cold temperatures brought over half a foot of snow to Idanha, as well as icy roads throughout the Santiam Canyon. Cold temperatures also caused the Bonneville Power Authority to cut interruptible power to the regions' industrial customers because ice behind the dam slowed water flow and limited the ability to generate power.[2] In January of 1963, Idanha recorded almost a foot, while cold temperatures created hazardous road

[2] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/14_severewinterstorm.pdf

conditions.[3] In 1964, a flood impacted 21 houses, and 2 bridges, while a winter storm in 1990 resulted in downed tree's and a loss of power.

During the last couple days of December 2003, the Detroit/Idanha area received an accumulation of 4-5 feet of snow. Both cities declared a State of Emergency as the City of Idanha lost power between December 29th and January 6th; Idanha lost power between January 1st and January 4th. In early 2008, Idanha received over 12 feet of snow in a two-month period. Three dozen Oregon National Guard personnel were called in to help with snow removal. Damage included collapsed roofs and cracked walls, mostly impacting homeowners.[4]

In 2012, a winter storm event accompanied by flooding, landslides, and mudslides left Santiam Canyon residents with no electricity for 3-5 days. Downed trees and power lines obstructed Hwy 22, requiring emergency vehicles to restore regular traffic flows.[5]

Winter storms are more frequent hazards and usually cause transportation issues and communication failures from downed trees and icy/snow filled roads.

Community Asset Identification

This section provides information on city specific assets. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Community Characteristics

Idanha is located approximately 57 miles east of Salem, bordering the North Santiam River. It is the smallest community in the North Santiam River Canyon with a population of 136. With an elevation of 1718 feet, the climate of Idanha is moderate; the average monthly temperatures range from 50 – 80 degrees in July and August, and 29-41 degrees in December and January. Idanha receives approximately 66 inches of rain and 35 inches of snow each year. The city's topography is relatively flat with steep slopes surrounding the area along Hwy 22.

Economy

Idanha benefits from its location along Hwy 22, a major east-to-west transportation route connecting Salem to Bend. But due to its small population size and lack of development, the city lacks many commercial amenities. The city has one retail storefront along Hwy 22, but most of the manufacturing and timber related employment has left the city. Historically, Idanha prospered from the development of the railroad and dam, which helped spur growth in

[3] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/14_severewinterstorm.pdf

[4] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/14_severewinterstorm.pdf

[5] http://www.fema.gov/media-library-data/20130726-1831-250457682/dhs_ocfo_pda_report_fema_4055_dr_or.pdf

manufacturing, logging, and fishing. Today, the economy relies upon the recreational opportunities available through state/federal lands, and the North Santiam River.

Critical and Important Facilities/Infrastructure

Communication/Information Technology

There is currently one communication provider in Idanha. Frontier provides phone service, and various satellite businesses provide broadband speed internet.

Strengths:

- Most residents utilize scanners or citizen band (CB) radio's.
- A phone substation is located in nearby Detroit.

Weaknesses:

- Limited internet speeds and provider access.
- Poor phone services and reception.
- Main communication line runs down highway 22, and is susceptible to from trees and wind.

Water

The City of Idanha has two water sources from the Chittum Creek, and Mud Puppy Creek fed by a natural spring named rainbow creek. This system currently utilizes a surface water intake to pull water from these sources. The city also contains dike and jetty infrastructure along the North Santiam River; however the town is still vulnerable due to the geographic topography of the river.

Waste Water

Idanha does not have any municipal waste-water infrastructure. The city's residents and business owners rely on individual septic tanks. These septic tanks can be up to 60-years old and could be leaching biohazardous waste into the ground water/ North Santiam River. The city recently conducted tests (10-15 years ago) and found no leaching or hazardous material issues.

Dams

Two dams sit below Idanha, *Detroit Dam* and *Big Cliff Dam.* Previous steering committees have concluded that the likelihood of Dam Failure is ***Low***[6]***.*** Current conditions still represent the previous decision. If Dam failure occurred in either dam, Idanha would most likely lose access to the western portion of Hwy 22.

[6] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/6_damfailure.pdf

Strengths:

- (2) water intake sources (Chittum & Mud Puppy Creek).
- (1) backup diesel generator on-site, near water intake sources.

Weaknesses:

- Limited diesel fuel available inside of city limits.
- Water intake sources are susceptible to wildfire damage.
- The city is losing large amounts of water distributed through leaky pipes.

Transportation Systems

Oregon Route 22 is the major transportation route for auto, public transit, and emergency vehicle access throughout the Santiam Canyon. Hwy 22 spans about 57 miles west, connecting Idanha to Salem and the remainder of the Willamette Valley. To the east, the highway connects Idanha to the Santiam Pass interchange.

The Cherriots Canyon Connector is the only existing public transit service in the entire Santiam Canyon. This route has three total round trips with buses running approximately every (5) hours. Idanha residents are forced to drive to Gates to utilize these services, as the canyon connector does not reach Detroit or Idanha.

In case of a major Oregon Route 22 closure, Idanha residents will have to rely on alternate routes to reach supplies or safety. The cities alternate routes are limited with NF-2231, NF-2233, and NF-2234. Depending on weather conditions, these roads may be unpassable.

The city is home to one bridge that crosses over the North Santiam River. Water lines that serve the population in "New Idanha" are co-located on this bridge. Bridge failure could disrupt water services to these residents.

Bridges

Structure Name	Year Built	Structural Condition
Church St. Bridge	n/a	Fair

Strengths:

- Proximity to ODOT facility may increase access to public works services.
- The Idanha-Detroit RFD location is in city limits and could be utilized in a hazard event.
- National Forest Roads exist outside of Idanha and could be utilized as emergency evacuation routes.

Weaknesses:

- Loss of Church St. Bridge would isolate a large percentage of Idanha residents.
- Loss of Church St. Bridge could disrupt drinking water services.
- Alternate routes are long, and most likely impassible in winter months.
- Hwy 22 closures could make travel outside of North Santiam Canyon extremely difficult.
- Public transportation options are limited and only reach to the city of Gates.
- The lack of a pedestrian sidewalk along Hwy 22 created safety hazards for pedestrians.

Energy & Utilities

Idanha receives energy and utility services from Consumer Power Inc. There are no substations located in Idanha. One main power line runs along Hwy 22, connecting to Detroit, Gates and Mill City.

Strengths:

- Many residents have their own generators and are able to power basic home amenities during power outages.
- Most residents utilize firewood as a heating source, making them more resilient in case of a power outage.

Weaknesses:

- No fueling stations exist within city limits.
- Nearby gas stations in Detroit do not currently possess backup diesel generators to pump fuel from storage tanks.
- No alternate sources of energy (wind, solar) exist to power basic services.
- Downed power lines are a reoccurring issue around Hoover Campground (Santiam Park).
- Power lines are co-located on the bridge
- Residents rely on wood burning stoves for heat.

Agriculture and Food

Although Idanha possesses the "Idanha County Store" the closest large-scale grocery exists down Hwy 22 in Stayton, Oregon. The loss of Hwy 22 as a transportation route would cause serious concern for residents and food accessibility. The city is surrounded by steep slopes that are state and federal land. There is no agricultural capability other than small-scale "urban" farms within city limits.

Strengths:

- Country store within city limits provides limited amenities and food supplies.
- Many residents have food storage already in place because of the lack of availability.

Weaknesses:

- No major (full service) grocery store inside of city limits.
- Surrounding land not suitable for agricultural purposes.

Banking and finance

Idanha's nearest option for banking services is located in Mill City. This one-story structure sits along Hwy 22 and could be utilized for emergency financial services during a hazard event. Idanha does not have any financial services within city-limits.

Strengths:

- Cash flow from nearby business and residents could possibly be utilized.

Weaknesses:

- Lack of banking/financing institutions within city limits.
- Full "urban" financial services unavailable.

Hazardous Materials

The city's history of manufacturing and logging activities have created concerns around hazardous materials found on abandoned lots. Although only one lot has been identified as a brownfield, many lots contain underground storage tanks that most likely need to be removed for any further development to occur. These tanks could be leeching hazardous materials previously used by local businesses.

Brownfields

DEQ ID	Facility Name	Location
2479	Green Veneer & Lumber Mill (assessment recommended)	886 Hwy 22

Strengths:

- There are currently not enough known hazardous materials to cause major concern.
- Brownfield sites could be utilized and attract privates sector development.

Weaknesses:

- Current brownfields maybe susceptible to leaching of unknown materials.
- Many lots still contain underground storage tanks that are even more susceptible to leaching of hazardous materials.

Emergency Services

Idanha receives emergency service support from the Idanha-Detroit Rural Fire Protection District.

- Idanha-Idanha Rural Fire Protection District, 107 Hwy 22 NW

Strengths:

- Idanha possesses emergency services provided by the Idanha-Detroit RFD within city limits.

Weaknesses:

- Idanha lacks any police or medical services.
- Ambulance services must travel from Lyons.
- First responders are very limited to basic life monitoring services.
- Emergency services do not have trained HAM radio operators.

Government Facilities

Idanha City Hall contains the office space for all city services.

- Idanha City Hall, 111 Hwy 22
- Post Office, 103 Hwy 22

Strengths:

- City Hall facility has bathrooms, and could be utilized in an emergency event.

Weaknesses:

- City Hall is small with space already utilized by other services.
- The building lacks any backup generator to power the facility.

Environmental/Historical Preservation Sites

Idanha is surrounded by environmental preservation sites including federal land, state parks and designated wilderness areas. The city is also home to the beginning of the Oregon Pacific Railroad Linear Historic District. Designated in 1999 this 20-mile section of old railroad connects Idanha to the Cascade Range Summit.

Strengths:

- Proximity to pristine state and federal land could attract residents or business.
- Oregon Pacific Railroad Linear Historic District could be utilized to as an emergency trail system.

Weaknesses:

- Idanha lacks any buildings with character that exemplify the historical “timber” identity in the community.

Education

Idanha is part of the Santiam School District. This district encompasses all cities in the Santiam Canyon including Mill City, Gates, and Detroit. This district includes the Santiam Elementary School, and the Santiam Jr./Sr. High School.

- Santiam School District
    - Santiam Elementary School, 450 SW Evergreen St.
    - Santiam Jr./Sr. High School, 265 SW Evergreen St.

Strengths:

- School facilities could be utilized to shelter a large amount of community residents including functional needs populations.

- School facilities already possess needed infrastructure for a shelter which includes restrooms, showers and a kitchen.
- School buses could be utilized for transportation after a hazard event.

Weaknesses:

- Idanha is over 25 miles from these school services.
- There are no current agreements or MOU's between the city and school district to utilize facilities after a hazard event.

Healthcare & Public Health

Idanha's nearest medical services are located in Mill City which possesses one clinic with limited services. The nearest hospital and full service health clinic is located in Stayton, Oregon.

- Santiam Medical Clinic, 280 S 1st Ave.

Strengths:

- A clinic with minor services exists within the North Santiam Canyon

Weaknesses:

- Closest health services are located over 20 miles.
- No facilities with major life-saving equipment currently exist within city limits.
- Emergency health supplies are limited to what exists within the community.

Access and Functional Needs

Idanha's vulnerable population consists of the elderly and those that are medically dependent and require life safety equipment. About 22% of Idanha's population is characterized as being elderly, and one legally blind resident resides within city limits.

Strengths:

- Over 55% of residents are over the age of 45, this older populous can volunteer and promote social cohesion in the community.

Weaknesses:

- Full medical services do not exist nearby for aging population.

CITY OF KEIZER ADDENDUM

Purpose

This document serves as the City of Keizer's Addendum to the Marion County Multi-Jurisdictional Hazards Mitigation Plan (MHMP, HMP). This addendum supplements information contained in Volume I (Basic Plan) of this HMP. The Basic Plan serves as the foundation for this jurisdiction's addendum. Volume III (Appendices) provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the HMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer and fall of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with the Oregon Military Department's Office of Emergency Management (OEM), and Marion County cities, including Keizer, to update their addendum to the Marion County HMP, which expired July 8, 2016. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County HMP, locally adopting it, and having it approved by FEMA, the City of Keizer will regain eligibility for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County HMP, and Keizer addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing the plan. For more information on the composition of the steering committee see the *Acknowledgements*, *Plan Summary*, and *Plan Process* (Volume III, Appendix B).

The Keizer Emergency Manager/Public Works Director is the designated local convener of this addendum. The Convener will take the lead in implementing, maintaining, and updating the addendum to the HMP in collaboration with Marion County Emergency Management.

Representatives from the City of Keizer steering committee met formally on one occasion: September 29, 2016 (see Appendix B for more information).

The city's addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with OPDR.

The City of Keizer Steering Committee is comprised of representatives from the following departments:

- Convener, Keizer Emergency Manager/Public Works Director
- Police
- Planning/Community Development
- Public Works:
    - Water Division
    - Project Manager
    - Public Works Technician
    - Environmental and Technical Division
- Marion County Emergency Management (as needed)
- Keizer Fire District
- Marion County Fire District 1
- Salem-Keizer School District
- Chamber of Commerce (as needed)

Keizer used multiple approaches to engage the public. First, the City established steering committee representatives from across the city. Next, the City actively participated in countywide community engagement activities described in Volume I, Section 4 and in Appendix B. City staff also presented the draft plan to the City Council during an open public council session. The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process (see Appendix B for more information).

The Marion County HMP was approved by FEMA on August 17, 2017 and the Keizer addendum was adopted via resolution on August 21, 2017. This HMP is effective through August 16, 2022.

Mitigation Strategy

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

During the 2016 Marion County and Keizer update process, OPDR and a representative from Marion County Emergency Management assisted the steering committee with developing mitigations that will meet Keizer's unique situation. The proposed actions were then re-reviewed by the steering committee to finalize. Keizer developed a list of priority actions (Appendix A-1), any actions that were not prioritized were placed in the Action Item Pool (Appendix A-2) and will be considered during the annual meetings. For a status update on each of Keizer's 2009 mitigation actions, see Appendix A-2.

Priority Actions

The City is listing a set of high priority actions in an effort to focus attention on an achievable set of high leverage activities over the next five-years. The City's priority actions are listed in Table KZ-1 on the following pages.

Action Item Pool

Table KZ-2 on the following pages presents a pool of mitigation actions. This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available.

Table KZ-1. Keizer Priority Action Items

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Priority Actions					
P-1	Earthquake	Work with Cities of Salem and Turner to perform siesmic evaluation of wastewater transmission infrastructure and impact on drinking water supply.	City of Keizer Public Works	City of Turner; City of Salem	Short Term (1-2 years)
P-2	Earthquake	Conduct seismic evaluation of Keizer's drinking water well field.	City of Keizer Public Works		Mid Term (3-5 years)
P-3	Earthquake	Conduct seismic evaluation of Chemawa, Dearborn, and Alder Street bridges over Claggett Creek	City of Keizer Public Works		Short Term (1-2 years)
P-4	Earthquake	Assess the feasibility and cost to seismically retrofit Keizer's public works facilities (City shops).	City of Keizer Public Works		Long Term (5 years)

Source: City of Keizer HMP Steering Committee, 2016.

Table KZ-2. Keizer Action Item Pool

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Multi-Hazard					
MH-1	Multi-Hazard	Create an emergency preparedness section on the City's website. Populate with resources and publicize.	Keizer Administration	Marion Co.	Ongoing
MH-2	Multi-Hazard	Maintain a regular presence at outreach events, especially neighborhood association events, and provide the public with preparedness resources.	Keizer Emergency Management	Marion Co., CERT	Ongoing
MH-3	Multi-Hazard	Make guest appearance on local radio shows to provide announcements and resources for preparedness.	Keizer Emergency Management	Marion Co., CERT	Ongoing
MH-4	Multi-Hazard	Add hazard awareness material into existing environmental education currently done in schools.	City of Keizer	Marion Co., CERT	Ongoing
MH-5	Multi-Hazard	Join Marion County's Everbridge communication system.	City emergency responders	Marion Co., CERT	Short Term (1-2 years)
MH-6	Multi-Hazard	Encourage residents to participate in Everbridge.	Keizer Emergency Management	City Council	Mid Term (3-5 years)
MH-7	Multi-Hazard	Meet with the City of Salem to discuss the Willow Lake Waste Water Treatment Plant: *How it can be reinforced to minimize damage in a hazard event. *How hazardous materials can be secured or removed to prevent groundwater contamination	City of Keizer Public Works	City of Salem	Short Term (1-2 years)
MH-8	Multi-Hazard	Further develop risk assessment maps to show areas at risk for all hazards.	FEMA Risk MAP	DOGAMI, DLCD	Short Term (1-2 years)
MH-9	Multi-Hazard	Develop mutual aid agreements with surrounding counties.	City Administration	Emergency Manager, Public Works	Short Term (1-2 years)
MH-10	Multi-Hazard	Expand on the information gathered for the internal public works operational manual to create a full registry of populations that may need particular assistance in an emergency situation.	Public Works	Emergency Manager	Mid Term (3-5 years)
MH-11	Multi-Hazard	Update the Continuity of Operations Plan.	Keizer Emergency Management	Marion Co.	Short Term (1-2 years)
MH-12	Multi-Hazard	Participate in Marion County's post-disaster recovery planning efforts.	City Administration	Marion Co.	Mid Term (3-5 years)
MH-13	Multi-Hazard	Continue development of CERT teams to ease the load on emergency services following a disaster.	Keizer Emergency Management	CERT	Ongoing
MH-14	Multi-Hazard	Develop memoranda of understanding with appropriate facilities specifying that they will function as emergency shelters during disruptive events with support from the City.	Keizer Emergency Management	Red Cross	Short Term (1-2 years)
MH-15	Multi-Hazard	Educate businesses and governmental organizations about the importance of developing continuity of operations plans.	Environmental	Marion Co.	Ongoing
MH-16	Multi-Hazard	Update the Keizer Comprehensive Plan to reflect statewide land use Goal 7 language surrounding natural hazards.	Planning	DLCD	Mid Term (3-5 years)

Source: City of Keizer HMP Steering Committee, 2016.

Table KZ-2. Keizer Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Earthquake					
EQ-1	Earthquake	Participate in the Great Shakeout each year.	City Administration	OEM	Ongoing
EQ-2	Earthquake	School seismic retrofitting action - need to talk to school district representative.	School District	Business Oregon - IFA	Short Term (1-2 years)
EQ-3	Earthquake	Send city employees to the County's ATC 20 training.	Public Works	City Administration, Emergency Management	Ongoing
EQ-4	Earthquake	Perform a seismic analysis of box culverts in Keizer and repair or upgrade as resources become available.	City of Keizer Public Works	Marion Co. DOT	Mid Term (3-5 years)
EQ-5	Earthquake	Encourage residents to prepare and maintain 2-week survival kits.	Keizer Emergency Management	CERT	Ongoing
Flood					
FL-1	Flood	Continue compliance with the National Flood Insurance Program through the enforcement of local floodplain ordinances. Update enforcement based on changes to the NFIP (such as flood elevation level changes).	Planning	DLCD	Ongoing
FL-2	Flood	Improve water quality and water flow through wetland vegetation restoration and stream cleanup, especially along Claggett Creek.	Environmental	Salem-Keizer Urban Watershed Councils, Association	Ongoing
FL-3	Flood	Educate residents and business owners near Labish and Clagget creeks about how to manage flood risks.	Environmental	Salem-Keizer Urban Watershed Councils, Association	Ongoing
Wind Storm					
WS-1	Wind Storm	Educate the public about windstorm-resistant trees and landscaping practices and the role of proper tree pruning and care in preventing damage during windstorms.	Environmental	OSU Extension	Ongoing
WS-2	Wind Storm	Ensure that all critical facilities have backup power and/or emergency operations plans to deal with power outages.	City Administration	Emergency Management	Ongoing
WS-3	Wind Storm	Record instances of infrastructure failure and notify PGE of infrastructure that regularly fails.	Emergency Management	PGE	Ongoing

Source: City of Keizer HMP Steering Committee, 2016.

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Keizer addendum to the Marion County HMP. This addendum designates a convener and a coordinating body to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional HMP, the City will look for opportunities to partner with the county. The City's steering committee will convene after re-adoption of the City of Keizer addendum on an annual schedule; the county meets on a semi-annual basis. The City of Keizer Convener will participate in the Marion County HMP meetings and will report on city specific activities as appropriate. The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the City's mitigation strategy (actions). The convener will also remain active in the county's implementation and maintenance process (see Volume I, Section 4 for more information).

The City will utilize the same prioritization process as the county (See Volume I, Section 4: Plan Implementation and Maintenance and Volume IV, Appendix D: Economic Analysis of Hazard Mitigation Projects for more information).

Implementation through Existing Programs

Many of the Hazard Mitigation Plan's recommendations are consistent with the goals and objectives of the City's existing plans and policies. Where possible, the City of Keizer will implement the HMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the HMP's action items through such plans and policies increases their likelihood of being supported and implemented.

Keizer's Comprehensive Plan was first acknowledged by the Oregon Land Conservation and Development Commission in 1987.[1] The City most recently completed updates to the plan, including updates to the Natural Hazards section, in December of 2013 and August of 2014. The Keizer Comprehensive plan indicates that the flood and earthquake hazards are the "two major types of natural hazards" that are estimated to affect the city. There is no mention in the natural hazards section of landslide or wildfire (listed under Statewide Planning Goal 7). The plan does contain a general goal to "Protect life and property from natural disasters and hazards." In addition, the plan contains three specific policies related to the flood hazard. There are no other hazard-related policies listed. The City implements the plan through the Keizer Land Development Code, first adopted in 1998. The City has completed numerous updates since, with the most recent occurrence in November of 2016.

Keizer currently lists the following as attachments to the Comprehensive Plan:

- Master Sewer Plan Update 1992

[1] Note, LCDC acknowledged the Salem Area Comprehensive Plan in 1982. Keizer prepared and adopted the Keizer Comprehensive plan in January of 1987 with LCDC acknowledging it as an Amendment to the Salem Area Comprehensive Plan in February of 1987.

- Master Sewer Plan Update December 1993
- Dual Interest Area Agreement
- Master Sewer Plan Update January 30, 2003
- Parks & Recreation Master Plan dated January 2008
- City of Keizer Transportation System Plan (April 2009) Part 1
- City of Keizer Transportation System Plan (April 2009) Part 2

For more information, refer to http://www.keizer.org/Adopted-Plans-Studies/.

Continued Public Participation

Keeping the public informed of the City's efforts to reduce the city's risk to future hazard events is important for successful plan implementation and maintenance. The City is committed to involving the public in the plan review and updated process. See Volume I, Section 4, for more information.

Plan Maintenance

The Marion County Multi-Jurisdictional Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the City will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

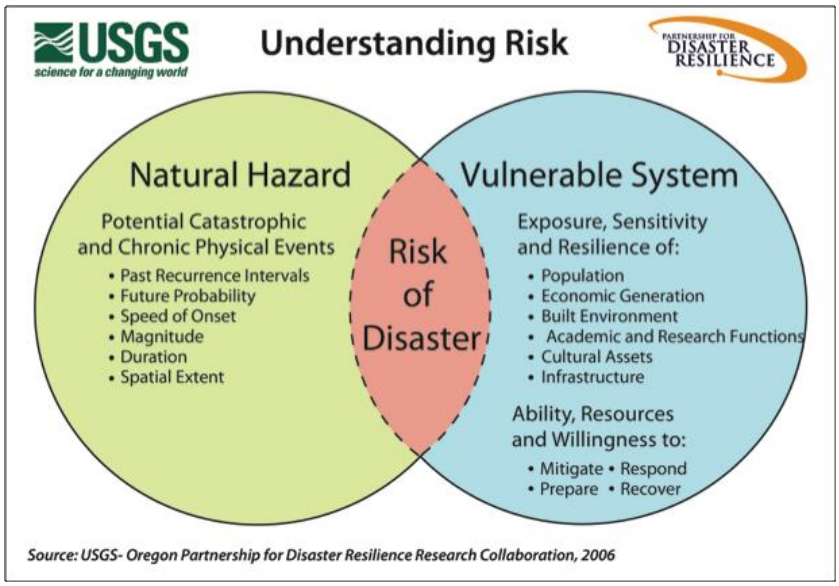
Risk Assessment

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

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein, and within Section 2, *Risk Assessment*, and Appendix C, *Community Profile*. The risk assessment process is graphically depicted in Figure KZ-1 below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure KZ-1. Understanding Risk



Risk Assessment Approach

A risk assessment is intended to provide the, "factual basis for activities proposed in the strategy to reduce loses from identified hazards."[2] To complete the risk assessment, the HMP update team first updated the description, type, location and extent of each hazard. Next, the team updated the vulnerability information based on each hazard's potential impact on the community.

The Marion County Basic Plan (Volume I, Section II) Risk Assessment describes in detail the methods used to assess risk. In summary, Marion County has prepared a Threat Hazard Identification and Risk Assessment as a formal annex to the Marion County Emergency Operation Plan. The assessment uses a method developed by BOLD Planning.[3] This city

[2] 44 CFR 201.6(2)(i)

[3] BOLD Planning is a consulting firm specializing in the development of actionable emergency plans. For more information, visit: http://www.boldplanning.com/

addendum builds on the county level assessment to produce a similar assessment for the City of Keizer. The assessment specifically examines:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

Refer to Page 2-4 of the Marion County Basic HMP for a description of the scoring values for each ranking category.

Hazard Analysis

The assessment identifies three levels of risk: High, Moderate and Low.

High - High probability of occurrence; at least 50 percent or more of population at risk from hazard; significant to catastrophic physical impacts to buildings and infrastructure; major loss or potential loss of functionality to all essential facilities (hospital, police, fire, EOC and shelters).

Moderate - Less than 50 percent of population at risk from hazard; moderate physical impacts to buildings and infrastructure; moderate potential for loss of functionality to essential facilities.

Low - Low probability of occurrence or low threat to population; minor physical impacts.

A summary of the risk assessment findings and rankings is presented below.

Table KZ-3. Hazard and Vulnerability Assessment Summary

Hazard Profile Summary for Keizer Usinging Bold Planning Analysis Scoring							
Natural Hazard	Probability	Warning Time	Magnitude	Duration	CPRI	Local Planning Significance	County Planning Significance
Weight Factor	0.45	0.3	0.15	0.1			
Earthquake*	4	4	4	4	4.00	High	High
Severe Weather/Storm**	4	1	3	3	2.85	Moderate	High
Flood	3	2	3	4	2.80	Moderate	High
Drought	3	1	3	4	2.50	Moderate	High
Extreme Weather - High Temperature	3	1	2	4	2.35	Moderate	Moderate
Wildland Interface Fire	1	4	2	2	2.15	Moderate	Moderate
Dam or Levee Failure	1	2	4	4	2.05	Moderate	Moderate
Landslide	1	2	2	2	1.55	Low	High
Volcanic Eruption	1	1	1	4	1.30	Low	Low
*Note: Earthquake probability listed to match county level analysis. See below for more detailed probability assessment.							
**Note: Includes tornado hazard							

Source: BOLD Planning Risk Assessment Method; Analysis by UO Community Service Center.

Community Asset Identification

This section provides information on city specific assets. For additional information on the characteristics of Keizer, in terms of geography, environment, population, demographics, employment and economics, as well as housing and transportation see Volume III, Appendix C, *Community Profile*. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Community Characteristics

The City of Keizer is located in Marion County, Oregon, immediately north of the City of Salem. The City is bordered to the west by the Willamette River and to the east by Highway 99 and Interstate 5. Keizer is located in Oregon's Willamette Valley, which experiences a moderate climate. In August, the average high temperature is 82 degrees and the average low temperature is 51 degrees. Wintertime temperatures in January range from an average high of 46 degrees to an average low of 33 degrees. The average annual precipitation is 39.9 inches. In addition to the Willamette River, other bodies of water that run through the city include Staats Lake, Claggettt Creek, and Labish Ditch. Keizer is located on a relatively flat area, with a few steep slopes bordering the Willamette River.

The US Census lists Keizer's 2015 population at 36,985. This represents a 13.2% increase from 2000. For more demographic information, refer to Appendix C.

Economy

Historically, Keizer was an agricultural community, but in the 1960s and 70s, the city grew rapidly into a residential suburb of Salem along North River Road. Today, Keizer's primary employment sectors are service, retail and public administration. Median household income in Keizer is $50, 897. For more economic information, refer to Appendix C.

Critical and Important Facilities

Critical and important facilities include the following:

<u>Transportation</u>

- Bridges and Culverts:
    - Three bridges over Claggettt Creek: Chemawa, Dearborn, and Alder
        - If damaged, evacuation of the eastern half of the community would be disrupted.
        - Alder Bridge is one of only two access points to Claggettt Creek Middle School and Weddle Elementary School.
        - Alder Bridge has water, and communications (maybe fiber).
    - Bridge over Labish Ditch at 35th (owned by Marion County)
        - If damaged, access to areas north of Keizer would be limited.
    - Keizer has two concrete box culverts located on River Road at Lockhaven Drive and at Wheatland Road
        - If they became non-functional, parts of town would be cut off.
- Major roads: I-5, the Salem Parkway, River Road, and Lockhaven Drive.
- Keizer Transit Center: 5860 Keizer Station Blvd.
- While not within Keizer, earthquake damage to the Detroit, Parkersville, and Lookout Point Dams could have significant impacts in Keizer, such as widespread flooding or road blockages.

<u>Energy</u>

- Bonneville Power Administration (BPA) – Chemawa Substation (Tepper Lane NE)

<u>Water</u>

- Drinking Water:
    - Water comes from the Troutdale Aquifer, pumped through 14 or 15 wells
    - Three water storage facilities with a storage capacity of 2.75 million gallons
      Note: Currently built to withstand earthquakes, however the water distribution system may not withstand a significant earthquake.
    - Emergency water agreement with the City of Salem is in place.
      Note: Chemical spills could potentially contaminate drinking water.
- Wastewater:
    - Willow Lake Wastewater Treatment Facility (5915 Windsor Island Rd. N)
      Note: The Willow Lake Wastewater Treatment Facility and main sewer lines are vulnerable to earthquakes and could potentially contaminate groundwater aquifers.
      Note: The Keizer Public Works building was built prior to earthquake standards.

Communication

- Qwest hub in the downtown area; several cell phone towers
    - One tower in Bear Park is leased out.
- City Hall (the Civic Center) has a communication tower – includes a cell carrier and the police radio.
    - This tower has a diesel-fueled generator.

Note: City of Salem is currently mapping communication system locations.

Emergency services

- Fire:
    - Keizer Fire District Station 350 (661 Chemawa Rd. NE).
    - Marion County Fire District 1 (300 Cordon Rd. NE) – serves northern part of Keizer, starting at Centennial.
- Police:
    - 930 Chemawa Rd. NE co-located with Keizer Civic Center, City Hall, Human resources, Community Center and Public Works.
- Medical
    - Legacy Keizer Health Center (5685 Inland Shores Way N).
        - *Note: Might get cut off because it's across Claggettt Creek.
    - WVP Medical Group Keizer (5100 River Rd. N).
    - Kaiser Permanente (5940 Ulali Dr. NE) – Keizer Station.
    - Salem Clinic Center (5900 Inland Shores Way N).

Cultural/historical resources

- Keizer Heritage Community Center houses the Chamber of Commerce, the library, and the Keizer museum.
  Note: older building and may be vulnerable to earthquake.

Vulnerable populations – Functional and Access Needs

- Assisted living facilities:
    - Brookdale River Road (592 Bever Drive NE)
    - Avamere Court at Keizer (5210 River Road N)
    - Avamere – memory care (Claggettt Ct).

    - The Village at Keizer Ridge (1165 Mcgee Court NE)
    - Willamette Lutheran Retirement (7693 Wheatland Road N)
    - Sweet Bye N Bye Adult Foster Care Home (4072 Brooks Ave. NE)
    - Sherwood Park Nursing & Rehabilitation Center (4062 Arleta Ave. NE)
    - Bonaventure Senior Living Facility (1615 Brush College Rd. NW)
- Schools:
    - Keizer has 10 public schools: http://www.salkeiz.k12.or.us/files/salkeiz/Keizer_14-15.pdf
- Simonka Place (5119 River Rd. N) – women's shelter
- Large Spanish speaking population – might be language barriers

See hazard sections below and Section 2, *Risk Assessment*, for potential hazard vulnerabilities to these facilities.

Hazard Characteristics

Drought

The characteristics of drought in Keizer are the same for the county as a whole.

Table KZ-4. Drought Summary

Hazard	Drought
Type	Climatic
Speed of Onset	Slow
Location	Varies, County Wide
Extent	Moderate to Severe Drought*
Prior Occurance	Three > 6 months duration since 1982
Probability	~9%

*Defined as between -2 and -4 on the National Resource Conservation Service (NRCS) Surface Water Supply Index (SWSI)

Sources: Oregon NHMP; NRCS; analysis by OPDR

The probability of drought in Keizer is likely, the same as for the county as a whole. Given that the City's water supply is primarily subsurface, the Keizer's vulnerability is moderate. Overall, the planning significance of drought is moderate, slightly lower than the county.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of drought hazards, as well as the location and extent of a potential event. Due to a cool, wet climate, past and present weather conditions have generally spared Marion County communities from the effects of drought. Governor Kate Brown declared a drought emergency for all of Marion County in September 2015.

Keizer's primary water supply comes from the Troutdale Aquifer. Raw water is treated for consumption at the Willow Lake Water Treatment Facility. The City has three (3) storage reservoirs with storage capacity for 2.75 million gallons of treated water. In addition, Keizer maintains an emergency water agreement with the City of Salem.

Keizer recently completed the review and update Keizer's water management plan to include new information and revisit emergency water agreements with the City of Salem.

This action was listed in the previous Keizer NHMP. Keizer adopted the revised agreements and ordinance language in 2016. The ordinance includes a water curtailment plan.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Earthquake

The characteristics of a crustal earthquake are similar to the county as a whole.

Table KZ-5. Earthquake Summary Crustal

Hazard	Earthquake - Crustal
Type	Geologic
Location	Multiple active faults; Willamette Valley
Speed of Onset	Rapid
Extent	Very Strong to Severe shaking ~ 500 yrs*
Prior Occurance	One over Magnitude 5 last 100 yrs**
Probability	Approximately 1% annual

*DOGAMI HazVu; ** PNSN - 1993 Scotts Mills just north of Marion County

Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

The characteristics of a Cascadia Subduction Zone Earthquake (CSZ) are the same as the county.

Table KZ-6. Earthquake Summary Subduction

Hazard	Earthquake - Subduction
Type	Geologic
Location	Primarily west of the Cascades; CA - BC
Speed of Onset	Rapid
Extent	Catastrophic
Prior Occurance	One over Magnitude 9 last 500 yrs
Probability	Magnitude 9+ is 7% - 12% over 50 yrs**

*DOGAMI HazVu; **Oregon Natural Hazard Mitigation Plan, anlysis by Oregon Department of Geology and Mineral Industries.

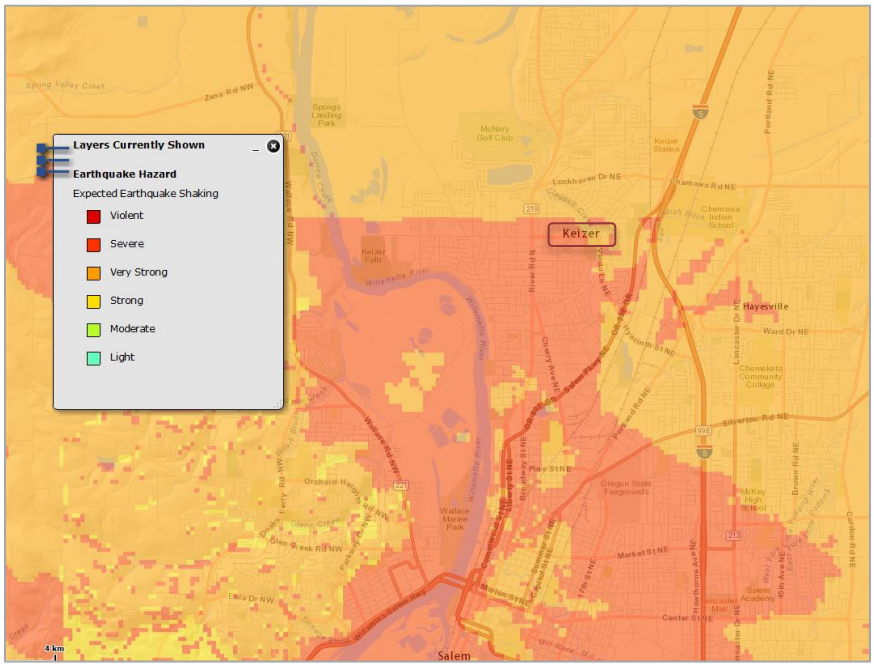
Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

Keizer's probability for a Crustal Earthquake event is "possible" and that their vulnerability to a Crustal Earthquake event is "limited". The county steering committee determined that the probability for a CSZ Earthquake event is "highly likely" and that the vulnerability to a Cascadia Earthquake event is "catastrophic". This hazard was not rated as distinct CSZ and crustal events in the previous HMP. There are no locally active faults within the Keizer City Limit. Active faults do exist within five-miles to the west and south. The 1993 Scott Mills quake caused $28 million in damages to cities throughout Marion County. No damaging earthquake events occurred during the previous five years.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of earthquake hazards, history, as well as the location and extent of a potential event. Generally, an event that affects the county is likely to affect Keizer as well. Previous occurrences are well-documented within the county's plan, and the community impacts described by the county would generally be the same for Keizer as well.

Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any particular site. In many major earthquakes, damages have primarily been caused by the behavior of the soil. Figure KZ-2 shows that ground shaking in Keizer for both crustal and subduction earthquakes are expected to be very strong to severe.

Figure KZ-2. Active Faults and Expected Shaking



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)

The Keizer steering committee identified liquefaction as a primary concern related to the earthquake hazard. The committee suggested conducing analysis of the city's 16 wells and how they will be impacted by earthquake. Another concern identified is the potential impact to Claggett Creek from sanitary sewer infrastructure impacts. Broken wastewater infrastructure could result in contamination. The committee also noted that if culverts on River Road collapsed, significant portions of the City could be cut off from vehicle access.

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 the "probability of collapse" due to the maximum possible earthquake for any given area. Within the City of Keizer, the following buildings were given a "moderate" or "high" probability of collapse:

- Cummings Elementary School: *high (> 10%)*
- Gubser Elementary School: *high (> 10%)*
- Kennedy Elementary School: *high (> 10%)*
- McNary High School: *high (> 10%)*

- Whiteaker Middle School: *moderate (> 1%)*

Keizer participates in the Great Oregon Shakeout each year and posts "Living on Shaky Ground" education documents at city hall. In addition, the City's Community Emergency Response Team is actively engaged in the promotion of earthquake safety and community outreach actions. The City eliminated two actions from the previous HMP related to earthquake preparation due to these ongoing efforts.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Flood

Table KZ-7. Flood Summary

Hazard	Flood
Type	Climatic
Speed of Onset	Slow to moderate
Location	Mapped flood zones, floodplain
Extent	Moderate to severe
Prior Occurance	Four significant events since 1964
Probability	1% annual within SFHA

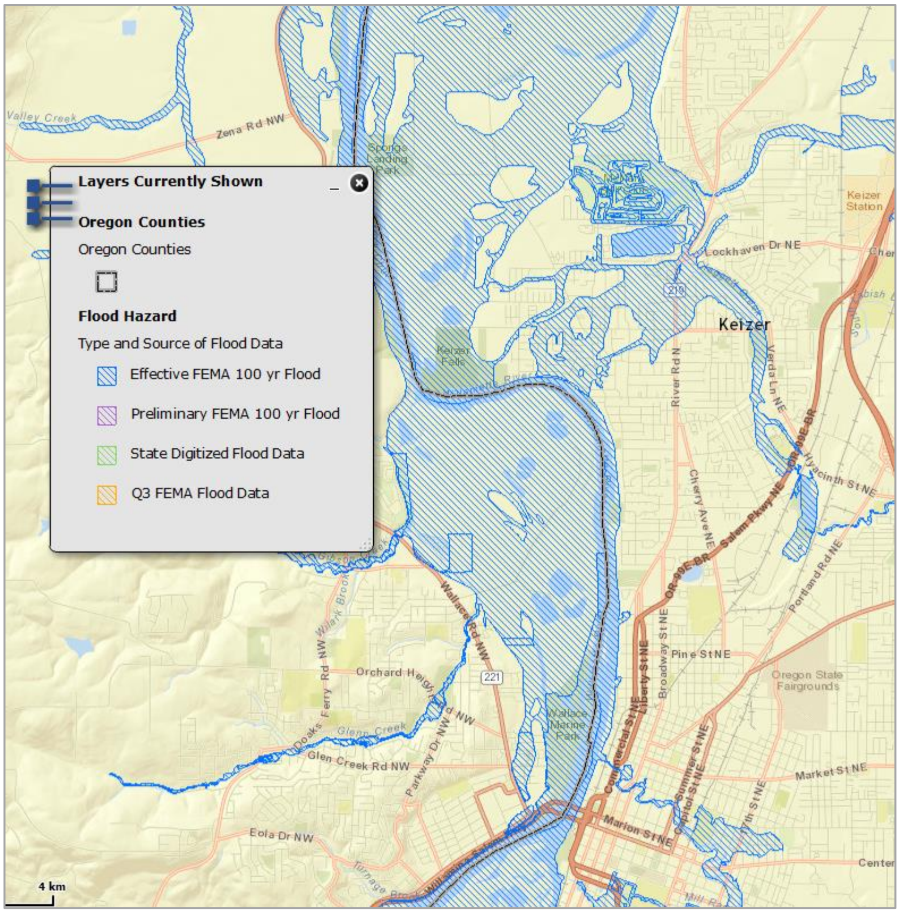
Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, Risk Assessment, describes the causes and characteristics of flooding hazards within the region. The city's probability for riverine flood is likely and their vulnerability to flood is critical. No new flood events have occurred since the 2010 HMP. Committee members noted that ongoing FEMA flood map updates may increase the base flood elevation by roughly three feet. This is primarily related to an existing earthen dike and flood wall constructed along the Willamette River after the 1996 flood event. If the flood elevation increases, the wall will no longer be certifiable. Any breaching of the dike or wall would result in the inundation of the western half of Keizer.

Some minor flooding does occur on Claggett Creek. However, the flooding is generally isolated. A related mitigation success is the ongoing retrofit and upgrade of Dearborn Bridge over Claggett Creek.

Portions of Keizer have areas of flood plains (special flood hazard areas). These include areas along the Marys River (see Figure KZ-3). Furthermore, other portions of Keizer, outside of the mapped floodplains, are also subject to significant, repetitive flooding from local storm water drainage.

Figure KZ-3. Special Flood Hazard Area



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]()

Figure KZ-4. Keizer Flood Insurance Rate Map

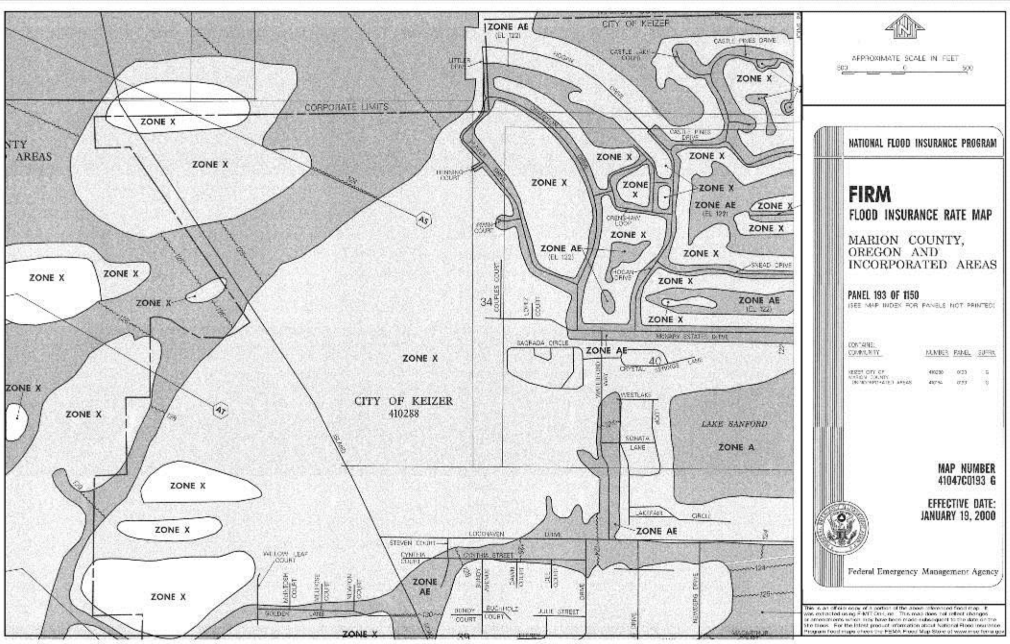
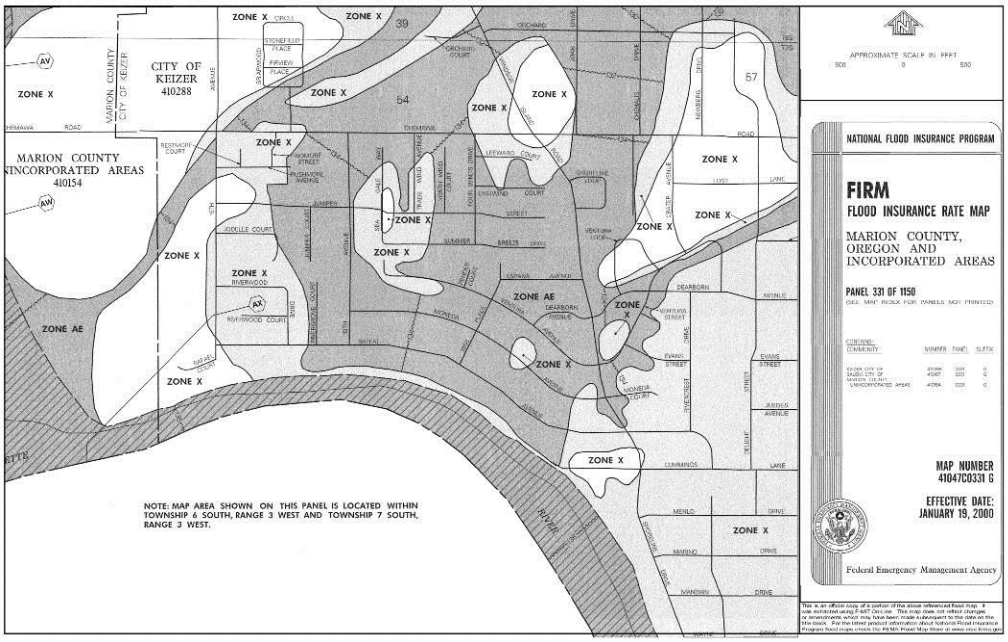


Figure KZ-5. Keizer Flood Insurance Rate Map



National Flood Insurance Program (NFIP)

FEMA modernized the Keizer Flood Insurance Rate Maps (FIRMs) in January of 2000. The table below shows that as of October 2016, Keizer has 440 National Flood Insurance Program (NFIP) policies in force. Of those, 215 are for properties that were developed before development of the initial FIRM. The last Community Assistance Visit (CAV) for Keizer was on July 17, 2006. Keizer is not a member of the Community Rating System (CRS). The table shows that the majority of flood insurance policies are for residential structures, primarily single-family homes. There have been 23 paid flood claims in Keizer totally $420,239.

The Community Repetitive Loss record for Keizer identifies no Repetitive Loss Properties[4] and no Severe Repetitive Loss Properties[5]. Notably, following flooding in 1996/1997, Keizer successfully used FEMA HMGP funds to relocate several homes out of the floodplain.

[4] A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

[5] A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Table KZ-8. Flood Insurance Detail

Jurisdiction	Effective FIRM and FIS	Initial FIRM Date	Total Policies	Pre-FIRM Policies	Policies by Building Type: Single Family	2 to 4 Family	Other Residential	Non-Residential	Minus Rated A Zone	Minus Rated V Zone
Marion County	-	-	2,067	1,239	1,614	115	105	232	97	0
Keizer	1/19/2000	5/1/1985	440	215	398	14	11	17	10	0

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-FIRM Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss	CRS Class Rating	Last Community Assistance
Marion County	$ 514,268,700	298	226	16	$ 5,732,543	11	2	-	-
Keizer	$ 131,321,300	23	11	1	$ 420,239	0	0	N/A	7/19/2006

Source: Information compiled by Department of Land Conservation and Development, October, 2016.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Landslide

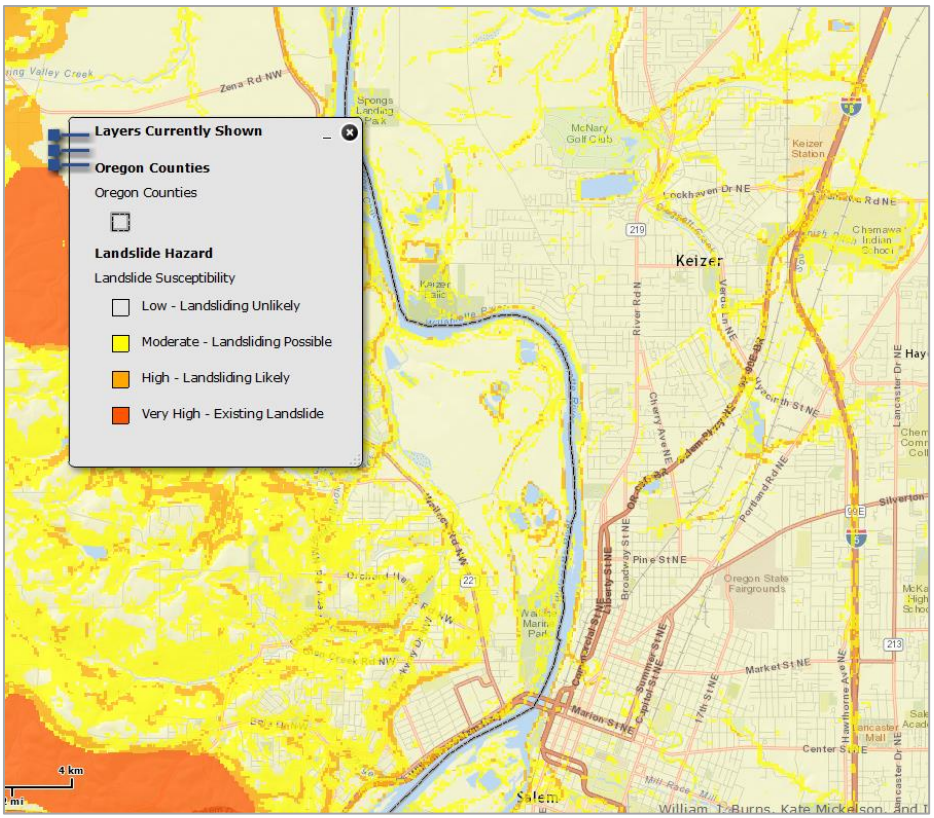
Table KZ-9. Landslide Summary

Hazard	Landslide
Type	Climatic/Geologic
Speed of Onset	Slow to rapid
Location	Waterways (banks) and transportation facilities
Extent	Minor
Prior Occurance	No major events
Probability	Low for minor events; less than 5% major events

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of landslides, and appropriately identifies previous landslide occurrences within the region. Keizer has a relatively flat topography. Keizer's probability for landslide is unlikely (which is lower than the county's rating) and their vulnerability to landslide is negligible (which is also lower than the county's rating). Figure KZ-6 shows that landslide risk in Keizer is virtually nonexistent.

Figure KZ-6. Landslide Susceptibility Exposure



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Volcano

Table KZ-10. Volcano Summary

Hazard	Volcano
Type	Geologic
Speed of Onset	Slow to rapid
Location	Cascade Mountains
Extent	Minor
Prior Occurance	One significant event since 1916 (Mount St. Helens)
Probability	<1% annual

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes Keizer risk to volcanic events. The steering committee determined that the city's probability for volcanic event is unlikely and their vulnerability to volcano is negligible.

The causes and characteristics of a volcanic event are appropriately described within the county's plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county's plan. Keizer is very unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in 1980, the city was not impacted.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Wildfire

Table KZ-11. Wildfire Summary

Hazard	Wildfire
Type	Climatic, Human Caused
Speed of Onset	Moderate to rapid
Location	Outside city limit
Extent	Minor to moderate
Prior Occurance	No history inside city limit
Probability	<1% annual

Sources: Marion County HMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of wildfires, as well as the county and city's history of wildfire events. The city's probability for wildfire is unlikely and the vulnerability to wildfire is limited. Keizer is located on the far western side of Marion County, surrounded on all sides by open farmland, waterways, or urban development. There are no forests within the city limits, and the closest forested area is Keizer Rapids Park, located half a mile west of the city. Due to its location, Keizer faces minimal risk of experiencing wildfires. There is no history of wildfire events in Keizer.

The County updated the Community Wildfire Protection Plan in 2016 and Keizer is not listed as a "Community at Risk."

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Severe Weather

Table KZ-12. Severe Weather Summary

Hazard	Severe Weather/Storm
Type	Climatic
Speed of Onset	Slow to moderate
Location	Countywide
Extent	Minor to severe
Prior Occurance	Minor events occur annually; ~30 moderate to severe events countywide over the past 130 years
Probability	100% for minor events, 23% for moderte to severe events

Sources: Marion County HMP

Windstorm

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of windstorms, as well as the location and extent of windstorm hazards. The City's probability for windstorm is highly likely and that their vulnerability to windstorm is critical.

Significant wind events occur in Keizer each year. Damaging wind events are only slightly less common; once or twice per year the city will experience a windstorm event that will interrupt services, experience downed trees, and cause power outages.

Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and very rarely, snow.

Winter Storm (Snow/ Ice)

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of winter storms, as well as the location and extent of winter storm hazards. The City's probability for windstorm is highly likely and that their vulnerability to windstorm is critical.

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting the city typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from November through March.

Major winter storms can and have occurred in the Keizer area, and while they typically do not cause significant damage, they are frequent and have the potential to impact economic activity. The most recent winter storms (December 2016 – January 207) included snow and ice. Transportation and power interruptions combined with government office and school closures. A disaster declaration is currently pending.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

CITY OF MILL CITY ADDENDUM

Purpose

This document serves as Mill City's Addendum to the Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan (MNHMP, NHMP). This addendum seeks to supplement information contained in Volume I (Basic Plan) of this multi-jurisdictional NHMP which serves as the foundation for this jurisdiction's addendum and Volume III (Appendices) which provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the NHMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with Marion County and Santiam Canyon cities, including Mill City, to create the first region-specific NHMP. Part of the Santiam Canyon Regional Hazard Mitigation Plan (RHMP) required the creation of city addenda which would be adopted into the 2016 Marion County NHMP. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County NHMP, locally adopting it, and having it approved by FEMA, Mill City will gain eligibility for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County NHMP, and Mill City addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing this addendum, and was composed of city staff, county representatives, and emergency service management.

The Mill City city recorder is the designated convener of the NHMP and will take the lead in implementing, maintaining, and updating the addendum to the Marion NHMP in collaboration with the Santiam Canyon liaison for Marion County Emergency Management.

Potential representatives for the City of Mill City steering committee met formally on one occasion: September 22, 2016, but communicated electronically throughout the creation of this

document. The city's addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with stakeholder and steering committee members.

The Mill City Steering Committee is comprised of the following representatives:

- David Kinney; City Planner, Mill City
- Stacie Cook; City Recorder, Mill City
- Kathleen Silva; Santiam Canyon Liaison, Marion County
- Mill City Planning Commission (7 Members)
- Joe Larsen; Lieutenant Linn County Sheriff's Office & Emergency Services Coordinator

Public participation was achieved with the establishment of the steering committee, which was comprised of city officials and county representatives. Kathleen Silva, Marion County's Regional Liaison, met with the city staff and the Mill City Planning Commission to discuss the preparation of the purpose of the Draft plan on February 21, 2017.

The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process. The Mill City Planning Commission reviewed the Draft plan in June 2017 and recommended several minor modifications.

The Marion County NHMP was approved by FEMA on August 17, 2017 and the Mill City addendum was adopted via resolution on June 26, 2017. This HMP is effective through August 16, 2022.

Mitigation Strategy

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

During 2016, Marion County and OPDR evaluated the Action Items set by the county and their particular relevance to the Santiam Canyon region. Following the review, actions with relevance to the region were added into the RHMP, noting what accomplishments had been made, and whether the actions were still relevant; any new action items were identified at this time. Mill City developed a list of priority actions (Table A-1), any actions that were not prioritized were placed in the Action Item Pool (Table A-2) and will be considered during the semi-annual meetings.

Priority Actions

The city is listing a set of high priority actions in an effort to focus attention on an achievable set of high leverage activities over the next five-years. The city's priority actions are listed below in the following table. Detailed implementation information for each action is listed in within (Table A-1).

Action Item Pool

This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available. The action items are split into various categories including ongoing, short-term (>1 year), and long-term (<1 year)

Many actions carry forward from prior versions of the Marion County NHMP and other local planning documents including the Community Wildfire Protection Plan, Drought Contingency Plan, and Mid-Willamette Economic Development study. Notably, given the location of Mill City, collaboration with both Marion County and Linn County will be required during the implementation process.

(Table A-1) Mill City Priority Action Items

Action Item	Cost and Process of Implementation	Funding Options	Approximate Date of Completion
Planning & City Staff	*Review the Natural Resource Chapter of the Comprehensive plan document and modify policies to reflect new hazard information. [roughly 20 hours]*	*General Fund*	*September 2018*
(e.g) *Multi-Hazard*	*Before purchase, city staff should first assess the amount of KWH needed to run city facilities. (100 KWH) diesel generators cost around $25,000.*	*General Fund, MWCOG grants/loans*	*December 2018*

-ONGOING-

(Table A-2) Mill City Action Item Pool

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Earthquake #1	Promote Great Oregon Shakeout Awareness month in October. Participate in activities for schools, business, and industry. Participating with the Mid-Willamette Emergency Communications Collective on initiatives that are focused on household preparedness.	Marion County Emergency Management	Public Works, Safety Committee, Marion County Risk, Red Cross, OEM and Media	Ongoing every October	X	X		I	X		
Earthquake #2	Collaborate with GROW EDC to develop relevant public-private partnerships with businesses that can contribute to response and recovery. (Multi-Hazard 6-9)	Marion County Emergency Management	Mill City, GROW EDC	Ongoing	X	X	X	X	X		X
Multi-Hazard #1	Develop an Energy Assurance Plan. (Multi-Hazard 2-4)	Marion County Emergency Management	Mill City, Department of Energy, Whole Community	Ongoing revisions			X	X	X		X

Source: City of Mill City NHMP Steering Committee, 2015.

-SHORT TERM-

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Multi-Hazard #2	Evaluate the diesel generation power needed for critical city facilities. Acquire a backup diesel generator, capable of powering city facilities for a minimum of 3 days with private, state, and federal resources.	Marion County Emergency Management, Mill City,	Mill City Public Works	Short Term			X				
Multi-Hazard #3	Develop diesel storage near Kingwood Wells #1 & #2 to support the generator for a minimum of 3 days.	Marion County Emergency Management, Mill City,	Marion County Public Works	Short Term			X				
Multi-Hazard #4	Incentivize and assist local fueling stations to purchase diesel generators capable of pumping fuel from in-ground storage tanks.	Marion County Emergency Management	Mill City,	Short Term			X		X		
Multi-Hazard #5	Conduct an assessment of the short and long term needs for sheltering access and functional needs populations for all hazards.	Mill City, Marion County Emergency Management	Marion County Public Health, Red Cross, Cities, NGO's, Oregon Public Health	Short Term					X		X

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Multi-Hazard #6	Develop a MOU with the Santiam School District to utilize facilities for sheltering residents.	Mill City, and Marion County Emergency Management	Santiam Canyon School District, Mill City RFPD, City of Mill City and Linn County Sheriff's Office, Red Cross	Short Term			X		X		
Multi-Hazard #7	Develop a MOU with First Student to utilize buses during/after hazard events	Mill City, and Marion County Emergency Management	Santiam Canyon School District, Linn County Sheriff's Office, City of Mill City and First Student	Short Term			X		X		
Multi-Hazard #8	Develop a MOU with Frank Lumber Company & Freres Lumber to share fuel resources after a hazard event.	Mill City, and Marion County Emergency Management	Linn County Sheriff's Office, Frank Lumber Co., Freres Lumber, Mill City RFPD, City of Mill City	Short Term			X		X		
Multi-Hazard #9	Develop a MOU with community fuel stations to utilize fuel resources found in below-ground tanks after a hazard event.	Mill City, and Marion County Emergency Management	Santiam Quick Mart, Mill City RFPD, Linn County Sheriff's Office and City of Mill City	Short Term			X		X		

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Multi-Hazard #10	Establish a Mill City CERT team.	Mill City, and Marion County Emergency Management	Mill City, Marion County Emergency Management, CERT,	Short Term	X	X			X		
Multi-Hazard #11	Develop a community education program - such as an all hazard community outreach forum for students and residents.*	Mill City, and Marion County Emergency Management	Linn County Sheriff's Office, Whole Community	Short Term	X	X	X				X
Multi-Hazard #12	Expand auxiliary radio capabilities by developing a team of HAM Radio operators for EMS and interested public.	Marion County Emergency Management, Linn County Sheriff's Office	ARES, CERT, Private partners, Whole Community	Short Term	X	X	X		X		

*Identified in Marion County Community Wildfire Protection Plan (Action Plan & Priorities)

**Identified in North Santiam Watershed Drought Contingency Plan (Priority Drought Mitigation Actions)

***Identified in Mid-Willamette Valley Council of Governments Comprehensive Economic Development Study (Appendix C)

-LONG TERM-

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Drought #1	Monitor economic impacts on recreation, tourism and agriculture communities.	Mill City, and Marion County Emergency Management	GROW EDC, Community Services	Long Term	X	X	X	X	X		X
Flood #1	Create partnerships and strategic plans with NSWC to facilitate riparian habitat restoration projects in flooding or erosion prone areas (e.g. Areas subject to reoccurring flood events –Elizabeth, Cedar, DeFord, and Snake Creeks.)**	Marion County Environmental Services, NSWC	Mill City , Marion County Parks Department, Oregon Department of Fish and Wildlife,	Long Term			X		X	X	X
Drought #2	Collaborate with NSWC to complete WMCP's and improve community understanding of water usage and opportunities to increase efficiencies.**	NSWC, Mill City	North Santiam Watershed DCP Partners	Long Term		X	X		X		X

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Multi-Hazard #14	Repair retaining wall on North Santiam River bank and develop recreational access dock to leverage retaining wall repair costs.**	Mill City , Marion County Emergency Management/Community Services Department	Marion County Board of Commissioners, Marine Board, DSL, Oregon River Experiences,	Long Term			X	X	X	X	X
Multi-Hazard #15	Designate evacuation routes outside of Hwy 22 for EMS.	Marion County Public Works, Linn County Public Works	RFPD, Mill City, Marion County Emergency Management	Long Term			X		X		
Multi-Hazard #16	Collaborate with Marion County to connect to a more resilient regional water/sewer system.***	Marion County Community Services Department/Board of Commissioners, Mill City	Marion County Emergency Management	Long Term			X	X	X		X
Multi-Hazard #17	Gather community support for the installation of resilient fiber communication infrastructure throughout the community.***	Marion County Community Services Department/Board of Commissioners	Mill City	Long Term	X		X		X		X
Wildfire #1	Collaborate with Detroit Ranger District, ODF, and BLM to conduct fuel hazard reduction along the Wildland Urban interface.*	ODF, BLM, Detroit Ranger District	Marion County Emergency Management	Long Term			X		X		X

Action Item	Proposed Action Title	Coordinating Organization	Partner Organizations	Timeline	Alignment with Plan Goals						
					Public Awareness	Education	Risk Reduction	Funding and Implementation	Partnerships and Coordination	Natural Resource Utilization	Plan Integration
Wildfire #2	Collaborate with ODF and Mill City RFD to develop strategic community fuel breaks along Hwy 22, Sitcom road, and Bud Long.*	ODF, BLM, Detroit Ranger District	Marion County Emergency Management	Long Term			X		X		X
Landslide #1	Integrate new DOGAMI landslide hazard information into land use zoning/development codes.	Mill City	Environmental Services, Engineering, ODOT, DLCD	Long Term			X				X

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Mill City addendum to the Marion County NHMP. This addendum designates a coordinating body and a convener consisting of MCRFPD, City Hall staff, PW staff, LC Sheriff's rep (Emergency Management), Planning Commissioner and a City Councilor to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional NHMP, the city will look for opportunities to partner with the county. The city's steering committee will convene after re-adoption of the City of Mill City addendum on an annual schedule; the county meets on a semi-annual basis and will provide opportunities for the cities to report on NHMP implementation and maintenance during their meetings. The City Recorder will serve as the convener and will collaborate with the Santiam Canyon liaison for assembling the steering committee (coordinating body). The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the city's mitigation strategy (actions) and will include support from Marion County and Linn County Emergency Management when possible. The convener will also remain active in the county's implementation and maintenance process.

Implementation through Existing Programs

Many of the NHMP's recommendations are consistent with the goals and objectives of the city's existing plans and policies. Where possible, the City of Mill City will implement the NHMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the NHMP's action items through such plans and policies increases their likelihood of being supported and implemented.

Mill City's acknowledged comprehensive plan is the Mill City Comprehensive Plan. The Oregon Land Conservation and Development Commission first acknowledged the plan in 1982. The City last completed a major update of the plan in 2015. The City implements the plan through Mill City regulatory ordinances.

Mill City currently has the following plans that relate to natural hazard mitigation. For a complete list visit the city website for planning and public works:

- Comprehensive Plan
- Zoning Code
- Mill City Access Management Plan
- Water System Master Plan

Continued Public Participation

Keeping the public informed of the city's efforts to reduce the city's risk to future natural hazards events is important for successful plan implementation and maintenance. The city is committed to involving the public in the plan review and updated process. This includes:

- Annual briefings to city council
- Articles and information in The Canyon Weekly

- Postings and media on social media/website.

Plan Maintenance

The Marion County Multi-Jurisdictional Natural Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the city will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

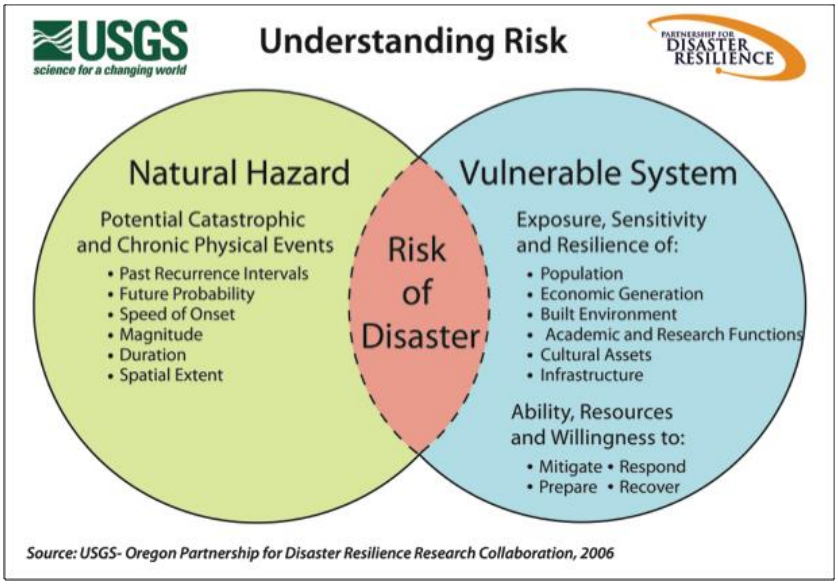
Risk Assessment

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

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein. The risk assessment process is graphically depicted in (Figure B-1) below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

(Figure B-1) Understanding Risk



Hazard Analysis Methodology

This NHMP utilizes a Threat Hazard Identification and Risk Assessment (THIRA) methodology that is consistent with the Marion County Multi-Jurisdictional Hazard Mitigation Plan. Mill City developed this assessment from historical data of events that have occurred in Marion County. The assessment uses the calculated priority risk index (CPRI) methodology to specifically examine:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

Table (A-3) below shows the scoring values for each ranking category.

Table (A-3) Risk Assessment Hazard Ranking Scoring Values

Score	Probability	Warning Time	Magnitude/Severity	Duration
4	Highly Likely	Less than 6 hours	Catastrophic	More than 1 week
3	Likely	6-12 hours	Critical	Less than 1 week
2	Possible	12-24 hours	Limited	Less than 1 day
1	Unlikely	24+ hours	Negligible	Less than 6 hours

Source: Marion County Emergency Management; BOLD Planning

Hazard Analysis

For emergency management planning purposes, this critical analysis is an assessment of the consequences of each hazard, including potential areas of impact, population exposed and impacted, duration of the hazard, and potential economic consequences. These rankings utilize the criteria laid out in THIRA to weigh them proportionally between historic data as well as future projections based on economic, demographic, the critical infrastructure information.

These rankings were reviewed and revised by Marion County Emergency Management staff and the local steering committee members to reflect specific community attributes and risks.

(Table A-4) Probability and Vulnerability Comparison

Hazard Profile Summary for Emergency Operations Plan						
Hazard	Probability	Magnitude	Warning Time	Duration	CPRI	Planning Significance
Earthquake	4	4	4	4	4.00	**High**
Severe Weather/Storm	4	3	1.5	3.5	3.28	**High**
Power Failure	2.5	4	4	3	3.23	**High**
Landslide	3	3	4	3	3.15	**High**
Wildland Interface Fire	3.5	3	2	3	3.08	**High**
Drought	3	3	1	4	2.80	**Moderate**
Extreme Weather - High Temperature	3.5	2	1	4	2.73	**Moderate**
Transportation Accident/Train Derailment	2	3	4	3	2.70	**Moderate**
School & Workplace Violence	1.5	4	4	2	2.68	**Moderate**
Epidemic	2	4	1	4	2.65	**Moderate**
Pandemic	2	4	1	4	2.65	**Moderate**
Dam or Levee Failure	1	4	4	4	2.65	**Moderate**
Animal Disease Outbreak	2	3	2	4	2.50	**Moderate**
Hazardous Materials Incident	2.5	3	1	3	2.48	**Moderate**
Biological Chemical, Sabotage and Cyber Incident and Explosives Radiological Attack-Terrorism	1	4	1	3	2.10	**Moderate**
Civil Disorder / Terrorism	1	2	4	3	1.95	**Low**
Radiological Release	1	2	4	3	1.95	**Low**
Volcanic Eruption	1	2.5	1	4	1.75	**Low**
Flood	1	1	2	3	1.35	**Low**
Tornado	1	1.5	1	1	1.15	**Low**

Source: Mill City NHMP Steering Committee and Marion County NHMP Steering Committee, 2016.

Hazard Characteristics

Drought

The steering committee determined that the city's probability for drought is **moderate** and their vulnerability to drought is **low**.

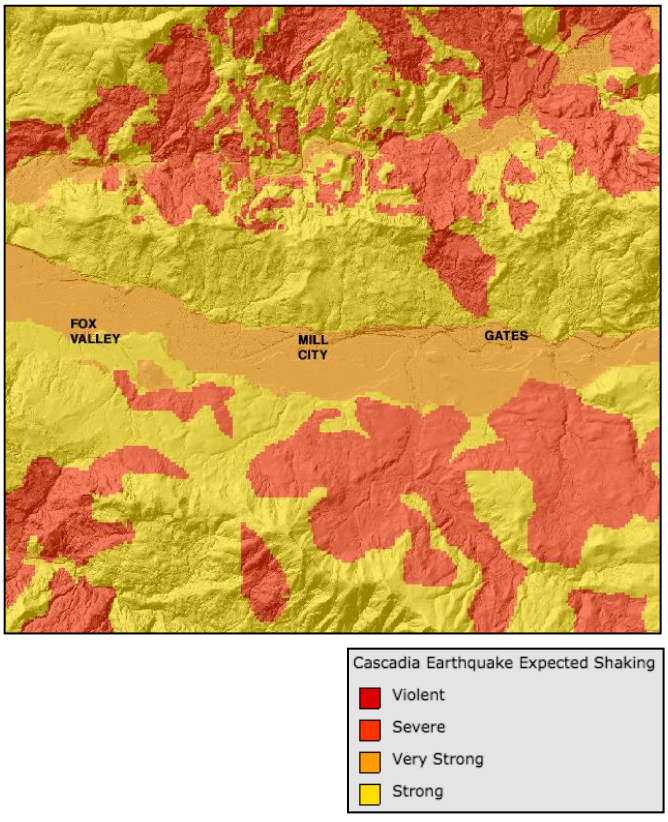
Although dryer conditions in the summer months have impacted the North Santiam Canyon as a whole, Mill City has not experienced major impacts from drought. Recently during the 2015 drought, many tree's and vegetation died off which has created increased risk of wildfire hazards. If dryer conditions become the new norm, Mill City could experience timber die-off, making the forest lands surrounding Mill City more susceptible to wildfires.

Earthquake

The steering committee determined that the city's probability for a Cascadia Subduction Zone (CSZ) Earthquake event is **high** and that their vulnerability to this event is **moderate**. The steering committee determined that the city's probability for a Crustal Earthquake event is **moderate** and that their vulnerability to this event is **moderate**.

Historically, Mill City has experienced one crustal earthquake on August 19, 1961. A 4.5 magnitude earthquake struck 6 miles from Mill City, with shaking felt throughout the Santiam Canyon, up to Detroit.

If another larger and more substantial earthquake occurs (Cascadia), Mill City is expected to experience damage to buildings, utility (electric power, communication, water, wastewater, natural gas) and transportation systems (roads, bridges, pipelines).



Flood

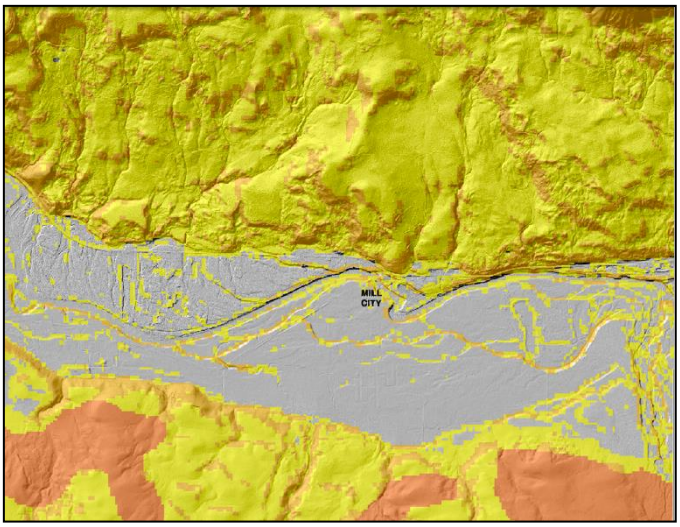
The steering committee determined that the city's probability for flooding is **low** and that their vulnerability to flooding is **low**. The City of Mill City is located approximately 10 miles downstream of the Big Cliff and Detroit dams. The U.S. Army Corps of Engineer regulates water levels behind the dams and manages discharges to prevent downstream flooding. Therefore, the N. Santiam River near Mill City rarely sees more than minor flooding.

Historically, Mill City experienced minor flooding events in 1964 and 1996. This was due to a specific weather pattern named "pineapple express", which blows warm, moist air from the southwest into the Pacific Northwest. Most flooding is mitigated due to the Detroit and Big Cliff Dams that regulate the amount of cubic feet per second that flow out of Detroit Reservoir, into the North Santiam

River. During the 1964 and 1996 storms, the small tributaries entering the North Santiam River near Mill City did have minor flooding caused by the rapid runoff from low elevation snow melt and the heavy rain events. However, the cities drinking water is pulled from an aquifer, and thus, high and dirty river levels do not impact those facilities.

Landslide

The steering committee determined that the city's probability for landslide is **moderate** and that their vulnerability to landslide is **moderate**.



Historically, Mill City has not experienced major impacts from landslides within city limits. Areas near Hwy 22 and the northern edge of the city are more susceptible to this hazard because of steep slopes. The developed areas of the City of Mill City south of the North Santiam River have a "LOW" susceptibility to landslides, but debris flows can occur in the Snake/DeFord creek channels, as they did in the 1964 flood event.

Potential landslide-related impacts are adequately described within the county's plan, and include infrastructural damages, economic impacts (due to isolation and/or arterial road closures), property damages, and obstruction to evacuation routes. Rain-induced landslides and debris flows can potentially occur during any winter in Marion County, and thoroughfares beyond city limits are susceptible to obstruction as well.

Volcano

The steering committee determined that the city's probability for volcanic event is **low** and that their vulnerability to volcanic event is **moderate**.

Mill City has not been impacted previously by volcanic activity, however Mount Jefferson is located east of the city, further into the Cascade Mountains, and could produce problems if an eruption occurs.

Wildfire

The steering committee determined that the city's probability for wildfire is **high** and that their vulnerability to wildfire is **moderate**.

In 2002 and 2004, Mill City was impacted by wildfire's which caused closure of Hwy 22 east of Detroit Lake. This impacted local residents, restricting travel, and negatively impacting the local economy due to the closure of Hwy 22 for an extended period of time. Mill City and the forest areas east and north of the City may experience more fires as dryer conditions occur in the

North Santiam Canyon. Less rainfall and snowpack can kill trees dependent on large amounts of water, which could ultimately lead to an increase of fuels and wild fire ignition probability.

Marion County updated the Community Wildfire Protection Plan (CWPP) in 2016, which mapped wild land urban interface areas and developed actions to mitigate wildfire risk. The city is a participant in the CWPP, and has included hazard mitigation action items directly in line with the CWPP actions.

Windstorm

The steering committee determined that the city's probability for windstorms is **high** and that their vulnerability to windstorms is **high**.

In April of 1931, winds in the Santiam Canyon region felled hundreds of trees causing road closures between Mill City and Detroit. The winds also caused several devastating fires. On December 12, 1995, high wind gusts of up to 60mph downed trees and disrupted power and communication services in the lower Santiam. Mill City residents reported power and phone outages. In 2002, a windstorm caused similar damages, blowing down trees onto roads and power lines.

About once or twice per year the city will experience a windstorm event that can interrupt services, down trees, and cause power outages. Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and very rarely, snow.

Winter Storm (Snow/Ice)

The steering committee determined that the city's probability for winter storm is **moderate** and that their vulnerability to winter storm is **high**.

Major winter storms have occurred in the Mill City area; in January of 1937, heavy snowfall of over 2 feet caused property damage. Major roads were closed and residents of Detroit and Mill City were stranded for five days as heavy snow and a landslide blocked Hwy 22. In the winter of 2006-07 ice storms caused the city to lose power for 2-3 days. In 2014, a similar storm knocked down tree's and caused hazardous road conditions. These types of storms are more frequent and usually cause transportation issues and communication failures from downed trees and icy/snow filled roads.

Community Asset Identification

This section provides information on city specific assets. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Community Characteristics

Mill City is nestled along the North Santiam River. The northern third of the City and the Hwy 22 corridor are located north of the river in Marion County. The remainder of the City,

including the majority of the residential areas, schools, fire station and city offices are located south of the N. Santiam River in Linn County. Mill City is the largest community in the North Santiam River Canyon with a population of 1,855.

With an elevation of 827 feet, the climate of Mill City is moderate; the average monthly temperatures range from 51 – 79 degrees in July and August, and 33-45 degrees in December and January. Mill city receives approximately 60-70 inches of rain, and 6-12 inches of snow each year. The city's topography is relatively flat, but does possess terrain attributed to the North Santiam River. Outside of city limits, steep slopes surround the city on the North and South sides.

Economy

Mill City benefits from its location along Oregon Hwy 22, a major east-to-west transportation route connecting Salem to Bend. The City serves as a local small business, education and service center for residents of the North Santiam Canyon and the traveling public along the Hwy 22 corridor. The existing businesses types include hospitality, restaurants, professional, financial, real estate, service stations, repair/service shops, and personal service businesses; primarily serving the daily needs of local residents.

Critical and Important Facilities/Infrastructure

Communication/Information Technology

There are currently three communication providers in Mill City. WAVE provides broadband internet and phone services, Stayton Cooperative Telephone Company provides phone service, and Frontier provides phone services and broadband internet with limited fiber infrastructure adjacent to Hwy 22.

Strengths:

- Fiber internet infrastructure already present along Hwy 22
- Cellular Tower (T-Mobile) near 155 NE Santiam Blvd

Weaknesses:

- Phone/Fiber lines may cross over 1st Ave. bridge
- Currently limited certified HAM radio operators

Water

The City of Mill City has two municipal wells (Kingwood Wells 1 & 2) and a water pump station located at SE 4th and SE Kingwood Avenue. The two wells were drilled to a depth of 168 feet. Well 1 has the capacity to produce 800 gpm and Well 2 has the capacity to produce 450 gpm.[1] Both of these wells are in close proximity to each other, pulling water from depths of 45-158 feet deep from the same aquifer.

[1] City of Mill City Comprehensive Plan Page 56

The city municipal water system currently depends on these wells to distribute water throughout the community. Unless other water facilities are created to pull water from the North Santiam, Mill City must preserve the well head protection area from any possible pollution attributed to encroaching development.

Waste Water

Mill City's has a municipal wastewater treatment facility and collection system. Individual homes are served by a STEP (Septic Tank Effluent Pumping) system. The building sewer from a home or business drains to an interceptor tank located on the property. Solids are collected in the interceptor tanks and the liquids are discharged into the city's sewer collection system. The liquid effluent flows to the City's wastewater treatment facility where it goes through a rock filtration system and is discharged into a large drain field. The City contracts with a private firm to pump out the interceptor tanks at each home or business. Residential interceptor tanks are pumped on a 7-10-year cycle, with tanks serving businesses or heavy water users pump on a more frequent basis.

Dams

Two dams sit above Mill City, *Detroit Dam* and *Big Cliff Dam. Federal officials and Marion County's Emergency Managers have previously* concluded that the likelihood of Dam Failure is ***Low***[2]***.*** Current conditions still represent the previous decision. If Dam failure occurred in either dams, Mill City would experience catastrophic impacts from a surge of water expelled from either Detroit or Big Cliff lake.

Strengths:

- (2) Municipal wells (Kingwood 1 &2)
- (1) Backup diesel generator on-site
- (2) Above-ground water storage reservoirs at 155 NE Santiam Blvd (Marion County side of river) and SE 4th Avenue (Linn County side of river))
    - Equivalent to (1.5 million) gallons or 3-5 days of water storage
- Municipal wastewater treatment system
- (3) sewage pump stations

Weaknesses:

- No current storage supply of diesel fuel
- Main water lines cross highway & pedestrian bridge
- No backup generator at waste water pump stations
- Main waste water line crosses 1st Ave. bridge

Transportation Systems

Oregon Hwy 22 is the major transportation route for auto, public transit, and emergency vehicle access throughout the Santiam Canyon. Mill City is located along Hwy 22, 30 miles east of the Interstate-5, the City of Salem and the remainder of the Willamette Valley. To the east, Hwy 22 connects to Gates, Detroit, Idanha, and ends at the Santiam Pass interchange with U.S. Route

[2] http://www.co.marion.or.us/PW/EmergencyManagement/Documents/6_damfailure.pdf

20/Oregon Hwy 126, which continue east to the Central Oregon cities of Sisters, Redmond and Bend.

The Cherriots Canyon Connector is the only existing public transit service serving communities in the North Santiam Canyon. The Canyon Connector route has three total round trips with buses running approximately every (5) hours.

In case of the closure of Oregon Hwy 22, Mill City residents will have to rely on alternate routes to reach supplies or safety in the Willamette Valley. Lyons-Mill City Drive runs from Mill City to Lyons, where it connects to OR 226 and Hwy 22.

Bridges

Structure Name	Location	Year Built	Structural Condition
Little North Fork Santiam River Bridge (HWY 22)	Mehama	1952	Fair
North Santiam River Railroad (Pedestrian) Bridge	Mill City	1919	Good
Mill City Bridge - 1st Ave.	Mill City	1960	Fair
Gates Bridge (over N. Santiam River)	Gates		
OR 226 Bridge (over N. Santiam River)	Lyons		

Strengths:

- Pedestrian Bridge owned by Mill City could be used by some light duty emergency vehicles
- Lyons/Mill City Drive serves as an additional evacuation route to Lyons (west).
- SE Kingwood Avenue serves as an additional evacuation route to Gates (east).
- Bridges over the N. Santiam River in Gates and Lyons provide an alternative route for Mill City traffic if problems occur on the 1st Avenue bridge in Mill City.

Weaknesses:

- 1st Ave Bridge has weight restrictions (owned by ODOT).
- Pedestrian Bridge needs restoration and contains more stringent weight restrictions.
- Hwy 22 closures could make travel outside of North Santiam Canyon extremely difficult.

Energy & Utilities

Mill City receives energy and utility services from Pacific Power and NW Natural Gas. The main power service line to Mill City comes from Lyons to Mill City, along Lyons-Mill City Drive. It was rebuilt in 2015-2016.

BPA transmission lines runs south of Mill City from the Detroit Dam generating turbines, connecting to the Lyons power station.

Strengths:

- Gas stations with fuel storage exist within Mill City.
- Businesses including Freres Lumber and Frank Lumber Co. possess fuel storage.

Weaknesses:

- Gas stations possess below ground tanks which cannot be pumped without electricity
- Gas stations do not currently possess backup diesel generators to pump fuel from storage tanks.
- No alternate sources of energy (wind, solar) exist to power basic services

Agriculture and Food

Mill City has a small 10,000 sf grocery store, the Mill City Marketplace, convenience stores and several restaurants to provide groceries and food services. The closest full-service grocery exists 17 miles west in Stayton. The closure of Hwy 22 as a transportation route would cause serious concern for residents and food accessibility.

Strengths:

- Private sector entities which possess limited (1-2 days) food supplies.
- Agricultural land availability near Mill City.

Weaknesses:

- No major (full service) grocery store inside of city limits.
- Surrounding agriculture currently not used for food production.

Banking and finance

A U.S Bank exists on the north side of the North Santiam River in Mill City. The bank is located along Hwy 22 and could be utilized for emergency financial services during a hazard event.

Strengths:

- Presence of a banking/financing institution within city limits.

Weaknesses:

- Full “urban” financial services unavailable.

Hazardous Materials

Mill City does not possess any large manufacturing firms that possess hazardous materials. The city has identified current brownfields which may be susceptible to leaching including the Texaco gas station and Remine Mill site.

Brownfields

DEQ Site ID	Facility Name	Location

1061	Forester Equipment, Inc.	SW 5th Ave. *Site Screening Recommended*
2107	Fred A. Moore Logging Co.	27860 NE Santiam Blvd *Site Screening Recommended*
1128	Hoover's Shop	SW 5th Ave. & Linn Place *Site Screening Recommended*
345	North Santiam Plywood	47983 Lyons Mill City Dr. *Site Screening Recommended*
1844	Mill City Railroad Bridge	At Hwy 22, N Santiam River, R.M. 47.2 *State Expanded Preliminary Assessment recommended*

Strengths:

- There are currently not enough known hazardous materials to cause major concern.
- Brownfield sites could be utilized and attract privates sector development.

Weaknesses:

- Current brownfields maybe susceptible to leaching of unknown materials.

Emergency Services

Mill City receives emergency service support from Linn County Sheriffs and the Mill City Rural Fire Protection District.

- Linn County Sheriff's Office substation at City Hall, 444 S. 1st Avenue
- Mill City Rural Fire Protection District, Main Fire Station, 400 S. 1st Avenue

Strengths:

- Mill City possesses community specific emergency services for fire and law enforcement.
- The Mill City RFPD main fire station possesses a backup generator.

Weaknesses:

- Emergency services do not have trained HAM radio operators.
- Emergency services do not possess rescue rafts for North Santiam River access.

Government Facilities

Mill City Hall contains the office space for the administration, finance, permits, planning, public works, municipal court, and also serves as the Mill City Sherriff substation

- Mill City Hall, 444 S. 1st Ave.
- Mill City Post Office, 101 SE Kingwood Avenue

Strengths:

- City Hall may be utilized for a shelter or emergency response center.

Weaknesses:

- City Hall does not possess a backup diesel generator to power facility in the event of a power outage.

Environmental/Historical Preservation Sites

Mill City is surrounded by environmental preservation sites including state parks and designated wilderness areas. 50% of the housing stock in Mill City was built before 1950. The Hinkle-Reid house located at 525 NE Alder St. was built in 1916. It is the only structure in Mill City listed on the National Register of Historic Places. There are four other structures listed on the City's local historic resource inventory, including a wrought iron Phoenix column railroad bridge on timber trusses that crosses the North Santiam River at 1st Avenue in Mill City. The railroad bridge was originally constructed in 1888, and then moved up to Mill City in 1919. The bridge remained in railroad use until 1967 and was refurbished for pedestrian use in the mid - 1990's. The City of Mill City has created a recreational trail on the abandoned railroad right of way through the City, with the refurbished railroad bridge as its focal point. The community plans to repaint and refurbish the bridge to celebrate its centennial in 2019.

Strengths:

- Proximity to pristine state and federal land could attract residents or business.
- Buildings of historical significance located within city limits.
- History and "timber" character provided by Mill City pedestrian bridge.

Weaknesses:

- Mill City bridge needs funding for restoration.

Education

Mill City is home to the Santiam Canyon School District. This district encompasses four cities in the Santiam Canyon including Mill City, Gates, Detroit and Idanha. All of the district's schools, the Santiam Elementary School, and the Santiam Jr./Sr. High school, are located in Mill City.

- Santiam School District
    - Santiam Elementary School, 450 SW Evergreen St.
    - Santiam Jr./Sr. High School, 265 SW Evergreen St.

Strengths:

- School facilities could be utilized to shelter a large amount of community residents including functional needs populations.
- School facilities already possess needed infrastructure for a shelter which includes restrooms, showers and a kitchen.

- School buses could be utilized for transportation after a hazard event.

Weaknesses:

- There are no current agreements or MOU's between the counties, city and school district to utilize facilities after a hazard event

Healthcare & Public Health

Santiam Memorial Hospital operates a satellite medical clinic in Mill City. The clinic provides outpatient services for local residents. The Mill City Pharmacy enables residents to fill prescriptions and purchase in-home medical supplies. The Santiam Memorial Hospital in Stayton and its adjacent medical clinics provide outpatient, surgery center, birthing services and in-patient medical care.

- Santiam Medical Clinic, 280 S 1st Ave.

Strengths:

- A clinic with out-patient services exists within the community.

Weaknesses:

- No facilities with major life-saving equipment currently exist within city limits.
- Emergency health supplies are limited to what exists within the community.

Access and Functional Needs

Mill City's vulnerable population consists of the elderly and those that are medically dependent and require life safety equipment. In 2010, 13.5% of Mill City's residents were elderly, 65 years of age or older.

Strengths:

- Over 39% of residents are over the age of 45, this older populous can volunteer and promote social cohesion in the community.

Weaknesses:

- There is no assisted living or full-service medical care facilities to serve the aging population.

CITY OF SILVERTON ADDENDUM

Purpose

This document serves as the City of Silverton's Addendum to the Marion County Multi-Jurisdictional Hazards Mitigation Plan (MHMP, HMP). This addendum supplements information contained in Volume I (Basic Plan) of this HMP. The Basic Plan serves as the foundation for this jurisdiction's addendum. Volume III (Appendices) provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the HMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer and fall of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with the Oregon Military Department's Office of Emergency Management (OEM), and Marion County cities, including Silverton, to update their addendum to the Marion County HMP, which expired July 8, 2016. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County HMP, locally adopting it, and having it approved by FEMA, the City of Silverton will regain eligibility for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County HMP, and Silverton addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing the plan. For more information on the composition of the steering committee see the *Acknowledgements*, *Plan Summary*, and *Plan Process* (Volume III, Appendix B).

The Silverton City Manager (who also serves as Silverton's Emergency Manager) is the designated local convener of this addendum. The Convener will take the lead in implementing, maintaining, and updating the addendum to the HMP in collaboration with Marion County Emergency Management.

Representatives from the City of Silverton steering committee met formally on one occasion: October 11, 2016 (see Appendix B for more information).

The city's addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with OPDR.

The City of Silverton Steering Committee is comprised of representatives from the following departments:

- Convener, City Manager (Emergency Manager)
- Police Department
- Public Works Department
- Community Development Department
- Silverton Fire Department
- Silverton Local Business Representative (2)
- Community Nonprofit Representative

Silverton used multiple approaches to engage the public. First, the City established steering committee representatives from across the city. Next, the City actively participated in countywide community engagement activities described in Volume I, Section 4 and in Appendix B. City staff also presented the draft plan to the City Council during an open public council session. The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process (see Appendix B for more information).

The Marion County HMP was approved by FEMA on August 17, 2017 and the Silverton addendum was adopted via resolution on July 17, 2017. This HMP is effective through August 16, 2022.

Mitigation Strategy

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

During the 2016 Marion County and Silverton update process, OPDR and a representative from Marion County Emergency Management assisted the steering committee with developing mitigations that will meet Silverton's unique situation. The proposed actions were then re-reviewed by the steering committee to finalize. Silverton developed a list of priority actions (Appendix A-1), any actions that were not prioritized were placed in the Action Item Pool (Appendix A-2) and will be considered during the annual meetings. For a status update on each of Silverton's 2009 mitigation actions, see Appendix A-2.

Priority Actions

The City is listing a set of high priority actions in an effort to focus attention on an achievable set of high leverage activities over the next five-years. The City's priority actions are listed in Table SV-1 on the following page.

Action Item Pool

Table SV-2 on the following pages presents a pool of mitigation actions. This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available.

Table SV-1. Silverton Priority Action Items

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Priority Actions					
P-1	Flood	Update Silverton Flood Insurance Rate Maps (FIRMS).	Silverton Flood Plain Coordinator	Oregon Risk MAP; Silver Jackets; DOGAMI	Mid Term (3-5 years)
P-2	Dam Failure	Update the dam breech inundation scenario map.	Public works, Engineering	Marion Co.; UASCE	Short Term (1-2 years)
P-3	Dam Failure	Conduct seismic evaluation of Silver Creek Dam and Silverton water supply reservoir.	Public Works Director, Water Quality Supervisor	USACE	Short Term (1-2 years)
P-4	Dam Failure	Develop evacuation strategy for both local and regional dam failure scenarios.	Silverton Emergency Management	USACE	Mid Term (3-5 years)
P-5	Earthquake	Conduct seismic evaluation of West C and Main Street bridges over Silver Creek	Silverton Public Works	Marion Co., ODOT	Short Term (1-2 years)

Source: City of Silverton HMP Steering Committee, 2016.

Table SV-2. Silverton Action Item Pool

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Multi-Hazard					
MH-1	Multi-Hazard	Assess options for a new City Hall building a structure that will withstand flood.	Administrative Services Director	City Council	Mid Term (3-5 years)
MH-2	Multi-Hazard	Create a Facilities Master Plan that assesses the need for new or updated facilities, and incorporates natural hazard vulnerabilities and mitigation measures for reducing vulnerability. Consider hazards in future facilities master plan updates.	Public Works	Administrative Services Director	Mid Term (3-5 years)
MH-3	Multi-Hazard	Create memoranda of understanding with fuel stations that allows emergency responders first access to fuel.	Public Works	Administrative Services Director	Short Term (1-2 years)
MH-4	Multi-Hazard	Create mutual aid agreement with sister cities.	Administrative Services Director	Emergency Management; Marion Co.	Short Term (1-2 years)
MH-5	Multi-Hazard	Educate businesses and governmental organizations about the importance of continuity of operations plans to make them more resilient to natural hazards.	Administrative Services Director	Chamber of Commerce	Ongoing
MH-6	Multi-Hazard	Participate in the COAD.	Emergency Management	Marion Co.; CERT	Ongoing
MH-7	Multi-Hazard	Improve coordination and evaluation of technical and engineering gaps in communications capabilities for natural hazards event response. (METCOM is currently doing an assessment.)	Emergency Management	City Administration; METCOM 911	Short Term (1-2 years)
MH-8	Multi-Hazard	Review, and if necessary, revise emergency management and business continuity plans, policies, and ordinances to ensure effective response, business continuity, and post-disaster recovery efforts. (Next update in 2018.)	Emergency Management	City Administration; City Council	Short Term (1-2 years)
MH-9	Multi-Hazard	Identify larger equipment that needs to be purchased that would support response during a disaster.	Emergency Management	City Administration; City Council	Short Term (1-2 years)
MH-10	Multi-Hazard	Secure memoranda of understanding for alternative sites that could be used for essential city functions if city buildings are not usable.	Administrative Services Director	City Council	Short Term (1-2 years)

Source: City of Silverton HMP Steering Committee, 2016.

Table SV-2. Silverton Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Drought					
DR-1	Drought	Participate in implementing the Marion County Drought Contingency Plan	Water Quality Supervisor - Public Works	Marion County; North Santiam Drought Contingency Committee	Ongoing
Earthquake					
EQ-1	Earthquake	Seek voter approval for construction of City of Silverton Police Facility/Emergency Operations Center.	City Manager and Council	Fire Marshal; Police Chief	Mid Term (3-5 years)
EQ-2	Earthquake	Following seismic evaluation of the West C and Main Street over Silver Creek, seek funding to reinforce or replace as needed.	Public Works Director	Marion C.; ODOT	Mid Term (3-5 years)
EQ-3	Earthquake	Assess the seismic strength of Silverton's sewage treatment system and develop improvements accordingly as part of the sewage system's current update efforts.	Public Works Director, Water Quality Supervisor	City Council	Short Term (1-2 years)
EQ-4	Earthquake	Coordinate with Silverton School District to seek funding to assess and seismically retrofit school buildings that are vulnerable to collapse, including Mark Twain Middle School and the Robert Frost Elementary School.	Administrative Services Director	Silverton School District; Business Orgon IFA (seismic grant program); City Council	Mid Term (3-5 years)
EQ-5	Earthquake	Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices through public education and the Map My Neighborhood program.	Administrative Services Director	Marion Co.	Short Term (1-2 years)
EQ-6	Earthquake	Update comprehensive plan to reflect the latest information on seismic hazards.	Community Development	Planning Commission; DLCD	Mid Term (3-5 years)
EQ-7	Earthquake	Evaluate the installation of automatic shut-off valves in all city facilities that use natural gas.	Engineering	Northwest Natural	Ongoing
EQ-8	Earthquake	Send city employees to the County's ATC 20 training.	Administrative Services Director	City/County Emergency Management	Ongoing
EQ-9	Earthquake/ Multi-Hazard	Encourage residents to prepare and maintain at minimum two-week survival kits.	Emergency Management	CERT	Ongoing

Source: City of Silverton HMP Steering Committee, 2016.

Table SV-2. Silverton Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Flood					
FL-1	Flood	Educate residents and business owners near Silver Creeks about how to manage flood risks.	City floodplain coordinator	DLCD; FEMA; Risk MAP	Ongoing
FL-2	Flood	Mitigate flood issues at the wastewater treatment facility though riverbank reconstruction and other flood mitigation measures.	Public Works Director, Water Quality Supervisor	City Council	Short Term (1-2 years)
FL-3	Flood	Continue compliance with the National Flood Insurance Program (NFIP) through the enforcement of local floodplain ordinances.	City floodplain coordinator	Administrative Services Director	Ongoing
Landslide					
LS-1	Landslide	Based on the new LIDAR information obtained from DOGAMI, create a list of at-risk infrastructure and develop a public infrastructure landslide mitigation program to address the landslide hazard.	Public Works Director	DOGAM; Marion Co.	Short Term (1-2 years)
Wildfire					
WF-1	Wildfire	Implement the wildfire mitigation actions for Silverton found in the Marion County Community Wildfire Protection Plan when an updated plan becomes available.	Fire Marshall	Marion Co.	Ongoing
WF-2	Wildfire	Review Marion County's development codes together with the Marion County Planning Department to develop ways to mitigate wildfires near Silverton.	Fire Marshall	Community Development	Short Term (1-2 years)
Severe Weather					
SW-1	Severe Winter Storm	Continue to educate citizens about ways to weatherize their homes, as well as safe emergency heating equipment. [This could be improved]	Emergency Management	PGE	Ongoing
SW-2	Windstorm	Continue to support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	Community Development	PGE	Ongoing
SW-3	Windstorm	Regularly assess the health of trees in Coolidge McClaine Park to prevent damage to buildings and utilities from falling trees.	Parks and Recreation	Public Works Maintenance	Ongoing

Source: City of Silverton HMP Steering Committee, 2016.

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Silverton addendum to the Marion County HMP. This addendum designates a convener and a coordinating body to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional HMP, the City will look for opportunities to partner with the county. The City's steering committee will convene after re-adoption of the City of Silverton addendum on an annual schedule; the county meets on a semi-annual basis. The City of Silverton Convener will participate in the Marion County HMP meetings and will report on city specific activities as appropriate. The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the City's mitigation strategy (actions). The convener will also remain active in the county's implementation and maintenance process (see Volume I, Section 4 for more information).

The City will utilize the same prioritization process as the county (See Volume I, Section 4: Plan Implementation and Maintenance and Volume IV, Appendix D: Economic Analysis of Hazard Mitigation Projects for more information).

Implementation through Existing Programs

Many of the Hazards Mitigation Plan's recommendations are consistent with the goals and objectives of the City's existing plans and policies. Where possible, the City of Silverton will implement the HMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the HMP's action items through such plans and policies increases their likelihood of being supported and implemented.

Silverton's Comprehensive Plan was first acknowledged by the Oregon Land Conservation and Development Commission in 1987.[1] The City most recently completed updates to the plan, including updates to the Natural Hazards section, in December of 2013 and August of 2014. The Silverton Comprehensive plan indicates that the flood and earthquake hazards are the "two major types of natural hazards" that are estimated to affect the city. There is no mention in the natural hazards section of landslide or wildfire (listed under Statewide Planning Goal 7). The plan does contain a general goal to "Protect life and property from natural disasters and hazards." In addition, the plan contains three specific policies related to the flood hazard. There are no other hazard related policies listed. The City implements the plan through the Silverton Land Development Code, first adopted in 1998. The City has completed numerous updates since, with the most recent occurrence in November of 2016.

Silverton currently lists the following as attachments to the Comprehensive Plan:

- Master Sewer Plan Update 1992

[1] Note, LCDC acknowledged the Salem Area Comprehensive Plan in 1982. Silverton prepared and adopted the Silverton Comprehensive plan in January of 1987 with LCDC acknowledging it as an Amendment to the Salem Area Comprehensive Plan in February of 1987.

- Master Sewer Plan Update December 1993
- Dual Interest Area Agreement
- Master Sewer Plan Update January 30, 2003
- Parks & Recreation Master Plan dated January 2008
- City of Silverton Transportation System Plan (April 2009) Part 1
- City of Silverton Transportation System Plan (April 2009) Part 2

For more information, refer to http://www.Silverton.org/Adopted-Plans-Studies/.

Continued Public Participation

Keeping the public informed of the City's efforts to reduce the city's risk to future hazard events is important for successful plan implementation and maintenance. The City is committed to involving the public in the plan review and updated process. See Volume I, Section 4, for more information.

Plan Maintenance

The Marion County Multi-Jurisdictional Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the City will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

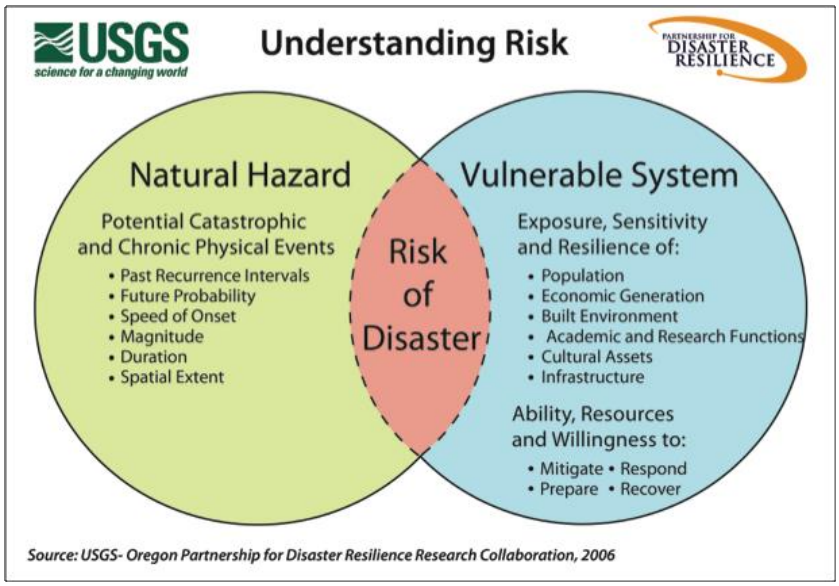
Risk Assessment

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

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein, and within Section 2, *Risk Assessment*, and Appendix C, *Community Profile*. The risk assessment process is graphically depicted in Figure SV-1 below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure SV-1. Understanding Risk



Risk Assessment Approach

A risk assessment is intended to provide the, "factual basis for activities proposed in the strategy to reduce loses from identified hazards."[2] To complete the risk assessment, the HMP update team first updated the description, type, location and extent of each hazard. Next, the team updated the vulnerability information based on each hazard's potential impact on the community.

The Marion County Basic Plan (Volume I, Section II) Risk Assessment describes in detail the methods used to assess risk. In summary, Marion County has prepared a Threat Hazard Identification and Risk Assessment as a formal annex to the Marion County Emergency Operation Plan. The assessment uses a method developed by BOLD Planning.[3] This city

[2] 44 CFR 201.6(2)(i)

[3] BOLD Planning is a consulting firm specializing in the development of actionable emergency plans. For more information, visit: http://www.boldplanning.com/

addendum builds on the county level assessment to produce a similar assessment for the City of Silverton. The assessment specifically examines:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

Refer to Page 2-4 of the Marion County Basic HMP for a description of the scoring values for each ranking category.

Hazard Analysis

The assessment identifies three levels of risk: High, Moderate and Low.

High - High probability of occurrence; at least 50 percent or more of population at risk from hazard; significant to catastrophic physical impacts to buildings and infrastructure; major loss or potential loss of functionality to all essential facilities (hospital, police, fire, EOC and shelters).

Moderate - Less than 50 percent of population at risk from hazard; moderate physical impacts to buildings and infrastructure; moderate potential for loss of functionality to essential facilities.

Low - Low probability of occurrence or low threat to population; minor physical impacts.

A summary of the risk assessment findings and rankings is presented below.

Table SV-3. Hazard and Vulnerability Assessment Summary

Hazard Profile Summary for Silverton Usinging Bold Planning Analysis Scoring							
Natural Hazard	Probability	Warning Time	Magnitude	Duration	CPRI	Local Planning Significance	County Planning Significance
Weight Factor	0.45	0.3	0.15	0.1			
Earthquake*	4	4	4	4	4.00	High	High
Severe Weather/Storm**	4	1	3	3	2.85	Moderate	High
Flood	3	2	3	4	2.80	Moderate	High
Drought	3	1	2	4	2.35	Moderate	High
Extreme Weather - High Temperature	3	1	2	4	2.35	Moderate	Moderate
Wildland Interface Fire	1	4	2	2	2.15	Moderate	Moderate
Dam or Levee Failure	1	2	4	4	2.05	Moderate	Moderate
Landslide	2	2	2	2	2.00	Moderate	High
Volcanic Eruption	1	1	1	4	1.30	Low	Low
*Note: Earthquake probability listed to match county level analysis. See below for more detailed probability assessment.							
**Note: Includes tornado hazard							

Source: BOLD Planning Risk Assessment Method; Analysis by UO Community Service Center.

Community Asset Identification

This section provides information on city-specific assets. For additional information on the characteristics of Silverton, in terms of geography, environment, population, demographics, employment and economics, as well as housing and transportation see Volume III, Appendix C, *Community Profile*. Many of these community characteristics can affect how hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city-specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Community Characteristics

The City of Silverton is located in Marion County, Oregon, straddling the banks of Silver Creek. The city is bisected by Highway 214 running roughly north-south and Highway 213 running roughly northeast-southwest. The city is approximately 15-miles west of the Salem-Keizer metro area. Silverton is located in Oregon's Willamette Valley, which experiences a moderate climate. In August, the average high temperature is 82 degrees and the average low temperature is 51 degrees. Wintertime temperatures in January range from an average high of 46 degrees to an average low of 33 degrees. The average annual precipitation is 39.9 inches.

The US Census lists Silverton's 2015 population at 9,590. This represents a 22.5% increase from 2000. For more demographic information, refer to Appendix C.

Economy

As with other early settlements throughout Marion County, proximity to water fueled early industry. Today, Silverton is home to the Oregon Garden, a private botanical wonderland attracting visitors from throughout the region. The city serves as a bedroom community to Salem and Portland. Its strong service economy caters to locals and tourists alike. Today, Silverton's primary employment sectors are health, manufacturing, retail, education and leisure, and hospitality. Median household income in Silverton is $53,929. For more economic information, refer to Appendix C.

Critical and Important Facilities

Critical and important facilities include the following:

Transportation

- Bridges:
    - Main St Bridge (ODOT bridge) – 12" waterline, forced sewer main, gas line, phone lines (this is the main switch into the Frontier station), fiber
    - C St Bridge (ODOT) – nothing attached
    - James Ave (City owned) – 8" waterline
- Highway 213 is the main east-west highway that connects Silverton with Salem to the west, and Oregon City to the northeast.
- Highway 214 is the major north-south highway that connects Silverton with Mount Angel and Woodburn to the north and Silver Creek Falls State Park and Highway 22 to the south.
- Highways 213 and 214 intersect in Silverton's commercial downtown.
  Note: Every route into town requires crossing a bridge – how will they get to the Aurora airport if bridges are out?
  Note: Silver Creek earthen dam and spillway – there isn't great access to the earthen dam (easy to get there from SW, but not NE)

Energy

- Portland General Electric is the only power supplier
  Note: Only one substation, and if it goes down, the entire town is affected.

Note: It is unlikely PGE will immediately provide assistance to Silverton in the event of a large-scale disaster.

- Fuel:
    - City Hall/Police – natural gas generator
    - Early warning dam building (monitoring building) – propane generator (150 gallons of propane stored, which will probably last 2 weeks)
    - City Shops – Generac propane generator (300 gallons of propane stored)
    - Edison pump station – propane generator
    - The City also has two very small emergency generators that run on gasoline

Water

- Drinking Water:
    - Abiqua Creek (primary) and Silver Creek are the main water supply sources for the city.
    - Abiqua diversion dam and 7-mile supply pipeline into town.

  Note: Pipeline was replaced in 1995, but there's a section that might fail in an earthquake. If water isn't available from Abiqua Creek (due to this issue), it would be possible to pull from Silver Creek.
    - Two water treatment plants on Ames Street, with a combined treatment capacity of 5.5 million gallons per day. (Need to find out about generators at each plant).
    - Three booster pump stations (Edison pump station, at the plant, Main St. pump station).
    - Three treated water storage tanks totaling 4.5 million gallons.
    - Reservoir (420 million gallons of storage) contained by the Silver Creek Dam (this is the earthen dam) southeast of the city.
- Wastewater:
    - Schemmel Lane Wastewater Treatment Plant treats the entire city.

Communication

- Communication towers:
    - Eastview Lane – tower with a repeater owned by Verizon, backup propane generator
    - Tower on top of City Hall
    - Tower on water plant on Ames
    - Tower off of Commerce owned by Wave Broadband
- Police, Fire, and Public Works can all communicate through radio.
  Note: All police cars connected to communication through cell towers – if cell towers aren't functional, police cars won't have computer access (just radio).
  Note: If Metcom goes down, 819 Railway Avenue becomes the dispatch center.

Emergency services

- Fire (Silverton Rural Fire District):
    - Station 1 (Main Station) (819 Rail Way NE, Silverton 97381)
    - Station 2 (13404 Riches Rd SE, Silverton 97381)
    - Station 3 (17447 Abiqua Rd NE, Silverton 97381)
    - Station 8 (490 3rd St., Scotts Mills 97375)
    - Station 9 (4724 Crooked Finger Rd NE, Scotts Mills 97375)

- Police:
    - Silverton Police Department (306 S. Water St.)
- Medical
    - Woodburn Ambulance substation (316 Phelps)
    - Silverton Hospital (342 Fairview St.) – 48-bed medical facility

Cultural/historical resources

- On the National Register of Historic Places:
    - Calvary Lutheran Church and Parsonage "White Steeple Church" (314 Jersey St.)
    - Downtown Silverton Commercial Historic District
    - Seven or eight homes listed around town
- Silverton Country Museum (428 South Water St.)
- Oregon Garden, containing the Gordon House, the only house designed by Frank Lloyd Wright in Oregon (879 W Main St.)

Functional and Access Needs (Vulnerable Populations)

- Silver Falls School District contains five public schools in the city. In 2010, 8.45% were in an ESL program.
- Assisted living facilities:
    - Davenport House/Davenport Place (930 Oak St.)
    - Wisdom Keepers Senior Care Home (171, 173 Steelhammer Rd.)
    - Marquis Silver Gardens (115 S. James St.)
    - Lone Oaks Care Homes (331 Lone Oaks Loop)
    - Silverton Senior Center (115 Westfield St.)
- Home for mentally challenged adults (1118 Florida Dr.)
- Silvertown 1 & 2 with senior and disabled adults (1 – 1000 N 2nd St.; 2 – 1115 mills St.)
- Silverton Mobile Estates (1307 S Water St.)
- Twilight Ct. (811 S Water) – low-income housing

Hazard Characteristics

Drought

The characteristics of drought in Silverton are the same for the county as a whole.

Table SV-4. Drought Summary

Hazard	Drought
Type	Climatic
Speed of Onset	Slow
Location	Varies, County Wide
Extent	Moderate to Severe Drought*
Prior Occurance	Three > 6 months duration since 1982
Probability	~9%

*Defined as between -2 and -4 on the National Resource Conservation Service (NRCS) Surface Water Supply Index (SWSI)

Sources: Oregon NHMP; NRCS; analysis by OPDR

The probability of drought in Silverton is likely, the same as for the county as a whole. Silverton relies on surface water and reservoir storage for its water supply source and historically drought has not been an issue. The City has a water curtailment plan that they have tested in the past even though conditions did not require it. Therefore, Silverton's vulnerability is low. Overall, the planning significance of drought in Silverton is moderate.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of drought hazards, as well as the location and extent of a potential event. Due to a cool, wet climate, past and present weather conditions have generally spared Marion County communities from the effects of drought. Governor Kate Brown declared a drought emergency for all of Marion County in September 2015.

As noted above, Silverton's primary water supply comes from Abiqua Creek via the Abiqua diversion dam and transmission pipeline. The transmission line, replaced in 1995, runs seven miles into town. The Silverton steering committee noted that there is a section that could fail in an earthquake. However, the City has a secondary source of water in Silver Creek. Silver Creek supplies 420 million gallons of raw water storage capacity provided by the Silverton Reservoir. Raw water from these two sources is treated for consumption at two treatment facilities located on Ames Street. The City is capable of treating up to 5.5. million gallons of water per day and has 4.5 million gallons of treated water storage capacity. The City maintains three (3) pump stations (Edison pump station, Main Street pump station, and the treatment plant pump).

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Earthquake

The characteristics of a crustal earthquake are similar to the county as a whole.

Table SV-5. Earthquake Summary Crustal

Hazard	Earthquake - Crustal
Type	Geologic
Location	Multiple active faults; Willamette Valley
Speed of Onset	Rapid
Extent	Very Strong to Severe shaking ~ 500 yrs*
Prior Occurance	One over Magnitude 5 last 100 yrs**
Probability	Approximately 1% annual

*DOGAMI HazVu; ** PNSN - 1993 Scotts Mills just north of Marion County

Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

The characteristics of a Cascadia subduction zone earthquake are the same as the county.

Table SV-6. Earthquake Summary Subduction

Hazard	Earthquake - Subduction
Type	Geologic
Location	Primarily west of the Cascades; CA - BC
Speed of Onset	Rapid
Extent	Catastrophic
Prior Occurance	One over Magnitude 9 last 500 yrs
Probability	Magnitude 9+ is 7% - 12% over 50 yrs**

*DOGAMI HazVu; **Oregon Natural Hazard Mitigation Plan, anlysis by Oregon Department of Geology and Mineral Industries.

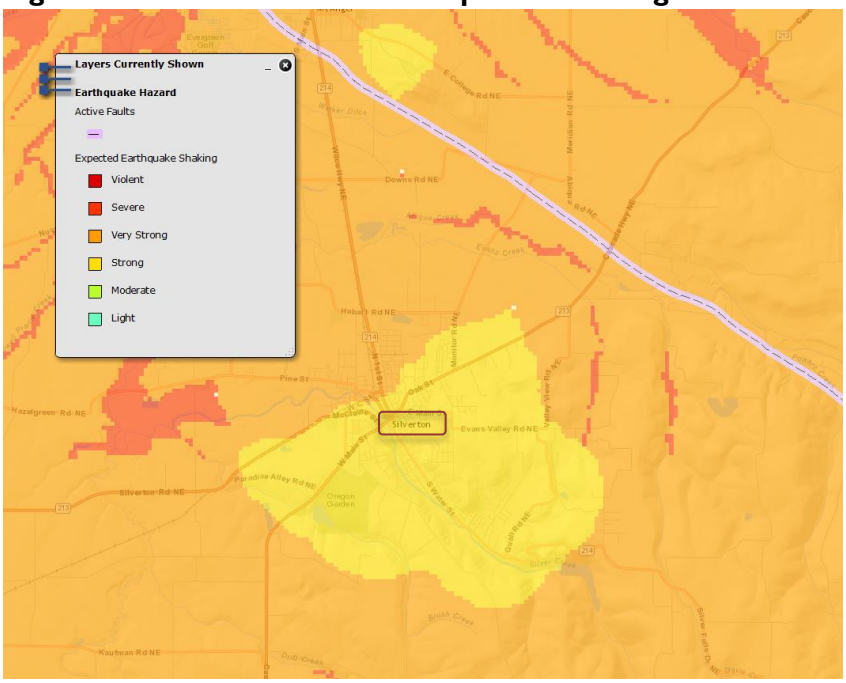
Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

Silverton's probability for a Crustal Earthquake event is "possible" and their vulnerability to a Crustal Earthquake event is "limited". The county steering committee determined that the probability for a Cascadia Subduction Zone (CSZ) Earthquake event is "highly likely" and that the vulnerability to a Cascadia Earthquake event is "catastrophic". This hazard was not rated as distinct CSZ and crustal events in the previous HMP. An active earthquake fault located north of the city exists within two miles of the Silverton City Limit. Other active faults exist within five-miles to the northeast and southwest. The 1993 Scott Mills quake caused $28 million in damages to cities throughout Marion County. No damaging earthquake events occurred during the previous five years.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of earthquake hazards, history, as well as the location and extent of a potential event. Generally, an event that affects the county is likely to affect Silverton as well. Previous occurrences are well-documented within the county's plan, and the community impacts described by the county would generally be the same for Silverton as well.

Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any particular site. In many major earthquakes, damages have primarily been caused by the behavior of the soil. Figure SV-2 shows that ground shaking in Silverton for both crustal and subduction earthquakes are expected to be strong and very strong, with some outlying areas experiencing severe shaking.

Figure SV-2. Active Faults and Expected Shaking



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

The Silverton steering committee identified earthquake damage to bridges and nearby dams as a primary concern. Transportation isolation and inundation due to dam failure could both have significant impacts on the city. The City's priority actions reflect these concerns.

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 the "probability of collapse" due to the maximum possible earthquake for any given area. Within the city of Silverton, the following buildings were given a "moderate" or "high" probability of collapse:

- Mark Twain Middle School: *high (> 10%)*
- Robert Frost Elementary School: *high (> 10%)*
- Eugene Field Elementary School: *high (> 10%)*
- Silverton High School (Schlador St. Campus): *very high (100%)*

The Silver Falls School District has completed several important school seismic mitigation projects since the last HMP. As a significant mitigation success, Silverton completed construction of the second phase of the Pine Street High School Campus in 2009. All high school students are now enrolled at the new high school. Further, in 2016, the district completed conversion of the Schlador Street Campus for use as a new middle school. The original multi-story (1938) portions of the old high school building remain intact, however they are no longer used for student instruction. Completion of the Silverton Middle School project resulted in the following school changes:

- Robert Frost School (currently grades 4,5,6) now houses grades 3, 4 and 5
- Mark Twain School (currently grades 7,8) now houses grades K, 1 and 2

- Eugene Field Elementary School has been liquidated by the district

Silverton is also in the process of seeking voter approval to construct a new police and emergency operations center.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Flood

Table SV-7. Flood Summary

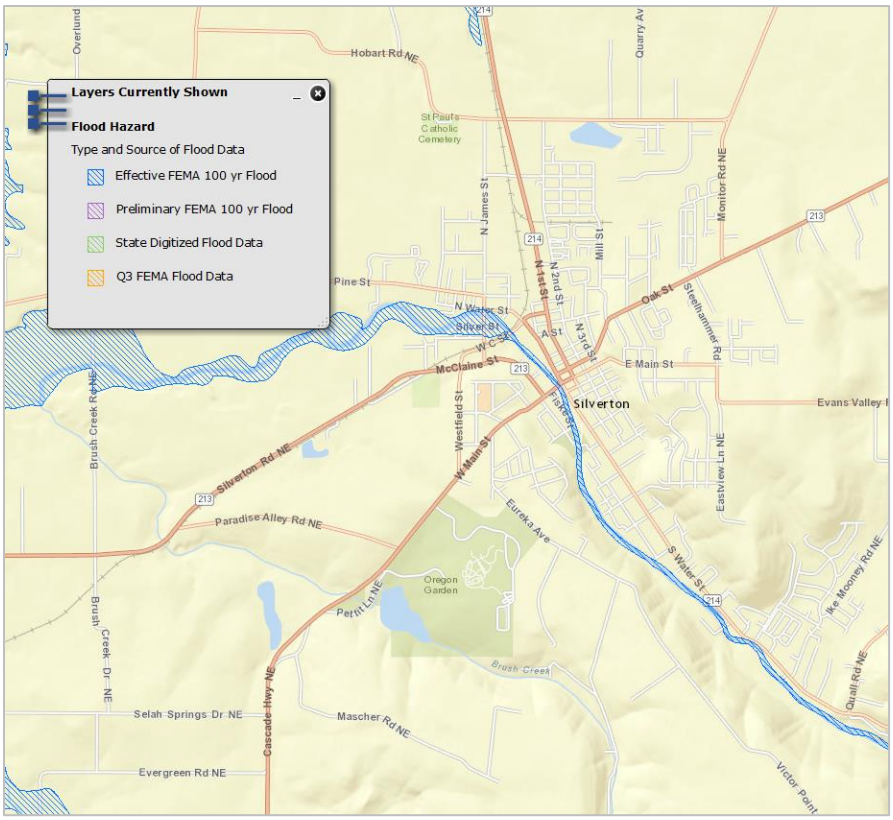
Hazard	Flood
Type	Climatic
Speed of Onset	Slow to moderate
Location	Mapped flood zones, floodplain
Extent	Moderate to severe
Prior Occurance	Four significant events since 1964
Probability	1% annual within SFHA

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, Risk Assessment, describes the causes and characteristics of flooding hazards within the region. The city's probability for riverine flood is likely and their vulnerability to flood is critical. In January of 2013 the City activated the Emergency Operations Center in response flood impacts. During the event the City activated its dam early warning system and monitored property impacts along Silver Creek. The adult care center on James Avenue sustained flooding impacts. Additionally, a tree the fell into the creek resulted in water backing up behind with localized flooding impacts as a result.

Portions of Silverton have areas of flood plains (special flood hazard areas). These include areas along the Silver Creek. However, flood impacts are largely limited to the within the banks or Silver Creek where it passes through the city.

Figure SV-3. Special Flood Hazard Area



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

National Flood Insurance Program (NFIP)

FEMA modernized the Silverton Flood Insurance Rate Maps (FIRMs) in January of 2000. Table SV-1 shows that as of October 2016, Silverton has 81 National Flood Insurance Program (NFIP) policies in force. Of those, 37 are for properties that were developed before development of the initial FIRM. The last Community Assistance Visit (CAV) for Silverton was on March 31, 1995. Silverton is not a member of the Community Rating System (CRS). The table shows that roughly two-thirds of the flood insurance policies are for single-family residential homes with the bulk of the other one-third being other residential. There have been 12 paid flood claims in Silverton totaling $70,080.

The Community Repetitive Loss record for Silverton identifies no Repetitive Loss Properties[4] and no Severe Repetitive Loss Properties[5].

[4] A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

[5] A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Table SV-8. Flood Insurance Detail

Jurisdiction	Effective FIRM and FIS	Initial FIRM Date	Total Policies	Pre-FIRM Policies	Policies by Building Type: Single Family	2 to 4 Family	Other Residential	Non-Residential	Minus Rated A Zone	Minus Rated V Zone
Marion County	-	-	2,067	1,239	1,614	115	105	232	97	0
Silverton	1/19/2000	3/1/1979	81	37	51	4	21	5	22	0

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-FIRM Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss	CRS Class Rating	Last Community Assistance
Marion County	$ 514,268,700	298	226	16	$ 5,732,543	11	2	-	-
Silverton	$ 19,421,300	12	8	0	$ 70,080	0	0	N/A	3/31/1995

Source: Information compiled by Department of Land Conservation and Development, October, 2016.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Landslide

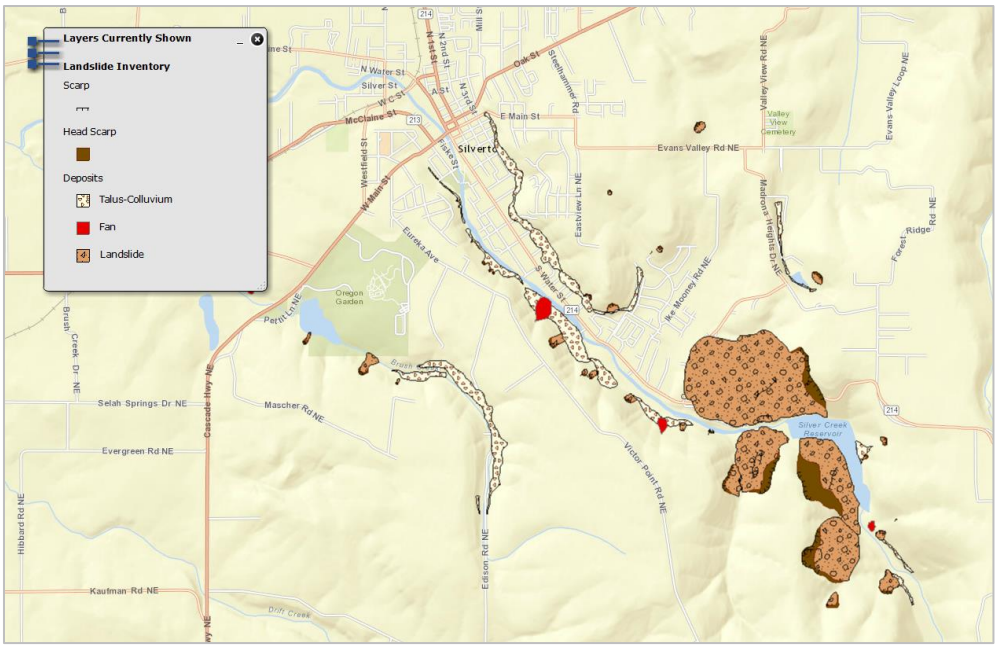
Table SV-9. Landslide Summary

Hazard	Landslide
Type	Climatic/Geologic
Speed of Onset	Slow to rapid
Location	Silver Creek Reservoir; west side Silver Creek south of Main St.; east of Water St. south of Main St.
Extent	Moderate to Very High
Prior Occurance	Evidence of old landslides; none in recent history
Probability	Possible

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

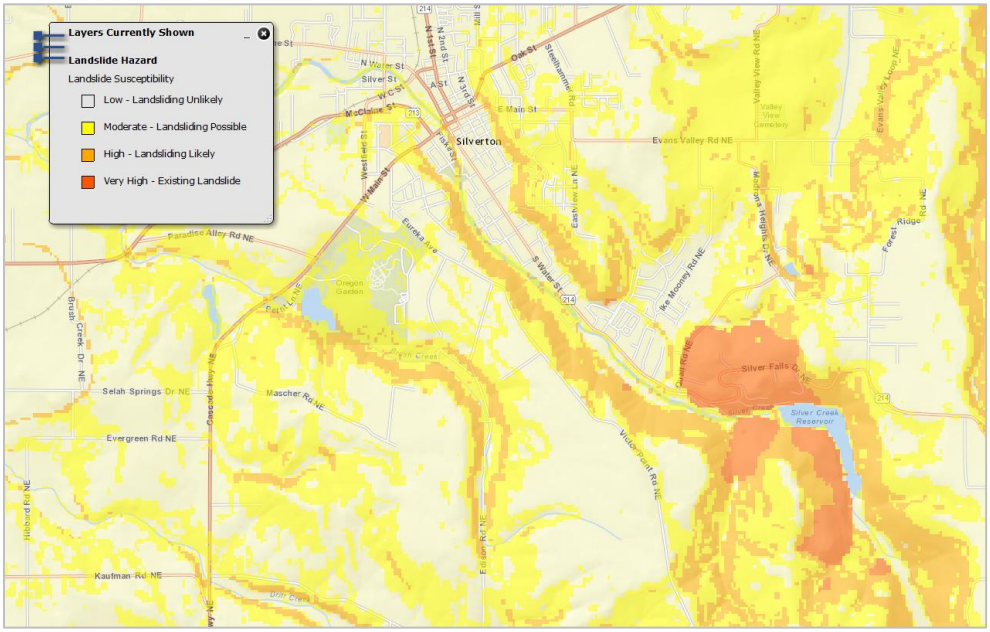
Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of landslides, and appropriately identifies previous landslide occurrences within the region. Silverton has a relatively flat topography, except for the area along Silver Creek southeast of Main Street and near the Silver Creek Dam. Silverton's probability for landslide is possible and their vulnerability to landslide is limited. Figure SV-4 shows the inventory of known historical landslides. Figure SV-5 shows the susceptibility and exposure to future landslides in Silverton.

Figure SV-4. Landslide Inventory



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

Figure SV-5. Landslide Susceptibility Exposure



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Volcano

Table SV-10. Volcano Summary

Hazard	Volcano
Type	Geologic
Speed of Onset	Slow to rapid
Location	Cascade Mountains
Extent	Minor
Prior Occurance	One significant event since 1916 (Mount St. Helens)
Probability	<1% annual

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes Silverton risk to volcanic events. The steering committee determined that the city's probability for volcanic event is unlikely and their vulnerability to volcano is negligible.

The causes and characteristics of a volcanic event are appropriately described within the county's plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county's plan. Silverton is very unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in 1980, the city was not impacted.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Severe Weather

Table SV-11. Severe Weather Summary

Hazard	Severe Weather/Storm
Type	Climatic
Speed of Onset	Slow to moderate
Location	Countywide
Extent	Minor to severe
Prior Occurance	Minor events occur annually; ~30 moderate to severe events over the past 130 years
Probability	100% for minor events, 23% for moderate to severe events

Sources: Marion County HMP

Windstorm

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of windstorms, as well as the location and extent of windstorm hazards. The city's probability for windstorm is highly likely and their vulnerability to windstorm is critical.

Significant wind events occur in Silverton each year. Damaging wind events are only slightly less common; once or twice per year the city will experience a windstorm event that will interrupt services, down trees, and cause power outages.

Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and very rarely, snow.

Winter Storm (Snow/Ice)

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of winter storms, as well as the location and extent of winter storm hazards. The City's probability for winter storms is highly likely and that their vulnerability to winter storms is critical.

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting the city typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from November through March.

Major winter storms can and have occurred in the Silverton area, and while they typically do not cause significant damage, they are frequent and have the potential to impact economic activity. The most recent winter storms (December 2016 – January 207) included snow and ice, transportation and power interruptions, and government office and school closures. A disaster declaration is currently pending.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Wildfire

Table SV-12. Wildfire Summary

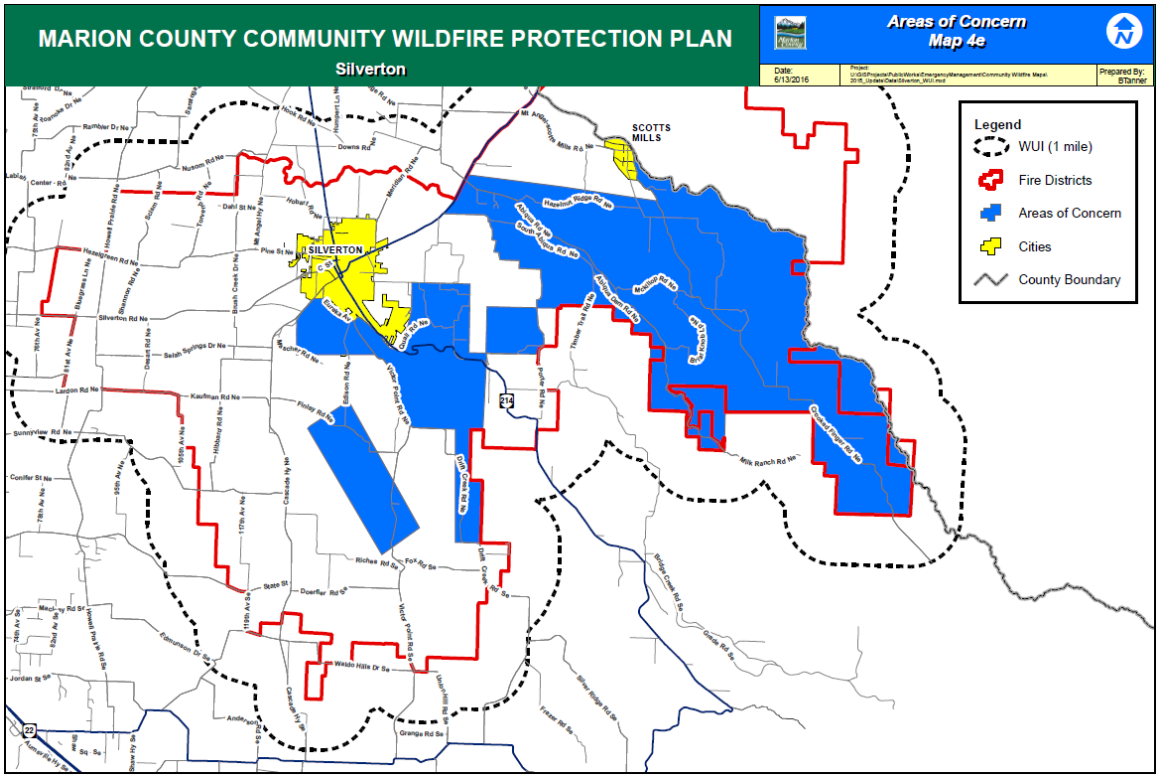
Hazard	Wildfire
Type	Climatic, Human Caused
Speed of Onset	Moderate to rapid
Location	Outside city limit
Extent	Minor to moderate
Prior Occurance	No history inside city limit
Probability	<1% annual

Sources: Marion County HMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of wildfires, as well as the county and city's history of wildfire events. The city's probability for wildfire is unlikely and the vulnerability to wildfire is limited. Silverton is located on the far western side of Marion County, surrounded on all sides by open farmland, waterways, or urban development. There are no forests within the city limits, and the closest forested area is Silverton Rapids Park, located half a mile west of the city. Due to its location, Silverton faces minimal risk of experiencing wildfires. There is no history of wildfire events in Silverton.

The County updated the Community Wildfire Protection Plan (CWPP) in 2016 and portions of Silverton are listed as having wildland urban interface (WUI) with areas of concern. Figure SV-6 depicts the areas near Silverton that the CWPP identifies as areas of concern. These areas should be targeted for fire suppression activities.

Figure SV-6. Areas of concern near Silverton.



Source: Marion County Community Wildfire Protection Plan (2016).

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

CITY OF STAYTON ADDENDUM

Purpose

This document serves as the City of Stayton's Addendum to the Marion County Multi-Jurisdictional Hazards Mitigation Plan (MHMP, HMP). This addendum supplements information contained in Volume I (Basic Plan) of this HMP. The Basic Plan serves as the foundation for this jurisdiction's addendum. Volume III (Appendices) provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the HMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer and fall of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with the Oregon Military Department's Office of Emergency Management (OEM), and Marion County cities, including Stayton, to develop an addendum to the Marion County HMP, which expired July 8, 2016. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County HMP, locally adopting it, and having it approved by FEMA, the City of Stayton will become eligible for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County HMP, and Stayton addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing the plan. For more information on the composition of the steering committee see the *Acknowledgements*, *Plan Summary*, and *Plan Process* (Volume III, Appendix B).

The Stayton Emergency Manager is the designated local convener of this addendum. The Convener will take the lead in implementing, maintaining, and updating the addendum to the HMP in collaboration with Marion County Emergency Management.

Representatives from the City of Stayton steering committee met formally on one occasion: October 13, 2016 (see Appendix B for more information).

The city's addendum reflects decisions agreed upon at the plan update meeting and during subsequent work and communication with OPDR.

The City of Stayton Steering Committee is comprised of representatives from the following departments:

- Convener, Emergency Manager
- Public Works
- Stayton Fire District
- North Santiam School District
- Santiam Hospital
- Pacific Power and NW Natural
- EMS
- Norpac
- Jeld-Wen

Stayton used multiple approaches to engage the public. First, the City established steering committee representatives from across the city. Next, the City actively participated in countywide community engagement activities described in Volume I, Section 4 and in Appendix B. City staff also presented the draft plan to the City Council during an open public council session. The steering committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process (see Appendix B for more information).

The Marion County HMP was approved by FEMA on August 17, 2017 and the Stayton addendum was adopted via resolution on August 7, 2017. This HMP is effective through August 16, 2022.

Mitigation Strategy

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

During the 2016 Stayton HMP development process, OPDR evaluated the risk assessment and presented a set of potential action items. In addition, the Stayton Steering committee presented additional action items and assisted with project prioritization. The proposed actions were re-reviewed by the steering committee to finalize. Stayton developed a list of priority actions (Appendix A-1), any actions that were not prioritized were placed in the Action Item Pool (Appendix A-2) and will be considered during the annual meetings.

Priority Actions

The City is listing a set of high priority actions in an effort to focus attention on an achievable set of high advantage activities over the next five-years. The City's priority actions are listed in Table ST-1 on the following page.

Action Item Pool

Table ST-2 on the following pages presents a pool of mitigation actions. This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available.

Table ST-1. Stayton Priority Action Items

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Priority Actions					
P-1	Flood	Upsize stormwater pipes at 6th and Pine, north end of Silvan Springs, and other streeets with chronic localized flooding issues.	Public Works	City Administrator; Finance; City Council	Short Term (1-2 years)
P-2	Multi-Hazard	Assess the wastewater and water treatment plants' ability to function during different hazard scenarios and begin to mitigate issues. This could include assessing and gathering supplies that will allow the plants to operate under emergency conditions and upgrading the facilities so they are more resilient.	Public Works	City Administrator; Finance; City Council	Short Term (1-2 years)
P-3	Earthquake	Purchase two portable temporary bridges to facilitate redundant transportion access to the wastewater treatment plan (via Wilco Rd. and Jetters Way) and downtown (via N. First Ave.).	Public Works	City Administrator; Finance; City Council	Short Term (1-2 years)
P-4	Earthquake	Acquire portable water filtration system(s) to improve water redundancy.	Public Works	City Administrator	Short Term (1-2 years)
P-5	Multi-Hazard	Purchase a satellite phone to improve communication redundancy.	Emergency Manager (Police Chief)	City Administrator	Short Term (1-2 years)

Source: City of Stayton HMP Steering Committee, 2016.

Table ST-2. Stayton Action Item Pool

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Multi-Hazard					
MH-1	Multi-Hazard	Create memoranda of understanding with fuel stations that allows emergency responders first access to fuel.	Public Works, Police, Fire	City Administrator; Finance; City Council	Short Term (1-2 years)
MH-2	Multi-Hazard	Work with fuel stations to understand their storage capacity and backup power capabilities.	Public Works, Police, Fire	City Administrator	Short Term (1-2 years)
MH-3	Multi-Hazard	Develop an agreement with the City's fuel distributor around providing fuel to backup generators during a disaster event.	Public Works, Police, Fire	City Administrator; Finance; City Council	Short Term (1-2 years)
MH-4	Multi-Hazard	Implement 2006-2007 water, wastewater, and stormwater master plan facility improvement recommendations. Include hazard vulnerabilities and mitigation measures for reducing infrastructure vulnerability. Consider hazards in all future facilities master plan updates.	Public Works	Administrative Services Director	Mid Term (3-5 years)
MH-5	Multi-Hazard	Acquire multi-band radios for public works.	Public Works	City Administrator; Finance	Short Term (1-2 years)
MH-6	Multi-Hazard	Develop memoranda of understanding with a port-o-potty company to establish "relief stations" throughout town post-event.	City Administrator	Finance; City Council	Short Term (1-2 years)
MH-7	Multi-Hazard	Update the City's Emergency Operations Plan. Invite more critical partners to participate in the plan update, including the hospital and private sector representatives. Update should cover: *Formalizing emergency shelter locations *What supplies to acquire for shelters *How to acquire supplies for shelters *Stronger relationship with the Red Cross - more official shelters and a Red Cross wagon	Emergency Manager	Marion Co.; City Administrator; City Council	Mid-Term (3-5 years)
MH-8	Multi-Hazard	Update the City's Continuity of Operations Plan.	Emergency Manager	Marion Co.; City Administrator; City Council	Mid-Term (3-5 years)
MH-9	Multi-Hazard	Provide mitigation and preparedness information and resources to residents via schools, faith organizations, and utility billings.	Police Chief	Marion Co.; CERT	Ongoing
MH-10	Multi-Hazard	Educate businesses about the importance of continuity of operations plans to make them more resilient to hazards.	Emergency Manager	Chamber of Commerce; CERT	Ongoing
MH-11	Multi-Hazard	Create a hazard resilience section on the City's website that provides mitigation and preparedness resources.	City Administrator	Marion Co.	Short Term (1-2 years)
MH-12	Multi-Hazard	Outreach to residents to increase participation in the Everbridge communication system.	Emergency Manager	City Council	Ongoing
MH-13	Multi-Hazard	Develop a list of medically dependent individuals.	Policy, Fire, Ambulance, Hospital	Marion Co.	Ongoing
MH-14	Multi-Hazard	Partner with Marion Co. to provide city staff with emergency management and response training.	Emergency Manager	Marion Co.	Ongoing
MH-15	Multi-Hazard	Host one emergency response exercize each year.	Emergency Manager	Marion Co.	Ongoing
MH-16	Multi-Hazard	Develop a list of individuals with medical training who could potentially assist during an event.	Emergency Manager	City Administraanr; City Council	Ongoing

Source: City of Stayton HMP Steering Committee, 2016.

Table ST-2. Stayton Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Drought					
DR-1	Drought	Participate in the Marion Co. Drought Contingency Plan.	Public Works	Marion Co.	Ongoing
Earthquake					
EQ-1	Earthquake	Host outreach events aimed at teaching residents how to turn off their gas and water valves.	Fire Chief	Northwest Natural Gas; Emergency Manager	Ongoing
EQ-2	Earthquake	Following seismic evaluation of West C and Main Street over Silver Creek, seek funding to reinforce or replace as needed.	Public Works Director	Marion C.; ODOT	Mid Term (3-5 years)
EQ-3	Earthquake/ Multi-Hazard	Encourage residents to prepare and maintain two-week (at minimum) survival kits.	Emergency Manager	CERT	Ongoing
Flood					
FL-1	Flood	Work with Marion Co. public works to clear and maintain ditches on county roads.	Public Works	Marion Co. Public Works	Ongoing
FL-2	Flood	Create a memorandum of understanding with Knife River so they will supply sandbags during a flood.	Floodplain Coordinator	City Administrator; Finance; City Council	Short Term (1-2 years)
FL-3	Flood	Identify residents with pumps who might share their equipment during a flood. Create equipment-sharing agreements with interested residents.	Public Works	City Administrator; Finance; City Council	Ongoing
Severe Weather					
SW-1	Severe Storm/Wind storm	Meet with utility companies to build relationships. Outcome should be an understanding of where infrastructure is located, who to contact in an emergency, and strategies for doing more outreach to the community.	Public Works, Police	Marion Co.	Short Term (1-2 years)
SW-2	Severe Storm/Wind storm	Work with Pacific Power to encourage them to upgrade old infrastucture.	Planning	Pacific Power	Short Term (1-2 years)

Source: City of Stayton HMP Steering Committee, 2016.

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Stayton addendum to the Marion County Multi-Jurisdictional HMP. This addendum designates a convener and a coordinating body to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional HMP, the City will look for opportunities to partner with the county. The City's steering committee will convene after re-adoption of the City of Stayton addendum on an annual schedule for plan maintenance purposes; the county meets on a semi-annual basis. The City of Stayton Convener will participate in the Marion County HMP meetings and will report on city-specific activities as appropriate. The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the city's mitigation strategy (actions). The convener will also remain active in the county's implementation and maintenance process (see Volume I, Section 4 for more information).

Regarding implementation, the City currently holds weekly management team meetings. Stayton intends to use those weekly meetings to perform ongoing work on mitigation action priorities.

The City will utilize the same prioritization process as the county (See Volume I, Section 4: Plan Implementation and Maintenance and Volume IV, Appendix E: Economic Analysis of Hazard Mitigation Projects for more information).

Implementation through Existing Programs

Many of the Hazard Mitigation Plan's recommendations are consistent with the goals and objectives of the City's existing plans and policies. Where possible, the City of Stayton will implement the HMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the HMP's action items through such plans and policies increases their likelihood of being supported and implemented.

Stayton's acknowledged comprehensive plan is the City of Stayton Comprehensive Plan. The City most recently completed updates to the plan in 2013. The Stayton Comprehensive plan indicates that the flooding is the "significant natural hazard in the Stayton Area." Stayton plans for the flood hazard, including implementation of a flood plain overlay district. The City also acknowledges potential catastrophic flooding associated with failure of Detroit Dam. The plan also references steep slope and landslides as another potential threat. The Comp Plan includes maps for each of the referenced hazards. Notably, the only hazards related goal in the plan is related to development on steep slopes. There is one hazard related policy in the comprehensive plan related to development on steep slopes.

Stayton currently lists the following documents related to the Comprehensive Plan:

- Local Wetland and Riparian Inventory (1999)
- Transportation System Plan (2004)

- Park and Recreation Master Plan (2005)
- Sublimity Interchange Area Management Plan (2006)
- Water Master Plan (2006)
- Wastewater Master Plan (2006)
- Downtown Transportation and Revitalization Plan (2007, amended 2010)
- Storm Water Master Plan (2009)

For more information, refer to http://www.staytonoregon.gov/page/planning_master_plans.

Continued Public Participation

Keeping the public informed of the City's efforts to reduce the city's risk to future hazards events is important for successful plan implementation and maintenance. The City is committed to involving the public in the plan review and updated process. See Volume I, Section 4, for more information.

Plan Maintenance

The Marion County Multi-Jurisdictional Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the City will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

Risk Assessment

This section of the HMP addendum addresses 44 CFR 201.6(b)(2) - Risk Assessment. In addition, this chapter can serve as the factual basis for addressing Oregon Statewide

Planning Goal 7 – Areas Subject to Natural Hazards. Assessing natural hazard risk has three phases:

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein, and within Section 2, *Risk Assessment*, and Appendix C, *Community Profile*. The risk assessment process is graphically depicted in Figure ST-1 below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure ST-1.Understanding Risk

Risk Assessment Approach

A risk assessment is intended to provide the, "factual basis for activities proposed in the strategy to reduce loses from identified hazards."[1] To complete the risk assessment, the HMP update team first updated the description, type, location and extent of each hazard. Next, the team updated the vulnerability information based on each hazard's potential impact on the community.

The Marion County Basic Plan (Volume I, Section II) Risk Assessment describes in detail the methods used to assess risk. In summary, Marion County has prepared a Threat Hazard Identification and Risk Assessment as a formal annex to the Marion County Emergency

[1] 44 CFR 201.6(2)(i)

Operation Plan. The assessment uses a method developed by BOLD Planning.[2] This city addendum builds on the county level assessment to produce a similar assessment for the City of Stayton. The assessment specifically examines:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

Refer to Page 2-4 of the Marion County Basic HMP for a description of the scoring values for each ranking category.

Hazard Analysis

The assessment identifies three levels of risk: High, Moderate and Low.

High - High probability of occurrence; at least 50 percent or more of population at risk from hazard; significant to catastrophic physical impacts to buildings and infrastructure; major loss or potential loss of functionality to all essential facilities (hospital, police, fire, EOC and shelters).

Moderate - Less than 50 percent of population at risk from hazard; moderate physical impacts to buildings and infrastructure; moderate potential for loss of functionality to essential facilities.

Low - Low probability of occurrence or low threat to population; minor physical impacts.

A summary of the risk assessment findings and rankings is presented below.

Table ST-3. Hazard and Vulnerability Assessment Summary

Hazard Profile Summary for Stayton Usinging Bold Planning Analysis Scoring							
Natural Hazard	Probability	Warning Time	Magnitude	Duration	CPRI	Local Planning Significance	County Planning Significance
Weight Factor	0.45	0.3	0.15	0.1			
Earthquake*	4	4	4	4	4.00	High	High
Severe Weather/Storm**	4	1	3	3	2.85	Moderate	High
Flood	3	2	3	4	2.80	Moderate	High
Drought	3	1	3	4	2.50	Moderate	High
Extreme Weather - High Temperature	3	1	2	4	2.35	Moderate	Moderate
Wildland Interface Fire	1	4	2	2	2.15	Moderate	Moderate
Dam or Levee Failure	1	2	4	4	2.05	Moderate	Moderate
Landslide	1	2	2	2	1.55	Low	High
Volcanic Eruption	1	1	1	4	1.30	Low	Low
*Note: Earthquake probability listed to match county level analysis. See below for more detailed probability assessment.							
**Note: Includes tornado hazard							

Source: BOLD Planning Risk Assessment Method; Analysis by UO Community Service Center.

Community Asset Identification

This section provides information on city-specific assets. For additional information on the characteristics of Stayton, in terms of geography, environment, population, demographics,

[2] BOLD Planning is a consulting firm specializing in the development of actionable emergency plans. For more information, visit: http://www.boldplanning.com/

employment and economics, as well as housing and transportation see Volume III, Appendix C, *Community Profile*. Many of these community characteristics can affect how natural hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city-specific assets during the planning process can assist in identifying appropriate measures for hazard mitigation.

Community Characteristics

The City of Stayton is located in Marion County, Oregon, at the confluence of the Santiam Canyon and Willamette Valley. Located roughly 15-miles east of Salem, the city is bordered to the north and east by Highway 22, the south and east by the Santiam River, and the west by agricultural lands. Stayton is located in Oregon's Willamette Valley, which experiences a moderate climate. In August, the average high temperature is 82 degrees and the average low temperature is 51 degrees. Wintertime temperatures in January range from an average high of 46 degrees to an average low of 33 degrees. The average annual precipitation is 39.9 inches. Stayton is relatively flat, except at the terminus of Santiam canyon in the northeast portion of the city.

The US Census lists Stayton's 2015 population at 7,725. This represents a 11.6% increase from 2000. For more demographic information, refer to Appendix C.

Economy

Stayton was founded as a mill city. Its location near a plentiful water source made it attractive for water-powered industry. Several mills, from timber to flour, operated in Stayton following its establishment. In the early part of the 20th century, Stayton transitioned to an emphasis on agricultural – the Norpac Foods, Inc. processing plant is currently the city's largest employer. Today, Stayton benefits from a relatively diverse local economy. Median household income in Stayton is $41,432. For more economic information, refer to Appendix C.

Critical and Important Facilities

Critical and important facilities include the following:

<u>Transportation</u>

- Bridges:

Table ST-4.Stayton Bridge Inventory

Water Body	Street	Owner	Inspection Date	Co-Located Utility				
				Sewer	Water	Electricity	Natural Gas	Telecomm
SALEM DITCH	N FIRST AVE	STAYTON	8/10/2016	YES	YES	YES	NO	YES
SALEM DITCH	N SECOND AVE	STAYTON	8/10/2016	NO	NO	NO	NO	NO
SALEM DITCH	N THIRD AVE	STAYTON	8/10/2016	NO	YES	NO	NO	NO
SALEM DITCH	W WASHINGTON ST	STAYTON	8/10/2016	YES	YES	NO	NO	NO
STAYTON DITCH	N HOLLY AVE	STAYTON	8/10/2016	NO	YES	NO	NO	NO
STAYTON DITCH	JETTERS WAY	STAYTON	8/10/2016	YES	YES	NO	NO	NO
STAYTON DITCH	E WATER ST	STAYTON	8/10/2016	NO	NO	NO	NO	NO
STAYTON DITCH	N FOURTH AVE	STAYTON	8/10/2016	NO	NO	NO	NO	NO
STAYTON DITCH	N FIRST AVE	MARION	N/A	NO	YES	NO	NO	NO
SALEM DITCH	N FOURTH AVE	STAYTON	N/A	NO	NO	NO	NO	NO
SALEM DITCH	N EVERGREEN AVE	STAYTON	N/A	YES	YES	NO	NO	NO
SALEM DITCH	WILCO RD	MARION	N/A	YES	YES	NO	NO	NO
SALEM DITCH	UPRR	UPRR	N/A	NO	NO	NO	NO	NO
SALEM DITCH	SHAFF RD	MARION	N/A	NO	NO	NO	NO	NO
MILL CREEK	GOLF CLUB RD	MARION	N/A	NO	NO	NO	NO	NO
MILL CREEK	CASCADE HIGHWAY	MARION	N/A	NO	NO	NO	NO	NO

Source: City of Stayton

Note: The water treatment plan lies across two bridges: 1 over the N Santiam R, 1 over the Stayton Canal. This could cause problems in the event of an earthquake that disables the bridges.
Note: The wastewater treatment plant lies across two bridges: 1 bridge on Jetters Way and 1 bridge over Salem Ditch on Wilco Rd. This could cause problems in the event of an earthquake that disables the bridges.
Note: Pacific Power employees would have to cross three bridges to reach the Pacific Power plant.

- Main roads through town:
  - State Highway 22 (North Santiam Highway)
  - Golf Club Rd/Wilco Rd.
  - Stayton Rd.
  - 1st St (Cascade Hwy) – leads to water treatment plant
- Public Transit: Cherriots bus system

Energy

- Pacific Power
- NW Natural
- The City gets all its fuel from Pacific Pride
- There are 3 commercial gas stations and one other fuel supplier (MNOP – Marc Nelson Oil Products)
- Police have a natural gas generator that won't run on any other fuel
- Public Works has several generators
- The Fire District has a generator

Water

- Drinking Water:
  - Source: N Santiam River via the Stayton Power canal

    - One shallow well – just supplemental
    - There are a very small number of residents on wells
    - Water treatment plant off of 1st Ave.
    - Water storage:
        - Pine St. = 1m gal
        - Regis St. = .5m gal
        - Old decommissioned storage tank on Holly

  Note: Stayton has access Salem's system and can buy from Salem if necessary, but there is no other water back-up source.

  Note: There are pump stations throughout the City, the pump station lines would likely not survive an earthquake.
- Wastewater:
    - Wastewater treatment plant located on Jetters Way.
    - Most of the sewer system is 50-year-old concrete pipe
    - Very, very few residents are on septic systems (in theory everyone connected to the city sewer system when it was installed).
    - Norpac has its own wastewater treatment ponds – on Jetters Way

Communication

- Communications towers:
    - Regis St. Reservoir – Police, Sprint
    - Pine St. Reservoir has cell antennas – Fire, T-Mobile
    - High school athletic field cell tower – Verizon (with a generator)
    - Cell tower south of Shaff and west of Wilco
    - Backup tower on the Police Department
- The City relies on cell phones to communicate
- Auxiliary radio access for Police (portable)
- Land line – SCTC (Stayton Cooperative Telephone Company)
- CERT has a radio system

Emergency services

- Fire:
    - Stayton Fire District, 1988 W. Ida St.
- Police:
    - Police Department, 386 N. 3rd Ave.
- Medical
    - Santiam Memorial Hospital, 1401 N. 10th Ave.

Cultural/historical resources

- Properties on the National Registry of Historic Places:
    - Deitrich Building (3rd and Florence)
    - Gehlens-Sims Building (2nd)
    - The City has a preliminary listing of downtown buildings that would qualify for the national registry.
- "The Brown House" Santiam Heritage Foundation (425 N. 1st Ave.)
- Library (515 N 1st Ave.)
- Community Center and City Swimming Pool (all next to library)

- Events that may have large crowds:
    - June: Summerfest and Car show– maybe between 2,000-5,000 visitors (last Saturday of June)
    - July: 4th of July – maybe 5,000 visitors
    - July: Stampede – at Sublimity fair grounds (slight impact to traffic in town)
    - September: Harvest Festival –at Sublimity fair grounds (slight impact to traffic in town)

Vulnerable populations

- Schools – enrollment ~2,400:
    - Stayton High School (757 W. Locust St.)
    - Stayton Middle School (1021 Shaff Rd. SE)
    - St. Mary's Catholic School (1066 N. 6th Ave.)
    - Regis High School (550 W. Regis St.)
    - Stayton Elementary School (875 N. 3rd Ave.)
- Daycares/preschools
    - Rise and Shine Day Care (2350 Martin Dr.)
    - Tree House Day Care (287 E Washington St.)
    - Tiny Hands Day Care (451 Hobson St.)
    - Highland Pre-school (1450 Fern Ridge Rd.) – First United Methodist Church
    - All Star Pre-school (975 Fern Ridge Rd.) – Foothills Church
- Assisted living
    - Brookdale Senior Living Solutions (2201 3rd Ave.)
- Santiam Senior Center (41818 Kingston Jordan Rd.)
- Apartment complexes for seniors:
    - Elder Manor (900 W Ida)
    - Stayton Manor (3rd and Washington)
    - Oak Apartment (10th and Santiam)
- Some Spanish-speaking residents, but most also speak English
- Stayton has a small Somali population, but most also speak English
- Low-income:
    - 47% of Stayton's housing stock is rental properties

Table ST-5. Government Subsidized Housing Developments from Stayton's Comprehensive Plan

Name	Location	# of Units	Type
Hollister Apartments	315 W Hollister St	20	family
Northridge Apartments	1633 N. 3rd Ave	24	family
Oak Park Village	1011-1087 N. 10th Ave	32	elderly
Stayton Elder Manor	660 N Ida St	32	elderly
Stayton Manor	820 N 3rd Ave	16	elderly
Westside Apartments	965 Gardner Ave	24	family
Wolf Ridge	1301-1371 E Santiam St	51	family

Source: Oregon Dept of Housing and Community Services

Hazard Characteristics

Drought

The characteristics of drought in Stayton are roughly the same for the county as a whole.

Table ST-6. Drought Summary

Hazard	Drought
Type	Climatic
Speed of Onset	Slow
Location	Varies, County Wide
Extent	Moderate to Severe Drought*
Prior Occurance	Three > 6 months duration since 1982
Probability	~9%

*Defined as between -2 and -4 on the National Resource Conservation Service (NRCS) Surface Water Supply Index (SWSI)

Sources: Oregon NHMP; NRCS; analysis by OPDR

The probability of drought in Stayton is likely, the same as for the county as a whole. Stayton relies on surface water from the North Santiam River via the Stayton Power canal. Raw water is directed into the City's slow sand filtration system. Once treated, finished potable water is delivered to residential, commercial, and industrial customers through 44 miles of water distribution pipes. Stayton also maintains a shallow well for supplemental water supply. Finally, Stayton maintains an intertie with the City of Salem and can purchase water from Salem if needed. The City has a water curtailment plan that they never had to use.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of drought hazards, as well as the location and extent of a potential event. Due to a cool, wet climate, past and present weather conditions have generally spared Marion County communities from the effects of drought. Governor Kate Brown declared a drought emergency for all of Marion County in September 2015. Stayton was close to local drought conditions during that event.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Earthquake

The characteristics of a crustal earthquake are similar to the county as a whole.

Table ST-7. Earthquake Summary Crustal

Hazard	Earthquake - Crustal
Type	Geologic
Location	Multiple active faults; Willamette Valley
Speed of Onset	Rapid
Extent	Very Strong to Severe shaking ~ 500 yrs*
Prior Occurance	One over Magnitude 5 last 100 yrs**
Probability	Approximately 1% annual

*DOGAMI HazVu; ** PNSN - 1993 Scotts Mills just north of Marion County

Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

The characteristics of a Cascadia subduction zone earthquake are the same as the county.

Table ST-8. Earthquake Summary Subduction

Hazard	Earthquake - Subduction
Type	Geologic
Location	Primarily west of the Cascades; CA - BC
Speed of Onset	Rapid
Extent	Catastrophic
Prior Occurance	One over Magnitude 9 last 500 yrs
Probability	Magnitude 9+ is 7% - 12% over 50 yrs**

*DOGAMI HazVu; **Oregon Natural Hazard Mitigation Plan, anlysis by Oregon Department of Geology and Mineral Industries.

Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

Stayton's probability for a Crustal Earthquake event is possible and their vulnerability to a Crustal Earthquake event is limited. The county steering committee determined that the probability for a Cascadia Subduction Zone (CSZ) Earthquake event is highly likely and that the vulnerability to a Cascadia Earthquake event is catastrophic. An active earthquake fault located northwest of the city exists within five miles of the Stayton City Limit. Other active faults exist within ten-miles to the west. The 1993 Scott Mills quake caused $28 million in damages to cities throughout Marion County. No damaging earthquake events occurred during the previous five years.

The City is working with Marion County to complete a seismic retrofit project on the North First Avenue (Stayton-Scio Road) bridge over the Santiam River. Stayton expects that this project will increase transportation redundancy, allowing travel north and south post-earthquake.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of earthquake hazards, history, as well as the location and extent of a potential event. Generally, an event that affects the county is likely to affect Stayton as well. Previous occurrences are well-documented within the county's plan, and the community impacts described by the county would generally be the same for Stayton as well.

Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any particular site. In many major earthquakes, damages have primarily been caused by the behavior of the soil. Figure ST-2 shows that ground shaking in Stayton for both crustal and subduction earthquakes are expected to be very strong. According to DOGAMI HazVu maps, there is little to no liquefaction potential in Stayton.

Figure ST-2. Active Faults and Expected Shaking

Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

The Stayton steering committee identified earthquake damage to the downtown central business district as a primary concern. Most of the buildings are old and constructed of masonry. The City's police department is also at risk of collapse during an earthquake. The City's priority actions reflect these concerns.

Additional local concerns include:

- Questions about the hospital's seismic condition. Historically, the City and hospital have had limited communication or coordination related the earthquake vulnerability.
- Police department is the highest priority critical facility for retrofit. Notably, it houses all of the city's computers.
- Stayton Community Center is the primary EOC (400 Virginia); secondary location is at the old 911 dispatch center.
- Pacific Power building will probably be standing (Wilco Rd. south end, across from Circle K) – this is their back up center for what operates the whole northwest.

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 the "probability of collapse" due to the maximum possible earthquake for any

given area. Within the City of Stayton, the following buildings received a "high" or "very high" probability of collapse:

- Stayton Elementary: *high (> 10%)*
- Stayton Middle School: *very high (100%)*
- Stayton High School: *very high (100%)*
- Stayton Police Department: *very high (100%)*
- Stayton Memorial Hospital: *high (> 10%)*
- Stayton Fire (west Ida): *very high (100%)*
- Stayton Fire (Ferry): *low (<1%)*

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Flood

Table ST-9. Flood Summary

Hazard	Flood
Type	Climatic
Speed of Onset	Slow to moderate
Location	Mapped flood zones, floodplain
Extent	Moderate to severe
Prior Occurance	Several minor events since 1964
Probability	1% annual within SFHA

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, Risk Assessment, describes the causes and characteristics of flooding hazards within the region. The city's probability for riverine flood is likely and their vulnerability to flood is limited.

Portions of Stayton have areas of flood plains (special flood hazard areas). These include areas along the Santiam River in the south and Mill Creek in the north. Overall, Stayton has relatively limited development in the mapped 100-year flood plain. However, the City's water and wastewater treatment plants are located adjacent to the Santiam River. Past flood events have threatened those critical facilities. As an additional note, Stayton has two irrigation canals that go through town. Those canals have head gates that can be closed. However, those gates have been breached at least once during historical flood events (e.g. 1996).

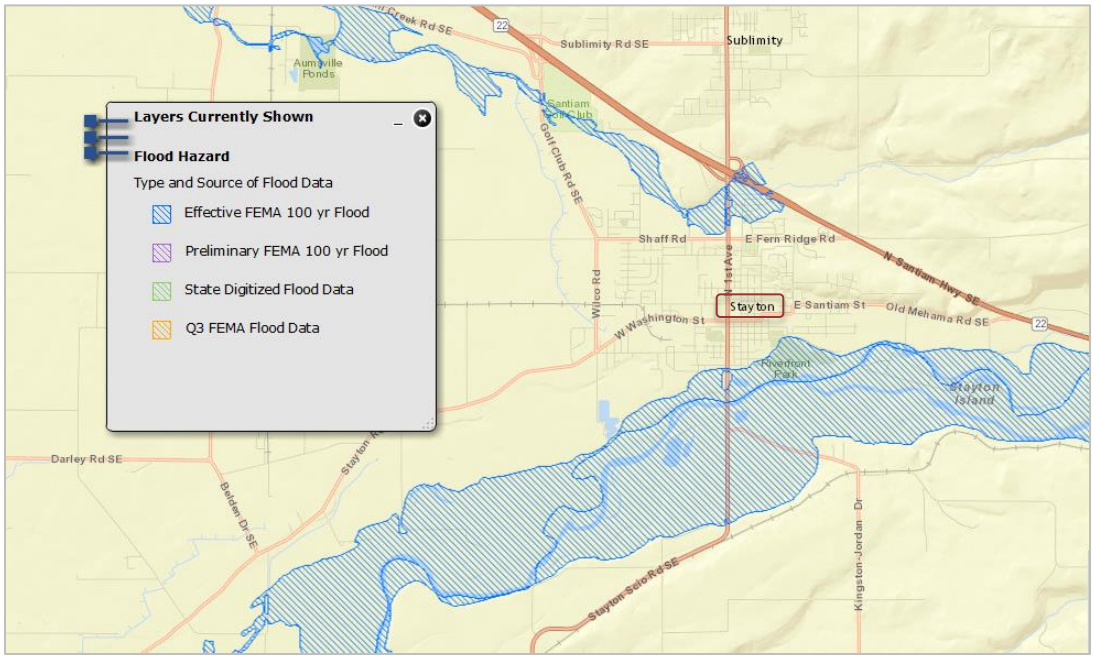
In 2006, the north portion of Santiam experienced significant flooding. The Santiam water treatment plant almost flooded during that event. In January of 2012, a warming trend corresponded with a rain on snow event that resulted in minor flooding in Stayton.

The City has successfully worked with the county to clear ditches along Shaff Road. This mitigation effort has reduced localized nuisance flooding through that corridor.

The Steering Committee specifically identified the following areas as subject to nuisance urban flooding:

- Silvan Springs subdivision has a small area of street that floods periodically, but the homes have not been impacted
- Undersized storm pipes cause localized flooding issues throughout town
    - Intersection of 6th and Pine is notable

Figure ST-3. Special Flood Hazard Area



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)

National Flood Insurance Program (NFIP)

FEMA modernized the Stayton Flood Insurance Rate Maps (FIRMs) in January of 2000. The table below shows that as of October 2016, Stayton has 27 National Flood Insurance Program (NFIP) policies in force. Of those, zero are for properties that were developed before development of the initial FIRM. The last Community Assistance Visit (CAV) for Stayton was on August 9, 2006. Stayton is not a member of the Community Rating System (CRS). The table shows that almost all of the flood insurance policies are for single-family residential homes, with two being for "other residential" uses. There has been 1 paid flood claims in Stayton totaling $8,200.

The Community Repetitive Loss record for Stayton identifies no Repetitive Loss Properties[3] and no Severe Repetitive Loss Properties[4].

[3] A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

[4] A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding

Table ST-10. Flood Insurance Detail

Jurisdiction	Effective FIRM and FIS	Initial FIRM Date	Total Policies	Pre-FIRM Policies	Policies by Building Type: Single Family	2 to 4 Family	Other Residential	Non-Residential	Minus Rated A Zone	Minus Rated V Zone
Marion County	-	-	2,067	1,239	1,614	115	105	232	97	0
Stayton	1/19/2000	3/1/1979	27		25	0	0	2	1	0

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-FIRM Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss	CRS Class Rating	Last Community Assistance
Marion County	$ 514,268,700	298	226	16	$ 5,732,543	11	2	-	-
Stayton	$ 8,510,300	1	0	0	$ 8,200	0	0	N/A	8/9/2006

Source: Information compiled by Department of Land Conservation and Development, October, 2016.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Landslide

Table ST-11. Landslide Summary

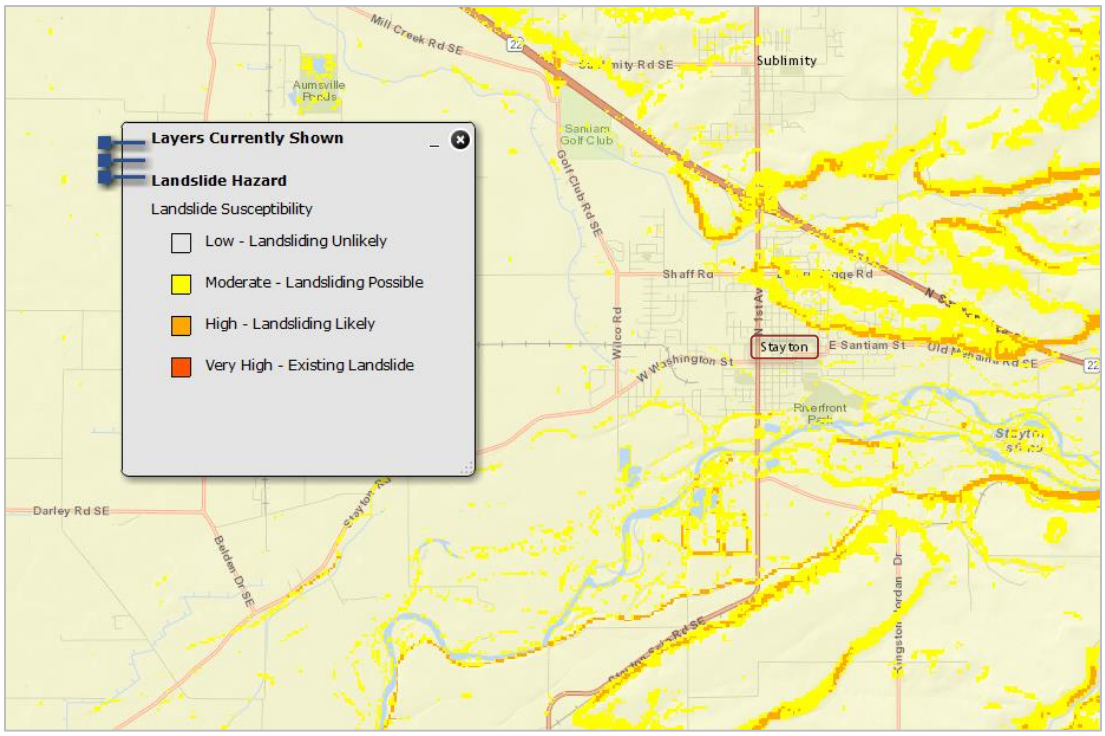
Hazard	Landslide
Type	Climatic/Geologic
Speed of Onset	Slow to rapid
Location	North of East Santiam Road
Extent	Minor to severe, but localized
Prior Occurance	Landslides occur annyally in Marion County
Probability	Possible to likely

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of landslides. DOGAMI does not currently identify existing landslides on the statewide inventory in Stayton. Stayton has a relatively flat topography, except for the area north of East Santiam Road at the terminus of Santiam Canyon. Figure ST-4 shows the susceptibility and exposure to future landslides in Stayton.

$20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Figure ST-4. Susceptibility and Exposure



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Volcano

Table ST-12. Volcano Summary

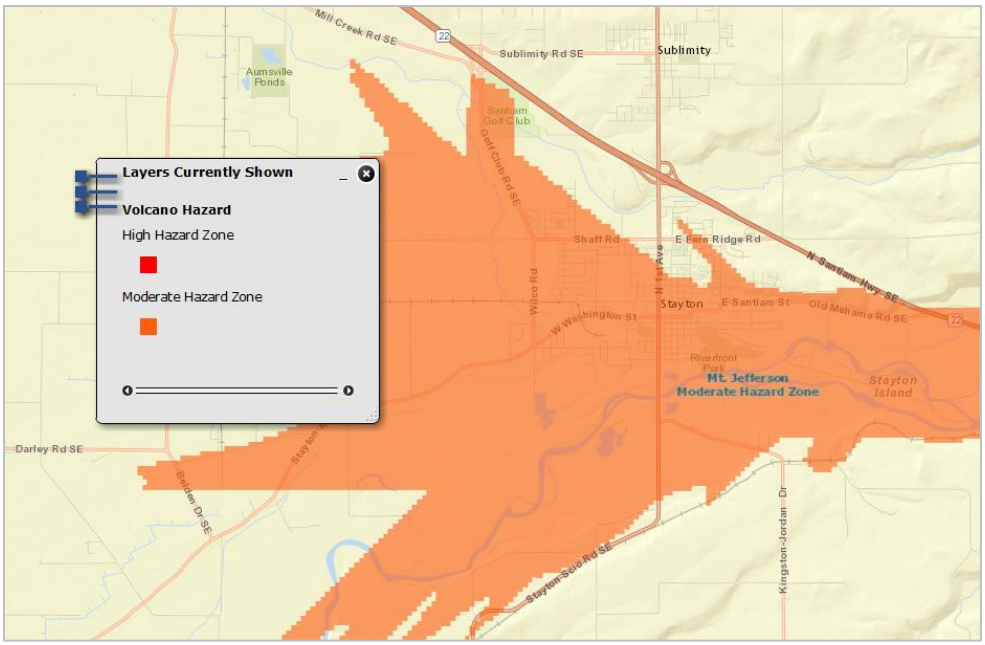
Hazard	Volcano
Type	Geologic
Speed of Onset	Slow to rapid
Location	Lahar flow impacts possible throughout Stayton
Extent	Critical to catastrophic
Prior Occurance	One significant event since 1916 (Mount St. Helens)
Probability	<1% annual

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes Stayton risk to volcanic events. The steering committee determined that the city's probability for volcanic event is unlikely and their vulnerability to volcano is critical to catastrophic.

The causes and characteristics of a volcanic event are appropriately described within the county's plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county's plan. When Mt. Saint Helens erupted in 1980, the city was not impacted. Notably, Stayton's location at the terminus of Santiam Canyon makes it susceptible to impacts from lahar flows originating at Mount Jefferson.

Figure ST-5. Susceptibility and Exposure



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Severe Weather

Table ST-13. Severe Weather Summary

Hazard	Severe Weather/Storm
Type	Climatic
Speed of Onset	Slow to moderate
Location	Countywide
Extent	Minor to severe
Prior Occurance	Minor events occur annually; ~30 moderate to severe events over the past 130 years
Probability	100% for minor events, 23% for moderate to severe events

Sources: Marion County NHMP

Windstorm

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of windstorms, as well as the location and extent of windstorm hazards. The City's probability for windstorm is highly likely and that their vulnerability to windstorm is critical.

Significant wind events occur in Stayton each year. Damaging wind events are only slightly less common; once or twice per year the city will experience a windstorm event that will interrupt services, experience downed trees, or cause power outages.

Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and very rarely, snow.

Winter Storm (Snow/ Ice)

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of winter storms, as well as the location and extent of winter storm hazards. The City's probability for windstorm is highly likely and that their vulnerability to windstorm is critical.

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting the city typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from November through March.

Major winter storms can and have occurred in the Stayton area, most recently in 2006, 2013, and 2016. While these events do not typically cause significant damage, they are frequent and have the potential to impact economic activity. The most recent winter storms (December 2016 – January 2017) included snow and ice. Transportation and power interruptions combined with government office and school closures. A disaster declaration is currently pending.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Wildfire

Table ST-14. Wildfire Summary

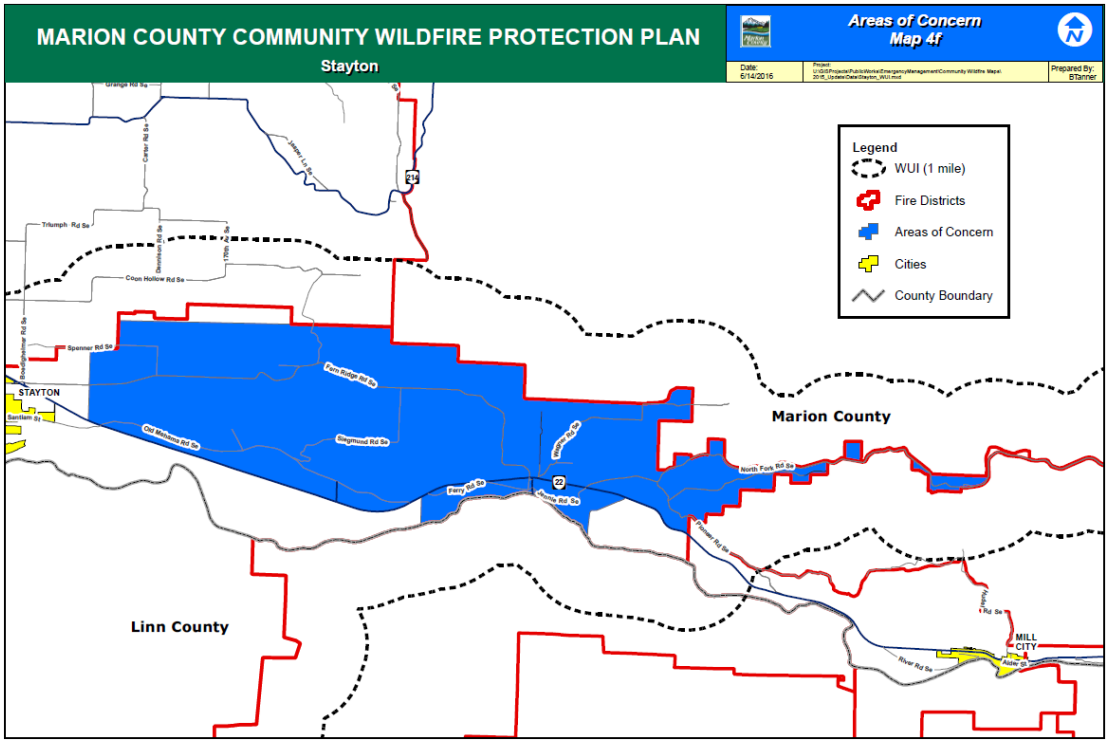
Hazard	Wildfire
Type	Climatic, Human Caused
Speed of Onset	Moderate to rapid
Location	Outside city limit
Extent	Minor to moderate
Prior Occurance	No history inside city limit
Probability	<1% annual

Sources: Marion County NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of wildfires, as well as the county and city's history of wildfire events. The city's probability for wildfire is unlikely and the vulnerability to wildfire is limited. Stayton has limited exposure to wildfire. Likely origination would be on agricultural lands outside the city limit or in wooded areas of Pioneer Park. Due to its location and limited fuels within the city, Stayton faces minimal risk of experiencing wildfires. There is no history of wildfire events in Stayton.

The County updated the Community Wildfire Protection Plan (CWPP) in 2016 and portions of Stayton are listed as having wildland urban interface (WUI) with areas of concern. Figure ST-6 depicts the areas near Stayton that the CWPP identifies as areas of concern. These areas should be targeted for fire suppression activities.

Figure ST-6. Areas of concern near Silverton.



Source: Marion County Community Wildfire Protection Plan (2016).

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Other Hazard or Concerns

The Stayton Steering Committee identified the following hazard issues or concerns during their meeting on October 13, 2016. While these hazards are non-natural, we've listed them here for reference.

- Cyber-attack in 2016 Ransom Ware/Bitcoinfiles were lost.
- Water and Wastewater only have fences w/barbed wire (low security) – potential vulnerability to domestic terrorism
- Industrial accident at Norpac
- Wilco fertilizer plant
- Pine Street reservoir: 1 million gallon reservoir could be a target
- Helena Chemical (agricultural chemicals)
- Migrant protesting (history of minor picketing in front of Norpac)
- Spill on 1st Street that could get into the water supply – they have a spill response for this
    - In the 80's diesel fuel spilled into one of the canals
    - More recently, a punctured fuel tank spilled fuel all through town.

CITY OF TURNER ADDENDUM

Purpose

This document serves as the City of Turner's Addendum to the Marion County Multi-Jurisdictional Hazards Mitigation Plan (MHMP, HMP). This addendum supplements information contained in Volume I (Basic Plan) of this HMP. The Basic Plan serves as the foundation for this jurisdiction's addendum. Volume III (Appendices) provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the HMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer and fall of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with the Oregon Military Department's Office of Emergency Management (OEM), Marion County and the City of Turner, to update the Turner NHMP and addend it to the Marion County HMP, which expired July 8, 2016. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County HMP, locally adopting it, and having it approved by FEMA, the City of Turner will retain eligibility for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County HMP, and Turner addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing the plan. For more information on the composition of the steering committee see the *Acknowledgements*, *Plan Summary*, and *Plan Process* (Volume III, Appendix B).

The Turner City Administrator is the designated local convener of this addendum. The Convener will take the lead in implementing, maintaining, and updating the addendum to the HMP in collaboration with Marion County Emergency Management.

Representatives from the City of Turner steering committee met formally on one occasion: March 9, 2017 (see Appendix B for more information).

The city's addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with OPDR.

The City of Turner Steering Committee is comprised of representatives from the following departments:

- Convener, City Administrator
- Mayor
- Police Department
- Turner Fire
- Community Emergency Response Team (CERT) Members
- Community Members

Turner used multiple approaches to engage the public. First, the City established steering committee representatives from across the city. Next, the City actively participated in countywide community engagement activities described in Volume I, Section 4 and in Appendix B. City staff also presented the draft plan to the City Council during an open public council session. The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process (see Appendix B for more information).

The Marion County HMP was approved by FEMA on August 17, 2017 and the Turner addendum was adopted via resolution on June 8, 2017. This HMP is effective through August 16, 2022.

Mitigation Strategy

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

During the 2016 Marion County and Turner update process, OPDR and a representative from Marion County Emergency Management assisted the steering committee with developing mitigation strategies that will meet Turner's unique situation. The proposed actions were then re-reviewed by the steering committee to finalize. Turner developed a list of priority actions (Appendix A-1); any actions that were not prioritized were placed in the Action Item Pool (Appendix A-2) and will be considered during the annual meetings. For a status update on each of Turner's 2012 mitigation actions, see Appendix A-2.

Priority Actions

The City is listing a set of high priority actions in an effort to focus attention on an achievable set of high leverage activities over the next five-years. The City's priority actions are listed in Table TR-1 on the following page.

Action Item Pool

Table TR-2 on the following pages presents a pool of mitigation actions. This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available.

Table TR-1. Turner Priority Action Items

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline	Priority
Priority						
P-1	Flood	Add water level monitoring equipment to the Marion Road Bridge, south of Mill Creek.	City Administrator (or designee)	CERT; Mill Creek Basin flood management agencies	Short Term	Top
P-2	Flood	Meet with City of Salem flood and emergency management staff on an annual basis to identify and implement collaborative flood mitigation project opportunities.	City Administrator (or designee)	Public Works, City of Salem, Marion Co., OEM, City of Aumsville, Beaver Creek Watershed Council, Santiam Watershed Council	Ongoing	Top
P-3	Multi-Hazard	Purchase a portable water filtration device.	Turner Public Works	City Administrator	Short Term	Top
P-4	Multi-Hazard	Provide public outreach and education to vulnerable populations (such as Turner Retirement Homes, the Christian Convention, Aldersgate, and others, as identified in this plan) regarding hazards.	City Administrator (or designee)	Turner Police, Turner Fire, Marion Co.	Ongoing	Top
P-5	Multi-Hazard	Partner with existing community organizations to disseminate hazard preparedness information.	City Administrator (or designee)	Turner Police Department, Turner Fire Department, Turner Christian Church, Cascade School District, Church of God, Turing Point	Ongoing	Top

Source: City of Turner HMP Steering Committee, 2017.

Table TR-2. Turner Action Item Pool

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline	Priority
Action Item Pool						
Multi-Hazard						
MH-1	Multi-Hazard	Use existing city public engagement tools (such as monthly utility bills, public reader boards, Facebook pages, etc.) as means of disseminating information to residents regarding hazard preparedness.	Turner Police	City Administrator; Public Works; Turner Fire;Turner Christian Church, Portland General Electric; School District; Marion County Emergency Management	Ongoing	High
MH-2	Multi-Hazard	Implement an automated notification system for disaster alerts and preparedness.	City Administrator (or designee)	Turner Police Department, Turner Fire, Community Emergency Response Team (CERT)	Short Term	High
MH-3	Multi-Hazard	Encourage documentation of the vulnerable populations listed in the Plan, including the creation and maintenance of a list of residents with special medical needs.	City Administrator (or designee)	Turner Police Department, Turner Fire Department	Ongoing	Medium
MH-4	Multi-Hazard	Retrofit the fire station to withstand flood and earthquakes or construct a new, seismically-sound fire station outside the flood zone in a location at minimal risk to natural and man-made hazards.	Turner Fire	City Administrator, OEM, Oregon Emergency Management Seismic Rehabilitation Grant Program Coordinator	Short Term	Medium
MH-5	Multi-Hazard	Conduct annual emergency management table top exercises that include hazardous material release scenarios (in addition to other hazard scenarios).	Turner Fire	Community Emergency Response Team, Marion County Emergency Management; Union Pacific	Ongoing	Low

Source: City of Turner HMP Steering Committee, 2017.

Table TR-2. Turner Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline	Priority
Action Item Pool						
Dam Failure						
DF-1	Dam Failure	Coordinate with Marion County Emergency Management to develop an evacuation plan for the City of Turner the event of dam failure.	City Administrator (or designee)	Turner Police , County Emergency Management, County Transit, Army Corps, State Water Services Division	Long Term	Low
DF-2	Dam Failure	Coordinate with Marion County Emergency Management and the Army Corps of Engineers to develop a dam failure notification procedure for the City of Turner.	City Administrator (or designee)	Turner Police, Marion County Sheriff's Office, Army Corps, Marion County Emergency Management	Long Term	Low
DF-3	Dam Failure	Meet with the City of Salem each year to receive updates on the Franzen Reservoir and notify the public of any changes to safety.	City Administrator (or designee)	City of Salem	Ongoing	Medium
DF-4	Dam Failure	Actively engage with the County's efforts to work with the Army Corps of Engineers to assess dam failure likelihood and risks.	Turner Police	Turner Fire, City Administrator, Army Corps of Engineers, Marion County Emergency Management	Long Term	Medium
Earthquake						
EQ-1	Earthquake	Perform seismic assessments of critical infrastructure as resources become available.	City Administrator (or designee)	Oregon Emergency Management Seismic Rehabilitation Grant Program Coordinator	Long Term	Low
EQ-2	Earthquake	Send city staff and other to the County's ATC 20 structural assessment training when the course is offered.	City Administrator (or designee)	Turner Police, Turner Fire, Marion Co.	Ongoing	Medium

Source: City of Turner HMP Steering Committee, 2017.

Table TR-2. Turner Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline	Priority
Action Item Pool						
Flood						
FL-1	Flood	Provide more training on flood insurance.	City Administrator (or designee)	Oregon Department of Land Conservation and Development (DLCD), Oregon Office of Emergency Management (OEM), Federal Emergency Management Agency (FEMA), FEMA trainers	Ongoing	Medium
FL-2	Flood	Identify and prioritize properties to be retrofitted against flood damage.	City Administrator (or designee)	DLCD	Short Term	Low
FL-3	Flood	Have City Council evaluate pursuing certifiaction in the Community Rating System (CRS).	City Administrator (or designee)	DLCD, FEMA, City of Salem, Marion County Public Works	Ongoing	Medium
FL-4	Flood	Implement annual flood vent inspection program for all residential properties in areas at risk of chronic flooding (inside and outside the mapped floodplain).	Planning / Building	CERT, DLCD	Ongoing	Low
FL-5	Flood	Work with the owners of repetitive flood loss buildings in the city to identify cost effective mitigation strategies including consideration of elevation or buy-out.	City Administrator (or designee)	DLCD, OEM	Long Term	Low
FL-6	Flood	Pursue and complete remapping of City floodplain.	City Administrator (or designee)	DLCD, OEM, FEMA	Short Term	High
FL-7	Flood	Provide annual public information materials to Turner residents regarding flood safety practices, including detailed information about sandbagging.	City Administrator (or designee)	City of Turner, CERT	Ongoing	High
FL-8	Flood	Maintain and cultivate partnerships with other government agencies, both local and regional, to plan for flood hazard events.	City Administrator (or designee)	Marion County, City of Salem, MWVCOG, Mill Creek Basin flood management agencies	Ongoing	High
FL-9	Flood	Pursue hiring of a flood coordinator to address flood-related action items.	City Administrator (or designee)	MWVCOG	Ongoing	Medium

Source: City of Turner HMP Steering Committee, 2017.

Table TR-2. Turner Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline	Priority
Action Item Pool						
Landslide						
LS-1	Landslide	Implement the Eastwood Drive Stabilization Plan and continue ongoing monitoring of conditions.	Public Works	City Administrator	Ongoing	Low
Severe Weather						
SW-1	Severe Weather	Develop MOUs with private businesses and citizens around equipment and resource sharing during severe weather events, particularly related to providing resources to residents who might be stranded up the hill in the Eastwood area during icy weather.	City Administrator (or designee)	Marion County Public Works, Turner Public Works, Police, Fire	Ongoing	Medium
SW-2	Severe Weather	Monitor the trees in the public right-of-way and maintain to minimize damage during wind or winter storms.	Public Works	Portland General Electric (PGE), Turner Fire Department	Ongoing	Medium
Wildfire						
WF-1	Wildfire	Conduct wildfire prevention outreach, as outlined in the Marion County Community Wildfire Protection Plan (CWPP), to residents in areas where wildfire is a potential concern (e.g. hillside neighborhoods in northeast Turner).	Turner Fire		Ongoing	Low
WF-2	Wildfire	Provide fire supression outreach throughout the Fire District.	Turner Fire		Ongoing	Low

Source: City of Turner HMP Steering Committee, 2017.

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Turner addendum to the Marion County HMP. This addendum designates a convener and a coordinating body to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional HMP, the City will look for opportunities to partner with the county. The City's steering committee will convene after adoption of the City of Turner addendum on an annual schedule (each October); the county meets on a semi-annual basis. The City of Turner Convener will participate in the Marion County HMP meetings and will report on city specific activities as appropriate. The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the City's mitigation strategy (actions). The convener will also remain active in the county's implementation and maintenance process (see Volume I, Section 4 for more information).

The City will utilize the same prioritization process as the county (See Volume I, Section 4: Plan Implementation and Maintenance and Volume IV, Appendix D: Economic Analysis of Hazard Mitigation Projects for more information).

Implementation through Existing Programs

Many of the Hazard Mitigation Plan's recommendations are consistent with the goals and objectives of the City's existing plans and policies. Where possible, the City of Turner will implement the HMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the HMP's action items through such plans and policies increases their likelihood of being supported and implemented.

Turner's Comprehensive Plan was first acknowledged by the Oregon Land Conservation and Development Commission in 1979.[1] The City most recently completed updates to the plan, including updates to the Environmental section(which includes discussion of natural hazards), in 2011. The Turner Comprehensive plan identifies floods and landslides as key hazards that are anticipated to affect the city. The plan also mentions sever weather conditions (including high winds, freezing rain, and lightening) as posing a threat to the city. There is no mention earthquakes or wildfires. Under "Water Resources," the plan contains three policies related directly to mitigating the flood hazard.[2] There are no other hazard related policies listed. The City implements the Comprehensive Plan through the Land Use Development Code.

[1] City of Turner Comprehensive Plan (2011). http://www.cityofturner.org/index.asp?Type=B_BASIC&SEC={14CD4F13-7BF8-4260-8892-F5FD3284B384}

[2] City of Turner Comprehensive Plan (2011). Section 9.200: Environment. Policies 7-9. P. 9.200-17 and 9.200-18

In addition to the Comprehensive Plan, Turner currently has the following plans that relate to hazard mitigation:

- Water Systems Master Plan (updated in 2013)
- Turner Transportation System Plan (updated in 1999)
- Floodplain Ordinance

For more information, refer to http://www.cityofturner.org/index.asp?Type=B_BASIC&SEC={14CD4F13-7BF8-4260-8892-F5FD3284B384} and http://www.cityofturner.org/index.asp?Type=B_LIST&SEC={E94C3D5B-E9C7-4CD1-A30D-E3E4D4781E5D}

Continued Public Participation

Keeping the public informed of the City's efforts to reduce the city's risk to future hazard events is important for successful plan implementation and maintenance. The City is committed to involving the public in the plan review and updated process. See Volume I, Section 4, for more information.

Plan Maintenance

The Marion County Multi-Jurisdictional Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the City will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

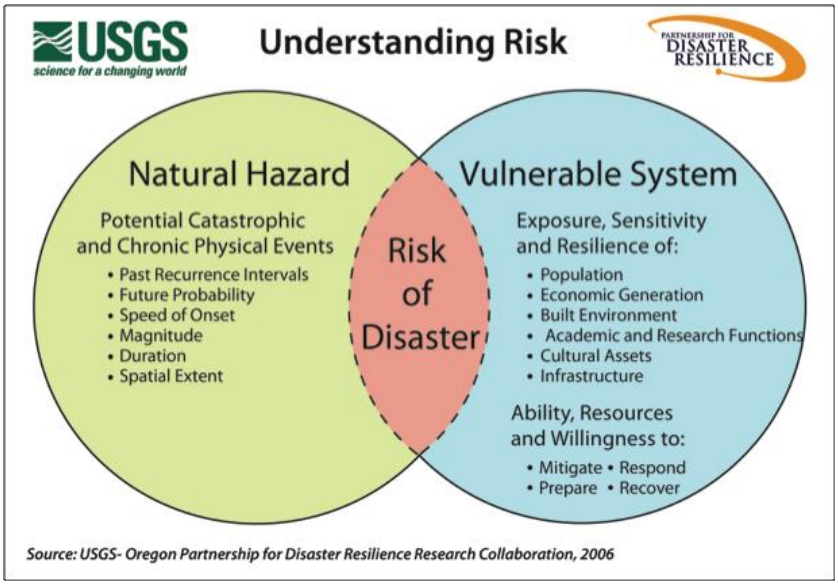
Risk Assessment

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

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.
- **Phase 3:** Evaluate the extent to which the identified hazards overlap with, or have an impact on, the important assets identified by the community.

The local level rationale for the identified mitigation strategies (action items) is presented herein, and within Section 2, *Risk Assessment*, and Appendix C, *Community Profile*. The risk assessment process is graphically depicted in Figure TR-1 below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure TR-1. Understanding Risk



Risk Assessment Approach

A risk assessment is intended to provide the, "factual basis for activities proposed in the strategy to reduce loses from identified hazards."[3] To complete the risk assessment, the HMP update team first updated the description, type, location and extent of each hazard. Next, the team updated the vulnerability information based on each hazard's potential impact on the community.

[3] 44 CFR 201.6(2)(i)

The Marion County Basic Plan (Volume I, Section II) Risk Assessment describes in detail the methods used to assess risk. In summary, Marion County has prepared a Threat Hazard Identification and Risk Assessment as a formal annex to the Marion County Emergency Operation Plan. The assessment uses a method developed by BOLD Planning.[4] This city addendum builds on the county level assessment to produce a similar assessment for the City of Turner. The assessment specifically examines:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

Refer to Page 2-4 of the Marion County Basic HMP for a description of the scoring values for each ranking category.

Hazard Identification

The 2012 City of Turner HMP identified seven hazards that could have an impact on the city. These hazards include dam failure, earthquake, flood, hazardous materials, landslide, severe weather, and wildfire. Note that in this update of the HMP, the Turner steering committee decided to incorporate hazardous materials into its "multi-hazard" action items.

The City completed a review of the hazards and hazard rankings in March of 2017. The committee made no changes to the list of hazards or rankings. Because Turner is electing to update its HMP as an addendum to the county HMP, the city specific risk assessment includes a more detailed hazard analysis below.

Table TA-2 Previous Hazard Rankings

Hazard	Probability	Vulnerability
Dam Failure	Low	High
Earthquake	Moderate	Moderate
Flood	High	High
Landslide	Low	Low
Wildfire	Low	Moderate
Severe Weather	High	High
Hazardous Material	Moderate	High

Source: 2012 HMP; Review completed March 2017

Hazard Analysis

The assessment identifies three levels of risk: High, Moderate and Low.

High - High probability of occurrence; at least 50 percent or more of population at risk from hazard; significant to catastrophic physical impacts to buildings and infrastructure; major loss or potential loss of functionality to all essential facilities (hospital, police, fire, EOC and shelters).

[4] BOLD Planning is a consulting firm specializing in the development of actionable emergency plans. For more information, visit: http://www.boldplanning.com/

Moderate - Less than 50 percent of population at risk from hazard; moderate physical impacts to buildings and infrastructure; moderate potential for loss of functionality to essential facilities.

Low - Low probability of occurrence or low threat to population; minor physical impacts.

A summary of the risk assessment findings and rankings is presented below.

Table TA-2 Hazard and Vulnerability Assessment Summary

Hazard Profile Summary for Turner Usinging Bold Planning Analysis Scoring							
Natural Hazard	Probability	Warning Time	Magnitude	Duration	CPRI	Local Planning Significance	County Planning Significance
Weight Factor	0.45	0.3	0.15	0.1			
Earthquake*	4	4	4	4	4.00	High	**High**
Flood	4	2	3	4	3.25	High	**High**
Severe Weather/Storm**	4	1	3	3	2.85	**Moderate**	**High**
Drought	3	1	2	4	2.35	**Moderate**	**High**
Wildland Interface Fire	2	4	2	2	2.60	**Moderate**	**Moderate**
Dam or Levee Failure	1	2	4	4	2.05	**Moderate**	**Moderate**
Extreme Weather - High Temperature	2	1	2	4	1.90	Low	**Moderate**
Landslide	1	2	2	2	1.55	Low	**High**
Volcanic Eruption	1	1	1	4	1.30	Low	**Low**
*Note: Earthquake probability listed to match county level analysis. See below for more detailed probability assessment.							
**Note: Includes tornado hazard							

Source: BOLD Planning Risk Assessment Method; Analysis by UO Community Service Center.

Community Asset Identification

This section provides information on city-specific assets. For additional information on the characteristics of Turner, in terms of geography, environment, population, demographics, employment and economics, as well as housing and transportation see Volume III, Appendix C, *Community Profile*. Many of these community characteristics can affect how hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city-specific assets during the planning process can assist in identifying appropriate measures for natural hazard mitigation.

Community Characteristics

The City of Turner is located in Marion County, about six miles south of Salem, and approximately 54 miles inland from the Pacific Ocean. The topography within the city is characterized by a fairly flat landscape, with the exceptions of two hills to the east and west of the City, which reach a maximum elevation of about 600 feet above sea level.

Turner is bisected by Mill Creek, which is the primary stream that runs through the city's limits. Mill Creek has an average annual flow rate of about 180 cubic feet per second and flows north through the city. The stream meanders through or adjacent to the city's limits for nearly three miles. Additional waterways within the city include the Mill Creek Bypass and the Perrin Lateral, both of which are significantly smaller than Mill Creek.

Like most of the Willamette Valley, Turner experiences a modified marine climate with cool and wet winters and moderately warm and dry summers. The average annual precipitation is approximately 39.28 inches with the heaviest rainfall in late fall and winter. While major

snow falls are rare, Turner experiences an average annual snowfall of approximately 7.1 inches.

Economy

Like the majority of cities in Oregon, industry in Turner has fluctuated greatly since the founding of the city in the mid-1800s. In the late 1800s the primary industries were a flour mill and granaries.[5] However, these industries eventually gave way to the more dominant lumber industry that arose in the late 1900s. These early industries owe their success in large part to the construction of the railroad, which runs through the middle of the city.

Due to Turner's small population and the city's proximity to Salem, many of Turner's residents commute to work outside of the city. According to the American Community Survey, these commuters represent 88% of the workforce.[6] Therefore, a large majority of the city's residents depend on other jurisdictions, such as Salem, for employment purposes. The dominant industries in the City of Turner are retail trade and education and health services.[7] The Turner Retirement Homes is the single largest employer in the city. However, the primary occupations of Turner residents (commuters included), are management, sales, and service occupations.[8]

Critical and Important Facilities

Critical facilities include buildings, their internal components and trained personnel, and may also include certain mobile units, such as those of first responders. For example, many vehicles of the police department, fire department (including ambulances), and public works department are key and essential components of the functions provided by these critical facilities. The interruption or destruction of any of these facilities would have a debilitating effect on incident management and long-term recovery. Not all critical facilities are of equal importance, and are therefore subject to prioritization of criticality. The steering committee identified key critical facilities, listed in Table TR-3.

[5] City of Turner. "What would you like to know? History." http://www.cityofturner.org/index.asp?Type=B_BASIC&SEC={2E2C16BF-EEC7-4611-9DF4-7F6DE25C90F2}

[6] US Census Bureau. 2011-2015 American Community Survey 5-year Estimates. Table S0801: Commuting Characteristics by Sex. 2015.

[7] US Census Bureau. 2011-2015 American Community Survey 5-year Estimates. Table DP03: Selected Economic Characteristics - Industry. 2015.

[8] US Census Bureau. 2011-2015 American Community Survey 5-year Estimates. Table DP03: Selected Economic Characteristics - Occupation. 2015.

Table TR-3. Turner Critical Facilities

Facility Name	Type
Fire Department	Emergency Response
Turner City Hall	Governance
Police Department	Emergency Response
Public Works	Emergency Response
Turner Retirement Homes	Care Facility
CARTS Bus – Santiam Route #30	Transportation
Turner Christian Church Food Bank	Food Services
Turner Elementary School	Miscellaneous
Cascade School District Office	Miscellaneous
Post Office	Communication
Aldersgate	Youth Camp

Source: City of Turner. http://cityofturner.org/

This plan also documents important infrastructure and facilities by lifelines, including transportation, energy, water, communication, emergency services, and cultural/historical resources. We also include a preliminary list of populations/locations that may be particularly vulnerable to hazards.

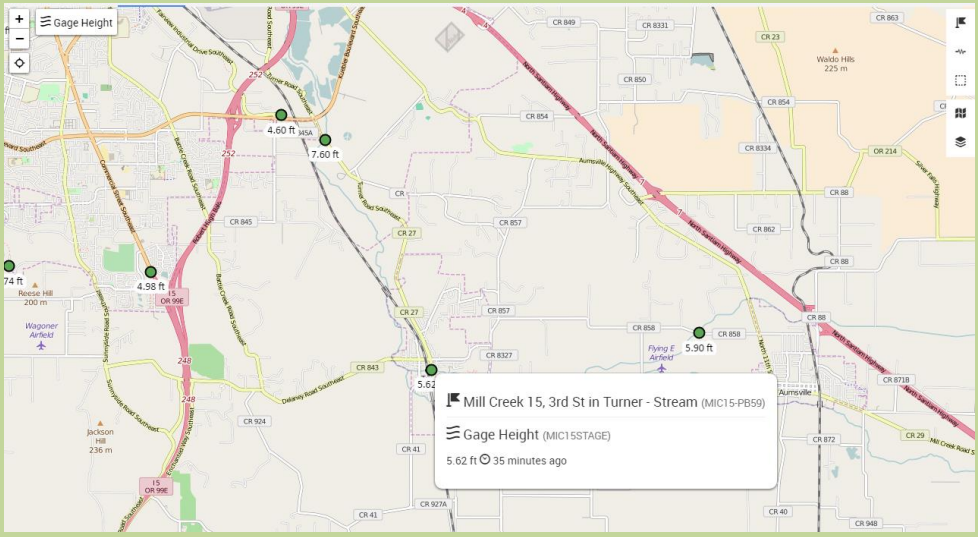
Transportation

- Delaney Rd is the link to I-5 – this would be under water in a major flood.
    - This road is the most vulnerable link – water on the road in particular would be very destructive and block access.
- Third St (Turner Rd.) is the link to Hwy 22 – this would be under water in a major flood.
- Witzle Rd. would become the exit if the other roads were blocked.
- There are a few backroad exists that don't involve bridges.
- CARTS Bus – Santiam Route #30 provides public transportation services for residents.
- Bridges:

Road	Over	Construction	Owner	Co-located infrastructure	Notes
Mill Creek Rd./Denver Street	Mill Cr.	Concrete continuous	Marion Co.	NW Natural gas line Water and sewer	Rebuilt in 2006
Delaney Rd. SE	Mill Cr.	Prestressed concrete	Marion Co.		
Wipper Rd.	Bypass canal	Prestressed concrete	Marion Co.		Rebuilt in 2014
55th Ave. SE	Bypass canal	Wood nail laminated	Marion Co.		
3rd St. SE	Mill Cr.	Prestressed concrete	Marion Co.	NW Natural gas line 8" water line	This bridge has a lower deck and debris collects on it during high water.
5th St.	Mill Cr.	Prestressed concrete	City of Turner	Water and sewer	Rebuilt around 2001 or 2002.

Mitigation Success Story: Flood Monitoring Infrastructure

After a 2012 storm caused a severe flood in Turner, the City partnered with State and Salem to implement a rain and stream gauge monitoring system to provide early warning for future floods. The jurisdictions used $200,000 from the Hazard Mitigation Grant Program to build the infrastructure and website that make up the early warning system. As pictured below, residents can visit the Mid-Willamette Valley High Water Watch website[1] and see real-time data about stream levels in and around Salem. The system also provides an alarm warning system for emergency managers, allowing them to alert residents to potential flood issues.



Energy

- PGE provides the city with power and has a sub-station on 5TH Street by Mill Creek.
- NW Natural provides the city with natural gas and has distribution mains connected to the Third street and Denver Street bridges.
- City gets fuel from Pacific Pride (by I-5).
    - Fuel access could be difficult if Delaney Road were not passable.
- Fuel storage: there are tanks at the gas station at 5235 Denver Street.
- Back-up power and fuel storage:
    - Fire has two 6kw diesel generators on engines E955 and E957 and keeps 15 gallons of gas and diesel at the fire station
    - City has a 2kw, 3kw and 7.5kw gas portable generators and keeps 15 gallons of gas stored.

Location	Owner	Fuel Type	Capacity
City Hall/Public Works – Fuel Storage	City	Above ground diesel tank	55 gal
Generators: Top of the hill pump station	City	Diesel	150 KW, 200 gallons
Generator: Lower Pump	City	Diesel	100KW, 150 gallons

Generator: main sewer pump station in 5th St. Park	Salem	Diesel	35KW, 50 gallon tank
Generator: 1952 station generator	Fire	Diesel	60 KW
Mobile generator	Fire	Gas	One 2000W portable on rescue965

Water and Wastewater

- Water storage and distribution:
  - Water is contracted to Salem.
  - City has a storage and distribution system – 100,000 gal water tank (redwood, but it's in great shape); 400,000 gal water tank (only 6 years old, so built with modern technology).
  - The city currently does not have back-up water sources.
  - Val View pump station can be accessed in two different ways
  - 3rd St pump station is on the main street so it should be accessible in an earthquake.
- Wastewater:
  - Wastewater this contracted to Salem.
  - Lift stations bring sewage to a forced main station on Kuebler Rd. – lift stations have emergency generators.
    - There are 2.5 miles of forced main sewer pipe that take wastewater to the intersection of Kuebler and Turner Roads – this pipe would probably not withstand an earthquake.
    - If this pipe broke, it would get into Mill Creek.
- Franzen Reservoir stores 100 million gallons of water for Salem. The reservoir is part natural, part constructed.
  - Salem was required by the Department of Water Resources to reevaluate the reservoir. As part of this, they had to do outreach about the inundation potential from the reservoir if it failed.

Mitigation Success Story: Stormwater Infrastructure Upgrades

Since Turner's 2012 Hazard Mitigation Plan, the City has invested about $15,000 in building and upgrading storm water systems where rain water has historically damaged property and threatened roadway stability. These projects have helped minimize localized flooding, improving the city's ability to remain functional during storm and high water events.

Communication

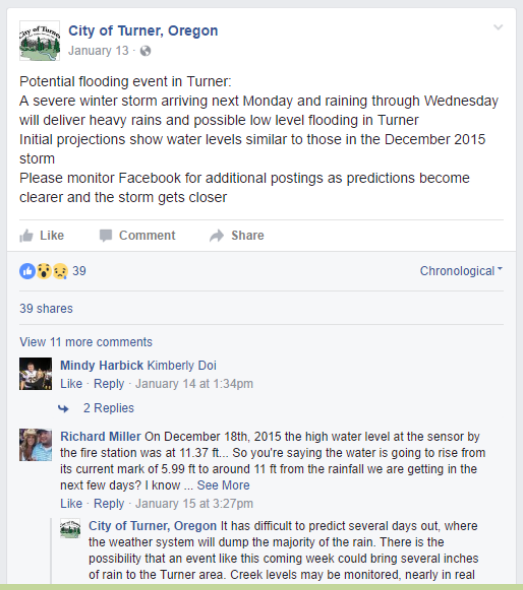
- The redwood water tank on Val View has some police radio equipment to connect with the Woodburn Dispatch Center.
- The police department has radio capabilities as a back-up if cell service is down.
- The water distribution system has its own radio system.

    - This system only requires a minimal amount of power, and it is possible to run the system without the radios.
- The City recently purchased a satellite phone (service provided by Global Star).
- Fire station has base radio, mobile in the trucks – dispatch connection infrastructure is outside the City – all of this is backed up
- Wave Broadband provides cable internet.
- Turner Elementary School has fiber, and the new subdivision at Crawford Lake may have fiber provided by Viser, a fiber company based in Aumsville.
- Fiber optic cable runs along the railroad (the Seattle to San Francisco line).
- Cell towers:
    - AT&T Tower on private property – this has a generator.
    - Verizon and T-Mobile on the tower in 5th Street Park – this has a generator.

Mitigation Success Story: Flood Early Warning System

To complement the flood monitoring system (see Mitigation Success Story: Flood Monitoring Infrastructure), Turner has also been actively working to improve communication with residents regarding floods and other hazard events. The City purchased a contract with Everbridge (an emergency mass communication tool) and has been collecting cell phone numbers for entire community. This "reverse 911" system allows the City to send out notifications about hazards. For example, the City can send a text alert about flood warnings when the flood monitoring systems indicates high water may be on the way.

In addition to the Everbridge system, the City actively uses Facebook for weather- and flood- related notices and advisories. Residents actively engage with the City's Facebook page, sharing notifications with their networks and quickly spreading the word about potential hazards that may affect the community. Additionally, the Facebook page helps the City advertise for upcoming preparedness events (see post below.)



Emergency services

- Fire:
  - Fire Department (7605 3rd St.) – they have a local ambulance dispatch.
- Police:
  - Police Department/City Hall (5255 Chicago St.).
- Public Works:
  - City shops (7250 3rd St.).
- CERT/EOC:
  - 7250 3rd St.; the backup location is Marion County Public Works
- Medical:
  - Aumsville has a health clinic.
  - Stayton hospital.

Cultural/historical resources

- Turner Memorial Tabernacle and Camp Meeting Grounds; Pioneer Lodge
- Masonic Hall
- Ball Brothers Grange and Dance Hall (old)
- Ball Brothers Grange (current)
- Davis Hall (at Turner Retirement Home)
- Events that may draw large crowds:
  - Lamb and Wool festival – 1st Saturday in June. This includes a parade with maybe 1,500 people passing through town.

Functional and Access Needs (Vulnerable Populations)

- Schools:
  - Turner Elementary School
  - Aldersgate (youth camp)
  - Cradle to Crayons (Daycare) at 7920 2nd St. – this is in the floodplain
- Assisted living:
  - Turner Retirement Homes
- Non-English speaking:
  - There is still only a small non-English speaking community
  - Many Spanish speakers work at the mill
- People who live up the hill (in the Eastwood area) might be hard to access in bad weather (for example, the roads were not passible during the last ice storm – too steep and slippery).
- Flooding impacts people in the low lands.

See hazard sections below and Section 2, *Risk Assessment*, for potential hazard vulnerabilities to these facilities.

Hazard Characteristics

Dam Failure

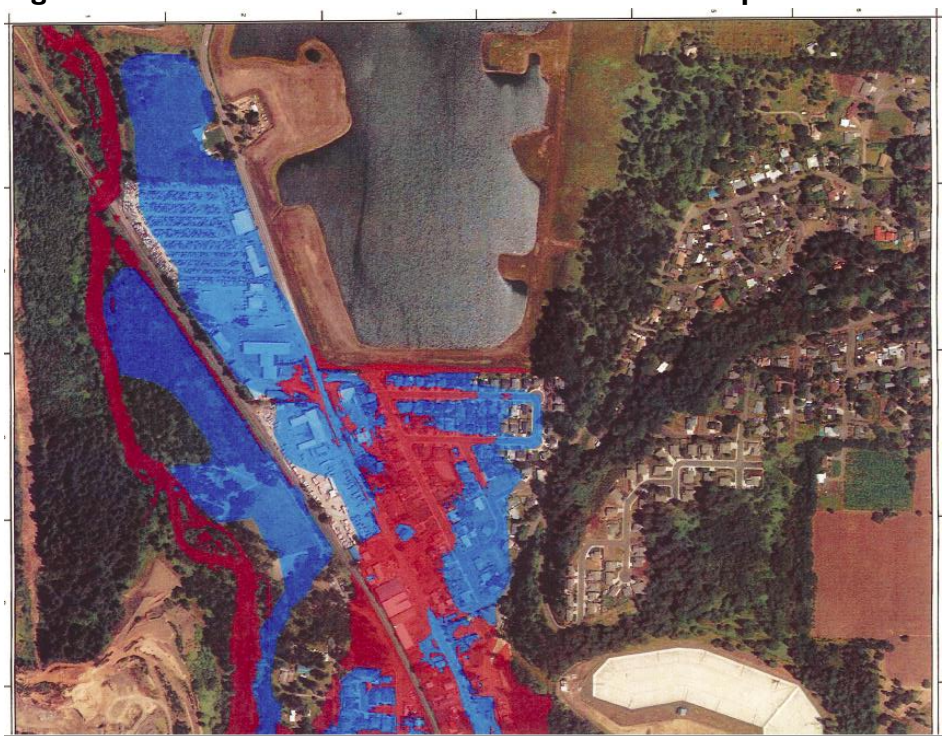
The steering committee confirmed that the city's probability for dam failure is low and that their vulnerability is high. Dams are impervious structures that block the flow of water in a

river or stream, capturing water behind the dam. Dams can fail for a variety of reasons, such as erosion, overtopping, structural failure, ground motion or unusual hydrodynamic forcing.

The primary Army Corps of Engineers controlled dam threat to the City of Turner is Detroit Dam. Contact the local Army Corps office for more information about specific dam failure and inundation impacts that could result from a failure at Detroit Dam.

In addition, the Franzen Reservoir poses a "high hazard" dam threat to the city of Turner.[9] Franzen Reservoir is located within the Turner city limits on the east side of town. The reservoir is 31-feet high and stores 300-acre feet of water. According to the Oregon Dam Safety Engineer, there are several dwelling located directly below the reservoir inundation area. In addition, the area of Delaney Road SE and North 3rd Street would be impacted by a reservoir breach. Notably, there is no history of dam failure in the City of Turner.

Figure TR-2. Franzen Reservoir Partial Inundation Map



Source: City of Turner

Drought

The characteristics of drought in Turner are the same for the county as a whole.

[9] In 2014, the Oregon Dam Safety Program Engineer reclassified Franzen Reservoir as a HIGH hazard dam following a review by a local hydraulic engineer and US Army Corps of Engineers.

Table TR-4. Drought Summary

Hazard	Drought
Type	Climatic
Speed of Onset	Slow
Location	Varies, County Wide
Extent	Moderate to Severe Drought*
Prior Occurance	Three > 6 months duration since 1982
Probability	~9%

*Defined as between -2 and -4 on the National Resource Conservation Service (NRCS) Surface Water Supply Index (SWSI)

Sources: Oregon NHMP; NRCS; analysis by OPDR

Using the BOLD methodology, the Turner steering committee determined that the city's probability for drought is moderate (which is lower than the county's rating) and that their vulnerability to drought is low (which is the same as the county's rating). Notably, the City did not assess the drought hazard in the previous version of their HMP.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of drought hazards, as well as the location and extent of a potential event. Due to a cool, wet climate, past and present weather conditions have generally spared Marion County communities from the effects of drought; however, Marion County was included in Presidential Drought Declarations in 1992 and 2015.

Turner receives water from the City of Salem under contract. Turner maintains two water tanks for local storage, with 100,000 and 400,000 gallon capacities respectively. The larger tank was constructed in 2011 using modern engineering and construction methods. The City also maintains a water distribution system. The City does not have a secondary water source. Additional, drought-related community impacts are described within the county's Drought Hazard Annex.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Earthquake

The characteristics of a crustal earthquake are similar to the county as a whole.

Table TR-5. Earthquake Summary Crustal

Hazard	Earthquake - Crustal
Type	Geologic
Location	Multiple active faults; Willamette Valley
Speed of Onset	Rapid
Extent	Very Strong to Severe shaking ~ 500 yrs*
Prior Occurance	One over Magnitude 5 last 100 yrs**
Probability	Approximately 1% annual

*DOGAMI HazVu; ** PNSN - 1993 Scotts Mills just north of Marion County

Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

The characteristics of a Cascadia subduction zone earthquake are the same as the county.

Table TR-6. Earthquake Summary Subduction

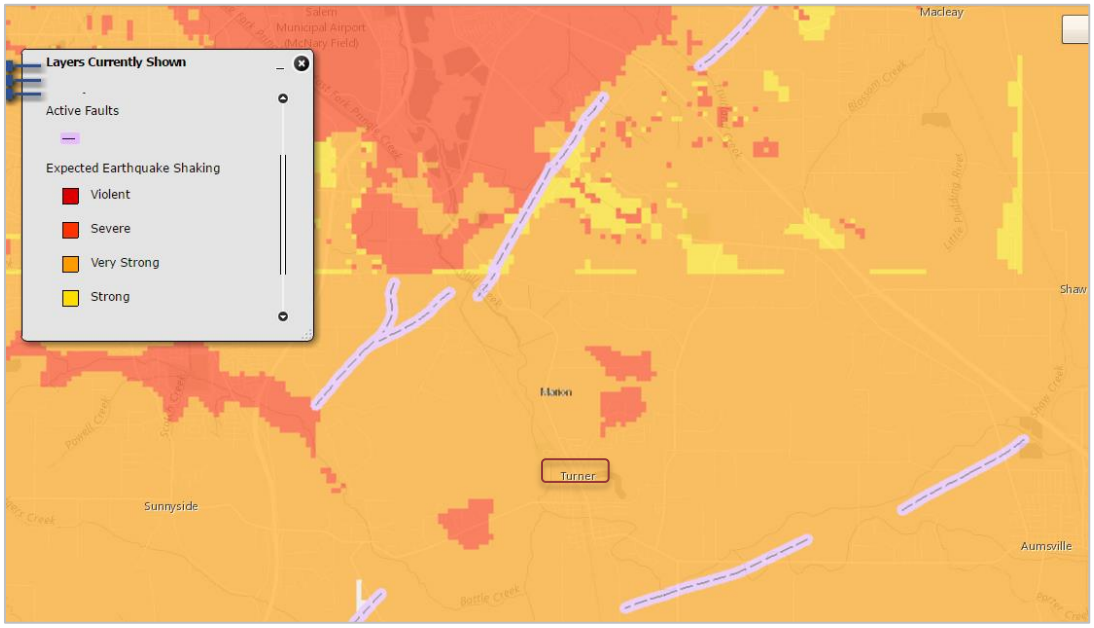
Hazard	Earthquake - Subduction
Type	Geologic
Location	Primarily west of the Cascades; CA - BC
Speed of Onset	Rapid
Extent	Catastrophic
Prior Occurance	One over Magnitude 9 last 500 yrs
Probability	Magnitude 9+ is 7% - 12% over 50 yrs**

*DOGAMI HazVu; **Oregon Natural Hazard Mitigation Plan, anlysis by Oregon Department of Geology and Mineral Industries.

Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

Turner's probability for a Crustal Earthquake event is "possible" and their vulnerability to a Crustal Earthquake event is "limited". The county steering committee determined that the probability for a Cascadia Subduction Zone (CSZ) Earthquake event is "highly likely" and that the vulnerability to a Cascadia Earthquake event is "catastrophic". This hazard was not rated as distinct CSZ and crustal events in the previous HMP. Turner is about one mile from several active faults: a string of faults run to both the north and south of Turner The 1993 Scott Mills quake caused $28 million in damages to cities throughout Marion County. No damaging earthquake events occurred during the previous five years.

Figure TR-3. Active Faults and Expected Shaking



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of earthquake hazards, history, as well as the location and extent of a potential event. Generally, an event that affects the county is likely to affect Turner as well. Previous occurrences are well-documented within the county's plan, and the community impacts described by the county would generally be the same for Turner as well.

Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any particular site. In many major earthquakes, damages have primarily been caused by the behavior of the soil. Figure TR-3 shows that ground shaking in Turner for both crustal and subduction earthquakes are expected to be very strong, with some nearby areas experiencing severe shaking.

The Turner steering committee identified earthquake damage to bridges and nearby dams as a primary concern. Transportation isolation and inundation due to dam failure could both have significant impacts on the city. The City's priority actions reflect these concerns.

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 the "probability of collapse" due to the maximum possible earthquake for any given area. Within the city of Turner, the following buildings were given a "high" or "very high" probability of collapse:

- Turner Elementary School: *very high (100%)*
- Turner Fire Department: *high (> 10%)*

Turner Elementary School is scheduled to receive $1.2 million for seismic retrofits from the State.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Flood

Table TR-7. Flood Summary

Hazard	Flood
Type	Climatic
Speed of Onset	Slow to moderate
Location	Mapped flood zones, floodplain
Extent	Moderate to severe
Prior Occurance	Four significant events since 1964
Probability	1% annual within SFHA

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, Risk Assessment, describes the causes and characteristics of flooding hazards within the region. The city's probability for riverine flood is highly likely and their vulnerability to flood is critical. In January of 2012, heavy rains caused extensive flooding throughout the City, with an estimated $500,000 in overall damage.[10] During a five-day period starting on January 16th, the city received as much as 9.01 inches of rain. Runoff from

[10] Congressman Kurt Schrader. "Officials tour flood-damaged Turner to assess needs – Salem Statesman Journal, January". http://schrader.house.gov/schrader-in-the-news/officials-tour-flood-damages-turner-to-assess-needs-salem-statesman-journal-january-27-2012/

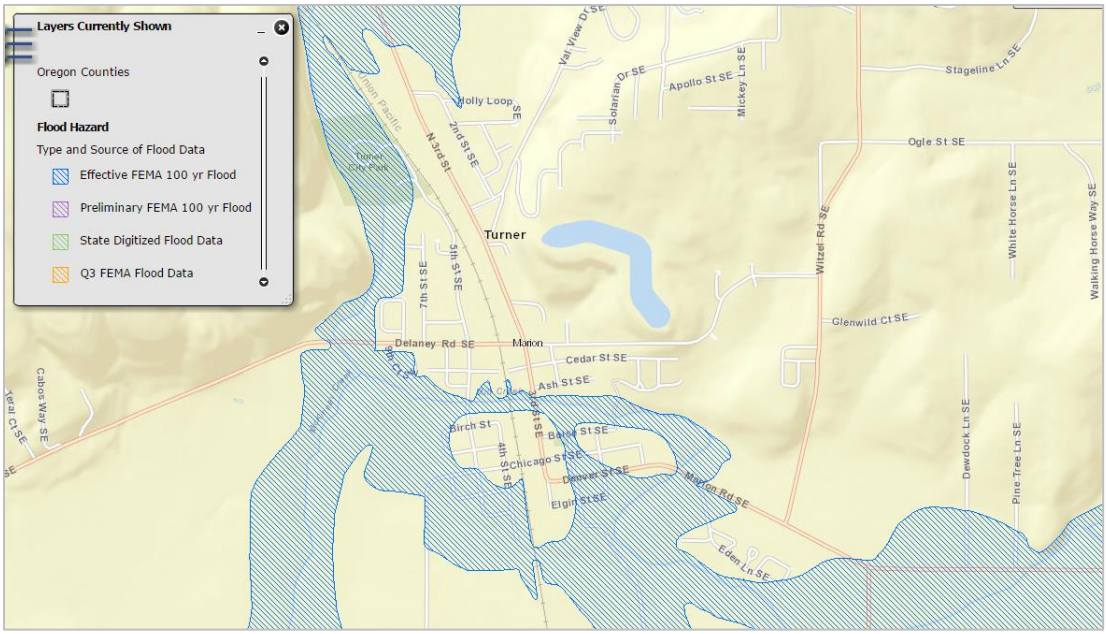
the heavy rainfall was intensified by the melting of three to six inches of snow that had fallen in higher elevations the previous week.[11] On March 2, 2012, the President issued a major disaster declaration (DR-4055).

The preliminary damage assessment from the January 2012 flood revealed 13 residences and three businesses with major damage, 14 residences and three businesses with minor damage, and two residences with other damage. Later, the City documented more than 80 homes that had suffered flood damage. In addition, damage from the sewer system resulted in more than 100 households using portable toilets set up in the street.

The flood event stretched local resources well beyond capacity, putting the entire town at risk. Issues confronted included: fire hydrants and water valve box piping were destabilized by the flood and ready to break; structural damage to bridges and road shoulders making use of narrow road corridors dangerous; all of the roads in and out of Turner were closed at one point with 75% remaining closed for multiple days; hundreds of individual evacuations; heavy flood waters directly impacted two businesses forcing one to close permanently; all downtown businesses were closed off to customers due to road closures, including the major mill complex in town; shut-off and later re-activation of the natural gas system created risk for potential explosions and fires.

Since the major flood in January 2012, Turner has experienced other near-floods and high water events. Mill Creek, which runs through the middle of town, presents the greatest flood risk to residents and travelers. Many residences and businesses are located within the 100-Year Floodplain.

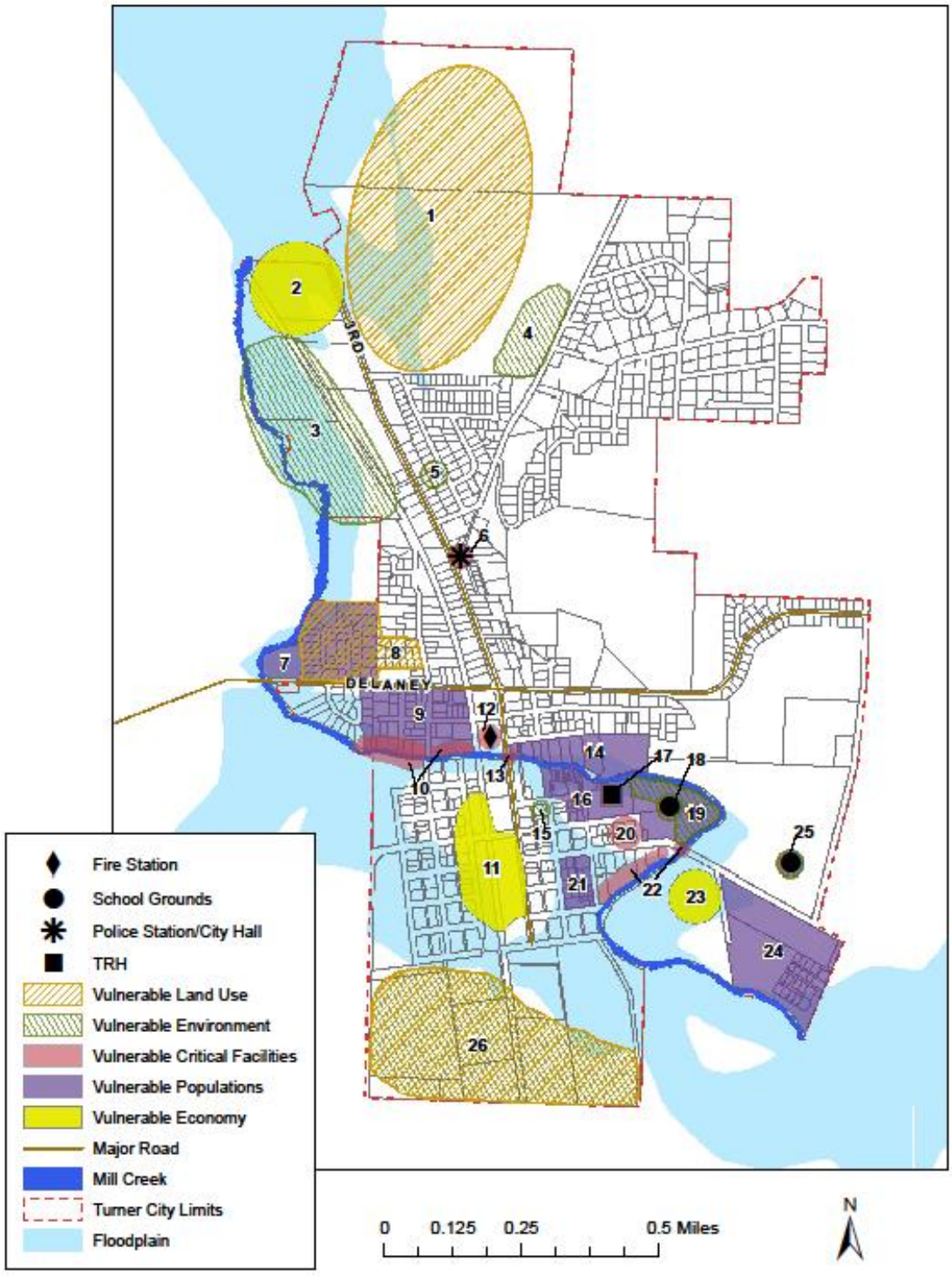
Figure TR-4. Special Flood Hazard Area



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

[11] Statesman Journal. "Salem Hosts Flood Meetings Starting Tonight". March 19, 2012.

Figure TR-5. Turner's Flood Vulnerability



Source: City of Turner 2012 NHMP Steering Committee.

Mitigation Success Story: Regional Flood Mitigation Initiative

Starting with flood early warning system, the City of Turner has built a coalition of partners that are committed to implementing flood mitigation strategies. These partners include Marion County, the City of Salem, Aumsville, the Beaver Creek Watershed Board, the Santiam Water Control District, and the State of Oregon. In December, this coalition applied for a $400,000 grant to study flood detention possibilities in Mill Creek. In the future, these partners will continue working together to find and implement flood mitigation projects in the Middle Willamette watershed.

National Flood Insurance Program (NFIP)

FEMA modernized the Turner Flood Insurance Rate Maps (FIRMs) in January of 2003. Table TR-8 shows that as of October 2016, Turner has 71 National Flood Insurance Program (NFIP) policies in force. Of those, 26 are for properties that were developed before development of the initial FIRM. The last Community Assistance Visit (CAV) for Turner was on February 6, 2012. Turner is not a member of the Community Rating System (CRS). The table shows that the majority of the flood insurance policies are for single-family residential homes. There have been 21 paid flood claims in Turner totaling $588,084.

The Community Repetitive Loss record for Turner identifies one Repetitive Loss Property[12] (a residential parcel near Mill Creek) and no Severe Repetitive Loss Properties[13].

Table TR-8. Flood Insurance Detail

Jurisdiction	Effective FIRM and FIS	Initial FIRM Date	Total Policies	Pre-FIRM Policies	Policies by Building Type: Single Family	2 to 4 Family	Other Residential	Non-Residential	Minus Rated A Zone	Minus Rated V Zone
Marion County	-	-	2,067	1,239	1,614	115	105	232	97	0
Turner	1/2/2003	4/2/1979	71	26	65	3	0	3	1	0

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-FIRM Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss	CRS Class Rating	Last Community Assistance
Marion County	$ 514,268,700	298	226	16	$ 5,732,543	11	2	-	-
Turner	$ 17,010,300	21	18	3	$ 588,084	1	0	N/A	2/6/2012

Source: Information compiled by Department of Land Conservation and Development, October, 2016.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

[12] A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

[13] A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Mitigation Success Story: FEMA Flood Insurance Trainings

As part of their continued effort to provide good communication and resources for residents, the City of Turner hired professionally trained FEMA flood insurance experts to meet with residents interested in or concerned about flood insurance. The trainings were well-received and the City intends to continue offering this service regularly to ensure residents are well-educated about options for properties that are susceptible to floods.

Landslide

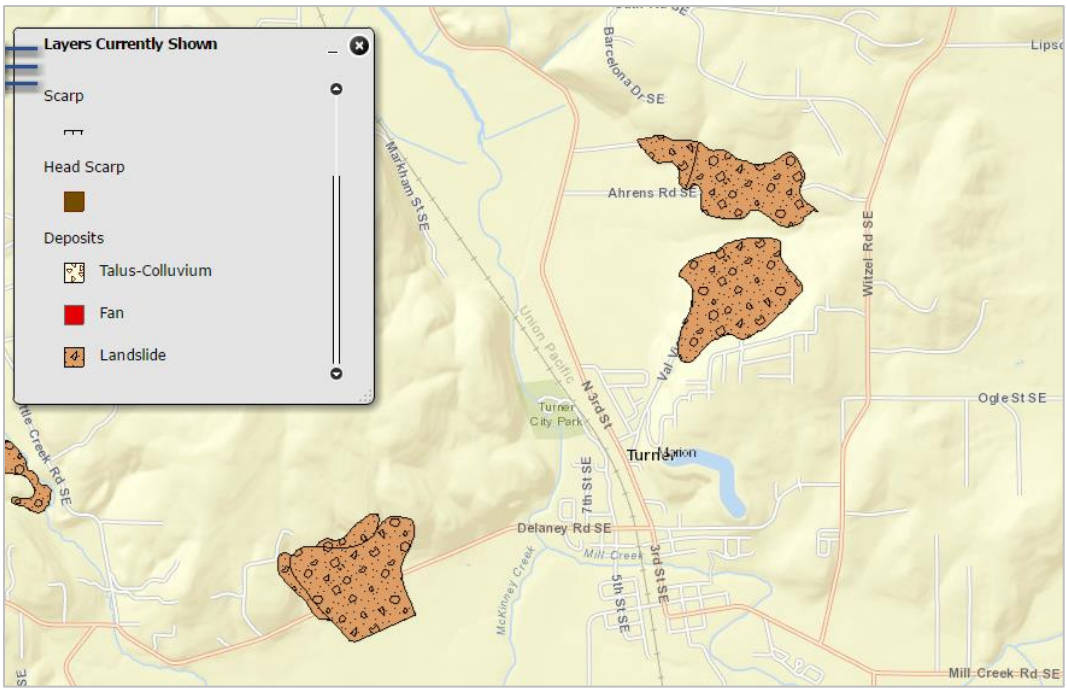
Table TR-9. Landslide Summary

Hazard	Landslide
Type	Climatic/Geologic
Speed of Onset	Slow to rapid
Location	Northeast Turner - Eastwood area; east of Turner city limits.
Extent	Moderate to High, but localized
Prior Occurance	Evidence of historic landslides; none in recent history
Probability	<1% annual

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

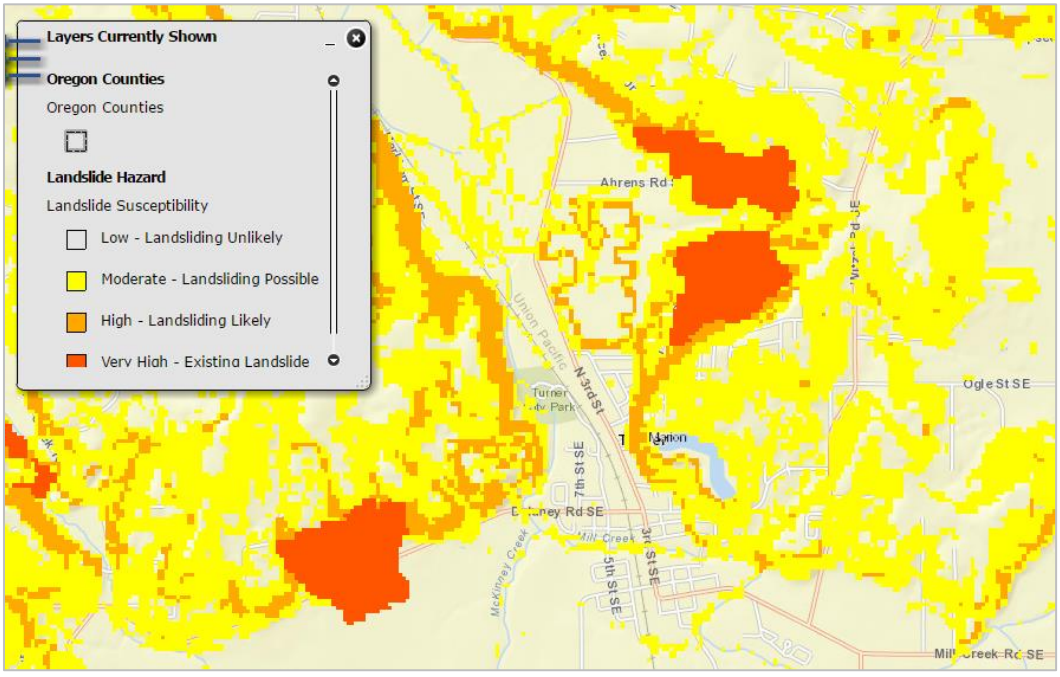
Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of landslides, and appropriately identifies previous landslide occurrences within the region. Turner has a relatively flat topography, except for the Eastwood area in the northeastern part of the town, near the Franzen Reservoir, and directly to the east between Turner and I-5. Turner's probability for landslide is unlikely and their vulnerability to landslide is limited. Figure TR-6 shows the inventory of known historical landslides. Figure TR-7 shows the susceptibility and exposure to future landslides in Turner.

Figure TR-6. Landslide Inventory



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

Figure TR-7. Landslide Susceptibility Exposure



Source: [Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)]

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Volcano

Table TR-10. Volcano Summary

Hazard	Volcano
Type	Geologic
Speed of Onset	Slow to rapid
Location	Cascade Mountains
Extent	Minor
Prior Occurance	One significant event since 1916 (Mount St. Helens)
Probability	<1% annual

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes Turner's risk to volcanic events. The steering committee determined that the city's probability for volcanic event is unlikely and their vulnerability to volcano is negligible.

The causes and characteristics of a volcanic event are appropriately described within the county's plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county's plan. Turner is very unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in 1980, the city was not impacted.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Severe Weather

Table TR-11. Severe Weather Summary

Hazard	Severe Weather/Storm
Type	Climatic
Speed of Onset	Slow to moderate
Location	Countywide
Extent	Minor to severe
Prior Occurance	Minor events occur annually; ~30 moderate to severe events over the past 130 years
Probability	100% for minor events, 23% for moderate to severe events

Sources: Marion County HMP

Windstorm

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of windstorms, as well as the location and extent of windstorm hazards. The city's probability for windstorm is highly likely and their vulnerability to windstorm is critical.

Significant wind events occur in Turner each year, usually between October and March. Damaging wind events are only slightly less common; once or twice per year the city will experience a windstorm event that will interrupt services, experience downed trees, and cause power outages. The F-2 tornado that touched down in Aumsville in December 2010, only four miles from Turner, did not cause damage to Turner.

Because windstorms typically occur during winter months, they are sometimes accompanied by ice, freezing rain, flooding, and very rarely, snow.

Winter Storm (Snow/Ice)

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of winter storms, as well as the location and extent of winter storm hazards. The City's probability for winter storms is highly likely and that their vulnerability to winter storms is critical.

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting the city typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from November through March.

Major winter storms can and have occurred in the Turner area, and while they typically do not cause significant damage, they are frequent and have the potential to impact economic activity. In particular, it becomes difficult to access the Eastwood area in the northeast of the city because ice can make the steep roads impassable. The most recent winter storms (December 2016 – January 207) included snow and ice, transportation and power interruptions, and government office and school closures. A disaster declaration is currently pending.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Wildfire

Table TR-12. Wildfire Summary

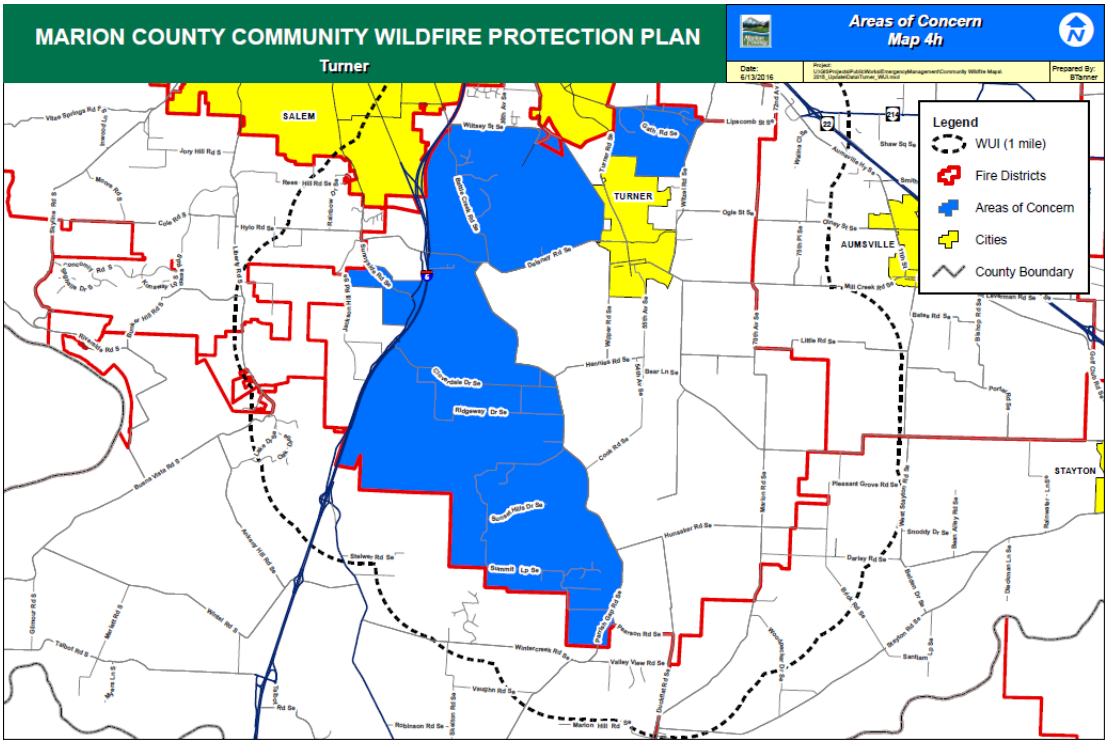
Hazard	Wildfire
Type	Climatic, Human Caused
Speed of Onset	Moderate to rapid
Location	Outside city limit
Extent	Minor to moderate
Prior Occurance	No history inside city limit
Probability	<1% annual

Sources: Marion County HMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of wildfires, as well as the county and city's history of wildfire events. The city's probability for wildfire is possible and the vulnerability to wildfire is limited. Turner is surrounded on all sides by open farmland, forests, or waterways. Although Turner has some forested areas within the city limits, there is no history of wildfire events in Turner.

The County updated the Community Wildfire Protection Plan (CWPP) in 2016 and portions of Turner are listed as having wildland urban interface (WUI) with areas of concern. Figure TR-8 depicts the areas near Turner that the CWPP identifies as areas of concern. These areas should be targeted for fire suppression activities.

Figure TR-8. Areas of concern near Turner.



Source: Marion County Community Wildfire Protection Plan (2016).

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

CITY OF WOODBURN ADDENDUM

Purpose

This document serves as the City of Woodburn's Addendum to the Marion County Multi-Jurisdictional Hazards Mitigation Plan (MHMP, HMP). This addendum supplements information contained in Volume I (Basic Plan) of this HMP. The Basic Plan serves as the foundation for this jurisdiction's addendum. Volume III (Appendices) provides additional information (particularly regarding participation and mitigation strategy). This addendum meets the following requirements:

- Multi-jurisdictional **Plan Adoption** §201.6(c)(5),
- Multi-jurisdictional **Participation** §201.6(a)(3),
- Multi-jurisdictional **Mitigation Strategy** §201.6(c)(3)(iv), and
- Multi-Jurisdictional **Risk Assessment** §201.6(c)(2)(iii).

Plan Process, Participation, and Adoption

This section of the HMP addendum addresses 44 CFR 201.6(c)(5), *Plan Adoption*, and 44 CFR 201.6(a)(3), *Participation.*

In the summer and fall of 2016, the Oregon Partnership for Disaster Resilience (OPDR) at the University of Oregon's Community Service Center (CSC) partnered with the Oregon Military Department's Office of Emergency Management (OEM), and Marion County cities, including Woodburn, to update their addendum to the Marion County HMP, which expired July 8, 2016. This project is funded through the Federal Emergency Management Agency's (FEMA) FY14 Pre-Disaster Mitigation Competitive Grant Program (PDMC-PL-10-OR-2014-002).

By developing this addendum to the Marion County HMP, locally adopting it, and having it approved by FEMA, the City of Woodburn will gain eligibility for FEMA Hazard Mitigation, Pre-Disaster Mitigation, and Flood Mitigation Assistance grant program funds.

The Marion County HMP, and Woodburn addendum, are the result of a collaborative effort between citizens, public agencies, non-profit organizations, the private sector, and regional organizations. A project steering committee guided the process of developing the plan. For more information on the composition of the steering committee see the *Acknowledgements*, *Plan Summary*, and *Plan Process* (Volume III, Appendix B).

The City of Woodburn Public Works Director is the designated local convener of this addendum. The Convener will take the lead in implementing, maintaining, and updating the addendum to the HMP in collaboration with Marion County Emergency Management.

Representatives from the City of Woodburn steering committee met formally on one occasion: September 7, 2016 (see Appendix B for more information).

The city's addendum reflects decisions decided upon at the plan update meeting and during subsequent work and communication with OPDR.

The City of Woodburn Steering Committee is comprised of representatives from the following departments:

- Convener, City of Woodburn Public Works Director
- City of Woodburn Building Official
- City of Woodburn Community Development Director
- City of Woodburn Senior Planner
- City of Woodburn Associate Planner
- City of Woodburn Police Executive Assistant
- Woodburn Police Department Patrol Division
- Woodburn Fire District Fire Marshal

Woodburn used multiple approaches to engage the public. First, the City established steering committee representatives from across the city. Next, the city actively participated in countywide community engagement activities described in Volume I, Section 4 and in Appendix B. City staff also presented the draft plan to the City Council during an open public council session. The Steering Committee was closely involved throughout the development of the plan and served as the local oversight body for the plan's development. In addition, community members outside of the steering committee were provided an opportunity for comment via the plan review process (see Appendix B for more information).

The Marion County HMP was approved by FEMA on August 17, 2017 and the Aurora addendum was adopted via resolution on June 28, 2017. This HMP is effective through August 16, 2022.

Mitigation Strategy

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

During the 2016 Marion County and Woodburn update process, OPDR and a representative from Marion County Emergency Management assisted the steering committee with developing mitigations that will meet Woodburn's unique situation. The proposed actions were then re-reviewed by the steering committee to finalize. Woodburn developed a list of priority actions (Appendix A-1), any actions that were not prioritized were placed in the Action Item Pool (Appendix A-2) and will be considered during the annual meetings. For a status update on each of Woodburn's 2010 mitigation actions, see Appendix A-2.

Priority Actions

The City is listing a set of high priority actions in an effort to focus attention on an achievable set of high leverage activities over the next five-years. The City's priority actions are listed in Table WB-1 on the following page.

Action Item Pool

Table WB-2 on the following pages presents a pool of mitigation actions. This expanded list of actions is available for local consideration as resources, capacity, technical expertise and/or political will become available.

Table WB-1. Woodburn Priority Action Items

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Priority Actions					
P-1	Flood	Include culvert widening projects for Wyffel Park and Gatch Street between Lincoln St. and Hardcastle Ave. in upcoming Capital Improvement Plans.	Public Works		Short Term
P-2	Flood	Update the Stormwater Master Plan to include important flood mitigation projects.	Public Works		Short Term
P-3	Multi-Hazard	Improve communication equipment in City Hall and in city vehicles, and identify additional radio operators to serve as communication backup in an emergency.	City, Police, Fire		Short Term
P-4	Multi-Hazard	Work to streamline the communication systems between all emergency responders. This might include purchasing additional equipment for some units.	City, Police, Fire		Short Term

Source: City of Woodburn HMP Steering Committee, 2016.

Table WB-2. Woodburn Action Item Pool

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Multi-Hazard					
MH-1	Multi-Hazard	Develop a voluntary registry of populations that may need particular assistance in an emergency situation.	Emergency Manager	Dispatch, Adult Family Services, Hospitals	Short Term
MH-2	Multi-Hazard	Provide periodic first-aid and CPR classes to members of the public.	Marion County	Red Cross, CERT	Ongoing
MH-3	Multi-Hazard	Participate in Marion County's post-disaster recovery planning efforts.	City Staff	Marion County	Short Term/ Ongoing
MH-4	Multi-Hazard	Continue development of CERT teams to ease the load on emergency services following a disaster.	CERT Program Coordinator (Marion County)		Ongoing
MH-5	Multi-Hazard	Develop and equip emergency shelters to take care of residents and vulnerable populations such as the elderly, the medically fragile, children, people who speak English as a second language, low-income residents, etc.	City Staff	Red Cross, Marion County, School Districts	Short Term/ Ongoing
MH-6	Multi-Hazard	Educate businesses and governmental organizations about the importance of continuity of operations plans to make them more resilient to natural hazards.	Marion County	Emergency Manager, SEDCOR, Chamber of Commerce	Ongoing
MH-7	Multi-Hazard	Ensure that all critical facilities have backup power and emergency operations plans to deal with power outages.	PIO and Emergency Manager	Public Works	Short Term
MH-8	Multi-Hazard	Evaluate the city computer system, network, and website for the ability to function during an emergency.	IT Department		Long Term
MH-9	Multi-Hazard	Develop a traffic management plan for redirecting traffic in the event of a major incident that cuts off roads.	Public Works	Planning	Long Term
MH-10	Multi-Hazard	Work with Marion Co. to provide a series of trainings about dealing with hazardous material.	Emergency Manager	Marion County	Short Term
Drought					
DT-1	Drought	Partner with Marion County to support local agencies' training on water conservation measures.	Emergency Manager	Environmental Services	Short Term

Source: City of Woodburn HMP Steering Committee, 2016.

Table WB-2. Woodburn Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Earthquake					
EQ-1	Earthquake	Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices through public education.	PIO	Emergency Manager, CERT	Ongoing
EQ-2	Earthquake	Complete and maintain an inventory of high-risk buildings, critical facilities, and infrastructure that may be particularly vulnerable to earthquake damage.	Emergency Manager	Marion County	Short Term
EQ-3	Earthquake	Send city employees to the County's ATC 20 training.	Building and Engineering		Short Term/ Ongoing
EQ-4	Earthquake	Evaluate the structural integrity of city-owned buildings.	Building and Engineering (Building Official)		Long Term
EQ-5	Earthquake	Require new city facilities to exceed the minimum structural requirements for seismic loading.	Building Inspection and Permitting	City Council	Long Term
EQ-6	Earthquake	Seek funding to further assess the “probability of collapse” for Lincoln Elementary School, Washington Elementary School, French Prairie Middle School, Nellie Muir Elementary School, and Woodburn High School.	School District		Long Term
EQ-7	Earthquake	Update the city’s Comprehensive Plan to reflect the latest information on seismic hazards.	Planning		Short Term
EQ-8	Earthquake	Encourage residents and commercial businesses to purchase earthquake insurance.	Building and Engineering	PIO	Ongoing
EQ-9	Earthquake	Install automatic shut-off valves in all city facilities that use natural gas.	Building Official	City Council	Long Term
EQ-10	Earthquake	Encourage residents to prepare and maintain 2-week survival kits.	PIO	Marion County, CERT, Statesman Journal	Ongoing

Source: City of Woodburn HMP Steering Committee, 2016.

Table WB-2. Woodburn Action Item Pool (Continued)

Action Item ID	Hazard	Action Item	Coordinating Organization	Partner Organizations	Timeline
Action Item Pool					
Flood					
FL-1	Flood	Implement mitigation action items in the Public Facilities Plan	Public Works		Short Term/ Ongoing
FL-2	Flood	Partner with Marion County to conduct workshops for target audiences on National Flood Insurance Programs, mitigation activities, and potential assistance from FEMA's Flood Mitigation Assistance and Hazard Mitigation Grant Programs.	Emergency Manager	Marion County Public Works	Ongoing
FL-3	Flood	Continue compliance with the National Flood Insurance Program through the enforcement of local floodplain ordinances.	City Engineer		Ongoing
FL-4	Flood	Update the City's Flood Insurance Rage Maps (FIRMs) - FEMA should be relseasing updates soon.	FEMA		Short Term
Volcano					
VC-1	Volcano	Identify critical facilities and equipment that can be damaged by ashfall, and develop mitigation activities to prevent damage to these facilities.	Emergency Manager	Public Works	Long Term
Severe Weather					
SW-1	Wind Storm	Educate the public about the benefits of proper tree pruning and care in preventing damage during windstorms. Outreach outlets include Arbor Day and passing out tree maintenance brochures.	Emergency Manager	PIO, CERT	Ongoing
SW-2	Wind Storm	Educate the community about the risk of downed power lines, aerial power lines in the vicinity of trees, and preparedness measures to take in the event of a power outage.	PGE	PIO, CERT	Ongoing
SW-3	Wind Storm	Require new city facilities to exceed the minimum structural requirements for wind loading.	Building Department		Long Term
SW-4	Severe Winter Storm	Educate homeowners about choosing ice and windstorm-resistant trees and landscaping practices to reduce tree-related hazards in future ice storms.	Emergency Manager	PIO, CERT	Ongoing
SW-5	Severe Winter Storm	Educate citizens about ways to weatherize their homes, as well as safe emergency heating equipment.	Emergency Manager	Marion County, PGE, CERT	Ongoing

Source: City of Woodburn HMP Steering Committee, 2016.

Plan Implementation and Maintenance

The City Council will be responsible for adopting the City of Woodburn addendum to the Marion County HMP. This addendum designates a convener and a coordinating body to oversee the development and implementation of action items. Because the city addendum is part of the county's multi-jurisdictional HMP, the city will look for opportunities to partner with the county. The city's steering committee will convene after adoption of the City of Woodburn addendum on a semi-annual schedule; the county also meets on a semi-annual basis. The City of Woodburn convener will participate in the Marion County HMP meetings and will report on city specific activities as appropriate. The steering committee will be responsible for identifying new risk assessment data, reviewing status of mitigation actions, identifying new actions, and seeking funding to implement the city's mitigation strategy (actions). The convener will also remain active in the county's implementation and maintenance process (see Volume I, Section 4 for more information).

The city will utilize the same prioritization process as the county (See Volume I, Section 4: Plan Implementation and Maintenance and Volume IV, Appendix D: Economic Analysis of Hazard Mitigation Projects for more information).

Implementation through Existing Programs

Many of the Hazards Mitigation Plan's recommendations are consistent with the goals and objectives of the city's existing plans and policies. Where possible, the City of Woodburn will implement the HMP's recommended actions through existing plans and policies. 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, allowing them to adapt to changing conditions and needs. Implementing the HMP's action items through such plans and policies increases their likelihood of being supported and implemented.

Woodburn's Comprehensive Plan was first acknowledged by the Oregon Land Conservation and Development Commission in 1978. The City most recently updated the entire plan, including updates to the Natural Hazards section, in October of 2005.[1] While policies in the Woodburn Comprehensive Plan mention floodplain requirements, the plan does not specifically call out any natural hazards and contains no goals directly related to natural hazards. One plan policy prohibits development within the 100-year floodplain and another seeks to preserve trees in designated floodplains. The City implements the plan through regulatory controls found in the Woodburn Development Ordinance.[2]

Woodburn also implements elements of the Comprehensive Plan related to natural hazards through the following Plans:

- Woodburn Transportation Systems Plan, updated 2005
- Woodburn Parks Master Plan, updated 2009

[1] Woodburn Comprehensive Plan (2009). Section J: Natural and Cultural Resources p. 42-45.

[2] "Section 2.1: Land Use Zoning." & "Section 3.1" & "Section 5.104"
http://www.ci.woodburn.or.us/sites/default/files/%2810-31%2909WDO.pdf

- Woodburn Public Facilities Plan, updated May 2005
- Woodburn Water Management and Conservation Plan, January 2010

Continued Public Participation

Keeping the public informed of the City's efforts to reduce the risk associated with future hazards events is important for successful plan implementation and maintenance. The city is committed to involving the public in the plan review and updated process. See Volume I, Section 4, for more information.

Plan Maintenance

The Marion County Multi-Jurisdictional Hazards Mitigation Plan and city addendum will be updated every five years in accordance with the update schedule outlined in the Disaster Mitigation Act of 2000. During the county plan update process, the City will also review and update its addendum. The convener will be responsible for convening the steering committee to address the questions outlined below.

- Are there new partners that should be brought to the table?
- Are there new local, regional, state, or federal policies influencing natural hazards that should be addressed?
- Has the community successfully implemented any mitigation activities since the plan was last updated?
- Have new issues or problems related to hazards been identified in the community?
- Are the actions still appropriate given current resources?
- Have there been any changes in development patterns that could influence the effects of hazards?
- Have there been any significant changes in the community's demographics that could influence the effects of hazards?
- Are there new studies or data available that would enhance the risk assessment?
- Has the community been affected by any disasters? Did the plan accurately address the impacts of this event?

These questions will help the steering committee determine what components of the mitigation plan need updating. The steering committee will be responsible for updating any deficiencies found in the plan.

Risk Assessment

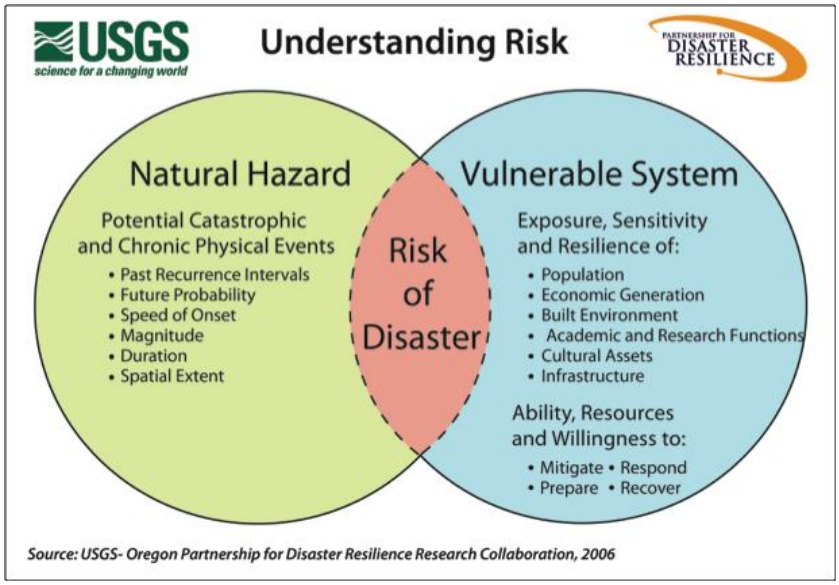
This section of the HMP addendum addresses 44 CFR 201.6(b)(2) - Risk Assessment. In addition, this chapter can serve as the factual basis for addressing Oregon Statewide Planning Goal 7 – Areas Subject to Natural Hazards. Assessing hazard risk has three phases:

- **Phase 1:** Identify hazards that can impact the jurisdiction. This includes an evaluation of potential hazard impacts – type, location, extent, etc.
- **Phase 2:** Identify important community assets and system vulnerabilities. Example vulnerabilities include people, businesses, homes, roads, historic places and drinking water sources.

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

The local level rationale for the identified mitigation strategies (action items) is presented herein, and within Section 2, *Risk Assessment*, and Appendix C, *Community Profile*. The risk assessment process is graphically depicted in Figure WB-1 below. Ultimately, the goal of hazard mitigation is to reduce the area of risk, where hazards overlap vulnerable systems.

Figure WB-1. Understanding Risk



Risk Assessment Approach

A risk assessment is intended to provide the, "factual basis for activities proposed in the strategy to reduce loses from identified hazards."[3] To complete the risk assessment, the HMP update team first updated the description, type, location and extent of each hazard. Next, the team updated the vulnerability information based on each hazard's potential impact on the community.

The Marion County Basic Plan (Volume I, Section II) Risk Assessment describes in detail the methods used to assess risk. In summary, Marion County has prepared a Threat Hazard Identification and Risk Assessment as a formal annex to the Marion County Emergency Operation Plan. The assessment uses a method developed by BOLD Planning[4]. This city addendum builds on the county level assessment to produce a similar assessment for the City of Woodburn. The assessment specifically examines:

1. Probability (frequency) of event
2. Magnitude of event
3. Expected warning time before event
4. Expected duration of event

[3] 44 CFR 201.6(2)(i)

[4] BOLD Planning is a consulting firm specializing in the development of actionable emergency plans. For more information, visit: http://www.boldplanning.com/

Refer to Page 2-4 of the Marion County Basic HMP for a description of the scoring values for each ranking category.

Hazard Analysis

The assessment identifies three levels of risk: High, Moderate and Low.

High - High probability of occurrence; at least 50 percent or more of population at risk from hazard; significant to catastrophic physical impacts to buildings and infrastructure; major loss or potential loss of functionality to all essential facilities (hospital, police, fire, EOC and shelters).

Moderate - Less than 50 percent of population at risk from hazard; moderate physical impacts to buildings and infrastructure; moderate potential for loss of functionality to essential facilities.

Low - Low probability of occurrence or low threat to population; minor physical impacts.

A summary of the risk assessment findings and rankings is presented in Table WB-3.

Table WB-3. Hazard and Vulnerability Assessment Summary

Hazard Profile Summary for Woodburn Usinging Bold Planning Analysis Scoring							
Natural Hazard	Probability	Warning Time	Magnitude	Duration	CPRI	Local Planning Significance	County Planning Significance
Weight Factor	0.45	0.3	0.15	0.1			
Earthquake*	4	4	4	4	4.00	High	High
Severe Weather/Storm**	4	1	3	3	2.85	Moderate	High
Flood	3	2	2	4	2.65	Moderate	High
Drought	3	1	3	4	2.50	Moderate	High
Extreme Weather - High Temperature	3	1	2	4	2.35	Moderate	Moderate
Wildland Interface Fire	1	4	2	2	2.15	Moderate	Moderate
Dam or Levee Failure	1	2	4	4	2.05	Moderate	Moderate
Landslide	1	2	2	2	1.55	Low	High
Volcanic Eruption	1	1	1	4	1.30	Low	Low
*Note: Earthquake probability listed to match county level analysis. See below for more detailed probability assessment.							
**Note: Includes tornado hazard							

Source: BOLD Planning Risk Assessment Method; Analysis by UO Community Service Center.

Community Asset Identification

This section provides information on city specific assets. For additional information on the characteristics of Woodburn, in terms of geography, environment, population, demographics, employment and economics, as well as housing and transportation see Volume III, Appendix C, *Community Profile*. Many of these community characteristics can affect how hazards impact communities and how communities choose to plan for natural hazard mitigation. Considering the city specific assets during the planning process can assist in identifying appropriate measures for hazard mitigation.

Community Characteristics

The city of Woodburn is located in the Willamette Valley in Marion County, Oregon, approximately 31 miles south of the city of Portland. Woodburn experiences a moderate

climate with an average high temperature of 82 degrees and low of 54 degrees in August, and an average high temperature of 47 and low of 35 in January.[5] The city receives an average annual precipitation of 40.7 inches.[6] Major bodies of water in Woodburn include Senecal Creek and Mill Creek. Woodburn is located on a flat area, with farmland surrounding the city on all sides.

The Population Research Center at Portland State University lists Aurora's 2015 population at 24,670. This represents a 19.7% increase from 2000. For more demographic information, refer to Appendix C.

Economy

Historically, the city of Woodburn was a commercial, agricultural, and industrial community that grew around the railroad that currently runs through the center of town.[7] Today, Woodburn's economy is still largely based on manufacturing, agriculture, construction and retail trade. Woodburn's proximity to I-5 allows for an auto-oriented service economy to exist along the interstate corridor. The Woodburn Premium Outlets are a large shopping attraction for out-of-town visitors. Median household income in Woodburn in 2014 was $43,144. For more economic information, refer to Appendix C.

Critical and Important Facilities

Woodburn's critical and important facilities include the following:

Transportation

- Interstate-5 runs north-south through western Woodburn
- Highway 99E runs parallel to I-5 through eastern Woodburn
- Highway 214 runs east-west through Woodburn (Highway 211 also runs east-west and merges with Highway 214 when it reaches Woodburn)
- The Union Pacific Railroad runs parallel to I-5 through the middle of Woodburn
- The Burlington Northern Santa Fe railroad runs north-south just west of Woodburn
- Woodburn Transit Service
- Woodburn Amtrak Station

Energy

- PGE – electricity (2079 Progress Way)
    - PGE operates a maintenance facility and three sub-stations in or near Woodburn

Water

- Water:
    - Above-ground storage tank: 750,000 gallons

[5] Weatherbase.com, "Aurora Oregon," http://www.weatherbase.com, accessed 2/21/17. (Note, the Aurora Airport is the closest weather station to Woodburn.)

[6] *Ibid.*

[7] Woodburn Comprehensive Plan (2009). "Woodburn's Historical Context." P. 4-6.

    - Underground storage reservoir: 4.7 million gallons
    - Seven active wells (according to the 2005 Public Facilities Plan)
    - Three water treatment plants (National Wy., Country Club Rd., and Parr Rd.)
- Wastewater Treatment Plant and Collection System (located off of Highway 211)
    - Approximately 140 acres of land
    - Ten lift stations for sanitary sewer services

Emergency Services

- Police Department (1060 Mount Hood Ave.)
- Fire:
    - Woodburn Fire District Station 21 (1776 Newberg Highway)
    - Woodburn Fire District Station 22 (1650 James Street)
    - (Waconda) Woodburn Fire District Station 24 (River Road, southwest of city)
    - (Broadacres) Woodburn Fire District Station 25 (Butteville Road, northwest of city)
- Medical:
    - Legacy Health / Woodburn Specialist Center (1475 Mount Hood Ave.)
    - Salud Medical Center (1175 Mount Hood Ave.)
    - Woodburn Pediatric Clinic (2050 Progress Way)
      Note: Major hospitals are in Silverton and Salem
- Woodburn City Hall (270 Montgomery St.) – contains the office space for the Administration, Finance and Community Development departments, and the Municipal Court.

Cultural/Historical Resources

- Buildings listed on the National Register of Historic Places:
    - Bank of Woodburn
    - Old Woodburn City Hall
    - Jesse H. Settlemier House
- Woodburn also has an Historic Downtown district
- Events/amenities that may have large crowds:
    - March and April: Woodburn Tulip Festival
    - Woodburn Premium Outlets (particularly around Black Friday and the holiday season)
    - Fiesta Mexicana in Legion Park
    - Relay for Life in July
    - Drag Racing NHRA (National Hot Rod Association) from March to November
    - Bauman's Fall Festival in Gervais (impacts traffic in Woodburn)
    - Oktober Fest in Mt. Angle (impacts traffic in Woodburn)
    - St. Paul Rodeo (impacts traffic in Woodburn)

Functional and Access Needs (Vulnerable Populations)

- Schools:
    - Heritage Elementary (440 Parr Rd.)
    - Lincoln Elementary (1041 N. Boones Ferry Rd.)
    - Nellie Muir Elementary (1800 W. Hayes St.)
    - Washington Elementary (777 E. Lincoln St.)
    - French Prairie Middle (1025 N. Boones Ferry Rd.)
    - Valor Middle (450 Parr Rd.)

- Academy of International Studies (1785 N. Front St.) – high school
- Success Alternative High School (610 Young Street)
- Wellness, Business and Sports School (1785 N. Front Street) – high school
- Woodburn Academy of Art, Science and Technology (1785 N. Front St.) – high school
- Woodburn Arts and Communications Academy (1785 N. Front St.) – high school
- St. Luke's Parochial School (529 Harrison St.)
- Headstart (950 N. Boones Ferry Rd.)
- Oregon Child Development Coalition (OCDC) (540 North Settlemier Avenue) – Infant services
- Chemeketa Community College (120 E. Lincoln Street) – community college
- Pacific University Campus (24 W Lincoln St) – college
- Woodburn Arthur Academy (575 Gatch St.) – K- 5th Grade

See hazard sections below and Section 2, *Risk Assessment*, for potential hazard vulnerabilities to these facilities.

Hazard Characteristics

Drought

The characteristics of drought in Woodburn are the same for the county as a whole.

Table WB-4. Drought Summary

Hazard	Drought
Type	Climatic
Speed of Onset	Slow
Location	Varies, County Wide
Extent	Moderate to Severe Drought*
Prior Occurance	Three > 6 months duration since 1982
Probability	~9%

*Defined as between -2 and -4 on the National Resource Conservation Service (NRCS) Surface Water Supply Index (SWSI)

Sources: Oregon NHMP; NRCS; analysis by OPDR

The probability of drought in Woodburn is likely, the same as for the county as a whole. The City's water supply comes exclusively from subsurface sources, making vulnerability to drought moderate. Overall, the planning significance of drought in Woodburn is moderate.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of drought hazards, as well as the location and extent of a potential event. Due to a cool, wet climate, past and present weather conditions have generally spared Marion County communities from the effects of drought. Governor Kate Brown declared a drought emergency for all of Marion County in September 2015, but according to the steering committee, Woodburn has not implemented water curtailment measures.

According to Woodburn's Public Facilities Plan, the City has seven active wells which pump water through three neighborhood treatment plants. This water is then pumped into two

storage facilities – an above ground tank and a larger underground storage reservoir. From here, water is distributed out to residential, commercial, and industrial customers.

Woodburn has a Water Management and Conservation Plan, released in January 2010. The Plan contains a "Water Curtailment Element."

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Earthquake

The characteristics of both a crustal earthquake and a Cascadia Subduction Zone (CSZ) earthquake are similar to the county as a whole.

Table WB-5. Earthquake Summary Crustal

Hazard	Earthquake - Crustal
Type	Geologic
Location	Multiple active faults; Willamette Valley
Speed of Onset	Rapid
Extent	Very Strong to Severe shaking ~ 500 yrs*
Prior Occurance	One over Magnitude 5 last 100 yrs**
Probability	Approximately 1% annual

*DOGAMI HazVu; ** PNSN - 1993 Scotts Mills just north of Marion County

Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

Table WB-6. Earthquake Summary Subduction

Hazard	Earthquake - Subduction
Type	Geologic
Location	Primarily west of the Cascades; CA - BC
Speed of Onset	Rapid
Extent	Catastrophic
Prior Occurance	One over Magnitude 9 last 500 yrs
Probability	Magnitude 9+ is 7% - 12% over 50 yrs**

*DOGAMI HazVu; **Oregon Natural Hazard Mitigation Plan, anlysis by Oregon Department of Geology and Mineral Industries.

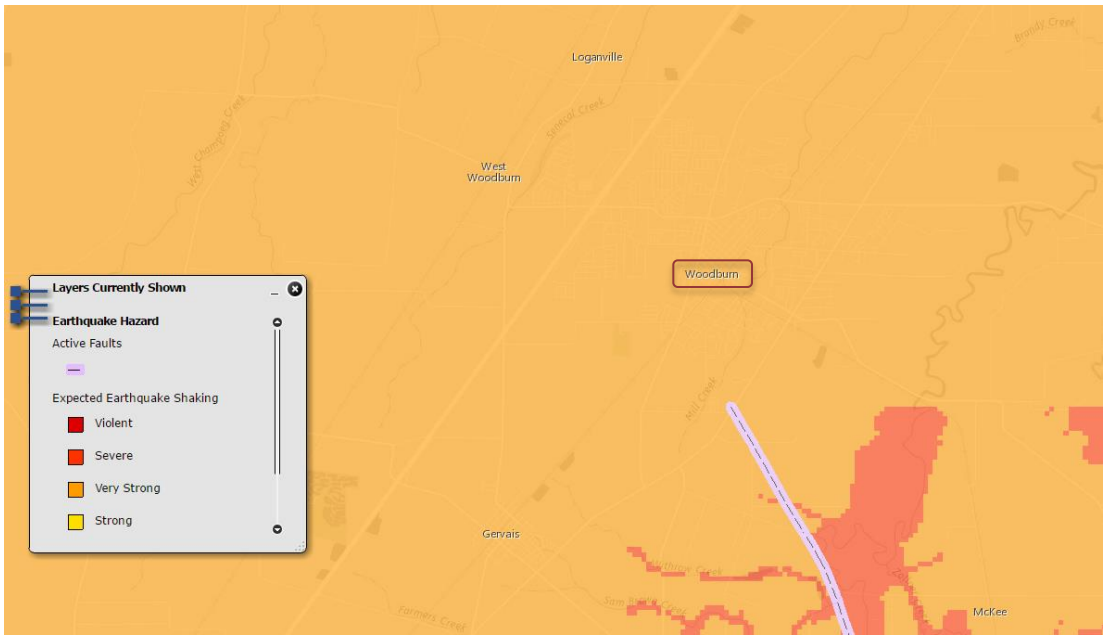
Sources: DOGAMI - Oregon HazVu; Oregon NHMP; Pacific Northwest Seismic Network

Woodburn's probability for a Crustal Earthquake event is "possible" and their vulnerability to a Crustal Earthquake event is "limited". The county steering committee determined that the probability for a Cascadia Subduction Zone (CSZ) Earthquake event is "highly likely" and that the vulnerability to a Cascadia Earthquake event is "catastrophic". This hazard was not rated as distinct CSZ and crustal events in the previous HMP. There are no locally active faults within the Woodburn city limits. The nearest active fault runs northwest to southeast just outside of Woodburn, ending just on the outskirts of the city. The 1993 Scott Mills quake caused $28 million in damages to cities throughout Marion County. In Woodburn, the 1993 quake caused damage to unreinforced masonry buildings in the downtown and the second story of Washington elementary school. Additionally, in a local store, pesticides, paints, and car batteries fell off shelves and mixed together causing hazardous fumes. No damaging earthquake events occurred during the previous five years.

Volume I, Section 2, *Risk Assessment*, adequately describes the characteristics of earthquake hazards, history, as well as the location and extent of a potential event. Generally, an event that affects the county is likely to affect Woodburn as well. Previous occurrences are well-documented within the county's plan, and the community impacts described by the county would generally be the same for Woodburn as well.

Earthquake-induced damages are difficult to predict, and depend on the size, type, and location of the earthquake, as well as site-specific building and soil characteristics. Presently, it is not possible to accurately forecast the location or size of earthquakes, but it is possible to predict the behavior of soil at any particular site. In many major earthquakes, damages have primarily been caused by the behavior of the soil. Figure WB-2 shows that ground shaking in Woodburn for both crustal and subduction earthquakes ~~is~~ are expected to be very strong.

Figure WB-2. Active Faults and Expected Shaking



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)

The Woodburn steering committee identified several concerns related to the effects of an earthquake:

- The city has a large non-English speaking population. In emergency situations, these groups may need particular attention and assistance. Likewise, outreach strategies that inform residents of shelters or preventative activities should be distributed in multiple languages.
- The steering committee identified a need within the community to identify populations (i.e., senior or disabled populations) that may need particular assistance in pre-disaster evacuation protocols or after disaster events. This could be a voluntary registry or a preliminary assessment of current needs.

- The entire city may have disruptions in communication systems. This will be an issue for schools (i.e., contacting parents), businesses, and public services. Likewise, transportation systems are likely to be disrupted after a high-magnitude earthquake.
- The city draws a large tourist population to the Woodburn Premium Outlets. Sheltering and caring for tourists post-event may be a difficult endeavor. Logistics for sheltering or providing food and basic care for the entire population will also be a challenging task.
- The MacLaren Youth Facility may be seismically unstable. Additional assessment is required (although, this is a state facility and outside of the city's jurisdiction). The facility houses up to 500 people at a time.
- Generally, older buildings may require seismic retrofit. This includes businesses in unreinforced masonry buildings, and older homes and buildings including the old City Hall, Library, and the historic Settlemeir House. Likewise, utility systems, communication systems, transportation corridors, and business or industrial centers may be vulnerable to seismic activity. Figure WB-3 identifies buildings in Woodburn that are 60 years or older.
- The city's steering committee believes that there are fragile waterlines in downtown Woodburn. Seismic activity may disrupt the water lines and prevent distribution to residents. Emergency generators for the water system currently have only a 72-hour supply of fuel.
- The city's water tower was built in 1962 and may be vulnerable to seismic activity.
- The I-5 overpass, if damaged, could isolate Woodburn from neighboring communities – especially if Highway 99E is damaged as well.
- An important water main is supported by the Hazelnut Street Bridge, where foundation problems have been identified. If the bridge fails either by seismic action or storm erosion, this line will fail also.

In 2007, the Department of Geology and Mineral Industries (DOGAMI) conducted a seismic needs assessment for public school buildings, acute inpatient care facilities, fire stations, police stations, sheriffs' offices, and other law enforcement agency buildings.[8] Buildings were ranked for the "probability of collapse" due to the maximum possible earthquake for any given area. This report assigned the following ratings to public facilities in Woodburn:

<u>Very High (100%)</u>

- Lincoln Elementary School
- Washington Elementary School

<u>High (> 10%)</u>

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

[8] Lewis, Don (2007). "Statewide Seismic Needs Assessment: Implementation of Oregon 2005 Senate Bill 2 Relating to Public Safety, Earthquakes, and Seismic Rehabilitation of Public Buildings." Department of Geology and Mineral Industries, Open-File Report O-07-02.

Moderate (> 1%)

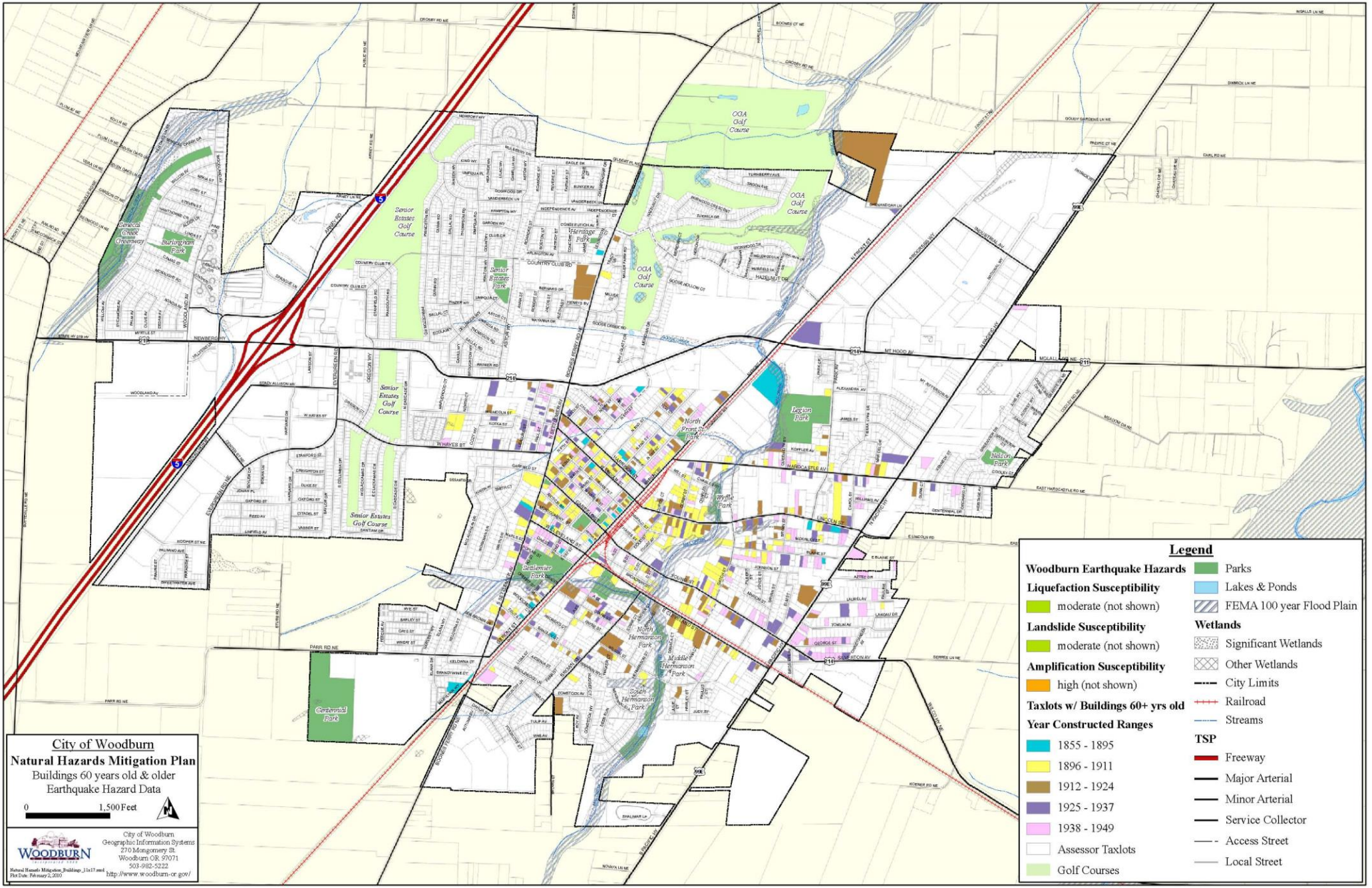
- Woodburn High School
- Woodburn RFPD
- Woodburn RFPD Station 21

Low (< 1%)

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

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Figure WB-3. Older Buildings.



Flood

Table WB-7. Flood Summary

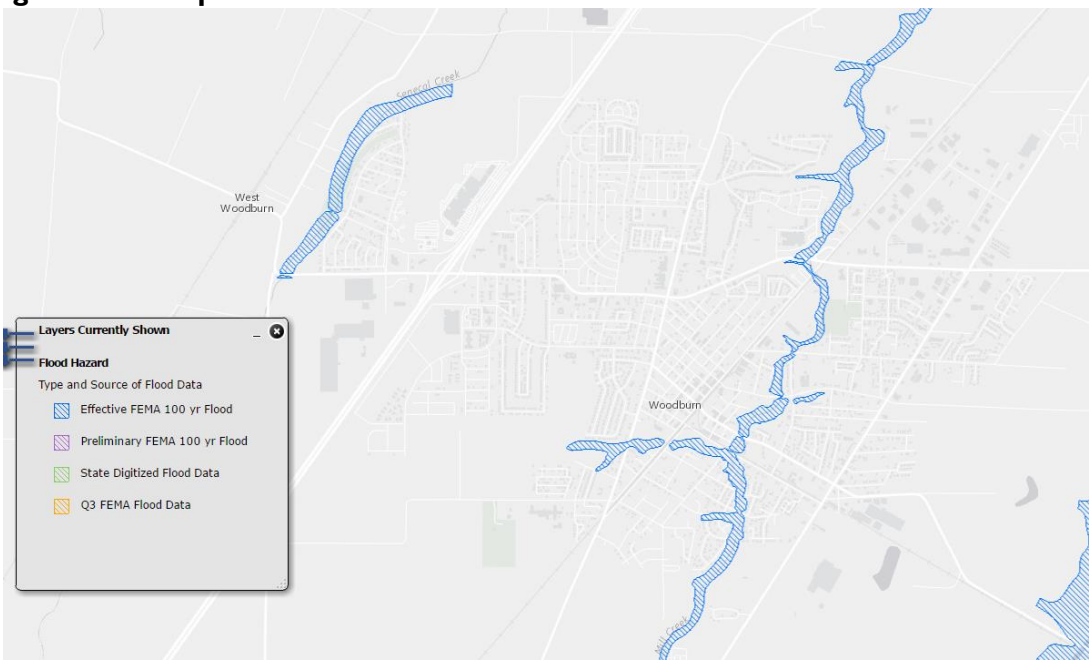
Hazard	Flood
Type	Climatic
Speed of Onset	Slow to moderate
Location	Mapped flood zones, floodplain
Extent	Moderate to severe
Prior Occurance	Four significant events since 1964
Probability	1% annual within SFHA

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, Risk Assessment, describes the causes and characteristics of flooding hazards within the region. Woodburn's probability for riverine flood is likely and vulnerability to flood is limited.

Portions of Woodburn have areas of flood plains (special flood hazard areas). These include areas along Mill Creek and Senecal Creek (see Figure WB-4). The Pudding River, just to the east of Woodburn, is also a major source of flooding. Historically, Woodburn has experienced major floods in 1986 and 1996 on the Pudding River. Since then, no major floods have affected the population, but Woodburn continues to experience regular localized flooding during the wet season. According to the steering committee, localized flooding occurred in 2013 along several drainages. The steering committee also indicated that Boones Ferry Rd. regularly experiences localized flooding issues.

Figure WB-4. Special Flood Hazard Area



Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)

National Flood Insurance Program (NFIP)

FEMA modernized the Woodburn Flood Insurance Rate Maps (FIRMs) in January of 2000. The table below shows that as of October 2016, Woodburn had 53 National Flood Insurance Program (NFIP) policies in force. Of those, 16 were for properties that were developed before development of the initial FIRM. Woodburn's last Community Assistance Visit (CAV) occurred on June 24, 2004. Woodburn is not a member of the Community Rating System (CRS). Table WB-8 shows that 50 flood insurance policies are for single-family residential structures and with three serving non-residential structures. There have been two paid flood claims in Woodburn, totaling $14,781.

The Community Repetitive Loss record for Woodburn identifies no Repetitive Loss Properties[9] and no Severe Repetitive Loss Properties[10].

Table WB-8. Flood Insurance Detail

Jurisdiction	Effective FIRM and FIS	Initial FIRM Date	Total Policies	Pre-FIRM Policies	Policies by Building Type: Single Family	2 to 4 Family	Other Residential	Non-Residential	Minus Rated A Zone	Minus Rated V Zone
Marion County	-	-	2,067	1,239	1,614	115	105	232	97	0
Woodburn	1/19/2000	3/1/1979	53	16	50	0	0	3	6	0

Jurisdiction	Insurance in Force	Total Paid Claims	Pre-FIRM Claims Paid	Substantial Damage Claims	Total Paid Amount	Repetitive Loss Structures	Severe Repetitive Loss	CRS Class Rating	Last Community Assistance
Marion County	$ 514,268,700	298	226	16	$ 5,732,543	11	2	-	-
Woodburn	$ 12,711,100	2	2	0	$ 14,781	0	0	N/A	6/24/2004

Source: Information compiled by Department of Land Conservation and Development, October, 2016.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Landslide

Table WB-9: Landslide Summary

Hazard	Landslide
Type	Climatic/Geologic
Speed of Onset	Slow to rapid
Location	Waterways (banks) and transportation facilities
Extent	Minor
Prior Occurance	No major events
Probability	Low for minor events; less than 5% major events

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

[9] A Repetitive Loss (RL) property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. A RL property may or may not be currently insured by the NFIP.

[10] A Severe Repetitive Loss (SRL) property is a single family property (consisting of 1 to 4 residences) that is covered under flood insurance by the NFIP and has incurred flood-related damage for which 4 or more separate claims payments have been paid under flood insurance coverage, with the amount of each claim payment exceeding $5,000 and with cumulative amount of such claims payments exceeding $20,000; or for which at least 2 separate claims payments have been made with the cumulative amount of such claims exceeding the reported value of the property.

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of landslides, and appropriately identifies previous landslide occurrences within the region. Woodburn has a relatively flat topography. Woodburn's probability for landslide is possible (which is lower than the county's rating) and their vulnerability to landslide is limited (which is also lower than the county's rating). Figure WB-5 shows that landslide risk in Woodburn is low to moderate in most populated areas, with some small areas of high along Mill and Senecal Creeks.

Figure WB-5. Landslide Susceptibility Exposure

Source: Oregon HazVu: Statewide Geohazards Viewer (DOGAMI)

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Volcano

Table WB-10: Volcano Summary

Hazard	Volcano
Type	Geologic
Speed of Onset	Slow to rapid
Location	Cascade Mountains
Extent	Minor
Prior Occurance	One significant event since 1916 (Mount St. Helens)
Probability	<1% annual

Sources: DOGAMI - Oregon HazVu; Oregon NHMP

Volume I, Section 2, *Risk Assessment*, adequately describes Woodburn's risk to volcanic events. The steering committee determined that the city's probability for volcanic event is unlikely and their vulnerability to volcano is negligible.

The causes and characteristics of a volcanic event are appropriately described within the county's plan, as well as the location and extent of potential hazards. Previous occurrences are well-documented within the county's plan. Woodburn is very unlikely to experience anything more than volcanic ash during a volcanic event. When Mt. Saint Helens erupted in 1980, the city was impacted only by ashfall.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Severe Weather

Table WB-11: Severe Weather Summary

Hazard	Severe Weather/Storm
Type	Climatic
Speed of Onset	Slow to moderate
Location	Countywide
Extent	Minor to severe
Prior Occurance	Minor events occur annually; ~30 moderate to severe events countywide over the past 130 years
Probability	100% for minor events, 23% for moderte to severe events

Sources: Marion County HMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of windstorms and severe winter storms, as well as the location and extent of these hazards. Woodburn's probability for windstorm and severe winter storms is highly likely (which is the same as the county's rating) and that their vulnerability is critical (which is lower than the county's rating).

Significant wind events occur in Woodburn each year, sometimes interrupting services, downing trees, and causing power outages. Since 1957, five reported tornadoes have struck Marion County, however none have touched down near Woodburn. More recently, two windstorms in 2015 toppled trees, with one tree causing damage to a house. According to the Woodburn steering committee, Woodburn experiences at least one severe wind event each year, often resulting in power outages.

Severe winter storms can consist of rain, freezing rain, ice, snow, cold temperatures, and wind. They originate from troughs of low pressure offshore that ride along the jet stream during fall, winter, and early spring months. Severe winter storms affecting Woodburn typically originate in the Gulf of Alaska or in the central Pacific Ocean. These storms are most common from November through March.

Major winter storms can and have occurred in the Woodburn area, and while they typically do not cause significant damage, they are frequent and have the potential to impact economic activity. During a storm in May 2014, lightening caused an estimated $75,000 in damage to property, including a house. The most recent winter storms (December 2016 – January 2017) included snow and ice and resulted in transportation and power interruptions combined with government office and school closures. A disaster declaration is currently pending.

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Wildfire

Table WB-12: Wildfire Summary

Hazard	Wildfire
Type	Climatic, Human Caused
Speed of Onset	Moderate to rapid
Location	Outside city limit
Extent	Minor to moderate
Prior Occurance	No history inside city limit
Probability	<1% annual

Sources: Marion County HMP

Volume I, Section 2, *Risk Assessment*, adequately describes the causes and characteristics of wildfires, as well as the county and city's history of wildfire events. The City's probability for wildfire is unlikely and the vulnerability to wildfire is limited (lower probability and vulnerability ratings than for the county). Due to Woodburn's isolation from the majority of at-risk areas, Woodburn is unlikely to be affected directly by wildfires. Should they occur nearby, however, the city could be affected by smoke, impacting people with respiratory problems, and potentially the elderly or very young.

The County updated the Community Wildfire Protection Plan in 2016 and Woodburn is not listed as a "Community at Risk."

Please review the Risk Assessment (Volume I, Section 2) for additional information on this hazard.

Other Hazard or Concerns

The Woodburn Steering Committee identified the following hazard issues or concerns during their meeting on September 7, 2016. While these hazards are non-natural, we've listed them here for reference.

- Hazardous Material Spills
- Transportation Accidents
- Active Shooter
- Cyber Terrorism
- Eco/Ag Terrorism