PART C: DISCUSSION

The previous sections of the report have described in broad terms, the biophysical nature of the land in the study area. The aim of this section is to expand some of the concepts that ere introduced, and indicate possible avenues for further work in the study area.

Geomorphic processes

An understanding of the geomorphic evolution of the landscape may help to explain many features of the land in the study area.

The land at various times has been subjected to numerous geomorphic processes – for example, uplift, folding and tilting, erosion, weathering, magma intrusion and extrusion and deposition. The culmination of these past processes is the present landscape and its natural characteristics.

Soils, soil parent materials, landscapes and even vegetation communities that developed under ancient conditions may persist into the present, even if present conditions are now conducive to their development. A few examples of relict soils and landforms, both postulated and proved, that occur in the Loddon River Study area are listed below:

Weathered parent material

Areas of deeply weathered parent material – the result of past, more-intensive weathering conditions – persist, particularly on granitic and sedimentary rocks in the northern and central parts. These areas are characterised by one or more of the following features:

- an uppermost lateritised (iron-rich) and/or silicified (silica-rich) zone
- a mottled zone (white kaolinitic clay with red sesquioxide mottles)
- a lowermost pallid zone (bleached zone of white kaolinitic clay)

The lateritised and/or silicified layer still persists in some places. Notable examples are those areas that support mallee vegetation in the Whipstick north of Bendigo and in the Inglewood-Wedderburn region and various remnants of Tertiary gravels through the study area, particularly the flat-topped cappings over weathered granite near Murphys Creek.

A number of other localities also exhibit high degrees of bedrock weathering, but the lateritic layer, if ever present, is now removed. These include undulating to hilly terrain on sedimentary rocks south of Creswick and south of the Daylesford-Glenlyon road, various examples of gentle sedimentary and granitic terrain in the north adjacent to the riverine plain and numerous remnants of Tertiary gravels scattered throughout the study area.

The weathered areas in the south are probably remnants of a pre-Older Volcanic surface back to the early Tertiary (Jenkin 1976). The deeply weathered profiles usually contain substantial stores of salt and the areas with deep weathering are often significant factors in the salinisation problem in many parts of the catchment.

Landforms

The original, almost-level surface of the Tertiary lava flows still persists relatively unchanged in parts of the central and southern areas. For example, between Guildford and Glenlyon along the Loddon River, dissection has removed much of the original flow, leaving numerous small, flat-topped erosion, remain largely unchanged in form since their eruption in the late Tertiary.

The gentle sedimentary terrain south of the Daylesford-Glenlyon road, already noted for the high degree of bedrock weathering probably reflects the landscape prior to the lava extrusion. The resistant lava flows to the north have restricted stream dissection by creating a locally raised erosional base-level, preserving an undulating landscape upstream. In a few places, where the north falls occur, such as Sailors Falls near Daylesford and Loddon Falls near Glenlyon. Downstream of the basalts the streams have dissected steep valleys into the softer sedimentary rocks.

Soil age

There is evidence of soils of different ages occurring throughout the study area, most notably on basalt. J. Rowan (pers comm.) considers that the deeper soils with mottled subsoils in the south of the study area are stumps of an older soil, which was once prevalent throughout central Victoria, and that nearby shallower non-mottled soils are a more recent development formed since the erosional removal of the older mottled soil mantle. He gives the names Carlsruhe and Tullaroop pedoperms has been made in this survey to substantiate these ideas.

Land deterioration

Many forms of deterioration – for example, gully erosion – are obvious and easily monitored. Other forms, which may also be significant, are not so readily detected. Soil compaction and surface sealing, for example, may not have significant influence on crop and pasture production as well as affecting the quantities of erosive run-off. An indication of the probable susceptibility of each land unit to various forms of deterioration is given in that land unit's description. These assessments, however, are made on limited field observations and the actual effect of land deterioration on short-and long-term productivity is a question that requires considerable research effort. Research is also required to develop appropriate land management techniques required to satisfactorily use area prone to land deterioration.

The land is under continual pressure to satisfy our needs. Many of our society's demands are conflicting, and it is important to reach a satisfactory compromise that does not cause ling-term degradation of the land resource.

The increasing trend towards small lots and hobby farms nearer the major population centres, especially within 100 km of Melbourne, brings attendant problems, including siting of roads and septic effluent disposal.

Inappropriate agricultural land use can have adverse effects on major water supplies – for example, when eroded soil material, agricultural chemicals or fertilisers or waste effluent enter the water supply. Inappropriate clearing or operations in forested catchments can also have undesired effects.

The incidence of salting throughout the catchment had increased dramatically in the last few decades, and is likely to continue to increase. Research is currently being conducted in a few areas in an attempt to determine the mechanism of salting and to recommend land management practices that may control or reduce the problem.

Soil acidification, especially in higher-rainfall areas under leguminous pastures is a problem which could increase in importance in future years. The extent of the current problem is not known.

Land unit complexity

In most parts of the study area, soils, geology, climate and position in landscape are clearly interrelated, and their relationships can be presented at a reconnaissance level. Other parts, however, are inherently complex, and their soil-landscape associations are not readily apparent. The plains and slopes on basalt fall into this category. An increased level of fieldworking and mapping, beyond the scale of the present survey, is required to accurately characterise these areas.

Further research

The choice of sites for further, more detailed research will depend largely on government priorities determined by actual or perceived community needs. Potential topics for further study include:

- The effect of land management on the various processes of land deterioration – for example, salting, sheet and gully erosion by water, and wind erosion
- The suitability of the land for various forms of land development: likely developments are urban and rural subdivision, especially near population centres.
- The likely effect of a change in land use or management brought by the availability of new technology or by changing economic conditions.