



Natural Hazards and Planning for the Future in Squamish, British Columbia, Canada

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The residents of Squamish, British Columbia, Canada, live with the reality of natural hazards. Squamish will be the gateway to the Winter Olympics in 2010, and its population is predicted to almost double over the next 25 years. As the community continues to grow so do the potential levels of vulnerability, loss (damage) and risk associated with increasing exposure to natural hazards. Integration of geological and hydrologic information with existing settlement and future development plans and property and community assets is essential to planning for a sustainable and resilient community. Such integrated analysis is in its infancy. An integrated natural-science/social-science team is developing a framework for multihazard risk assessment in support of ongoing community-planning initiatives in Squamish.

Scientific research and engineering reports are used to estimate the likelihood of occurrence, magnitude and extent of natural hazards in Squamish, such as floods, earthquakes, and debris flows. Socioeconomic data are used to estimate potential loss (damage) and risk of property and community assets due to the natural hazards. Squamish planners can use both scientific and socioeconomic data to evaluate a scenario (i.e., a unique combination of a development alternative, selected natural hazards, and mitigation actions) with respect to the community's tolerance of vulnerability, loss, risk, and return on mitigation investment.

The results for a scenario are communicated in a geographic information system as a progression from the manifestation of a natural hazard(s), to the associated community vulnerability and loss to risk. Loss, risk and return on mitigation investment are

illustrated as dependant on various input variables, including the planning horizon, valuation of damage, and private and public values.

At the conclusion of the first Squamish community workshop attended by planners, administration officers and emergency-response personnel, several issues were exposed, such as the need to use an updated hydrological model that is responsive to development, mitigation options, and conditions for flooding, and the limitations of using engineering data for only two flood magnitudes (return periods). Other issues concern the distribution of flood magnitudes, the combination of multiple hazards, the relation between valuation of damage and the time horizon, presentation of the uncertainty in inputs and outputs, comparison of alternatives, and community's tolerances for vulnerability, loss, and risk.

Melding scientific research with socioeconomic data provides a practical, science based method for communities to incorporate natural- hazard considerations into the planning process.