

## Section 5: Hazard Identification and Vulnerability Assessment (HIVA)

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The first step toward a mitigation program is the identification of the hazards a community may face. Firsthand information can be obtained from interviews of businesses, local employees, first responders, and residents; or gathered from newspaper archives, FEMA documents, state and local government records, and the Internet. Largely, local hazards can be categorized as either natural or technological/manmade events. While the local climate changes rather slowly, our manmade environment can change rapidly, especially in terms of the local economic base.

Some hazard events occur on an almost annual basis while others may not happen once within our lifetime. Additionally, not every hazardous event occurs with notable damage or loss of life. For this reason, hazards are assessed by comparing the experienced frequency of the event versus the potential impact that may result.

<b>High Probability Low Impact</b>	<b>High Probability Moderate Impact</b>	<b>High Probability High Impact</b>
<b>Moderate Probability Low Impact</b>	<b>Moderate Probability Moderate Impact</b>	<b>Moderate Probability High Impact</b>
<b>Low Probability Low Impact</b>	<b>Low Probability Moderate Impact</b>	<b>Low Probability High Impact</b>

### Probability vs. Impact

Planning begins with events that are expected to occur often and have potentially high impacts on life and property followed by those with more moderate probabilities or moderate impacts. Jurisdictional strategies are dependant on the philosophy and experiences of local officials. Largely, the priorities addressed in HIVA years one through five are a reflection of this assessment and local philosophical priorities.

For the purpose of this document, the criteria for high, moderate, and low probability are:

**High Probability:** once a year

**Moderate Probability:** once every two to ten years

**Low Probability:** once every ten to fifty years

Events occurring once every 50 to 1,000 years will be treated as “low probability” for the purpose of this document.

Criteria for evaluating impacts are somewhat more subjective. While some figures are available for dollar damages, productivity and economic losses are difficult to gauge. Injuries and fatalities are similarly difficult to assess. There is no known method for evaluating and quantifying the impacts of personal injury or loss of life, and whether the potential exists to affect one life or many. However, without establishing a value to human casualty, calculation of benefit-cost analysis for proposed mitigation projects could not be conducted.

$$\text{Benefit / cost} = \text{ratio}$$

Benefit-Cost analysis is required to prioritize mitigation projects. High ratios would receive a higher priority than lower ratios. We will use \$2.3 million as the minimum benefit of one life saved by these projects. The figure was one used by some in the 9-11 World Trade Tower settlement discussions.

### **Cause and Effect**

Disaster events can be categorized as the cause of an impact or the effect/impact itself. Winter storms bring heavy rains, high winds, snow, and cold temperatures (causes) that may result in property damage, local flooding, power outages, injuries and deaths (effects). Despite flooding being an effect of severe weather conditions, it can also be considered to be an event with its own unique effects to roadways, structures, building sites, and bridges. Power outages can be associated with a variety of natural or manmade events. Power interruptions are addressed as effects of natural or technological events in the King County Regional Hazard Mitigation Plan. Washington State Emergency Management has included a flooding element of its hazard identification and vulnerability assessment as well. The RHMP follows that model.

### **Five-year Planning Cycle**

Research and planning for all the hazards a community may be vulnerable to is a very time-consuming process. For this reason, HIVA is being updated over a five-year period. The expectation of the “year one” planning effort is to provide a detailed update of the community’s most pressing vulnerabilities, with other possibilities and year one revisions distributed over the subsequent four years.

### **Year One Hazard Focus**

The Pacific Northwest has experienced specific notable natural hazards listed below for thousands of years. These are included in the first year HIVA. The following hazards are addressed as part of the year one (2003) planning phase:

**Severe Weather  
Avalanche  
Flooding  
Landslide  
Earthquake  
Civil Unrest  
Terrorism**

These topics were identified as a higher priority based on past hazard history, frequency and likelihood of occurrences, and potential catastrophic losses. On the strength of recent national and local events and other concurrent planning processes, it seemed logical to add terrorism and civil unrest to the year one HIVA focus.

**Years Two through Five**

Years two through five will include updates, expansion and development of other hazard topics including drought, wildfire, tsunami-seiche, cyber terrorism, hazardous materials, industrial, transportation, erosion, volcanic activity, urban economy, agricultural economy, air and water quality, food contamination and epidemics. This time period also includes a process to continually review HIVA documents in order to maintain current hazard information and to accurately evaluate vulnerabilities and planning priorities.

Some topics to be updated and expanded upon are contained in the 1997 King County Hazard Identification Vulnerability Assessment included in the “annex” section of this document; new hazard topics will be developed over the next four years based on priority of hazard impact.

**Sources of Data**

Information supporting the hazard identification vulnerability assessment update for the 2003 regional hazard mitigation plan was obtained from a variety sources:

- King County Office of Emergency Management-Duty Officer Log 1996 to present
- National Weather Service
- Presidential Disaster Declarations 1990 to present
- Media searches (newspapers) & Websites
- Jurisdiction and agency experience
- King County Geographic Information System (GIS)
- University of Washington Seismology Department  
(Note: Washington State damage data was not made available for this document.)