**Impacts of Climate Change
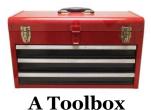on Urban Infrastructure
& the Built Environment**

A Toolbox

Tool 2.2: Overview of Rainfall-Induced Landslide Tools

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Contents

1. Introduction

Landslides cause millions of dollars of damage every year in New Zealand and have been responsible for at least 412 deaths since 1840. EQC Insurance claims for landslide damage to New Zealand's domestic housing stock alone account for more than NZ$16 million per annum in direct costs over the period 2001-2008. This figure does not include repair of landslide damage to commercial buildings, transport and utility networks and the loss of productive agricultural land. Indirect costs increase these losses substantially.

The Tools in Bin 2.3 of this Toolbox demonstrate a method (PRILHM - the Probabilistic Rainfall-Induced Landslide Hazard Model; Dellow *et al*., 2005) that can be used to estimate the probability of a rainfall-induced landslide occurring at any site within the spatial extent of the model.

2. Description of the Rainfall-Induced Landslide Tools

Table 2.1 outlines the Rainfall-Induced Landslide Tools in this Toolbox. The Tools describe some general principles of landslides, the data and information needs, and the PRILHM model. Example landslide hazard maps are shown for the Wellington region [see Toolbox Overview and Case Study Examples]. The methods and statistical models described in the Tools are used for demonstration purposes only. It is recognised that other methods and models are available which can be used to perform functions similar to those described here.

Table 2.1: Tools associated with the evaluation of landslide hazard

Tool Name	Tool Reference	Purpose of the Tool
General information on the causes of rainfall-induced landslides	[Tool 2.3.1]	Provides a general introduction to the causes of rainfall-induced landslides.
Collection and analysis of historical landslide information and other data required for modelling rainfall-induced landslides	[Tool 2.3.2]	Describes in generic terms the datasets needed to calculate the probability of a rainstorm-induced landslide occurring at any point in New Zealand. These generic datasets must include landslide, rainfall, topographic, geologic and vegetation datasets. Includes an example for Wellington region.
Modelling present-day and future landslide potential	[Tool 2.3.3]	Describes a model that can be used to calculate the probability of a rainstorm-induced landslide occurring at any point in New Zealand (PRILHM - Probabilistic Rainfall-Induced Landslide Hazard Model).
Mapping the landslide hazard	[Tool 2.3.4]	The types of maps that can be generated from the Probabilistic Rainfall-Induced Landslide Hazard Model (PRILHM) methodology [Tool 2.3.3] are described and shown for the Wellington region.
Linkages to risk assessment, adaptation options and decision tools	[Tool 2.3.5]	To identify the next stages in an assessment of rainfall-induced landslide impacts and climate change; particularly the assessment of risk [e.g. Tool 4.5].

3. References

Dellow, G.D.; McSaveney, M.J.; Stirling, M.W.; Berryman, K.R., 2005: A probabilistic landslide hazard model for New Zealand. p. 24 IN: Pettinga, J.R.; Wandres, A.M. (eds) *Geological Society of New Zealand 50th annual conference, 28 November to 1 December 2005 ... Kaikoura : programme & abstracts.* [s.l.]: Geological Society of New Zealand. *Geological Society of New Zealand miscellaneous publication 119A.*