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**Soil Mapping, Compilation and Land Evaluation of
Motueka, Riwaka and Moutere Valleys**

A thesis presented in partial fulfilment of the requirements

For the degree of

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In

Natural Resource Management

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Abstract

The development of a soil map of the Motueka area, along with the supporting documents was completed during this study. This was achieved by the verification of an old poorly documented paper soil map. Primary Solutions Ltd initiated this project, but Tasman District Council provided the funding and assistance during this project. The project was developed as it was realized that there was significant potential for the map to be expanded and therefore better utilized.

Validation of the original map was done by auger observations during extensive fieldwork. It was found that the paper map provided a reasonably accurate portrayal of textural distinctions, but lacked definition for drainage classes. Some reclassification of the map was therefore undertaken, and two new soil series were developed (the Ferrer and Motueka) to compliment the existing seven series (Riwaka, Umukuri, Sherry, Maori, Hau, Braeburn and Tahunanui). Some areas of the Ferrer series still exist within the Riwaka series as they could not be extracted due to the timeframe of this study.

Soil physical and chemical analysis was also carried out on four of the most extensive and intensively used soils (Riwaka, Umukuri, Sherry and Ferrer). The Umukuri soil had the most suitable results from the tested physical factors, while the Riwaka came out as the poorest. The Riwaka was the most chemically fertile soil, while the Sherry was the least fertile.

Current land use in the study area (a total of 4355 ha) is dominated by apples (30% or 1261 ha) and pasture (28% or 1207 ha). Other horticultural crops with significant areas in the study area are kiwifruit (499 ha), hops (218 ha) and blackcurrants (87 ha). There is limited potential for expansion of the more intensive land uses onto pasture, as the pasture is generally located on stony or wet soils making them unsuitable for horticulture.

Land evaluation results demonstrated that all the sampled soils generally were well suited to hop, blackcurrant and kiwifruit. The Umukuri soil however was rated the most suitable, while the Sherry rated the poorest.

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TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	I
ACKNOWLEDGEMENT.....	II
TABLE OF CONTENTS.....	1
LIST OF FIGURES.....	4
LIST OF TABLES.....	5
CHAPTER ONE – Introduction.....	6
1.1 Problem Statement.....	7
1.2 Aim.....	7
1.3 Objectives.....	7
CHAPTER TWO - Physical Resources of the Region.....	8
2.1 Location.....	8
2.2 Geology.....	9
2.3 Climate.....	12
2.3.1 Temperature.....	12
2.3.2 Rainfall.....	13
2.3.3 Sunshine hours.....	13
2.3.4 Frosts.....	14
2.3.5 Wind.....	14
2.3.6 Evaporation.....	14
2.3.7 Other features.....	14
2.4 Previous soil studies.....	14
2.4.1 Bulletins and reports.....	15
2.4.2 Papers and journal articles.....	17
2.5 Historical Vegetation.....	19
2.6 Land Use.....	19
2.6.1 Early Maori Agriculture.....	22
2.6.2 Tobacco.....	22
2.6.3 Hops.....	22
2.6.4 Apples & Pears.....	23
2.6.5 Kiwifruit.....	24
2.6.6 Berries.....	24
2.6.7 Blackcurrants.....	24
2.6.8 Vineyards.....	25
2.6.9 Market Gardens.....	25
2.6.10 Green Tea, Boronia Oil, Medicinal Herbs.....	25
2.6.11 Pasture.....	26
CHAPTER THREE - Revision of the Soil Classes.....	27
3.1 Approach.....	27
3.2 Methods.....	28
3.2.1 Map Validation.....	28
3.2.2 Land Use Map.....	28
3.2.3 Soil Description and Sample Collection.....	29

3.3 The Problem with the Old Classes.....	29
3.4 Revision of the Soil Series: Concepts.....	30
3.4.1 Parent materials.....	31
3.4.2 Profile form.....	31
3.4.3 Environmental conditions.....	33
3.4.4 Nature of the landform.....	33
3.5 Soil Types.....	34
CHAPTER FOUR - Physical Properties of the Selected Soils.....	38
4.1 Introduction.....	38
4.2 Soil Dry Bulk Density.....	38
4.2.1 Introduction.....	38
4.2.2 Method.....	39
4.2.3 Results.....	40
4.2.4 Discussion.....	41
4.3 Saturated Soil Hydraulic Conductivity.....	41
4.3.1 Introduction.....	41
4.3.2 Method.....	42
4.3.3 Results.....	43
4.3.4 Discussion.....	44
4.4 Soil Water Retention.....	44
4.4.1 Introduction.....	44
4.4.2 Method.....	46
4.4.3 Results.....	47
4.4.4 Discussion.....	48
CHAPTER FIVE - Chemical Properties of the Selected Soils.....	50
5.1 Introduction.....	50
5.2 Soil Acidity.....	51
5.2.1 Introduction.....	51
5.2.2 Results.....	54
5.2.3 Discussion.....	54
5.3 Cation Exchange Capacity.....	54
5.3.1 Introduction.....	54
5.3.2 Results.....	55
5.3.3 Discussion.....	55
5.4 Base Saturation.....	56
5.4.1 Introduction.....	56
5.4.2 Results.....	56
5.4.3 Discussion.....	57
5.5 Exchangeable Cations – Potassium, Calcium, Magnesium and Sodium.....	57
5.5.1 Introduction.....	57
5.5.2 Results.....	59
5.5.3 Discussion.....	63
5.6 Phosphate.....	64
5.6.1 Introduction.....	64
5.6.2 Results.....	65
5.6.3 Discussion.....	66
5.7 XRF of Sediments.....	67
5.7.1 Introduction.....	67
5.7.2 Results.....	67
5.7.3 Discussion.....	69
CHAPTER SIX - Land Evaluation.....	70
6.1 Introduction.....	70
6.1.1 Soil Versatility.....	70
6.2 Individual Crop Requirements.....	73
6.3.1 Kiwifruit.....	74

6.2.2 Blackcurrants.....	76
6.2.3 Hops.....	77
6.3 Method of land evaluation.....	78
6.4 Results of land evaluation.....	79
6.5 Discussion.....	82
CHAPTER SEVEN – Soil Survey Report.....	84
7.1 General Description of the Study Area.....	86
7.1.1 Location.....	86
7.1.2 Geology.....	87
7.1.3 Climate.....	88
7.1.4 Vegetation.....	88
7.1.5 Soil Survey.....	89
7.2 Soil Units.....	90
7.2.1 Tahumanui sands.....	90
7.2.2 Riwaka soils.....	92
7.2.3 Ferrer soils.....	97
7.2.4 Umukuri soils.....	100
7.2.5 Sherry soils.....	103
7.2.6 Maori soils.....	106
7.2.7 Hau soils.....	108
7.2.8 Motueka soils.....	110
7.2.9 Braeburn soils.....	112
7.3 Land Use.....	114
7.4 Conclusion.....	116
7.5 References.....	117
7.6 Appendices.....	118
A1 Detailed Profile Description – Riwaka soil.....	118
A2 Detailed Profile Description – Ferrer soil.....	119
A3 Detailed Profile Description – Umukuri soil.....	120
A4 Detailed Profile Description – Sherry soil.....	121
CHAPTER EIGHT – Discussion and Conclusion.....	122
8.1 Validity of the original paper map.....	122
8.1.1 Textural distinctions.....	122
8.1.2 Drainage distinctions.....	123
8.1.3 Parent material distinctions.....	123
8.2 Validity of the digitised soil map.....	123
8.3 Modification to the soil map.....	124
8.3.1 Polygon modification.....	124
8.3.2 Database modification.....	124
8.4 Accuracy of the produced map.....	125
8.4.1 Limitation of scale.....	126
8.5 Conclusion.....	126
CHAPTER NINE – References.....	128
9.1 Personal communication.....	132
APPENDICES.....	133
A1 Auger observations and pit locations.....	133
A2 Individual Soil dry bulk density results.....	134
A3 Raw and calculated data for saturated hydraulic conductivity.....	136
A4 Raw and calculated pressure plate.....	142
A5 Soil chemical analysis results.....	144
A6 Ranking tables for land evaluation.....	147

LIST OF FIGURES

Figure 2.1	Extent of the existing soil map.....	8
Figure 2.2	Geology of the Motueka and Riwaka Catchments	11
Figure 2.3	Climate summary of the region	12
Figure 2.4	Rainfall Isohyets for the study area.....	13
Figure 2.5	Intensive land use about Brooklyn, looking east along Old Mill Road.....	19
Figure 2.6	Land uses on the Motueka soil map area.....	21
Figure 3.1	Drainage classes for soil series classification.....	32
Figure 3.2	Soil depth for soil series classification.....	32
Figure 3.3	Typical soil profile development on river terraces.....	34
Figure 4.1	Typical relationship between soil texture and soil water content.....	45
Figure 4.2	Representation of soil water contents at Saturation, Field Capacity, Stress Point and Permanent Wilting point.....	46
Figure 5.1	Relative nutrient availability and pH relationships.....	53
Figure 5.2	Exchangeable K of sampled soils.....	60
Figure 5.3	Exchangeable Ca of sampled soils.....	61
Figure 5.4	Exchangeable Mg of sampled soils.....	62
Figure 5.5	Exchangeable Na of sampled soils.....	62
Figure 6.1	LUC units of the study area.....	72
Figure 6.2	Kiwifruit work calendar.....	74
Figure 7.1	Location of the Motueka soil map.....	86
Figure 7.2	Contrasting grass growth between Riwaka medium sand over gravel and Riwaka fine sand.....	93
Figure 7.3	A ploughed paddock of the Hau soil.....	109

LIST OF TABLES

Table 2.1	Land uses and distribution on differing soil series in the Motueka area.....	20
Table 4.1	Bulk Density of the Sampled Soils (g/cm^3).....	40
Table 4.2	Soil permeability classes.....	42
Table 4.3	Saturated soil hydraulic conductivity of sampled soils (mm h^{-1}).....	43
Table 4.4	Classification of profile readily available water.....	46
Table 4.5	Readily and total available water in sampled soils (mm).....	48
Table 5.1	Ratings for chemical properties of New Zealand Soils.....	51
Table 5.2	Optimum pH levels for crops.....	53
Table 5.3	pH values of sampled soils.....	54
Table 5.4	CEC of sampled soils ($\text{me}/100\text{g}$).....	55
Table 5.5	Base saturation of sampled soils (%).....	57
Table 5.6	Normal soil test potassium ranges ($\text{me}/100\text{g}$) for selected crops.....	58
Table 5.7	Exchangeable cations of sampled soils.....	60
Table 5.8	Normal Olsen P range ($\mu\text{g}/\text{ml}$) for selected crops.....	65
Table 5.9	Olsen P ($\mu\text{gP}/\text{g}$) and P retention (%) values for sampled soils.....	66
Table 5.10	Major oxide analyses on the subsoil of the sampled soils.....	68
Table 5.11	Trace element analyses on the subsoil of the sampled soils.....	68
Table 6.1	Climatic data for Te Puke.....	75
Table 6.2	Soil chemical requirements for kiwifruit.....	76
Table 6.3	Soil chemical requirements for blackcurrants.....	77
Table 6.4	Factor evaluation of selected crops to selected soils.....	79-80
Table 7.1	XRF major analyses of the subsoils of four key soils in the study area.....	87
Table 7.2	Climatic data for Riwaka.....	88
Table 7.3	Brief descriptions of the Riwaka soils.....	94
Table 7.4	Physical and chemical properties of the Riwaka soil.....	95
Table 7.5	Brief description of the Ferrer soils.....	98
Table 7.6	Physical and chemical properties of the Ferrer soils.....	99
Table 7.7	Brief description of the Umukuri soil.....	101
Table 7.8	Physical and chemical properties of the Umukuri soil.....	102
Table 7.9	Brief description of the Sherry soils.....	104
Table 7.10	Physical and chemical properties of the Sherry soil.....	105
Table 7.11	Land uses and distribution on differing soil series in the Motueka area.....	114

CHAPTER ONE

Introduction

Soil maps provide an insight into the distribution of soils within a selected area. Understanding this distribution is a significant benefit to land managers and others involved in land based decision making responsibilities. Soil is a very important and complex resource that can be easily damaged, but difficult, if not impossible to repair within the human time scale. Understanding the attributes and limitations of individual soil units therefore can assist in managing the soil resource.

While the identification of soils has been occurring for many thousands of years, the study of soils as an independent science is relatively new. The German scientist A. Fallou introduced the term 'pedology' in 1862 (Yaalon and Berkowicz, 1997), from which soil science has grown. Soil surveying was born in New Zealand in 1920 when Theodore Rigg together with J. Bruce carried out a survey of Waimea County.

Nationally, the coverage of New Zealand's soil resources is patchy. There are many publications between the scales of 1:1,000,000 and 1:50,000 that depict the distribution of soil from national through to regional scales. Soil publications at scales greater than 1:50,000 are rare. This is predominately due to the significantly higher costs and time involved with producing detailed maps. As land use and knowledge on the processes that contribute towards increasing production have intensified and increased, so has the need for such maps.

Soil maps for the Motueka area are currently inadequate for use by interested parties. The most detailed published soil map has a scale of 1:126,720 (Chittenden *et al.*, 1966).

Recently soil maps of various valleys within the region at scales as detailed as 1:15,000 have been rediscovered by the Tasman District Council (TDC), but lack accompanying documentation to enable their use. It is unknown who produced these maps that are no more than a sheet of paper with an unlabeled illustration. To utilise these assets it was recognised by Primary Solutions – an organisation set up to produce a Land Use Parameter Database for the Nelson Region - that documentation of these maps was needed. Jeremy Cooper (project co-ordinator of Primary Solutions) contacted Massey University on behalf of the TDC in an attempt to find personal who could undertake the documentation of the soil maps. This thesis was designed to meet this need.

1.1 Problem Statement

The TDC has various paper soil maps of the valleys within its region surveyed prior to 1951 but no documentation of the soil units. The TDC needs to know what each soil unit depicted on the map represents, and which soil units are significant for land use management decisions.

1.2 Aim

Produce a workable and meaningful soil map and supporting documents from detailed but poorly documented paper soil maps of the Motueka area.

1.3 Objectives

The objectives of this study are to:

1. ground truth the paper maps;
2. characterise soils on the paper map;
3. generalise the paper map where necessary;
4. create detailed soil map;
5. select four of the most extensive soils for detailed analysis;
6. provide recommendations; *and*
7. provide examples of applications of land evaluation.