

Plan Update Process

The Clackamas County Hazard Mitigation Advisory Committee (HMAC) completed a comprehensive review of all sections of the Clackamas Natural Hazards Mitigation Plan in accordance with the Plan Maintenance Section to ensure that the document maintains its relevance and effectiveness over the long term. The purpose of this plan update is to track implementation of activities and evaluate how well the goals of the NHMP are being met. This review measures progress over time in order to determine how well objectives are being met, and the data collected will provide information on the status and trends of the NHMP.

Adaptive management is a process of learning from our management actions. As applied to the NHMP, it involves implementing an approach to current projects, monitoring and analyzing the effects of that approach, and then incorporating these findings into the next round of projects.

The HMAC utilized adaptive management strategies in the plan update process to most effectively communicate “lessons learned” in approaches to planning and project implementation.

Plan Update Organization

The 2007 Plan Update structure mirrors that of the NHMP, and includes only those subject areas that have changed or added since the adoption of the NHMP in September, 2002. This method was chosen to streamline the review process, and bring attention to only those pieces of the plan that require revision.

Methodology

Building a collaborative and cooperative environment between community-based organizations, fire districts, local government, and the public land management agencies was the first step in identifying and prioritizing measures to reduce risk. Maintaining this cooperation with the public is a long-term effort that requires commitment of all partners involved. The HMAC members shared the responsibilities and tasks associated with this update process. The following items were included in the update:

Update Elements	Plan Update Section
Stakeholder surveys and public input	Section 1: Introduction
Planning process review to include multi-jurisdictional planning	Section 1: Introduction
Updates to reflect general changes in County	Section 2: Community Profile
Action item review & update	Executive Summary & Hazard Sections 6-12
Description of hazard events since 2002	Hazard Sections 6-12
Enhanced hazard and vulnerability assessment	Section 3: Hazard Assessment & Hazard Sections 6-12

Executive Summary

How is the Plan Organized?

The Mitigation Plan contains an updated action plan matrix, background on the purpose and methodology used to develop the mitigation plan, an updated profile of Clackamas County, sections on seven natural hazards and associated effects within the county, and several appendices. Volume IV: Mitigation Plans has been added to include the plans that are referred to throughout the NHMP, including city addenda. All of the sections are described in detail in Section 1: Plan Introduction.

Who Participated in Developing the Plan?

The Clackamas County Natural Hazards Mitigation Action Plan is the result of a collaborative effort between Clackamas County citizens, public agencies, non-profit organizations, the private sector, and regional and state organizations. Public participation played a key role in development of goals and action items. Interviews were conducted with stakeholders across the county, and a public hearing was held to include Clackamas County residents in the plan update process. The Hazard Mitigation Advisory Committee guided the plan update process and is responsible for plan implementation. The HMAC has been a standing, albeit fluid, committee throughout the last five years, with agency representatives attending when available. The following table includes the current HMAC members:

County Departments	Special Districts, Private Industry, Nonprofits	Cities	State and Federal Agencies
County Administration	Clackamas Fire Defense Board	Canby	Oregon Emergency Management
Building Services	Clackamas Fire Prevention Cooperative	Milwaukie	Department of Geologic and Mineral Industries
Economic Development	Clackamas Soil and Water Conservation District	Lake Oswego	FEMA
Emergency Management	Clackamas River Water	Gladstone	
Finance	Clackamas River basin Council	West Linn	
Geographic information Systems			
Land Use Planning			
Public Information Officer			
Roads Division			
Water Environment Services			

What Plans, Documents, and Materials Were Used?

A variety of plans, documents, and other reference materials were used to update the Clackamas NHMP. The first of which is the Emergency Operations Plan (EOP), which contained the methodology used for prioritizing the hazards affecting Clackamas County residents, infrastructure, and property. The EOP also contains information regarding

responsibilities of government and partner agencies during an emergency event. These agencies were consulted for input on actions items, depending on the roles outlined in the EOP.

The second plan that is a primary component of the NHMP 2007 update is the Clackamas Community Wildfire Protection Plan (CCWPP). Many state and federal documents were used to ensure that the Clackamas Wildfire Plan met state and federal guidelines for CWPPs. These include the National Fire Plan and the Healthy Forests Restoration Act of 2003. In addition, Clackamas County used the National Association of Foresters “*Preparing a Community Wildfire Protection Plan*” guide for ease in plan development. Clackamas County utilized the “Identifying and Assessment of Communities-at-Risk in Oregon, Draft Version 4.0” developed by ODF, as a template to conduct the wildfire risk assessment. Finally, the Oregon Forestland-Urban Fire Protection Act of 1997 was referenced to ensure that Clackamas County was aligning the goals of our CWPP with the state goals for wildland urban interface areas.

Clackamas County also referenced the Oregon State Natural Hazards Mitigation Plan to ensure state and local consistency in mitigation planning priorities. The FEMA requirements under Title 44 CFR Part 201 of the Disaster Mitigation Act of 2000 were also reviewed to assist in developing a plan update that would meet federal criteria.

Finally, Clackamas County utilized the “Earthquake and Landslide Hazard Maps and Future Earthquake Damage Estimates for Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report O-03-10.” for the purpose of developing earthquake and landslide hazard maps and future damage estimates for Clackamas County. The two main objectives of this study were to (a) develop a set of county-wide maps to identify areas of relatively low and high earthquake and landslide hazard (hazard maps), and (b) to improve the county’s capabilities for earthquake damage and loss estimation (earthquake damage and loss modeling using HAZUS).

Multi-Jurisdictional Planning Process

One of the highest priorities of the 2002 NHMP was to incorporate the cities needs into the county plan as addenda. This approach ensures that we are taking a regional approach to mitigation planning. It also allows the cities to build off of the baseline data and information that is already documented in the county plan, thereby streamlining their planning process. This process of incorporating the cities has encouraged partnership development and coordination so that jurisdictions can share information and pool resources to accomplish mitigation projects.

The County utilized Pre-Disaster Mitigation grant funding 2002-2003 to hire staff for providing technical assistance to all incorporated jurisdictions to complete a nine month mitigation planning process. The cities that have completed their DMA 2K-compliant plans have an opportunity to participate in the County HMAC for providing information about current projects or mitigation needs. All completed city plans are included as addenda in Volume IV.

The City Hazard Mitigation Advisory Committees are invited to send representatives to the County Hazard Mitigation Advisory Committee meetings. The cities report their progress in implementing mitigation projects, identify challenges, and seek support from the larger County multi-jurisdictional team. This strategy has fostered partnerships and collaboration among cities that are diverse in population, economy, and values, as there is a shared vision for public safety and sustainable development.

What is the Plan Mission?

The mission of the Clackamas County Natural Hazards Mitigation Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural hazards. This can be achieved by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the county towards building a safer, more sustainable community.

**(No change from 2002)*

What are the Plan Goals?

The plan goals describe the overall direction that Clackamas County agencies, organizations, and citizens can take to work toward mitigating risk from natural hazards. The goals changed only slightly from 2002 to include an action word in each goal. Each action items is associated with the goals it addresses to ensure that the goals are being considered in plan implementation.

- Protect Life and Property
- Enhance Natural Systems
- Augment Emergency Services
- Encourage Partnerships for Implementation
- Promote Public Awareness

**(No change from 2002)*

How are the Action Items Organized?

The *action items* are a listing of activities in which county agencies and citizens can be engaged to reduce risk. The structure of the action items that has changed slightly in that the actions are not given a timeline of short term or long term, and they have been prioritized. In addition, the matrix includes the progress made toward action item implementation.

Omission of Timeline

All broad scale action items have been determined to be ongoing, as opposed to short-term or long-term. This is because the action items are broad ideas, and although actions may be implemented to address the broad ideas, the efforts should be ongoing. For example, although *Flood Action Item #1: Analyze public and private flood-prone properties within Clackamas County and identify feasible mitigation options* has been addressed by elevating of a home in the floodplain using FMA funds, the HMAC will continue this effort of mitigating flood loss.

Prioritization Methodology

The HMAC prioritized the identified mitigation strategies in order to better allocate resources for plan implementation. The criteria used for prioritizing the action items

include plan goals, hazards addressed, criticality of need, population served, ease of implementation, and political support.

Although this methodology provides a guide for the HMAC in terms of implementation, the HMAC has the option to implement any of the action items at any time. This option to consider all action items for implementation allows the committee to consider mitigation strategies as new opportunities arise, such as capitalizing on funding sources that could pertain to an action item that is not the highest priority.

Step 1: Prioritize Plan Goals

The NHMP goals including Protect Life and Property, Promote Public Awareness, Augment Emergency Services, Enhance Natural Systems, and Encourage Partnerships and Implementation were considered during each phase of the mitigation planning process. As the mitigation action items were developed, the HMAC identified which plan goals were addressed by each action item. The HMAC ranked the plan goals to determine the priorities for Clackamas County, and each goal was given a score of one point to five points, with five points going to the highest priority. The points for the plan goals were then totaled for each action item. The prioritized plan goals are as follows:

- 5 Points: Protect Life and Property
- 4 Points: Enhance Natural Systems
- 3 Points: Augment Emergency Services
- 2 Points: Partnerships and Implementation
- 1 Point: Public Awareness

Step 2: Prioritize Hazards

The natural hazards addressed by the NHMP were prioritized using the FEMA-accepted hazard analysis methodology for Emergency Operations Plans. This methodology considers the history of the hazard, the vulnerability to the hazard, the maximum threat of the hazard (worst case scenario), and the probability of the hazard. The data in the vulnerability assessment (Table 3-2) was also used to assist in prioritize each hazard. Each of these criteria was weighted, and the final score was used for prioritizing the hazards. For more information regarding this process, please see the Clackamas County Emergency operations Plan Basic Plan Attachment 3: Hazard Analysis (not included in this NHMP).

- 8 points: Multi Hazard
- 7 points: Earthquake
- 6 points: Winter Storm
- 5 points: Flooding
- 4 points: Windstorm
- 3 points: Wildfire
- 2 points: Landslide
- 1 point: Volcano

Step 3: Incorporate Criticality of Need, Large Number of Population Served, Likelihood of Success

The committee then considered the criticality of need, the percentage of population served, ease of implementation and the political support. The HMAC was given an opportunity to give each action item a score of 1 (low priority) to 3 (high priority) based on those four criterion. The final score for each action items was computed by summing the plan goal score the hazard score, and the HMAC score. The actions were then given a ranking of high, medium, or low, based on the distribution of scores.

Step 4: Economic Analysis

The final step in the prioritization of action items is performing an economic analysis. Conducting detailed benefit/cost or cost-effectiveness analysis for every possible mitigation activity could be very time consuming and may not be practical. For this reason, the Hazard Mitigation Advisory Committee will undertake Step 4: Economic Analysis as funding becomes available to ensure that the action items are evaluated appropriately for potential grant funding.

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

Benefit/cost Analysis

Benefit/cost analysis is a key mechanism used by the state Office of Emergency Management (OEM), the Federal Emergency Management Agency, and other state and federal agencies in evaluating hazard mitigation projects, and is required by the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended. Benefit/cost analysis is used in natural hazards mitigation to show if the benefits to life and property protected through mitigation efforts exceed the cost of the mitigation activity. Conducting benefit/cost analysis for a mitigation activity can assist communities in determining whether a project is worth undertaking now, in order to avoid disaster-related damages later. Benefit/cost analysis is based on calculating the frequency and severity of a hazard, avoided future damages, and risk. In benefit/cost analysis, all costs and benefits are evaluated in terms of dollars, and a net benefit/cost ratio is computed to determine whether a project should be implemented. A project worth pursuing will have a benefit/cost ratio greater than 1 (i.e., the net benefits will the exceed net costs).

Cost-Effectiveness Analysis

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

STAPLE/E Approach

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

2007 NHMP Action Item Updates

Natural Hazard	Action Item	Priority	Accomplishments	Multi-Jurisdictional
Multi-Hazard Mitigation Action Items				
Multi-Hazard #1	Integrate the goals and action items from the Clackamas County Natural Hazard Mitigation Plan into existing regulatory documents and programs, where appropriate.	High	<ul style="list-style-type: none"> • Land Use Planning used the NHMP to enter into the CRS program • County Facilities Maintenance can utilize the vulnerability analysis to assist in prioritizing structural upgrades 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Multi-Hazard #2	Identify and pursue funding opportunities to develop and implement local and county mitigation activities.	High	<ul style="list-style-type: none"> • 8 PDM Grant awards to Clackamas County and Cities for over 6 million dollars • 5 HMGP awards to Clackamas County and Cities • 3 FMA Grant awards to Clackamas County • HMAC is working with fire districts to incorporate mitigation strategies into Fire Grant applications • Submission of Homeland Security Grants that include allocations for equipment and infrastructure that supplement mitigation efforts. • Utilization of EMPG funding to implement mitigation strategies identified in the NHMP. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Multi-Hazard #3	Establish a formal role for the Clackamas County Natural Hazards Mitigation Committee to develop a sustainable process for implementing, monitoring, and evaluating countywide mitigation activities.	Medium	<ul style="list-style-type: none"> • The HMAC developed bylaws to establish clear roles for participants and develop a process for developing a mitigation program in Clackamas County that includes public and private organizations that have a vested interest in mitigation. • Members of the HMAC attended a Firewise conference and a Western States Seismic Policy Council conference to become more familiar with new technologies and processes for reducing losses from the fire and earthquake hazards. 	
Multi-Hazard #4	Identify, improve, and sustain collaborative programs focusing on the real estate and insurance industries, public and private sector organizations, and individuals to avoid activity that increases risk to natural hazards.	High	<ul style="list-style-type: none"> • Pub education: partnered with ONHW, ISO to get wildfire and earthquake handouts for people applying for permits in Timber Zones & for people building or remodeling homes. • A partnership with Partners for Loss Prevention allowed the County to utilize a Pre-Disaster Mitigation grant to implement nonstructural retrofitting at one day care at YMCA in Gladstone, and one at the Mentor Graphics Child Development Center in Wilsonville. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Multi-Hazard #5	Develop public and private partnerships to foster natural hazard mitigation program coordination and collaboration in Clackamas County.	Medium	<ul style="list-style-type: none"> • Safety Fair at Hoodland Fire, door-to-door canvass providing education about mitigation and preparedness at two rural mobile home parks, project Impact funded non-structural seismic retrofitting and education in Molalla, John Wetten Elementary, Estacada, and Colton; • Worked with city governments to develop local Natural Hazards Mitigation Plans and hazard assessments that are consistent with the goals and framework of the county plan. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Multi-Hazard #6	Develop inventories of at-risk buildings and infrastructure and prioritize mitigation projects.	High	<ul style="list-style-type: none"> • Hazard assessment identifies critical facilities at risk from natural hazards events; • The building inventory developed by DOGAMI(Dec. 2002) will be incorporated into the hazard assessment. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Multi-Hazard #7	Strengthen emergency services preparedness and response by linking emergency services with natural hazard mitigation programs, and enhancing public education on a regional scale.	High	<ul style="list-style-type: none"> • Through the plan adoption process, the adoption process, public officials were informed of the federal requirements regarding public assistance for disaster mitigation, recovery, and response, and the county administrator continues to keep the BCC updated in regard to any new regulations • The HMAC developed and distributed an Emergency Preparedness Calendar to promote public education and individual emergency preparedness. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby

2007 NHMP Action Item Updates

Natural Hazard	Action Item	Priority	Accomplishments	Multi-Jurisdictional
Multi-Hazard Mitigation Action Items (Continued)				
Multi-Hazard #8	Develop, enhance, and implement education programs aimed at mitigating natural hazards, and reducing the risk to citizens, public agencies, private property owners, businesses, and schools.	High	<ul style="list-style-type: none"> • The Clackamas County Natural Hazards Mitigation Plan is available to the public by publishing the plan electronically on the county and emergency management websites, Libraries, • Oregon Natural Hazards Workgroup Developed and completed a baseline survey to gather perceptions of private citizens and the business community regarding natural hazard risks and identify mitigation needs, • C-map has been upgraded to incorporate earthquake and landslide hazards into the layers available for public view, update 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Multi-Hazard #9	Use technical knowledge of natural ecosystems and events to link natural resource management and land use organizations to mitigation activities and technical assistance.	Medium	<ul style="list-style-type: none"> • The Watershed Councils in Clackamas County have been actively developing and implementing watershed analyses and action plans for the following watersheds: Rock Creek, Richardson Creek, Clear Creek, Foster Creek, and the Clackamas River. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Multi-Hazard #10	Incorporate the Regional Emergency Transportation Routes developed by the Regional Emergency Managers Group into appropriate planning documents.	Medium	<ul style="list-style-type: none"> • Regional Emergency Transportation Routes are incorporated into the EOP-2006. 	
Multi-Hazard #11	Enhance strategies for debris management.	High	<ul style="list-style-type: none"> • Roads Division has identified contractors that could provide debris removal resources, has made provision to enact a two-week emergency measure for expediting contracting services during an emergency, and has developed protocol for notifying County Public and Government Relations when a road has been closed or could be unsafe. The County is working with Metro in developing a regional Debris Management Plan 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Flood Mitigation Action Items				
Flood #1	Analyze public and private flood-prone properties within Clackamas County and identify feasible mitigation options.	High	<ul style="list-style-type: none"> • 2004-All repetitive loss property owners were contacted to establish communication with the county, and to identify if there is an interest in mitigation. • The Clackamas County Planning Department is maintaining a listing of those residents who have special interest or needs in regard to flood mitigation. • 2006-Clackamas County received a Flood Mitigation Assistance grants to elevate two repetitively flooded homes. 	Canby, Milwaukie, Lake Oswego, Gladstone, West Linn
Flood #2	Recommend revisions to requirements for development within the floodplain, where appropriate.	Low	<ul style="list-style-type: none"> • 2005-Clackamas County entered the CRS program at a rating of 5, resulting in a 25% decrease in insurance premiums for all unincorporated Clackamas County residents in the floodplain. 	
Flood #3	Develop better flood warning systems.	Medium	The National Weather Service provides notices of potential flooding hazards to County Emergency Management. CCEM has developed distribution lists to alert public service providers of potential flooding events.	Canby, Milwaukie, Lake Oswego, Gladstone, West Linn
Flood #4	Enhance data and mapping for floodplain information within the County, and identify and map flood-prone areas outside of designated floodplains.	Medium	<ul style="list-style-type: none"> • GIS enhanced topographic data by developing relief maps with 2-foot contour intervals. • As part of the Map Modernization process, FEMA is providing new hazard data in the form of DFIRMs 	Milwaukie, Lake Oswego, Gladstone, West Linn
Flood #5	Encourage development of acquisition and management strategies to preserve open space for flood mitigation, fish habitat, and water quality in the floodplain.	Medium	<ul style="list-style-type: none"> • The Watershed Councils in Clackamas County have been actively developing and implementing watershed analyses and action plans for the following watersheds: Rock Creek, Richardson Creek, Clear Creek, Foster Creek, and the Clackamas River. 	Canby, Milwaukie, Lake Oswego, Gladstone, West Linn

2007 NHMP Action Item Updates

Natural Hazard	Action Item	Priority	Accomplishments	Multi-Jurisdictional
Flood Mitigation Action Items (Continued)				
Flood #6	Identify and address surface water drainage obstructions for all parts of unincorporated Clackamas County.	Medium	<ul style="list-style-type: none"> Clackamas County Roads Dept. is currently replacing outdated culverts with larger ones that are fish friendly and can sustain higher flows. 	
Flood #7	Establish a framework to compile and coordinate surface water management plans and data throughout the county.	Medium	<ul style="list-style-type: none"> No resources or support available to make progress thus far. 	
Landslide Mitigation Action Items				
Landslide #1	Improve knowledge of landslide hazard areas and understanding of vulnerability and risk to life and property in hazard-prone areas.	Medium	<ul style="list-style-type: none"> The HMAC has incorporated the results from the DOGAMI mapping effort into the Clackamas County Natural Hazards Mitigation Plan Risk Assessment, and County GIS completed a vulnerability assessment, which identifies all community assets exposed to landslide and debris flow hazards. 	Milwaukie, Lake Oswego, Gladstone, West Linn
Landslide #2	Identify safe evacuation routes in high-risk debris flow and landslide areas.	Medium	<ul style="list-style-type: none"> Regional Earthquake Transportation Evacuation Routes are incorporated into the EOP, 2006 This information is used in the Emergency Operations Center for directing emergency work efforts, and is provided to the public through various media outlets. 	Milwaukie, Lake Oswego, Gladstone, West Linn
Landslide #3	Evaluate current landslide warning systems to ensure effectiveness and efficiency and increase coordination between local jurisdictions and ODF for landslide warning systems.	Low	<ul style="list-style-type: none"> No resources or support available to make progress thus far. 	
Landslide #4	Limit activities in identified potential and historical landslide areas through regulation and public outreach, and recommend construction and subdivision design that can be applied to steep slopes to reduce the potential adverse impacts from development.	High	<ul style="list-style-type: none"> Communication between the Departments of Land Use Planning and Building with the Roads Division has significantly improved throughout the development review process. 	
Wildfire Mitigation Action Items: Please see the CCWPP for a complete listing of all Wildfire Action Items				
Wildfire #1	Develop and continuously update a wildfire risk assessment to accurately portray vulnerable populations, property, and infrastructure	Low	<ul style="list-style-type: none"> A wildfire risk assessment including hazards, community values, history of wildfires, and protection capabilities was completed for the CCWPP. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Wildfire #2	Implement fuels reduction projects in highest risk areas and explore biomass utilization opportunities.	Medium	<ul style="list-style-type: none"> The Wildfire Planning Executive Committee developed a listing of potential fuels reduction projects using fire district input. Model fuels reduction projects have been completed in Wapinitia, Government Camp, Timberline Rim, and in the South County area. The WFPEC developed a feasibility study for a potential sort yard and/or collection site to add value to small diameter wood in an effort to provide incentives for sustaining fuels reduction efforts 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby

2007 NHMP Action Item Updates

Natural Hazard	Action Item	Priority	Accomplishments	Multi-Jurisdictional
Wildfire Mitigation Action Items: Please see the CCWPP for a complete listing of all Wildfire Action Items				
Wildfire #3	Enhance Wildfire response efforts.	High	<ul style="list-style-type: none"> A Clackamas Wildfire Operations Group has been established to identify and address issues regarding wildfire response. Please see the CCWPP for details. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Wildfire #4	Increase fire prevention and safety efforts throughout Clackamas County through public education and outreach.	Medium	<ul style="list-style-type: none"> The Clackamas County Fire Prevention Cooperative implemented a public outreach campaign in 2006, which included the development of debris burning and defensible space brochures, which were mailed to all 60,000 Wildland Urban Interface residents. The Fire Co-op completed a second public outreach campaign in 2007 that included a series of public services announcements regarding defensible space, campfire safety, firework safety, and debris burning. The Fire Co-op partnered with local nurseries to promote firewise landscaping. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Wildfire #5	Reduce structural ignitability of homes in the WUI.	Medium	<ul style="list-style-type: none"> Clackamas County Building and Land Use Planning Departments have improved communication with fire districts to assist in reducing wildfire hazards in WUI areas. Please see the CCWPP for more details. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Severe Winter Storms				
Severe Winter Storm #1	Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms.	Medium	<ul style="list-style-type: none"> The County Roads Department works with utility providers to reduce utility outages by maintaining vegetation in the Right of Way. County utilized HMGP funding to develop a hazard tree program that identifies hazard trees and replace them with more sustainable and appropriate vegetation. 	
Severe Winter Storm #2	Increase public awareness of severe winter storm mitigation activities.	Medium	<ul style="list-style-type: none"> The National Weather Service has developed severe weather awareness weeks that includes a public outreach campaign 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Severe Winter Storm #3	Enhance weather monitoring to attain earlier severe winter storm warnings.	Medium	<ul style="list-style-type: none"> The National Weather Service provides notices of potential winter storm hazards to County Emergency Management. CCEM has developed distribution lists to alert public service providers of potential winter storm events. 	
Windstorms				
Windstorm #1	Develop and implement programs to keep trees from threatening lives, property, and public infrastructure during windstorm events.	High	<ul style="list-style-type: none"> The County Roads Department works with utility providers to reduce utility outages by maintaining vegetation in the Right of Way. County utilized HMGP funding to develop a hazard tree program that identifies hazard trees and replace them with more sustainable and appropriate vegetation. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Windstorm #2	Map and publicize locations around the county that have the highest incidence of extreme windstorms.	Low	<ul style="list-style-type: none"> PGE has identified hazardous areas in the County that are most prone to power outages. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Windstorm #3	Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms.	Medium	<ul style="list-style-type: none"> County support Canby utility in obtaining HMGP funds to underground utility lines. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Windstorm #4	Increase public awareness of windstorm mitigation activities.	Medium	<ul style="list-style-type: none"> The National Weather Service has developed severe weather awareness weeks that includes a public outreach campaign 	
Windstorm #5	Encourage development and enforcement of wind-resistant building siting and construction codes.	Low	<ul style="list-style-type: none"> The recently adopted Structural and Residential Oregon Codes have included the National models for designing for wind forces. These codes are "tweaked" with each code review and adoption process to reflect the most recent accumulation of knowledge based on the analysis of actual events, and it incorporates the knowledge base derived from the ever continuing product testing. 	

2007 NHMP Action Item Updates

Natural Hazard	Action Item	Priority	Accomplishments	Multi-Jurisdictional
Earthquake Mitigation Action Items				
Earthquake #1	Integrate new earthquake hazard mapping data for Clackamas County and improve technical analysis of earthquake hazards.	Medium	<ul style="list-style-type: none"> • Through Project Impact, DOGAMI updated earthquake hazard mapping for the county (including liquefaction, slope stability ground shaking & amplification). • DOGAMI provided an updated HAZUS model based on local data in 2004 	Lake Oswego, West Linn
Earthquake #2	Identify funding sources for structural and nonstructural retrofitting of homes, schools, businesses, and government offices that are identified as seismically vulnerable.	Medium	<ul style="list-style-type: none"> • Project Impact Grant funding 2003: Johnson City Mobile Home Estates and Cedar Glen Estates / HoodCourse Acres: Welches, OR; Colton School District, Gladstone YMCA, Wilsonville Mentor Graphics, Public Health, Courthouse, Records Management, 3 Estacada schools • Pre Disaster Mitigation Grant funding for seismic upgrades 2003-2007: Clackamas County Emergency Operations Center, Tri Cities Wastewater Treatment Facility, Clackamas River Water, Canby Central Telephone Facility, Oregon City Mountain View Reservoir, Clackamas Deep Creek Bridge, Lake Oswego City Hall • Hazard Mitigation Grant Funding 2004: Preschool Safety Education Program and Clackamas County emergency preparedness information to state-licensed childcare centers serving preschoolers, ages 3-5, in Clackamas County. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Earthquake #3	Encourage purchase of earthquake hazard insurance.	Low	<ul style="list-style-type: none"> • Partnered with State Farm for development of Emergency Preparedness Calendars 	
Earthquake #4	Encourage seismic strength evaluations of critical facilities in the County to identify vulnerabilities for mitigation of schools and universities, public infrastructure, and critical facilities to meet current seismic standards.	High	<ul style="list-style-type: none"> • DOGAMI and PSU developed a building inventory for all schools, hospital, fire stations and law enforcement facilities and conducted seismic rapid visual surveys (FEMA 154). 2007 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Long-Term Earthquake #5	Encourage reduction of nonstructural and structural earthquake hazards in homes, schools, businesses, and government offices through public education.	Medium	<ul style="list-style-type: none"> • County building inspectors provided earthquake safety brochures to all homes when the inspections were finalized. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby
Volcanic Eruption Mitigation Action Items				
Volcano #1	Work with the state and other impacted jurisdictions to update and exercise the Mount Hood Inter-Agency Coordination Plan	Medium	<ul style="list-style-type: none"> • The Mount Hood Coordination Plan was updated in 2005. 	
Volcano #2	Collaborate with USGS-CVO and related agencies to develop ash fall models that are specific to Clackamas County.	Low	<ul style="list-style-type: none"> • No resources or support available to make progress thus far. 	
Volcano #3	Strengthen response and recovery programs, and work with the National Volcano Early Warning System to enhance public education programs for volcanic eruption hazards.	Low	<ul style="list-style-type: none"> • CCEM is currently with the USGS and the National Volcano Early Warning System collaborative group to obtain volcano hazard training and education materials for emergency managers, first responders and the public. 	Milwaukie, Lake Oswego, Gladstone, West Linn, Canby