

3 Hazard Identification and Risk Assessment

In This Chapter

Purpose

The hazard identification and risk assessment identifies and characterizes the Planning Area's natural hazards and describes how each hazard can impact our communities. The risk assessment reveals our vulnerabilities and informs our mitigation strategy.

Hazards

All five jurisdictions in the Planning Area are subject to six natural hazards: earthquakes, floods, landslides, severe weather, volcanic activity, and wildfire. Each hazard is profiled separately. Interrelationships between hazards (e.g., flooding can trigger a landslide) and climate change projections are included in each hazard profile, when applicable.

Human-caused and technological hazards are analyzed in a separate report that can be found in **Annex I: Human-Caused and Technological Hazard Identification and Risk Assessment**. This report profiles the following eight hazards of concern for Multnomah County, as identified by the steering committee: transportation incidents, hazardous materials incidents, pipeline incidents, critical infrastructure failure, utility interruption, terrorism, workplace/school/university violence, and fuel/resource shortage.

Multi-Jurisdictional Plan

This Natural Hazards Mitigation Plan (NHMP) addresses both common risks across the Planning Area and those risks unique to each jurisdiction. Unique observations or relevant anecdotal information noted by the steering committee and other stakeholders are also included.

Format

Each risk assessment includes a profile of the hazard that contains five sections: local risk rankings, an overview, history, probability and vulnerability.

1. **Local Risk Rankings** are determined by local emergency managers and other local subject matter experts based on a risk analysis methodology developed by the Federal Emergency Management Agency (FEMA) and refined by the Oregon Office of Emergency Management (OEM) called the OEM Hazard Analysis.

The OEM Hazard Analysis is based on partially subjective scoring for each hazard. It is intended to assist local jurisdictions with identifying their risk and hazard priorities. This methodology has four components: history, probability, vulnerability to an average event, and vulnerability to a maximum event. The OEM methodology is further described in **Appendix C Local OEM Hazard Analysis Scores**.

Each hazard profile begins with OEM Hazard Analysis rankings (high to low) for each jurisdiction, as shown in **Table 3-1**, and a brief justification of those rankings. Each jurisdiction’s scoring sheets are located in **Appendix C**.

Table 3-1: OEM Hazard Analysis Risk Rankings by Jurisdiction

	Unincorporated Multnomah County	Gresham	Troutdale	Fairview	Wood Village
HIGH	Earthquake	Earthquake	Severe Storm	Severe Storm	Severe Storm
	Flood	Severe Storm			
	Wildfire				
MODERATE-HIGH				Earthquake	
MODERATE	Severe Storm	Flood	Earthquake	Volcano	Earthquake
		Landslide	Volcano		Volcano
			Flood		Landslide
			Wildfire		
LOW-MODERATE				Flood	Flood
LOW	Landslide	Wildfire	Landslide	Landslide	Wildfire
	Volcano	Volcano		Wildfire	

Source: NHMP Steering Committee

2. The hazard **Overview** describes the types, location (geographic area) and extent (strength or magnitude) of each hazard.
3. The **History** section lists known previous hazard events, including the location and a brief description.
4. **Probability** describes the likelihood of the hazard occurring in the future. Probability is described using historical frequencies or statistical probabilities, depending on the data available.

Included in this section are impacts of a changing climate on the hazard. This section is based on the Oregon Climate Assessment Report (Oregon Climate Change Research Institute, 2010), the Climate Change Adaptation Framework (State of Oregon, 2010), the analysis of these two reports as described in the Oregon NHMP (DLCD, 2015), and the Climate Change Preparation Strategy: Preparing for Local Impacts in Portland and Multnomah County (2014). According to these sources, the most reliable information on climate change to date is at the state level and indicates that hazards projected to be impacted by climate change in the Planning Area include drought, wildfire, flooding and landslides.

5. Each hazard’s impact on the Planning Area is described in the **Vulnerability** section, including loss estimates and particular areas of concern for each jurisdiction. The vulnerability analysis helps each community understand its greatest risks. A combination of exposure-, historical occurrence- and scenario-based methods were used to qualitatively and quantitatively analyze vulnerability.

Comparing State and Local Risk Rankings

The 2015 Oregon NHMP contains a side-by-side comparison table of local and state risk rankings for each hazard, titled “Table 2-39. Local and State Vulnerability Ranking by County.” The local risk rankings in this table for Multnomah County are from an OEM Hazard Analysis completed in 2008, while the state rankings were developed in 2014. The 2008 analysis considered all of Multnomah County, including the City of Portland.

Multnomah County’s OEM Hazard Analysis update in 2016 was conducted differently. Each jurisdiction completed the OEM methodology for its respective community. This resulted in five separate sets of risks scores, as seen in **Table 3-2**. The City of Portland conducted a separate risk assessment in 2016, using a different methodology, during the update of its Mitigation Action Plan (MAP).

As a result, some of the risk rankings for Multnomah County have changed based on the county’s new approach to local risk analysis. Nonetheless, similarities and differences between local and state risk rankings still exist (**Table 3-2**).

Table 3-2: Risk Rankings by Hazard from the State (2015) and from Jurisdictions Within Multnomah County (2016)

	Earthquake	Flood	Landslide	Severe Weather	Volcano	Wildfire
State rankings for Multnomah County	Most Vulnerable	Vulnerable	Most Vulnerable	Most Vulnerable	Most Vulnerable	Vulnerable
Unincorporated Multnomah County	High	High	Low	Moderate	Low	High
Gresham	High	Moderate	Moderate	High	Low	Low
Troutdale	Moderate	Moderate	Low	High	Moderate	Moderate
Fairview	Moderate-High	Low-Moderate	Low	High	Moderate	Low
Wood Village	Moderate	Low-Moderate	Moderate	High	Moderate	Low

Sources: 2016 Local Hazard Vulnerability Assessments and the 2015 Oregon NHMP

How local and state entities identify risk varies greatly, from local to state as well as across all hazards at the state level (DLCD, 2015). As described above and in **Appendix C Local OEM Hazard Analysis Scores**, local risk scores are based on the knowledge of local emergency managers and other local subject matter experts. The methodology identifies risk to each hazard within that particular jurisdiction.

The state risk assessment in the 2015 Oregon NHMP was conducted by one or more subject matter experts for each hazard based on recent data and scientific expertise. They ranked vulnerability for Multnomah County overall, including the City of Portland, which may account for much of the difference between the state and local rankings. In addition, for some hazards, a significant amount of data are available and support detailed damage and loss projections that help the state identify which communities are most vulnerable to each hazard (DLCD, 2015). Hazards for which there are limited data undergo a less rigorous assessment, and identifying which communities are most vulnerable to those hazards may be more challenging (DLCD, 2015).

This method compares the *relative* level of risk among Oregon’s counties. In some instances, cities and local communities are identified as being especially vulnerable — such as the Critical Infrastructure Hub in Portland having a high risk to seismic activity, and the City of Seaside being especially vulnerable to a

tsunami. In the risk ranking comparison tables, though, only counties are compared relative to each other. Both methodologies are quasi-subjective.

Given the methods used to assess risk at the local and state levels, it is not surprising that risk rankings sometimes differ greatly for the same hazards, as shown in **Table 3-2**. Comparing state and local risk rankings therefore is difficult. A common risk assessment methodology applied locally and by the state would provide a common picture of our true risk, and would help to better align local and state mitigation action priorities.

A Note About Data in the Hazard Identification and Risk Assessment

The best available data was used to assess risk. However, it is important to note that there is a wide range of data available from hazard to hazard, and from jurisdiction to jurisdiction, each with its own use limitations. For example, a wealth of high resolution data for floods enables us to understand the impact a 100-year flood can have on specific properties. On the contrary, the intended use for volcanic activity data informs general planning, but should not be used for site-specific planning.

Hazard data varies among jurisdictions. A function of merging five plans into one Multi-Jurisdictional NHMP, data available for one community may not be available for another community. Furthermore, the granularity of the data varies among jurisdictions. Coordinating hazard data updates in future iterations of the plan will minimize these variations.

When available, data are categorized by each city and unincorporated area.

While this plan does not include the City of Portland overall, some data for the risk assessment was available only at the Multnomah County level, which includes the City of Portland.

References

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