DEPARTMENT OF
PRIMARY INDUSTRIES

A land resource assessment of the Corangamite region

Primary Industries Research Victoria – Bendigo
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The Place To Be

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Salinity & Water
AUSTRALIA

CORANGAMITE CATCHMENT
MANAGEMENT AUTHORITY

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Summary

Soil provides the basis for our agricultural production, acts as a buffer against environmental pollution, is a repository for wastes, and forms the hydrological interface between rainfall, runoff, recharge, groundwater storage and streamflow. Soil is therefore pivotal in the provision of fundamental ecosystem services. Land use and land management choices rely on this versatility of soil but can also compromise these services if land is inappropriately managed. Protection, maintenance and enhancement of soil quality are the foundations for sound environmental management and necessitate knowledge of soil differences. Land resource assessment, which provides the understanding of the variety of soils and their relationships in the landscape, is an essential tool for any land use activity, from agriculture to waste disposal.

This 1:100 000 scale land resource assessment (LRA) project for the Corangamite Catchment Management Authority (CCMA) region was commissioned to provide consistent land resource information across the region. This information will improve the platform from which policy and strategies (e.g. Corangamite Regional Catchment Strategy, Corangamite Soil Health Strategy) can be developed with a future emphasis on research into sustainable farming systems, target setting and program development at a regional scale.

The primary objectives of the LRA project were:

- To undertake an inventory of soils and landforms to establish a continuous spatial dataset for the CCMA region. As the first consolidated dataset of this type for the region, the information from the soil point data and the spatial mapping will become key datasets for input into catchment and natural resource modelling applications.
- To provide land degradation hazard susceptibility information to identify potential on-site and off-site impacts to underpin decision making regarding current and future land use.
- To provide information that will enable future land capability assessment for the catchment, designed to attract investors to the region and to ensure that investment takes place in areas where there is low economic and environmental risk.
- To increase the efficiency and effectiveness of natural resource utilisation in the region.
- To provide specialist land resource assessment (LRA) training to Catchment and Agricultural Services (CAS) staff and other stakeholders.

The data and information derived from this project can be used for spatial analysis of future landscapes (possibly for condition, classification or resource definition), as well as identifying land management issues including land hazards, land capability, soil decline, natural assets (e.g. soil and soil ecosystems). This information, in combination with modelling to identify areas of risk, can support priority setting for initiatives, programs or policies to manage land use change. This report provides a consistent soil-landform dataset that will assist future opportunities to develop sustainable primary production (farming systems), processing enterprises and maintain ecosystem services within this region.

As the use of this information by stakeholders and community is recognised as important, the data has been made available on CD-ROM. This allows easy access to the information via Adobe Acrobat Reader and enables the user to print maps, land unit information and the report text.

In presenting this report, the authors would like to emphasise three points:

- That the report and information products generated by this project be available at regional locations to enable stakeholder and community access.
- That assessment of future land use change should be carried out with respect to hydrological processes such as salinity recharge and discharge, groundwater and surface water availability for irrigation, and surface water quality impacts. Such assessment would utilise the soil-landform mapping as a basis for scenario modelling.
- That stakeholders and the community be directed to the Victorian Resources Online website (www.dpi.vic.gov.au/vro) and Victorian Catchment Indicators Online (www.dpi.vic.gov.au/vcio) for additional information on land and water resources in the CCMA region.

The CCMA region encompasses almost 13 350 km^2 of south-western Victoria, including the Central Highlands, the Western Plains, the Otway Ranges and the Bellarine Peninsula, as well as a suite of major rivers that occur throughout the region (Barwon, Moorabool, Yarrowee–Leigh, Gellibrand and Curdies). The region has experienced an increase in agricultural intensification, especially dairy, grazing and cropping systems, and other forms of agricultural enterprise (CCMA 2002). A marked growth in tourism and recreation are factors that also need to be considered in future natural resource allocation decisions.

The nominal scale recommended for use of this spatial dataset and soil-landform inventory is 1:100 000. This is appropriate for broadscale assessment of land capability and regional planning. Local government may find the data strategically useful, but finer resolution mapping, particularly of map unit boundaries, is recommended for reconciliation with local government planning scale (1:40 000). The soil inventory—soil descriptions and associated chemical data—may be used to inform future mapping at finer scale (farm planning for example). This report draws substantially on earlier geology mapping and soil surveys, in particular those of Maher and Martin (1987) and Pitt (1981), as well as site investigations for the dairy industry, Southern Farming Systems, south-west gas pipeline and regional extension activities.

Map units and boundaries published in the earlier surveys have been modified to reflect the new geomorphic framework for Victoria. This framework is hierarchical and is based on a top-down approach to landscape analysis and includes at the highest level the three geomorphic divisions: the Western Uplands, Southern Uplands, and Western Plains. Progressive subdivisions of these units have been made in this study, with the resultant 1:100 000 soil-landform map units forming a fourth tier in the hierarchy.

The region has been divided into over 200 soil-landform units, and, for each of these, the principal land elements have also been described and presented in a series of tables. In spite of the variety and complexity of the plains and uplands, there are many features of the region's soils that are held in common, regardless of the parent material from which they have been developed (otherwise known as Corangamite Soil Groups).

Interpretation of the regional soil and land qualities that affect susceptibility to different forms of land degradation has been used to generate maps of land degradation hazard. These maps do not represent current land condition or actual land degradation.

The inventory has enabled a production of inherent land degradation susceptibility maps for the project that include:

- mass movement
- gully and tunnel erosion
- sheet and rill erosion
- wind erosion
- soil structure decline
- waterlogging.

The land degradation analysis has indicated that there are substantial areas at risk from land and water degradation in the CCMA region. The following table provides a breakdown of the area (given in hectares and as a percentage) into different risk categories for the above land and water degradation themes.

Hazard	High and Very High		Moderate		Low and Very Low	
	(ha)	(%)	(ha)	(%)	(ha)	(%)
Sheet and rill erosion	366 000	27.4	609 600	45.7	300 800	22.5
Gully and tunnel erosion	425 000	31.8	403 200	30.2	448 200	33.6
Mass movement (landslides)	353 300	26.5	87 900	6.6	835 200	62.6
Wind erosion	163 900	12.3	576 300	43.1	536 100	40.2
Waterlogging	697 300	52.2	431 600	32.3	147 400	11.0
Soil structure decline	798 600	59.8	407 100	30.5	70 700	5.3

In the CCMA region, it is apparent that particular soil-landform units are naturally prone to land and water degradation and the following generalisations can be made. The Otway Range and Heytesbury areas are particularly susceptible to mass movement. Granites at Lismore and Mount Kinross, and dissected ranges in the Otways are especially vulnerable to gully and tunnel erosion. Swamps, drainage floors and lowlands of the Western Plains, and slopes of the Heytesbury area suffer from waterlogging. Coastal dunes and sedimentary plains are susceptible to wind erosion. The Western Highlands and Otway Range are potentially highly susceptible to sheet and rill erosion; while the sedimentary Western Plains, Heytesbury and dissected low hills of the Otway Range are particularly susceptible to a decline in soil structure.

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