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**A DEM BASED INVESTIGATION OF MASS MOVEMENT
SEDIMENT DELIVERY**

A thesis presented in partial fulfilment of the requirements for the
Degree of Master of Applied Science in Soil Science,
Massey University, Palmerston North, New Zealand.

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ABSTRACT

Environmental legislation in New Zealand has required local and regional government to place a greater emphasis upon the external effects of land use. For New Zealand hill country this means a quantitative understanding of accelerated soil erosion in terms of its effects upon downstream sedimentation and subsequent flood events. This study was an investigation into the spatial distribution of soil slip erosion (NZLRI) for the Waipaoa River Catchment ($\sim 2204\text{km}^2$), East Cape, New Zealand. A combined Remote Sensing and GIS approach using orthorectified aerial photographs and digital elevation models was employed to investigate the topographic attributes influencing the spatial pattern of erosion, utilising a series of classified erosion maps. Of the variables examined, slope, aspect, elevation, and the soil moisture index (SMI) were quantitatively reaffirmed as controlling influences upon mass movement. The erosion maps in conjunction with hydrological flow accumulation images were also found to objectively determine thresholds for identifying stream channel networks from the DEM. The erosion maps when combined with historical data were used to construct sediment delivery ratios and sediment budgets for each landsystem investigated. The most significant influences upon landsliding were combined in a data driven model to assign a probability of landsliding for each pixel, which can later be used to create landslide susceptibility maps and assist in the allocation of soil conservation resources.

Keywords:

ORTHORECTIFIED AERIAL PHOTOGRAPHS, DEMs, SOIL SLIP EROSION, SEDIMENT DELIVERY RATIOS, SEDIMENT BUDGETS

ACKNOWLEDGEMENTS

I would like to thank the following people that I have had the pleasure of working with throughout the past year:

- Mr. Mike Tuohy for facilitating the relationship with Landcare Research Ltd, his advice regarding the direction, outcomes, and delivery of the project, and his good humour.
- Mr. John Dymond for his continual support, encouragement, advice on quantitative matters, and interpretation of my often incoherent ramblings, as well as his uncanny ability to always say the right thing at the right time.
- Mr. Mike Page for furnishing many historical data, and accompaniment into the field for an introduction of the hillslope processes of the Waipaoa River catchment.
- Mr. Murray Jessen for his geomorphological advice, professional opinion, and his advice upon the importance of field cuisine and correct field posture.
- Dr. Alan Palmer for tailoring material prior to commencement of this project.
- Mr. Harley Betts for his assistance in the field, friendship, and support in our attempt to consume the greatest number of cheesecakes by any field party ever.
- Mr. Terry Crippen for introducing me to the majestic world of alpine climbing.
- Likewise, to anybody else on the top floor of Landcare Research Ltd. that I might have harassed during the course of the year.
- Helen E. Akers Scholarship committee for enabling me to lead a fulfilling lifestyle.

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