

Section 1 Introduction



1.1 INTRODUCTION

The City of Portland NHMP provides a multi-bureau, multi-hazard, Council approved set of actions that could improve the City's disaster resilience. The City depends on business and property taxes, licenses and fees to operate public safety, infrastructure and essential services. Through the identification of mitigation action items, risk to the continued operations of City services and the impact of the hazards to business and property could be minimized by incorporating hazard reduction measures in planning maintenance, improvement and development investment projects. This plan outlines City mitigation actions that are protecting the public's investment. Important issues are:

- Portland is subject to substantial natural hazard risks. Of the 1,037 "major disaster declarations" in the US between 1972 and 2000, the state of Oregon has claimed 19, ranking it 33rd in the number of disaster declarations for any state or territory. Total aggregated losses from natural disasters in Oregon have reached into the hundreds of millions of dollars during the past decade.
- Seismic activity, heavy precipitation, weather extremes and geographic influences will continue to result in earthquakes, floods and landslides. In addition, periods of long dry summers and fuel accumulation (tree, grass and understory growth) contribute to the potential for wildfires.
- During the winters of 1996 and 1997, the Portland area experienced floods, landslides and ice storms. Over \$220 million was provided to Oregon under several federal relief programs for three flood and landslide disasters that occurred in 1996 and 1997.
- Portland assets equal over \$59 billion, including residential and commercial structures and building contents, critical facilities and infrastructure (utilities and transportation lifelines).
- The banks of the Willamette River are at risk of flood, landslide, liquefaction and erosion. They are also areas of significant development for industry, housing and leisure activities. The combination of population use of the riverfront areas and the hazards that could impact them creates a greater potential risk of loss.

Hazard mitigation, as defined in Title 44 of the Code of Federal Regulations (CFR), Part 201, §201.2, is "any sustained action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." Hazard mitigation is any work done to minimize the impacts of any type of hazard event before it occurs. It aims to reduce losses from future disasters. Hazard mitigation planning is a process in which hazards are identified and profiled, people and facilities at risk are analyzed and mitigation actions are developed. The result of this process is an integrated and coordinated effort to mitigate hazards.

1.2 NHMP COMPLIANCE DOCUMENTATION DESCRIPTION

Appendices at the end of this document provide documentation verifying compliance. Throughout this document the FEMA crosswalk criteria is highlighted in red at the beginning of the section that contains the supporting documentation.

- Appendix A** FEMA Crosswalk Documenting Compliance with FEMA Criteria
- Appendix B** Adoption Resolution for the City
- Appendix C** Planning Process and Requirements
- Appendix D** Public Involvement
- Appendix E** Benefit-Cost Analysis Fact Sheet
- Appendix F** Plan Maintenance Documents
- Appendix G** Acronyms and Abbreviations
- Appendix H** References
- Appendix I** National Flood Insurance Program Compliance Information
- Appendix J** Maps

1.3 PORTLAND HAZARDS AND SUCCESSES

(Organized by severity and frequency - earthquake being the most severe, weather being the most frequent and expansive)

Earthquake

- Three crustal faults are predicted to have the potential of a 6.8 magnitude.
- Portland is within the Cascadia Subduction Zone impact area capable of producing a 9.0 magnitude quake.

Severe Weather*

- Including snow and ice storms, wind, drought and extreme temperature.
- Projected changes in temperature over the next 100 years will likely reduce the winter snowpack and cause more snow to fall as rain; more frequent periods of drought, dryer summers, increased fire danger and higher levels of pollution in the Portland area.

Flood

- Flooding most often occurs from October through April.
- 31 miles of levees protect the Portland International Airport and over \$3 billion of commerce along the Columbia River.
- Johnson Creek floods annually displacing residents and business owners.

Landslide

- Portland has slopes of 20% grade in the west hills, above Swan Island north of University of Portland, along the ridges of Mt. Tabor, Mt. Scott, Powell Butte and Rocky Butte.
- Ninety landslides were recorded from 2005-2009 in the Portland area.

Wildland Urban Interface Fire

- Portland's largest natural area - the 5,500 acre Forest Park - is surrounded on three sides by industrial and residential development.
- The risk of loss to homes and businesses built at the wildland urban interface is significant and growing due to the buildup of hazardous wildfire fuels (including invasive species), longer dry seasons and changing weather patterns.

Invasive Plant Species*

- Many invasive plants have shallow root systems that provide limited erosion control, crowd out native plants and inhibit tree growth.

Erosion*

- Wind and erosion along rivers and creeks can cause significant destruction of property and infrastructure.
- The 2008 Erosion and Sediment Control Manual is a key reference for actions to be taken to mitigate erosion.

Volcanic Activity*

- Portland has been and could be affected by ash from Cascade volcanoes that would impair breathing, limit visibility and clog air filters, HVAC systems and water and sewer systems.



Completed Action Item ST Flood #12 - Provide staff to participate in flood fight trainings led by the Multnomah County Drainage District. The Multnomah County Drainage District maintains the 31 miles of dikes along the Columbia River.

* Indicates hazard was added in 2010.

NHMP – A Useful Tool for All Bureaus

The NHMP outlines Portland’s hazard vulnerability and the actions that can mitigate hazards. Bureau involvement in the process and their inclusion of action items into the NHMP qualifies actions for pre-disaster mitigation grant funding. The NHMP is a tool that all bureaus can use to identify shared mitigation opportunities.

The 2010 Natural Hazard Mitigation Plan (NHMP) process was a set of facilitated discussions between bureaus about their programs and mitigation efforts, resource capabilities and the ability to maximize their programs’ effectiveness through collaboration. An example of collaboration is the development of a citywide landslide committee that meets to discuss landslide sites and actions taken by different bureaus to mitigate the impact of the landslide, provide information to the public and share engineering expertise. The NHMP process also allowed bureaus to understand how their ongoing projects mitigate hazards. The greatest finding this year was the identification of invasive plant species as a hazard that has a cascading affect on the environment if uncontrolled. Whereas indigenous plants have deep roots, greater fire resistance and do not stunt tree canopy growth, invasive plants do. We learned that by eradicating invasive plants we mitigate landslides, air pollution and wildland urban interface fire.

Resiliency Means to Bounce Back

Portland’s NHMP is a five year, multi-bureau effort to strategically develop a more resilient city. The objective of this mitigation strategy is to coordinate bureau projects and resources to proactively maximize the protection of life, infrastructure, property and the environment. By investing in mitigation projects, the city decreases the risk and consequently the cost of disaster. In disaster our response resources will be stretched. Through prior planning and implementation of mitigation projects we decrease the amount of damage to our assets and will be able to use resources for the greatest response and rebuilding needs. The intent of this plan is to identify what can be done prior to disaster that will protect the most people, the most essential and critical infrastructure and the most natural resources to enable the continuation of services, livability and economic stability for the citizens.

Criteria Based Ranking

The Mitigation Planning Team identified criteria to identify the action that would have the greatest impact on the most hazards, meet the greatest number of goals, have the resources to implement current projects, and align with citywide and individual bureau priorities and goals. Table 1-3a lists the actions in order of the number of criteria met.

Table 1-3a Criteria Based Ranking of Action Items

ID	Description	Responsible Parties
ST= Short Term, LT= Long Term, MH = Multi-Hazard, WF = Wildland Urban Interface Fire		
STMH #1 19 pts	Continue to involve the public in updating the Natural Hazard Mitigation Plan.	All Bureaus
STMH #11 18 pts	Implement actions in the 2005 Portland Watershed Management Plan to help mitigate flood, landslide, earthquake and wildfire hazards.	Bureau of Environmental Services (BES)
STMH #13 17 pts	Coordinate emergency standard operating procedures and plans between disaster responder organizations in the Portland Metro region.	Portland Office of Emergency Management (POEM) Transportation (PBOT), Fire and Rescue, Emergency Communications, Police
LTMH #1 16 pts	Revise Portland's Comprehensive Plan to address and implement Citywide policies, land use improvements...mapping changes of natural hazards.	Planning and Sustainability (BPS); POEM
LTMH #14 16 pts (Reworded STMH#5)	Acquire (buy out), demolish or relocate structures from hazard prone areas. Property deeds shall be restricted for open space uses in perpetuity to keep people from rebuilding in hazard areas.	BPS, PBOT, BES, POEM,
STWF #14 16 pts	Convene a standing wildfire interface fire technical group.	Fire and Rescue, Parks and Recreation, BES, POEM
STMH #5 15 pts	Acquire Light Detection and Ranging (LIDAR) analysis of the Portland Metro area.	POEM, Corporate GIS, BES, Fire and Rescue, Water, PBOT
ST MH #7 15 pts	Create a mitigation mapping committee to index and maintain Geographic Information System (GIS) mapped inventory and develop prioritized list of critical facilities, residential and commercial buildings within known hazard areas.	POEM, Corporate GIS, BPS, BDS, Fire and Rescue, Water. PBOT, BES
ST MH #8 15 pts	Partner with utilities to ensure continuity of service to the City and the Columbia South Shore Well Field to provide for redundancy in case of primary power outage.	Water, BES
STMH #10 15 pts	Develop educational materials for residents that identify and define their risk to multi hazards.	POEM
STMH #9 14 pts	Develop a City employee emergency response plan to ensure that City employees understand expected actions so that essential services can continue.	POEM
LTMH #15 NEW 13 pts	Cross reference and incorporate mitigation planning provisions into all community planning processes such as comprehensive, capital improvement and land use plans to demonstrate multi-benefit considerations and strengthen eligibility for funding from multiple sources.	POEM, BPS, Fire and Rescue, PBOT, Water, BES

Successes

Since 2004, Portland has received three Pre-Disaster Mitigation Grants. The Bureau of Environmental Services, Portland Water Bureau, Portland Parks & Recreation and Portland Fire and Rescue have all been recipients and have worked toward mitigating flood, fire, earthquake and landslide hazards.

Bureau of Environmental Services (BES) Johnson Creek East Lents Floodplain Restoration Project

In 2006, BES received a \$2,700,000 Pre-Disaster Mitigation Grant from FEMA to create the East Lents Floodplain Restoration Project. The 60-acre project will restore the historic floodplain along Johnson Creek. The project site is south of SE Foster Road from about SE 106th Avenue to SE 110th Drive and expected to be completed by 2011. This project will address flooding, habitat and water quality issues in the watershed. When complete, the project will add flood storage to the floodplain. To date, the City has spent over \$8 million acquiring land in this area and \$30 million in the Johnson Creek Watershed. In addition to the FEMA grant, the City has provided approximately \$900,000 in funding.



Johnson Creek Floodplain

Action Items in the 2010 Mitigation Plan relative to flooding include:

- Identify funding for the design and construction of the Springwater Wetlands complex, a 30-acre floodplain wetland restoration project in the Lents area of Johnson Creek.
- Complete update of the Johnson Creek Restoration Plan.
- As Waterfront Park remodeling is designed, ensure that Portland's downtown property and critical facilities remain protected from floodwaters.



January 2009 Flood - Lents

**Portland Parks and Recreation, Fire and Rescue and the Bureau of Environmental Services
Portland Wildfire Fuel Reduction Project
Wildfire Readiness Assessment & Gap Analysis**

2006 funding provided by a FEMA Pre-Disaster Mitigation Grant enabled the City to educate residents about wildfires and work with volunteers, non-governmental agencies and local contractors to reduce hazardous wildfire fuels on public and private lands at the wildland urban interface. An interagency project team composed of staff from Portland Parks and Recreation, the Bureau of Environmental Services and Portland Fire and Rescue, a Technical Advisory Committee and three Citizen Advisory Committees prepared and implemented long term natural resource restoration plans and carried out fuel reduction projects in three focus areas: Forest Park, Powell Butte Nature Park and two segments of the Willamette Escarpment (Oaks Bottom and Mocks Crest).



Powell Butte controlled burn



To date, hazardous wildfire fuels have been treated on approximately 900 acres of public and private lands. On the ground work will continue for the duration of the grant, but additional risk reduction and interagency wildfire planning remains to be done. In 2009, the project team, with the assistance of consultants and the Technical Advisory Committee conducted a Citywide Wildfire Readiness Assessment to determine the ability of the City to cope with wildfires in and around Forest Park and Powell Butte. The findings of this assessment are documented in a report that details proposed actions to improve City preparedness for wildland fires. www.portlandonline.com/wildfire.

Action items in the 2010 NHMP include:

- Convene a standing City/County Wildfire Technical Working Group.
- Modify existing regulations to improve the permitting process and increase the defensible space around structures.

Portland Water Bureau Conduit Trestle – Diack’s and Sester’s Ponds

800,000 people in the Portland metropolitan area depend on the Bull Run Watershed near Mt. Hood for drinking water. Three conduits and their related structures provide the primary supply line from the Bull Run watershed to the city.

The September 2000 System Vulnerability Assessment (SVA) Study recommended work to reduce the vulnerability of the conduits to multi-hazard risk from various hazards, including earthquakes, landslides, flooding and human error. This work involves multi-phase projects over the course of 10–20 years to increase the system’s reliability.



FEMA funding allowed for the upgrade of the conduit trestles at Diack’s and Sester’s Ponds where the water supply conduits cross stream channels on trestles. The primary goal is to minimize service outages and shorten restoration times for water service in future earthquakes. At Diack’s Pond, the existing non-engineered dam will be drained, the existing stream channel will be channeled into a box culvert and the piping will be hardened against scour by concrete encasement along with additional structural improvements. At Sester’s Pond, the conduits will be relocated downstream of the dam, under the stream below scour depth and hardened with concrete encasement.

The grant award was for up to three million dollars with the City providing a match contribution of \$1,054,000. The work on the Diack site began in April 2008 and at the Sester site in June 2008.

Actions within the 2010 NHMP relative to hardening infrastructure such as this are:

- Partner with utilities as they ensure continuity of service to the City and the Columbia South Shore Well Field to provide for redundancy in case of primary power outage.
- Assess the stability of levees in the Columbia Corridor Area and develop appropriate emergency plans to address potential levee failure and associated hazards.

