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THE DISTRIBUTION AND PROPERTIES OF SOILS IN
RELATION TO EROSION IN A SELECTED CATCHMENT OF
THE SOUTHERN RUAHINE RANGE, NORTH ISLAND, NEW ZEALAND

A thesis presented in partial fulfilment of
the requirements for the degree of
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FRONTISPIECE

A view of the south-eastern fault-controlled front of the Ruahine Range. Car Park Creek, a subcatchment of the West Tamaki River, is seen in the centre of photo. In the foreground, fertile floodplains are seen. These are threatened by the inundation of erosion products which are carried out of the mountainland by the rivers, during storm periods.

ABSTRACT

The soils of a selected subcatchment of the Southern Ruahine Range have been mapped at a scale of 1:5,000. The soil mapping units have been further characterised by measurement of a number of soil physical and chemical properties, together with an investigation of their sand and clay mineralogies.

The erosion history since 20,000 yrs B.P. when the Aokautere Ash was deposited in the West Tamaki River catchment, has been partially reconstructed for this catchment. It is one of erosive periods and resulting aggradational gravel deposits, alternating with more stable periods with soil development and vegetation growth. Studies of a histosol (organic soil) on the summit plateau of the Southern Ruahine Range, at the head of the catchment, suggests that this soil is approximately 4600 years old, and prior to this time the summit plateau was stripped by erosion.

Present erosion occurs predominantly: (1) on convex creep slopes, just below the summit plateau, and (2) on the steep valley-sides. In the former zone, where Takapari hill soils exist, deep-seated creep and mass movements occur. In the latter zone, where Ruahine stepland soils exist, superficial soil and rock slips are more common.

An investigation of the soil-water relationships for each soil mapping unit indicates that a number of factors render the Takapari hill soils and Ruahine stepland soils particularly susceptible to erosion. A comparison of soil properties which affect the erosion susceptibilities of each soil mapping unit has enabled an ordering of the units with respect to erosion risk. Thus, areas of high, medium and low risk to erosion in the West Tamaki River catchment have been delineated. Many of the deep-seated erosion surfaces occur in the high risk area. Thus, if stabilisation of these sites is possible, by intensive revegetation programmes, the result will be a decrease in the amount of gravels carried out of the mountainland by rivers onto the surrounding fertile floodplains.

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TABLE OF CONTENTS

	page
FRONTISPIECE	
ABSTRACT	i
ACKNOWLEDGEMENTS	ii
TABLE OF CONTENTS	iii
LIST OF FIGURES	viii
LIST OF TABLES	xi
CHAPTER I	
INTRODUCTION	1
1.1 Reasons for Study	1
1.2 Objectives of Study	1
1.3 Choice of Study Area	2
1.4 Methodology of Study	3
CHAPTER 2	
LITERATURE REVIEW ON THE SOILS AND EROSION SITUATION OF THE SOUTHERN RUAHINE RANGE	5
2.1 Introduction	
2.2 Landscape Evolution in the Southern Ruahine Range, Through Geological Time	6
2.2.1 Genesis of the Mountain Range	6
2.2.2 Landscape Evolution, during Plio-Pleistocene times	7
2.2.3 Post-glacial Climatic Changes	8
2.3 Present Erosion Situation of the Southern Ruahine Range . . .	10
2.3.1 Erosion Situation	10
2.3.2 Erosion Types	10
2.3.3 Causes of Erosion	11
2.3.4 Future Control of Erosion	14

	page
2.4 Soils of the Southern Ruahine Range	16
2.5 Soil Parameters, Relevant to Erosion Studies	19
2.5.1 Erosion Processes	19
2.5.2 Soil Mineralogy	20
2.5.3 Soil-Water Characteristics	22
2.5.4 Slope Stability Studies	25
2.6 Summary	27

CHAPTER 3

DESCRIPTION OF THE STUDY AREA

3.1 Location	30
3.2 Physiography	30
3.3 Geology	36
3.4 Soils	38
3.5 Vegetation	40
3.6 Climate	42
3.7 Introduced Wildlife	46
3.8 Erosion	48

CHAPTER 4

HISTORY OF EROSION IN THE WEST TAMAKI RIVER CATCHMENT

4.1 Introduction	
4.2 Method of Study	51
4.3 Erosion History	52
4.3.1 Deposits of the Last Stadial (Ohakean Substage)	52
4.3.2 Tephrostratigraphy of the Takapari peaty loam, and Erosion History of the Summit Plateau	54
4.3.3 Depositional Surfaces in the West Tamaki River Catchment	59
4.3.4 Aerial Photographs (1946-1978)	68

CHAPTER 5

A PEDOLOGICAL INVESTIGATION OF THE SOILS IN CAR PARK CREEK

SUBCATCHMENT

5.1	Introduction	70
5.2	Method of Approach	74
5.3	Soils (and Soils Legend)	76
5.3.1	The Ruahine steepland soils	79
5.3.2	The Takapari peaty loam	85
5.3.3	The Takapari hill soils	88
5.3.4	The Dannevirke soils	96
5.3.5	Recent soils	101
5.4	General Discussion	103

CHAPTER 6

AN INVESTIGATION OF SOIL PARAMETERS RELATED TO SOIL GENESIS AND
ERODIBILITY

6.1	Introduction	105
6.2	Soil Physical Properties	107
6.2.1	Materials and Methods	107
6.2.1.1	Particle density	108
6.2.1.2	Bulk density	108
6.2.1.3	Total Porosity and Macroporosity	109
6.2.1.4	Saturated Hydraulic Conductivity	110
6.2.1.5	15 bar water retention (A.W.C. and "drying effect")	112
6.2.1.6	Loss of weight on ignition	113
6.2.1.7	Soil pH in (1) water and (2) sodium flouride	113
6.2.2	Results and Discussion	114
6.2.2.1	Particle density and Bulk density	114

	page
6.2.2.2 Total Porosity and Macroporosity	116
6.2.2.3 Saturated Hydraulic Conductivity	119
6.2.2.4 Soil Water Retention and Available Water- Holding Capacity	121
6.2.2.5 15 bar Soil Water Retention, and the Effect of Drying	126
6.2.2.6 Loss of weight on ignition	130
6.2.2.7 pH values in (1) water and (2) sodium flouride .	130
6.3 Soil Mineralogy	133
6.3.1 Sand Mineralogy	133
6.3.1.1 Materials and Methods	133
6.3.1.2 Results and Discussion	134
6.3.2 Clay Mineralogy	137
6.3.2.1 Introduction	137
6.3.2.2 Materials and Methods	138
6.3.2.3 Results and Discussion	141
6.4 Conclusions	157

CHAPTER 7

FINAL DISCUSSION OF RESULTS AND EROSION PROCESSES, WITH CONCLUSIONS .	163
Bibliography	182
Abbreviations (used in soil profile descriptions)	191
Appendix I: Classification of Landslides: Abbreviated Version (Varnes, 1958)	192
Appendix II: Soil Chronosequence in the West Tamaki River Catchment - profile descriptions	193

	page
Appendix III: Soil Map of Car Park Creek (in pocket inside rear cover)	(pocket)
Appendix IV: Nitrogen Mineralisation Data from a Laboratory Experiment for the Takapari Peaty Loam	196
Appendix V: Phosphate Retention Values for the Dannevirke Taxadjunct, and Dannevirke Hill Soils	197

LIST OF FIGURES

FIGURE		page
1.	Kumeti Gravel Reserve	15
2.	Locality Map of Study Area	29
3.	Longitudinal Profiles of (a) Car Park Creek; (b) West Tamaki River, (Mosley, 1977).	31
4.	An idealised diagram of the landsurface units which occur on a valley-side in the West Tamaki River catchment	33
5.	Landsurface Units at the head of Car Park Creek . . .	35
6.	Landsurface Units of a Valley-side in Car Park Creek.	35
7.	A rockslide, and deep terracette features on the convex creep slope of Car Park Creek	37
8.	Downcutting in Hut Creek, since Cyclone Alison of March, 1975.	41
9.	Altitudinal Distribution of four vegetational species in the Southern Ruahine Range, compared with their distribution further north	39
10.	The Kamahi forest in Car Park Creek	41
11.	Gully erosion in Car Park Creek	43
12.	Vegetation on a Slope in Car Park Creek	43
13.	Rainfall Map for the Tamaki River area	45
14.	Illustrations and Field Description of the Aokautere Ash, as it occurs in the West Tamaki River catchment.	53
15.	Takapari Peaty Loam: Particle-size and Organic matter percentages. Profile Description (b)	55
16.	Depositional Surfaces in the West Tamaki River catchment	58
17.	A reconstruction of events forming the Whiteywood Creek fan	60
18.	Whiteywood Creek fan deposit	61
19.	A soil profile developed on the Whiteywood Creek fan deposit	61
20.	Old terrace, in the West Tamaki River channel	63
21.	A Soil Profile developed on the old terrace system .	63

	page
22. An extensive gravel terrace, formed during Cyclone Alison, and a 98 year old fan deposit at Stanfield Hut	65
23. Recent soil, formed in a gravel deposit, at the mouth of Car Park Creek	65
24. Isopach Map of a Recent Gravel surface, associated with Car Park Creek and Dry Creek	67
25. Car Park Creek - a subcatchment of the West Tamaki River	71
26. Diagrammatic Cross-section to show the distribution of Soil classes, in relation to the land surface units, within Car Park Creek	73
27. Ruahine steepland soil (RuS)	80
28. Takapari peaty loam (Tp)	86
29. Takapari hill soil (TpH)	89
30. Iron and Aluminium distribution in the soil profile of a Takapari hill soil	94
31. Dannevirke taxadjunct (D tax)	98
32. Dannevirke hill soil (DH)	99
33. Native earthworm, and native earthworm burrows	100
34. A Histogram to show the bulk density values for each Soil Class	115
35. Total Porosity and Macroporosity of Selected Soil Samples	117
36. Saturated Hydraulic Conductivity Values for three Selected Soil Profiles	120
37. Water Retention Characteristics of Selected Soil Profiles	123
38. The Relationship between A.W.C. and bulk density in selected soil samples	125
39. The Relationship between A.W.C. and organic matter in selected soil samples	125
40. The Relationship of Organic Matter to the Effect of Drying on 15 bar Water Retention Values, for selected soil samples	129
41. X-ray diffraction patterns of NH_4^+ saturated clay samples	142
42. X-ray diffraction patterns of a Dannevirke taxadjunct soil profile, indicating the presence of a small amount of pedogenic chlorite	144

	page
43. X-ray diffraction patterns of NH_4^+ and K^+ saturated clay samples from a Bw horizon of a Ruahine steepland soil .	145
44. D.T.A. Curves of Selected Soil Clay Samples	147
45. Infra-red Spectra of Selected Soil Clay Samples	150
46. Electron Micrograph showing kaolinite and halloysite .	153
47. " " " the 2 forms of halloysite .	153
48. " " " weathering volcanic glass .	153
49. " " " amorphous gel	154
50. " " " " and crystalline material in a Ruahine steepland soil (RuVS)	154
51. Representative electron micrograph of a Ruahine steepland soil (RuS)	154
52. Electron Micrograph showing imogolite and unidentified laths	154
53. Representative electron micrograph of D tax (Ah horizon)	155
54. " " " " " (C ")	155
55. " " " " the clay fraction of Aokautere Ash	155
56. Representative electron micrograph of the clay fraction of a greywacke pebble	155
57. An illustration of the Possible Origin of Terracettes, Observed at the Head of Car Park Creek	167
58. Erosion Potential Map for the West Tamaki River Catchment	178

LIST OF TABLES

	page
TABLE 1. Erosion Phases in the Southern Ruahine Range (Grant, 1978)	9
2. Soils of the Mountain Range, in Pohangina County (Rijkse, 1977)	18
3. Factors Contributing to Mass Movement in soils (Selby, 1970)	26
4. Classification of landsurface units, according to the Nine Unit Landscape Model, of Conacher and Dalrymple (1977)	33
5. Percentage Eroded Area in Car Park Creek and No. 1 Creek, from 1946-1978	68
6. Variation of Properties in the Ruahine Steepland Soils Mapping Unit	83-84
7. Bulk density and Particle density values for selected soil profiles of the study area	115
8. Saturated Hydraulic Conductivity Data for Selected Soils.	120
9. Soil Water Retention Values, and Available-Water Holding Capacity (A.W.C.) of Selected Soil samples	122
10. The Effect of Drying on 15 bar Water Retention Values of Selected Soil samples	127
11. Loss of Weight on Ignition Data for Selected Soil samples	131
12. pH values in (1) water, and (2) sodium flouride	132
13. Sand Mineralogy of Selected Sand Fractions of Samples from the Study Area	135
14. Results of Transmission Electron Microscopy: Visual Identification of Mineral and Amorphous Materials	152
15. Average Soil and Tree Rooting Depths of each Soil Mapping Unit	171
16. Factors Affecting the Erosion Susceptibility of the Soils in Car Park Creek subcatchment	175