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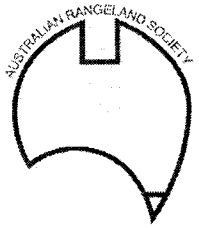

The Australian Rangeland Society

RESTORELAND, A DECISION SUPPORT SYSTEM FOR RANGELAND REHABILITATION

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INTRODUCTION

Extensive areas of Australia's semi-arid and arid grazing lands have been degraded. The present extent and seriousness of rangeland degradation is not precisely known because there is no simple, inexpensive and unequivocal way to define and measure it, but one recent estimate of the extent of the problem is that up to one third of all rangelands are affected (1). Some techniques for rehabilitating these degraded lands are available, for example, prescribed fire can be used to control dense shrubs thereby improving conditions for pasture production and in turn soil productive potential (2). However, there is no system for evaluating when and where restoration should take place and for choosing what is the most cost-effective treatment.

DECISION SUPPORT SYSTEMS

Decisions on whether, when, and how to use restoration techniques involves the consideration of many complex and inter-connected issues. The best way to guide advisers and pastoralists through these issues is by using a decision support system (DSS). Such systems contain expertise of researchers, experienced field advisors and pastoralists. For example, a DSS called SHRUBKILL has been developed to provide advice on the use of prescribed fire to control dense shrubs in degraded rangelands (3). This DSS is being used by extension personnel for consultations with pastoralists, and by new personnel to learn about the use of fire as a management tool.

The aim is to synthesize currently available information and data on rangeland restoration into a microcomputer-based DSS or advisory program called RESTORELAND. This advisory system will strongly complement PADDOCKPLAN, a module of RANGEPACK currently being developed by the CSIRO rangelands group at Alice Springs. RESTORELAND, by contrast, provides advice on how to restore a paddock that is already degraded. Another aim will be to promote the extension of RESTORELAND to field officers, pastoralists, land care groups, and agribusiness consultants.

STRUCTURE

The RESTORELAND DSS is modular and hierarchical (Fig. 1). The main program guides the rangeland adviser or manager through a problem definition module which asks a series of questions to precisely define the degradation problem.

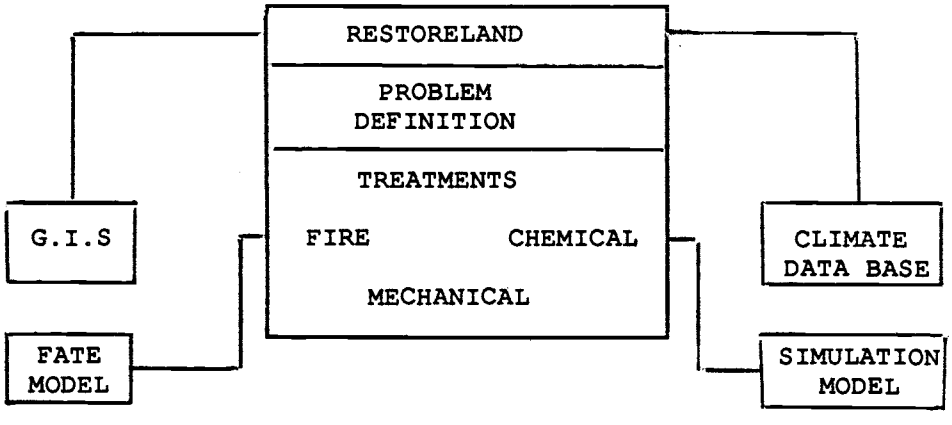

Figure 1. Structure of the RESTORELAND Decision Support System and its connections to other data bases and models.

Then, given the situation specified, the appropriate modules are used to provide advice relevant to restoration techniques, including a prediction of the likelihood of success of these restoration techniques. RESTORELAND modules may require inputs from geographic information systems and a climatic data-bases. It also requires long-term predictions of shrub and grass population dynamics and estimates of pasture, animal and economic production. These predictions of population dynamics will be obtained from a modified version of a model called FATE, an acronym for Functional Attributes in Terrestrial Ecosystems (4). Estimates of production will be derived from microcomputer-based simulation models.

An advisory body comprising pastoralists and extension personnel (from Agricultural and Soil Conservation Services) will initially provide expert information and advice for the development of the first version of the RESTORELAND DSS. RESTORELAND will incorporate this expert information, together with published information, and the results of experiments. The advisory body will subsequently evaluate later versions and will provide an ongoing assessment of this research project, in general.

SUMMARY

A microcomputer-based DSS, called RESTORELAND, provides expert advice on the application of cost-effective management technologies to rehabilitate degraded rangelands. Expert information from experienced pastoralists, land care committees, extension officers and scientists, and from publications, is incorporated within RESTORELAND. An early version of this DSS will be demonstrated; later versions will include results from new experiments and projects on rangeland rehabilitation.

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