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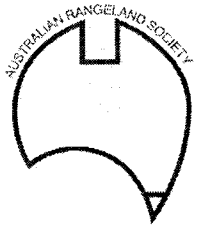

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DEVELOPMENT OF AN OPERATIONAL METHOD FOR ESTIMATING GROUND-COVER IN RANGELANDS USING LANDSAT TM SATELLITE IMAGERY

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INTRODUCTION

Concern has been raised over the condition of grazed lands in Queensland by various researchers (e.g. Miles, 1991; Tothill and Gillies, 1992; Rogers *et al*, 1999). A limitation of some past assessments of land condition is that they have been subjective. There is a need for objective monitoring of land condition and trend at a range of scales, including property, regional and statewide levels. This need is also supported by current state priorities such as the discussion paper on the management of rural leasehold land in Queensland (Department of Natural Resources and Mines, 2001). This discussion paper has identified that high quality and timely information on land condition and trends is an integral component of natural resource planning and management of Queensland's vast leasehold estate.

BACKGROUND

Ground-cover is functionally related to several important ecological processes such as soil surface stability and soil erosion. As such, it is one of the key indicators of land condition in semi-arid grazing lands (Taube *et al.* 2001). A pilot study using a single Landsat Thematic Mapper (TM) scene in North Queensland developed a method to estimate ground-cover on lighter soils, which is accurate over time and space for semi-arid rangelands of relatively low tree density (Taube 1999, 2000).

The Department of Natural Resources and Mines Statewide Landcover and Trees study (SLATS) project was initiated to monitor woody vegetation and landuse in Queensland (Danaher *et al* 1998). As a result of this project, statewide Landsat TM imagery is available for the periods, 1988, 1991, 1995, 1997, 1999 and 2001, with future statewide acquisitions planned on a biannual basis. This image archive, together with the existing computing infrastructure, enables statewide ground-cover analyses to be undertaken at a relatively minimal cost.

CURRENT FOCUS

The Climate Impacts and Natural Resource Systems (CINRS) group is undertaking further research into the application of the method described in Taube (2000) to other soil types and bio-regions across the State, with field data collection and image analysis currently underway. Image stratification of different land/soil types is essential prior to ground-cover estimation. Methods of Landsat TM scene stratification by soil brightness and colour are also being investigated in order to facilitate the development and testing of ground cover indices for different soil types.

In conjunction with the field work and image analysis, a highly automated image processing system is being developed that will allow newly acquired statewide Landsat imagery to be used to produce soil mapping and ground-cover information. This will enable the timely distribution of land condition maps and summaries to a variety of stakeholders (land managers, extension officers, Landcare groups, government bodies) using tools such as 'webGIS', delivered via the existing Long Paddock website. The provision of spatially explicit information on land condition and trend will allow the Department of Natural Resources and Mines to monitor the condition of leasehold lands, and provide other stakeholders with information to aid risk assessment, decision making and assist in the sustainable management of rangelands.

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