

A LAND CAPABILITY STUDY OF THE SHIRE OF ROMSEY

June 1994

CENTRE FOR LAND PROTECTION RESEARCH

Technical Report No. 13

N.M. Baxter, G. Boyle and E. Jones

ISBN No. 0 7306 2610 5

ISSN No. 1038 216X

Land Protection Branch

Department of Conservation and Natural Resources

Further Information

This report has been prepared to assist broad scale planning in the Shire of Romsey. While the ratings indicate the likely performance of the various types of land for a specific use, site specific information may be required for on-site planning. The information in the report has been derived from air photo interpretation and a limited number of representative field sites. The scale of mapping adopted has necessitated some generalisations from the site information collected. The precision of mapped boundaries is affected by the scale of the map. Any enlargement of the map will distort information and cannot improve its accuracy.

Any queries in relation to the Land Capability Assessment process may be directed to the Centre for Land Protection Research, 22 Osborne Street, Bendigo, 3550, phone (054) 44 6777.

Baxter, N.M (Nathalie Marie), 1968-
A land capability study of the Shire of Romsey.

Bibliography
Includes index
ISBN 0 7306 2610 5

I. Land Use - Victoria - Romsey (Shire). I. Boyle, G. (Grant). II. Jones, E (Evan).
III. Romsey (Vic.: Shire) IV. Centre for Land Protection Research. V. Victoria,
Land Protection Branch. VI Title. (Series : Technical report (Centre for Land
Protection Research (Vic.)); no. 13).

333.7317099452

CONTENTS

PREFACE.....	1
SUMMARY	2
1. INTRODUCTION	4
1.1 Introduction	4
1.2 User's Guide	4
1.3 Location	5
1.4 Purpose of the study	6
1.5 Objectives	6
2. LAND CAPABILITY ASSESSMENT	7
2.1 Philosophy and principles	7
2.2 Land resource mapping - methodology and constraints.....	7
2.3 Assessment Procedure.....	7
2.4 Land Capability Rating Tables	8
3. LAND MANAGEMENT GUIDELINES	15
3.1 Management of land characteristics that influence land use.....	15
3.1.1 Soil texture	15
3.1.2 Boulders and rock outcrop	15
3.1.3 Depth to hard rock.....	15
3.1.4 Depth of top soil	15
3.1.5 Depth to seasonal, perched or permanent watertable.....	15
3.1.6 Dispersible clays	15
3.1.7 Flooding	16
3.1.8 Organic matter.....	16
3.1.9 Permeability.....	16
3.1.10 Plasticity Index	16
3.1.11 Linear shrinkage (shrink-swell potential)	16
3.1.12 Site drainage	16
3.1.13 Slope	17
3.1.14 Soil reaction.....	17
3.1.15 Stones and gravel	17
4. DETAILED MAP UNIT DESCRIPTIONS AND CAPABILITY RATINGS	18
5. PHYSICAL DESCRIPTION.....	115
5.1 Geology and Geomorphology	115
5.1.1 Sedimentary Gently Undulating Rises/Undulating Rises/Rolling Hills/Rolling Low Hills.....	117
5.1.2 Granodiorite Rolling Hills/Steep Hills.....	118
5.1.3 Granite Rolling Low Hills/Undulating Rises Steep Hills/Plateaux	118
5.1.4 Rhyodacite Steep Hills/Rolling Low Hills	118
5.1.5 Basalt Lava Plain/Undulating Low Hills/Rolling Hills/Steep Low Hills.....	119
5.1.6 Quaternary Volcanics Rolling Hills/Rolling Low Hills/Undulating Low Hills/Steep Hills.....	121
5.1.7 Sedimentary and Conglomerate Steep Hills/Rolling Low Hills	121
5.1.8 Alluvial terraces.....	122
5.1.9 Colluvial Fan Undulating Rises	122
5.2.1 Sedimentary Gently Undulating Rises/Undulating Rises/Rolling Low Hills/Steep Hills.....	123
5.2.2 Granodiorite Rolling Hills/Steep Hills.....	123
5.2.3 Granite Rolling Low Hills/Undulating Rises/Steep Hills/Plateaux	124
5.2.4 Rhyodacite Steep Hills/Rolling Low Hills	124
5.2.5 Basalt Lava Plain/Undulating Low Hills/Steep Low Hills.....	125
5.2.6 Quaternary Volcanic Rolling Hills/Rolling Low Hills/Undulating Low Hills/Steep Hills.....	125
5.2.7 Sedimentary and Conglomerate Steep Hills/Rolling Low Hills	126
5.2.8 Alluvial terraces.....	126
5.2.9 Colluvial fan undulating rises.....	126
5.3 Land systems.....	133
5.4 Land uses	136
5.4.1 Public Land	136
5.4.2 Forestry	136
5.4.3 Mining.....	136
5.4.4 Grazing.....	136
5.4.5 Cropping.....	136
5.4.6 Recreation.....	136
5.4.7 Residential Development	136
5.4.8 Intensive Horticulture.....	136
5.5 Land degradation: incidence and susceptibility	137
5.5.1 Dryland salinity	137
5.5.2 Sheet Erosion.....	137
5.5.3 Gully Erosion.....	137
5.5.4 Mass movement.....	139
5.5.5 Wind erosion	139
5.5.6 Soil structure decline.....	139

5.5.7 Soil acidification.....	139
5.6 Climate.....	140
5.6.1 Rainfall	140
5.6.2 Temperature.....	140
5.6.3 Length of growing season	141
5.7 Native vegetation	142
5.7.1 Sedimentary Gently Undulating Rises/Undulating Rises/Rolling Hills/ Rolling Low Hills	142
5.7.2 Granodiorite Rolling Hills/Steep Hills.....	142
5.7.3 Granite Rolling Low Hills/Undulating Rises/Steep Hills/Plateaux	142
5.7.4 Rhyodacite Steep Hills/Rolling Low Hills	142
5.7.5 Basalt Lava Plain/Undulating Low Hills/Rolling Hills/Steep Low Hills	142
5.7.6 Volcanic Rolling Hills/Rolling Low Hills/Undulating Low Hills/Steep Hills	143
5.7.7 Sedimentary and Conglomerate Steep Hills/Rolling Low Hills	143
5.7.8 Alluvial Terraces.....	143
5.7.9 Colluvial Fan Undulating Rises	143
5.8 Proclaimed water supply catchments.....	144
6. MOUNT WILLIAM RANGE	146
6.1 Introduction	146
6.2 Map unit description.....	146
6.3 Geology and Geomorphology	149
6.4 Soils	149
6.5 Land degradation.....	149
ACKNOWLEDGEMENTS.....	151
7. REFERENCES	152
GLOSSARY	184

LIST OF TABLES

Table 1 Summary of land capability classes	3
Table 2.1 Land Capability Classes for Effluent Disposal, Farm Dams and Building Foundations.....	9
Table 2.2 Land Capability Classes for Agriculture	10
Table 2.3 Land capability assessment for on-site effluent disposal	11
Table 2.4 Land capability assessment for earthen dams	12
Table 2.5 Land capability assessment for building foundations	13
Table 2.6 Land capability assessment for agriculture	14
Table 5.1 Geological history.....	115
Table 5.2 Simple types of erosion landform pattern characterised by relief and modal slope.....	116
Table 5.3 Comparisons of scale and detail in land inventory studies.....	133
Table 5.4 Mean monthly rainfall (mm) and number of rain days	140
Table 5.5 The mean maximum, minimum and average monthly temperatures (° C) for Macedon	140
Table A.2 Rating for top soil condition	155
Table A.3 The effects of soil salting on plant growth.....	156
Table A.4 Permeability characteristics of a soil profile	158
Table A.5 Index for permeability/rainfall.....	158
Table A.6 Susceptibility to gully erosion.....	159
Table A.7 Susceptibility to slope failure.....	160
Table A.9 Erodibility of topsoils	161

List of Figures

Figure 5.1 Sedimentary undulating rises occurring off the rolling low hills	116
Figure 5.2 Steep sedimentary hills.....	117
Figure 5.3 Outcropping boulders on granite crest.....	118
Figure 5.4 Basalt cone	119
Figure 5.5 Cultivation around areas of greater than 50% rock outcrop	119
Figure 5.6 Steep basalt slopes overlying sedimentary down cut to the creek terrace.....	120
Figure 5.7 Steep hills of the Kerrie Conglomerate	121
Figure 5.8 Sheet erosion on the on the steep sedimentary hills.....	138
Figure 5.9 Gully erosion on the sedimentary lithology	138
Figure 5.11 Average monthly rainfall and evapotranspiration for Macedon	141
Figure 5.12 Mount William 1 in background and Mount William 3 in foreground.....	149
Figure 5.13 Mount William 2	150

List of Plates

Plate 1 Yellow duplex soil (Dy3.11).....	127
Plate 2 Yellow duplex soil (Dy3.21).....	127

Plate 3 Yellow duplex soil (Dy3.41).....	127
Plate 4 Uniform silty clay (Uf4.3).....	127
Plate 5 Uniform clay loam (Um6.14)	128
Plate 6 Red duplex soil (Dr3.22)	128
Plate 7 Red duplex soil (Dr3.42)	128
Plate 8 Brown duplex soil (Db2.11).....	128
Plate 9 Yellow duplex soil (Dy3.11).....	129
Plate 10 Yellowish brown gradational soil (Gn4.51).....	129
Plate 11 Dark reddish brown gradational soil (Gn3.11).....	129
Plate 12 Yellow duplex soil (Dy2.3).....	129
Plate 13 Dark duplex soil (Dd1.12)	130
Plate 14 Brown duplex soil (Db1.12).....	130
Plate 15 Brown duplex soil (Db1.12).....	130
Plate 16 Dark gradational soil (Gn4.42)	130
Plate 17 Uniform silty loam (Um1.14).....	131
Plate 18 Uniform silty loam (Um1.44).....	131
Plate 19 Yellowish red gradational soil (Gn3.51)	131
Plate 20 Dark duplex soil (Dd2.21)	131
Plate 21 Yellow duplex soil (Dy3.41).....	132

Appendices

APPENDIX A NOTES TO ACCOMPANY LAND CAPABILITY RATING TABLES.....	154
A.1 Total amount of water available to plants	154
A.2 Bearing capacity	154
A.3 Coarse fragment sizes.....	154
A.4 Linear Shrinkage	154
A.5 Condition of the topsoil	154
A.6 Depth to hard rock or impermeable layer.....	155
A.7 Depth to seasonal watertable	155
A.8 Depth of topsoil.....	156
A.9 Dispersibility	156
A.11 Electrical conductivity	156
A.12 Flooding risk	156
A.13 Length of the growing season.....	157
A.14 Number. of months per year when average daily rainfall > K_{sat}	157
A.15 Permeability of a soil profile (K_{sat}).....	157
A.16 Index for permeability - rainfall.....	157
A.17 Rock outcrop	158
A.18 Slope	158
A.19 Susceptibility to gully erosion.....	158
A.20 Susceptibility to slope failure	159
A.21 Susceptibility to sheet and rill erosion by water	160
A.22 Suitability of subsoil	160
A.23 Susceptibility to erosion by wind	162
APPENDIX B WORKING TABLES FOR LAND CAPABILITY CLASSES.....	163
B1 Farm Dams.....	163
B3 Building Foundations, i) slab ii) stumps	170
B3 Building Foundations, i) slab ii) stumps	171
B.4 Agriculture	172
B.4 Agriculture	173
B.4 Agriculture	174
APPENDIX C SPECIFIC METHODOLOGY	175
C.1 Map Unit Determination.....	175
C.2 Field Observations.....	175
C.3 Field Tests.....	175
C.4 Laboratory Analysis.....	175
C.4.1 Physical Properties.....	175
C.4.2 Chemical Properties	176
APPENDIX D PHYSICAL AND CHEMICAL LABORATORY RESULTS	178
APPENDIX E. CRITERIA USED FOR ESTABLISHING RECHARGE VALUES.....	182