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**An Evaluation of the Gerangamete Catchment
Management Plan Using the Safe Minimum Standard**

By

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of Economics**

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Declaration

I certify that the substance of this dissertation has not already been submitted for any degree and is not currently being submitted for any other degree.

I certify that, to the best of my knowledge, any help received in preparing this dissertation, and all resources used have been acknowledged.

Any omissions or errors are entirely the responsibility of the author.

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Abstract

In this study an evaluation of the catchment management plan for the Gerangamete catchment is undertaken. This catchment suffers from dryland salinity which is a result of current land use practices, and can only be solved by changing those practices. Current methods of land use evaluation have been criticised for their inflexibility and lack of attention to costs (both private and social) associated with particular land use activities. These deficiencies can limit the usefulness of land evaluation procedures for defining land capability and suitability for farm and regional land use planning for salinity control. In this study a method is outlined, which is based on incorporating deterministic spreadsheet modelling and risk analysis using simulation modelling which overcomes some of these deficiencies. The technique integrates biophysical and economic data in a measure which can be readily computed, updated and communicated to land managers.

Deterministic cashflow analysis and risk simulation is applied to a hydrogeological model of a catchment in south west Victoria to determine the viability of a proposed catchment management plan. The safe minimum standard is discussed in terms of a lottery and as an insurance game and the minimax principle is posed as a decision criterion for evaluation of the proposed catchment management plan. The net priced cost of the catchment management plan is compared with the unpriced benefits of avoiding salinity.

The derived decision matrix demonstrates the economic advantage of implementing the proposed catchment management plan. The welfare gap, as measured by differences in the net present value of economic returns to the catchment under the catchment plan (optimal land use) versus an uncontrolled situation, is not trivial. From the results and the sensitivity analysis, evidence is provided to conclude that the benefits of implementing the catchment plan outweigh the costs associated with salinity under current land use practices. Thus, it is recommended that the catchment management plan should be adopted. From the sensitivity analysis the assumptions about the existing area of salt affected land and the spread of salinity, *vis-a-vis* their impact on the shape of the returns function, and the benefits of planting trees are particularly critical with respect to the magnitude of benefits achievable by implementing the catchment management plan.

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