

Chapter 1

Introduction

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Chapter 1

Introduction

The City of Beaverton (the City) developed this Natural Hazard Mitigation Action Plan in an effort to reduce future loss of life and property resulting from natural disasters. It is impossible to predict exactly when these disasters will occur, or the extent to which they will affect the City. However, with careful planning and collaboration among public agencies, private sector organizations, and citizens within the community, it is possible to minimize the losses that can result from natural disasters.

A natural disaster occurs when a natural hazard impacts people or property and creates adverse conditions within a community. Natural hazards include: floods, earthquakes, coastal erosion, tsunami, volcanic eruption, severe winter storm, windstorm, drought, and wildfire, and each has the potential to harm people or property. This plan focuses on the natural hazards which could affect the City of Beaverton, Oregon. Beaverton's topography, the presence of streams, and its proximity to the Cascade Range and the Columbia Gorge play a large role in determining which natural hazards affect the City. Beaverton is subject to and has been affected by flooding, windstorms, severe winter storms, earthquakes, and volcanic eruption in the past. Wildfires or landslides have not significantly impacted Beaverton in the past, but these hazards may become more prominent as the City annexes lands to the northeast and southwest in the future. The historic impacts of these hazards have resulted in economic loss and damaged infrastructure in and around the City.

Plan Revisions (New 03/2011)

Federal requirements for the maintenance of natural hazard mitigation plans, and for remaining eligible for mitigation grants, includes the need to review and update the plan at least every five years. This is to help ensure that the plan remains an active and relevant document. **The City's** Emergency Management Program, assisted by the Natural Hazards Mitigation Plan (NHMP) Steering Committee, is responsible for the review and update of the plan.

During the initial phase of the review process conducted during a NHMP Steering Committee meeting, it was determined that overall the original plan and the information that it was based on was still valid and did not require substantial change. Changes to the plan that were identified and implemented were driven by:

- Changes in available hazard data including:
 - Recent occurrence of events.
 - Changes to flood data
 - **Data from development of the County's Community Wildfire Protection Plan**
- An update to the lists of recommended action items including information on actions taken during the previous plan cycle.

- **Changes in the City's organizational structure and department names.**
- Need to address Flood Mitigation Assistance (FMA) Plan requirements which were added to 44 CFR 201.6, which requires NFIP (National Flood Insurance Program) related information be included in the NHMP.

Changes to department names that are used in a historical context, like the list of the original NHMP Steering Committee members, were not made. Department names used in the context of roles and responsibilities were made (Example; Department of Operations and Maintenance was changed to Public Works).

Updated portions of **the plan will be identified as "New" or "Revised"** followed by 03/2011. See the header of this section for an example. The exception will be the changes in department titles, which will not be annotated.

Why Develop a Mitigation Plan?

(Revised 03/2011) The dramatic increase of the costs associated with natural disasters over the past decades has fostered interest in identifying and implementing effective means of reducing vulnerability. This natural hazard mitigation plan is intended to assist the City of Beaverton in reducing its risk from natural hazards by identifying resources, information, and strategies for risk reduction. It will also help to guide and coordinate mitigation activities throughout the City. The City received one third of the funds to develop the original plan from the Flood Mitigation Assistance (FMA) Program, a Federal Emergency Management Agency (FEMA) grant program. **The City of Beaverton provided the additional funds for the plan's development from its General Fund.** Costs associated with the maintenance, update and distribution of the plan were paid for out of the **City's General Fund.**

In 2000, Congress passed and the President signed the Disaster Mitigation Act of 2000, commonly known as DMA 2000. Under this Act and rules published in 44 CFR Part 201.6, states, communities, and tribal governments must complete FEMA-approved natural hazard mitigation plans by December 31, 2004 to be eligible for certain federal assistance programs such as the Hazard Mitigation Grant Program (HMGP).

The plan is non-regulatory in nature, meaning that it does not set forth any new policy. It does however, provide: (1) a foundation for coordination and collaboration among agencies and the public in the City of Beaverton; (2) identification and prioritization of future mitigation activities; and (3) assistance in meeting federal planning requirements and qualifying for assistance programs. The mitigation plan works in conjunction with other City plans and programs including the Comprehensive Land Use Plan, Emergency Response and Recovery Plans, Economic Development Strategic Plan, Capital Improvement Plan as well as the Washington County Natural Hazard Mitigation Plan.

The plan provides a set of actions to prepare for and reduce the risks posed by natural hazards through education and outreach programs, the development of partnerships, and implementation of preventative activities

such a land use or watershed management programs. The actions described in the plan are intended to be implemented through existing plans and programs within the City.

This plan is not the first effort the City has undertaken in natural hazard mitigation. The City has undergone a seismic survey of city facilities, developed and routinely conducts public and employee preparedness training, upgraded portions City Hall, upgraded the Operations Facility and had the City's seismic maps updated,

Why Natural Hazard Mitigation?

What is natural hazard mitigation? Natural hazard mitigation is defined as permanently reducing or alleviating the losses of life, property, and injuries resulting from natural hazards through long and short-term strategies. Example strategies include planning, policy changes, programs, projects, and other activities. Mitigation is the responsibility of individuals, private businesses and industries, state and local governments, and the federal government.

Engaging in mitigation activities provides jurisdictions with a number of benefits including reduced loss of life, property, essential services, critical facilities and economic hardship, reduced short-term and long-term recovery and reconstruction costs, increased cooperation and communication within the community through the planning process and increased potential for state and federal funding for recovery and reconstruction projects.

Who Will the Plan Affect?

The plan affects the City of Beaverton and a portion of its urban service area. This includes the incorporated areas north of Highway 26 south to **Scholls Ferry/Taylor's Ferry Roads and from the Multnomah/** Washington County line west to 170th & 185th. The hazard identification includes unincorporated areas already addressed by the city in Statewide Planning Goal 5 studies. Map 1.1 shows the areas involved in this study area boundary. While this plan does not establish mandates for the City, it does provide a viable framework for planning for natural hazards. The resources and background information in the plan are applicable citywide, and the goals and recommendations can lay groundwork for the development and implementation of local mitigation activities and partnerships. Recognizing that natural hazards do not start or stop a jurisdiction boundaries, mitigation action items identified in the Beaverton plan overlap with mutual benefit to many actions identified in the Washington County mitigation plan.

Policy Framework for Natural Hazards in Oregon

Planning for natural hazards is an integral element of Oregon's statewide land use planning program, which began in 1973. All Oregon cities and counties have comprehensive plans and implementing ordinances that are required to comply with the statewide planning goals. The challenge faced by state and local governments is to keep this network of local plans coordinated in response to the changing conditions and needs of Oregon

communities.

Statewide land use planning Goal 7, Planning for Natural Hazards, calls for local plans to include inventories, policies, and ordinances to guide development in hazard areas. Goal 7, along with other land use planning goals, has helped to reduce losses from natural hazards.

The primary responsibility for the development and implementation of risk reduction strategies and policies lies with local jurisdictions. However, resources exist at the state and federal levels. Some of the key agencies in this area include Oregon Emergency Management (OEM), Oregon Building Codes Division (BCD), Oregon Department of Forestry (ODF), Oregon Department of Geology and Mineral Industries (DOGAMI), and the Department of Land Conservation and Development (DLCD).

The Disaster Mitigation Act of 2000 (DMA 2000) is the latest federal legislation addressing mitigation planning. The new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, this Act established a pre-disaster hazard mitigation program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). Section 322 of the Act specifically addresses mitigation planning at the state and local levels. It identifies new requirements that allow HMGP funds to be used for planning activities, and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and local communities must have approved mitigation plans in place in order to qualify to receive post-disaster HMGP funds. Mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to the individual and their capabilities.

Plan Methodology

The Beaverton Natural Hazard Mitigation Plan was developed using a planning process created by the Oregon Natural Hazard Workgroup at the University of Oregon. The planning process was designed to (1) result in a plan that is DMA 2000 compliant, (2) coordinate this plan with the Washington County Natural Hazard Mitigation Plan, and (3) build a network of jurisdictions and organizations that can play an active role in plan implementation. Following is a summary of major activities included in the planning process.

Steering committee input: The project steering committee convened approximately every 6 to 8 weeks (a total of 9 meetings) to guide the development of this plan. The committee played a vital role in developing the goals and action items for the mitigation plan. The committee consisted of representatives of public and private agencies and organizations in the City of Beaverton, including:

- City of Beaverton Emergency Management Program
- City of Beaverton Community Development Department/Planning Services
- **City of Beaverton Mayor's Office**
- City of Beaverton Operations and Maintenance Department

- City of Beaverton Engineering Department
- City of Beaverton Community Development/Building Division
- City of Beaverton Information Systems Department/Geographic Information Systems Services
- Office of Consolidated Emergency Management
- Portland General Electric
- American Red Cross
- Beaverton Chamber of Commerce
- Oregon Emergency Management

Stakeholder Interviews: Community Planning Workshop (CPW) conducted interviews with individuals and specialists from organizations with natural hazard mitigation responsibilities in and around Beaverton. A complete listing of stakeholders is located in Appendix A. The interviews provided insight on community issues related to natural hazards and a laundry list of current mitigation activities that are being implemented by the various organizations. Interviewed stakeholders included representatives from:

- City of Beaverton Departments
- Watershed Councils
- Water Providers
- School Districts
- Fire Departments
- Utility Providers
- Insurance Industry
- Relief Organizations
- Local Businesses

State and federal guidelines and requirements for mitigation plan: CPW reviewed natural hazard mitigation plans from other jurisdictions, current FEMA planning requirements, the FEMA Flood Mitigation Assistance Program requirements, and the National Flood Insurance Program's Community Rating System. Statewide reference materials consisted of community and county mitigation plans, including:

- Washington County Natural Hazard Mitigation Plan;
- Clackamas County Natural Hazard Mitigation Plan;
- **Metro's Regional Hazard Mitigation Policy and Planning Guide;**
- Planning for Natural Hazards: Oregon Technical Resource Guide (DLCD);
- State of Oregon Natural Hazards Mitigation Plan (OEM); and
- Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments (OEM)

Hazard specific research: CPW collected data and compiled research on six hazards: flood, severe weather, earthquake, volcanic eruption, wildfire,

and landslide. Research materials came from state agencies including OEM, DOGAMI, DLCDD, BCD, and ODF. Historical local newspapers served as the main source of information on the past impacts of hazards in the community. CPW identified current mitigation activities, resources and programs, and potential action items from research material, input from the steering committee and stakeholder interviews.

Citizen and Business Risk Perception Survey: CPW developed and administered a risk perception survey in the City of Beaverton in January and February of 2003. The purpose of the survey was to gain an understanding of citizen and business levels of preparedness as well as whether or not they have taken steps to reduce risk. The survey also asked citizens and businesses to prioritize community wide preparedness and risk reduction activities. CPW received 320 household surveys and 366 business surveys. Results of the Surveys are noted in Appendixes B and C.

Citizen Focus Groups: CPW developed and implemented a series of three citizen focus groups in mid-April 2003. The purpose of the focus groups was two fold: (1) to facilitate a discussion about what citizens have done to prepare for and/or reduce the risks posed by natural hazards at their home and (2) to facilitate an activity aimed at prioritizing community-wide goals and preparedness and risk reduction activities. Two recruitment strategies were used to get participants for the focus groups. One strategy invited the respondents of the survey to volunteer to participate and the other used existing neighborhood association committees as a means of spreading the word about the focus groups. A total of 14 people attended and participated in the 90-minute focus groups. Appendix D contains information on the Focus Group process.

The resources and information cited in the mitigation plan proved a strong local perspective and helped identify strategies and activities to make the City of Beaverton more disaster resistant and resilient. **Figure 1-1** shows the mitigation planning process components and the key outcomes.

Figure 1.1. Hazard Mitigation Planning Process

Methodology for Prioritizing Plan Action Items

To prioritize the plan's action items the City of Beaverton utilized a multi-tiered approach. First the plan goals were prioritized. Second, the natural hazards identified in the community were prioritized based on the hazard risk assessments used in the City of Beaverton's Business Continuity Plan (BCP). Using the outcome of these two activities each action item was tallied according to a point system in a third step in order to determine its relative priority within the plan. The prioritized list of action items serves simply as a starting point for the implementation of mitigation activities.

The Hazard Mitigation Steering Committee and the leadership of the City of Beaverton have the option to implement any of the action items at any time. This allows the committee to consider mitigation strategies as new opportunities arise, such as funding for action items that may not be of highest priority. The following is the method by which the Hazard Mitigation Steering Committee will prioritize the plan action items.

Step 1: Prioritizing Plan Goals

To accomplish this task the Hazard Mitigation Steering Committee examined and voted on the importance of each of the plan's four goals. The steering committee was led through a "dot prioritization" activity to determine the relative priority of each goal. Steering committee members were given 4 different colored adhesive "dots". Each "dot" had a number assigned to it ranging from 1 to 4 points (four being the highest value). They were asked to place a single "dot" on each of the plan goals, whereby ranking the importance of each goal in making Beaverton more disaster resilient. The steering committee was asked to rank the goals regardless of how easy each goal would be to accomplish. After the vote, their priorities, the "dots" and their associated points were tallied and the results are as follows:

Highest Priority (31 Points) - Goal 1: Develop and Implement Activities to Protect Human Life, Commerce, Property and Natural Systems

2nd Highest Priority (23 Points) - Goal 4: Ensure Implementation of Mitigation Activities

3rd Highest Priority (16 Points) - Goal 3: Enhance Emergency Services

4th Highest Priority (10 Points) - Goal 2: Improve Partnerships for Communication and Coordination

(New 03/2011) The Natural Hazard Mitigation Plan Steering Committee validated the prioritized list of goals through a similar process conducted by email.

Step 2: Prioritizing Community Hazards

The second step in prioritizing the plan's action items was to examine which hazards they are associated with and where these hazards rank in

terms of community risk.

(Revised 8/2010) To re-evaluate the rankings of the hazards, **Tab B - Beaverton Hazard Analysis, to the City's Emergency Response and Recover Plan**, Basic Plan was utilized. That hazard analysis provides a systematic investigation of potential emergencies/disasters by analyzing history, vulnerability, and probability. The hazard analysis was updated in 2010 using a methodology originally developed by FEMA, and currently required by **Oregon Emergency Management's (OEM)**. The methodology determines the relative risk by applying severity ratings to four criteria; History, Vulnerability, Maximum Threat, and Probability. According to this analysis, the natural hazards identified in this plan were ranked in the following order or priority: Severe Weather, Earthquake, Flood, Volcanic Eruption, Landslides, and then Wildfire. Compared to the previous methodology Flood dropped to third, with Severe Weather and Earthquakes being numerically equal at the top. Because of its higher scores in Vulnerability and Maximum Threat earthquakes will be prioritized as the highest priority.

Table 1.1. Beaverton Hazard Analysis(new 03/2011)

Beaverton Natural Hazards	Score
Earthquakes	203
Severe Weather	203
Flood	178
Volcano (Ash Fall)	178
Landslides	86
Wildfire	58

Maximum score possible for each hazard = 240

Step 3: Tallying the Priorities of Plan Goals and Hazards

A prioritized list of action items were developed based on how the goals and hazards were ranked in Steps 1 and 2. In developing the prioritized list - **each action item was examined according to the plan goals addressed** and what priority those goals were assigned. In this first step, action items were assigned the following number of points for addressing each goal.

4 Points - Goal 1: Develop and Implement Activities to Protect Human Life, Commerce, Property and Natural Systems

3 Points - Goal 4: Ensure Implementation of Mitigation Activities

2 Points - Goal 3: Enhance Emergency Services

1 Point - Goal 2: Improve Partnerships for Communication and Coordination

Action items that address multiple goals were assigned points for all of the goals that they address.

(Revised 03/2011) Depending on which hazards each action item addresses the following point system will be assigned to each:

10 Points - Multi-Hazard

6 Points - Earthquake

5 Points - Severe Weather

4 Points - Flood

3 Points - Volcanic Eruption

2 Points - Landslides

1 Point - Wildfire

Multi-Hazard action items are assigned the most points due to the fact they address multiple hazards.

The points assigned to each action item depend on which hazard they address. These points are then combined with the points assigned to each item based on the goals addresses as detailed in step one to arrive at an Action Item Priority Score noted in the Action Item Matrix included in the Executive Summary. Higher scores indicate higher priorities. The point totals for step one were combined with the point totals in step two to create a number by which each action item is prioritized.

Step 4: Action Item Implementation (Revised 03/2011)

While numeric values can be assigned to the individual action items other factors have a direct impact on whether these items will be implemented including:

- **Regional impacts - Any actions taken would have to be done on a county-wide or regional basis,**
- **Costs - the cost of action items may exclude it from being implemented or it will only be feasible under a grant award.**
- **Political/Policy - Some recommendations may run contrary to the direction set by the City's elected officials or strategic plans.**

The Emergency Management Program, supported by the City's Natural Hazards Mitigation Plan Steering Committee, has been monitoring the implementation of action items. During the latest round of plan review and update the Natural Hazards Mitigation Plan Steering Committee divided the Action Items into four categories:

- **On-going - Action Items are being worked on; but are not to the point where they are fully incorporated into City operations, plans, or regulations.**
- **Current Plan Cycle - Action Items that could be accomplished during the 5 years before the next scheduled plan revision.**
- **Future Plan Cycle - Action Items that are not likely to be started or accomplished in the 5 year before the next scheduled plan revision**
- **Completed - Action Items that have been completed**

In examining the feasibility of funding for action items, a benefit-cost analysis will be encouraged for all structural mitigation projects. See Appendix E for more information on this process.

Plan Organization

(Revised 03/2011) Each section of the mitigation plan provides specific information and resources to assist people in understanding the City and the hazard-specific issues facing citizens, businesses, and the environment. Combined, the sections work together to create a mitigation plan that guides the mission to reduce risk and prevent loss from future natural hazard events. This plan structure enables people to use the section(s) of interest to them.

Executive Summary (Revised 03/2011)

The Executive Summary provides an overview of the mitigation plan mission, goals, and action items. A consolidated list of the plan's action items is included in this section, and address multi-hazard issues, as well as hazard-specific activities that can be implemented to reduce risk and prevent loss from future natural hazard events.

Chapter 1: Introduction (Revised 03/2011)

The Introduction briefly describes historical events that have impacted the area, mitigation planning, and the methodology used to develop the plan. It **also includes information about the steering committee's role, how stakeholders provided input, and finally, the role of the public.**

Chapter 2: Community Profile (Revised 03/2011)

The Community Profile describes the City in terms of demographic, economic, and development trends as well as geography and environment, housing and transportation.

Chapter 3: Risk Assessment (Revised 03/2011)

The Risk Assessment illustrates the three phases of risk assessment, which include: identifying hazards, assessing vulnerabilities, and estimating potential losses.

Chapter 4: Mitigation Plan Goals, Action Items and Public Participation (Revised 03/2011)

This chapter provides information on the process used to develop the goals and action items in the plan. It also describes the framework that focuses the plan on developing successful mitigation strategies.

Chapter 5: Plan Implementation and Maintenance (Revised 03/2011)

This chapter provides information on the implementation, monitoring and evaluation of the plan.

Chapter 6: Multi-Hazard Action Items (Revised 03/2011)

This chapter provides information on goals and action items that address all the natural hazards in the mitigation plan.

Chapter 7: Flood (Revised 03/2011)

This chapter provides information about historical impacts, risk assessments, specific community issues, goals and action items, and local resources associated with floods.

Chapter 8: Severe Weather (Revised 03/2011)

This chapter provides information about historical impacts, risk assessments, specific community issues, goals and action items, and local resources associated with severe weather.

Chapter 9: Landslide (Revised 03/2011)

This chapter provides information about historical impacts, risk assessments, specific community issues, goals and action items, and local resources associated with Landslides.

Chapter 10: Wildfire (Revised 03/2011)

This chapter provides information about historical impacts, risk assessments, specific community issues, goals and action items, and local resources associated with wildfires.

Chapter 11: Earthquake (Revised 03/2011)

This chapter provides information about historical impacts, risk assessments, specific community issues, goals and action items, and local resources associated with earthquakes.

Chapter 12: Volcano-Related Events (Revised 03/2011)

This chapter provides information about historical impacts, risk assessments, specific community issues, goals and action items, and local resources associated with Volcanoes.

Appendix A: Public Participation (Revised 03/2011)

This appendix includes specific information on the various public processes used during development of the plan.

Appendix B: Household Natural Hazards Preparedness Survey (Revised 03/2011)

This appendix describes the results of the household risk preparedness survey including the methodology, limitations, response rate, responses and open-ended remarks.

Appendix C: Business Preparedness Survey (Revised 03/2011)

This appendix describes the results of the business risk preparedness survey including the methodology, limitations, response rate, responses and open-ended remarks.

Appendix D: Focus Group Results (Revised 03/2011)

This appendix describes the results of the focus group exercise designed to follow up on the Household Natural Hazards Preparedness Survey. The section includes the methodology, activities and results of the community focus groups.

Appendix E: Economic Analysis of Natural Hazard Mitigation Projects (Revised 03/2011)

This appendix describes the Federal Emergency Management Agency's (FEMA) requirements for benefit cost analysis in natural hazards mitigation, as well as various approaches for conducting economic analysis of proposed mitigation activities.

Appendix F: List of Acronyms (Revised 03/2011)

This appendix provides a list of acronyms for city, county, regional, state and federal agencies and organization that may be referred to within the City of Beaverton Natural Hazard Mitigation Plan.

Appendix G: Consolidated Resource Directory (New 03/2011)

This appendix provides a consolidated list of resources available for all of the potential hazards. This Appendix replaces the sections that appeared at the end of each hazard chapter, which will enable easier updates to the resource information.

Appendix H: 2010 Preparedness and Mitigation Survey (New 03/2011)

This Appendix shows the findings from the 2010 on-line preparedness and mitigation survey and compares it to the results of the 2003 Household survey.