

Grazing Capacity of Native Pastures
in the Mulga Lands of
South-Western Queensland:
A Modelling Approach.

Peter William Johnston
B. Agr. Sc. (Hons.I),
University of Queensland 1984

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Brisbane, Queensland, Australia
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DECLARATION OF ORIGINALITY

This thesis reports the original research work of the author, except where acknowledged in the text. The material has not been submitted, either in whole or in part for a degree at this or any other University.

Peter W. Johnston

44 Hunter St Charleville Q 4470

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ABSTRACT

Grazing capacities for individual sheep properties were estimated and related to sustainable levels of pasture utilisation through the measurement of key plant processes and the extrapolation of these over time and space.

Measurements of forage production from dominant land systems in south-west Queensland Australia were used to calibrate the GRASP forage production model. This model uses daily climatic records and links a soil water balance to forage growth via a water use efficiency (transpiration) characteristic for each forage. From short term, point observations of forage growth, historical climatic records were used to examine the temporal and spatial variation in water use efficiency (kg/ha/mm rainfall). "Average" water use efficiencies and historical rainfall records were then used to estimate average annual forage growth and "safe" long term grazing capacities for individual grazing properties.

Combining actual stock, climatic and land condition data enabled the estimation of real-time forage growth and utilisation for 46 properties for the period 1986 to 1989. Estimates of annual forage utilisation (5-95%) by sheep and cattle on these properties were compared to known "safe" levels of utilisation (15-25%). These were derived from the combined experience of (1) re-analysis of the results of grazing trials, (2) reaching a consensus on local knowledge and (3) examination of existing grazing practice on "benchmark" grazing properties.

If land managers and administrators used such an ecological approach to assess grazing capacity, improved land management practices may follow as a result of more informed decision making. This thesis quantifies the key ecological relationships in a practical model for estimating the grazing capacity of individual properties in south-west Queensland. When used in a spreadsheet or as a series of manual calculations, "safe" grazing capacities for individual properties and paddocks were estimated by both land managers and administrators. Land managers evaluating the model recommended that the "various relevant bodies and particularly the grazing industry accept the methodology for estimating the grazing capacities in the Mulga lands of south-west Queensland". Through application of such an approach, our understanding of the risks associated with grazing in south-west Queensland, and our ability to "safely" utilise the resource will be improved

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