

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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## 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*

## TABLE OF CONTENTS

|  |      |
|--|------|
| Declaration of originality   | ii   |
| Acknowledgments  | iii  |
| Abstract   | iv   |
| Table of Contents  | v    |
| List of Figures  | viii |
| List of Tables   | xiii |
| Chapter 1.0 <u>INTRODUCTION</u>  | 1    |
| Chapter 2.0 <u>REVIEW OF LITERATURE AND DEVELOPMENT OF A SYSTEMS ANALYSIS</u>  | 3    |
| 2.1 Significance and characteristics of the Mulga zone   | 3    |
| 2.1.1 Current land use and productivity  | 3    |
| 2.1.2 Significance of native pastures  | 5    |
| 2.1.3 Climate  | 5    |
| 2.1.4 Soils  | 8    |
| 2.1.5 Vegetation   | 8    |
| 2.2 Grazing management, stocking theory and pasture utilisation  | 9    |
| 2.2.1 Definitions  | 9    |
| 2.2.2 Stocking theory  | 11   |
| 2.3 Plant growth and net primary productivity  | 15   |
| 2.4 Role of system analyses and computer modelling in understanding pasture productivity, grazing theory and decision making processes | 16   |
| 2.5 Modelling pasture productivity using the GRASP model   | 18   |
| 2.6 Conclusions  | 19   |
| Chapter 3.0 <u>PRIMARY PRODUCTIVITY OF NATIVE PASTURES</u>   | 21   |
| 3.1 Introduction   | 21   |
| 3.2 Materials and methods  | 21   |
| 3.2.1 Plant sampling and analysis  | 22   |
| 3.2.2 Soil sampling, analysis and additional data sources  | 24   |
| 3.2.3 Climatic data  | 24   |
| 3.3 Results of primary productivity experiments  | 24   |
| 3.3.1 Weather conditions during observation periods  | 24   |
| 3.3.2 Pasture yields and growth patterns   | 28   |
| 3.3.3 Comparisons between sites  | 35   |
| 3.3.4 Nitrogen uptake  | 39   |
| 3.3.5 Soil moisture, evapo-transpiration and water use efficiency  | 40   |
| 3.4 Discussion   | 41   |
| 3.4.1 Pasture yield  | 41   |
| 3.4.2 Water use efficiency   | 43   |
| 3.4.3 Nitrogen uptake and dilution   | 44   |
| 3.4.4 Conclusion   | 45   |
| Chapter 4.0 <u>MODELLING PRIMARY PRODUCTIVITY USING THE GRASP MODEL</u>  | 46   |
| 4.1 Introduction   | 46   |
| 4.2 Materials and methods  | 46   |
| 4.2.1 Description of the GRASP model   | 46   |
| 4.2.2 Calibrating the GRASP model to south-west Queensland   | 46   |
| 4.2.3 Validation of the GRASP model with independent data from south-west Queensland   | 47   |

|  |     |
|--|-----|
| 4.2.4 Extrapolation of model results over time and space                         | 47  |
| 4.3 Results  | 49  |
| 4.3.1 Calibration  | 49  |
| 4.3.1.1 Biddenham - Mitchell grass   | 52  |
| 4.3.1.2 Mulga Site - Mulga grasses   | 55  |
| 4.3.1.3 Airlie - Mitchell grass  | 55  |
| 4.3.1.4 Lisnalee - Buffel grass  | 57  |
| 4.3.1.5 Maxvale - Mulga grasses  | 58  |
| 4.3.1.6 Turn Turn - Mulga grasses  | 59  |
| 4.3.1.7 Wittenburra - Mulga grasses  | 60  |
| 4.3.1.8 Wongalee - Spinifex  | 63  |
| 4.3.2 Validation   | 64  |
| 4.3.2.1 Arabella - Mulga pasture   | 64  |
| 4.3.2.2 Charleville - Mulga pasture  | 67  |
| 4.3.2.3 Louth - Mulga pasture  | 69  |
| 4.3.2.4 Charleville - Mitchell grass   | 69  |
| 4.3.2.5 Burenda - Mitchell grass   | 70  |
| 4.3.2.6 Burenda - Mitchell grass   | 71  |
| 4.3.3 Extrapolation over time and space  | 73  |
| 4.4 Discussion   | 80  |
| 4.4.1 Calibration of the GRASP model   | 80  |
| 4.4.2 Validation of the GRASP model  | 81  |
| 4.4.3 Extrapolation of the GRASP model   | 82  |
| 4.4.4 Conclusion or "Were the modelling objectives met"?                         | 84  |
| Chapter 5.0 <u>A QUANTIFIED APPROACH TO ESTIMATING "SAFE" GRAZING CAPACITIES</u> | 85  |
| 5.1 Introduction   | 85  |
| 5.2 Model development  | 85  |
| 5.2.1 Land system area   | 86  |
| 5.2.2 Intake   | 86  |
| 5.2.3 Forage grown   | 87  |
| 5.2.3.1 Estimation of standard rainfall use efficiencies for land systems        | 87  |
| 5.2.3.2 Estimating the spatial variability in VPD                                | 90  |
| 5.2.3.3 Estimating the impact of trees and shrubs                                | 91  |
| 5.2.3.3.1 Estimating the spatial distribution of trees                           | 95  |
| 5.2.3.4 Estimating dietary mulga leaf  | 96  |
| 5.2.4 "Safe" level of forage utilisation   | 96  |
| 5.2.4.1 Analysis of grazing trials   | 97  |
| 5.2.4.2 Consensus data   | 98  |
| 5.2.4.3 Selected benchmark properties and grazier experience                     | 99  |
| 5.3 Estimating a grazing capacity  | 101 |
| 5.4 Sensitivity analysis   | 103 |
| 5.5 Estimating grazing capacities on 46 individual properties                    | 104 |
| 5.5.1 Forage utilisation in south-west Queensland                                | 104 |
| 5.5.2 Comparison of stocking rate and calculated grazing capacity                | 107 |
| 5.6 Discussion   | 108 |
| 5.7 Conclusions  | 112 |

|   |            |
|---|------------|
| Chapter 6.0 <u>APPLICATION AND EVALUATION OF A "SAFE" GRAZING CAPACITY MODEL</u>  | <b>113</b> |
| 6.1 Introduction  | <b>113</b> |
| 6.2 Materials and methods   | <b>114</b> |
| 6.2.1 Selection of appropriate methodology  | <b>114</b> |
| 6.2.2 Selection and roles of grazier consultants  | <b>115</b> |
| 6.2.3 Packaging the methodology and consultant training   | <b>115</b> |
| 6.3 Results   | <b>117</b> |
| 6.3.1 Training evaluation   | <b>117</b> |
| 6.3.1.1 The learning process  | <b>117</b> |
| 6.3.1.2 Grazier observations regarding the methodology  | <b>117</b> |
| 6.3.1.3 Scientific insights gained through grazier participation  | <b>118</b> |
| 6.3.2 Property assessments  | <b>118</b> |
| 6.3.2.1 Land systems and land condition   | <b>119</b> |
| 6.3.2.2 Grazing capacity comparisons  | <b>119</b> |
| 6.4 Discussion  | <b>122</b> |
| 6.4.1 Graziers as consultants and the scientific insights gained  | <b>122</b> |
| 6.4.2 Land condition  | <b>123</b> |
| 6.4.3 Comparison of grazing capacities  | <b>124</b> |
| 6.4.3.1 Ratio of owner assessed grazing capacity to calculated "safe" grazing capacities  | <b>124</b> |
| 6.4.3.2 Ratio of owner assessed grazing capacity to Department of Lands rated carrying capacities   | <b>124</b> |
| 6.4.3.3 Ratio of Department of Lands rated carrying capacity to the calculated "safe" grazing capacity  | <b>125</b> |
| 6.4.4 Grazing capacities at a practical scale   | <b>125</b> |
| 6.5 Conclusions   | <b>126</b> |
| Chapter 7.0 <u>CLOSING DISCUSSION AND CONCLUSIONS</u>   | <b>127</b> |
| Chapter 8.0 <u>APPENDICES</u>   | <b>130</b> |
| Appendix 1. Plot layout and direction of sampling fronts for yield and soil moisture at sites 1 and 2 from October 1986 to November 1987  | <b>130</b> |
| Appendix 2. Plot layout and direction of sampling fronts for yield and soil moisture at sites 3 to 9 from October 1988 to November 1990.  | <b>131</b> |
| Appendix 3. Detailed results of native pasture primary productivity experiments.  | <b>132</b> |
| Appendix 4. Average proportion of soil moisture in top half of the profile (where complete profiles were available) for nine sites in south-west Queensland.  | <b>140</b> |
| Appendix 5. Structure and operation of the GRASP model.   | <b>141</b> |
| Appendix 6. Default parameter file used as input to the GRASP forage production model.  | <b>143</b> |
| Appendix 7. Diaries describing steps taken to calibrate the GRASP model to individual sites.  | <b>148</b> |
| Appendix 8. Observed and predicted green cover (%) of pasture from nine native pasture primary productivity sites in south-west Queensland.   | <b>166</b> |
| Appendix 9. Detailed annual rainfall, tree and shrub foliage projected canopy cover for 77 land systems (Dawson 1974 and Mills and Lee 1990) encountered in the assessment of 20 grazing properties in south-west Queensland. | <b>169</b> |
| Appendix 10. Recent validation of the GRASP model to independent data in south-west Queensland  | <b>173</b> |
| Chapter 9.0 <u>REFERENCES</u>   | <b>176</b> |

## List of Figures

|                    |  |           |
|--------------------|--|-----------|
| <b>Figure 2.1</b>  | Location of the semi-arid zone (dashed line represents the 500 mm average annual rainfall isohyet) and the mulga lands in Queensland (solid line).   | <b>3</b>  |
| <b>Figure 2.2</b>  | Declared drought periods for nine south-west Queensland shires from 1964 to 1994 (Queensland Department of Primary Industries).  | <b>6</b>  |
| <b>Figure 3.1</b>  | Location (+) of the nine sites for primary productivity measurements on native pastures in south-west Queensland during the period October 1986 to November 1990.  | <b>21</b> |
| <b>Figure 3.2</b>  | Monthly (vertical lines) and long-term median monthly (continuous line) rainfall at the Biddenham and Charleville native pasture primary productivity sites for the first observation period October 1986 to December 1987.  | <b>25</b> |
| <b>Figure 3.3</b>  | Monthly (vertical lines) and long-term median monthly (continuous line) rainfall for the Turn Turn, Wittenburra, Airlie, Wongalee, Maxvale and Lisnalee pasture primary productivity sites in south-west Queensland for the second observation period October 1988 to November 1990 (median rainfall from nearest long-term station).                                    | <b>26</b> |
| <b>Figure 3.4</b>  | Temperature, pan evaporation and vapour pressure deficit over both observation periods at Charleville, October 1986 to November 1990 (Bureau of Meteorology).  | <b>27</b> |
| <b>Figure 3.5</b>  | Deviations from average climatic conditions for Charleville over both observation periods October 1986 to November 1990 (Bureau of Meteorology).   | <b>27</b> |
| <b>Figure 3.6a</b> | Change in standing dry matter yield (kg/ha), green cover (%) and nitrogen concentration of plant tops (%) at Biddenham and Charleville during the period November 1986 to December 1987.   | <b>33</b> |
| <b>Figure 3.6b</b> | Change in standing dry matter yield (kg/ha) at (a) sites 3 to 4 and (b) sites 5 to 9 during the period September 1988 to November 1990.  | <b>33</b> |
| <b>Figure 3.7</b>  | Relationship between net growth rate (kg/ha/day) and basal area of perennial grasses (%), total soil nitrogen (%), total soil phosphorus (%), a moisture index (calculated evapo-transpiration/pan evaporation), tree basal area (m <sup>2</sup> /ha) and the available soil water range (mm) at nine sites in south-west Queensland from October 1986 to November 1990. | <b>38</b> |
| <b>Figure 3.8</b>  | The relationship between the soil moisture index (ratio of evapo-transpiration to pan evaporation) and net growth rate and water use efficiency over summer for nine sites in south-west Queensland from October 1986 to November 1990.  | <b>42</b> |
| <b>Figure 4.1a</b> | Comparison between predicted and observed total soil moisture (mm) following calibration of the GRASP model to nine sites in south-west Queensland during the period November 1986 to November 1990.   | <b>50</b> |
| <b>Figure 4.1b</b> | Comparison between predicted and observed standing dry matter (kg/ha) following calibration of the GRASP model to nine sites in south-west Queensland during the period November 1986 to November 1990.  | <b>51</b> |
| <b>Figure 4.2</b>  | Frequency distribution of the ratio between (a) predicted and observed total soil moisture and (b) predicted and observed standing dry matter following calibration of the GRASP model to nine sites in south-west Queensland during the period October 1986 to November 1990.   | <b>52</b> |



|   |           |
|---|-----------|
| <b>Figure 4.3</b> Predicted and observed standing dry matter and total soil moisture at the Biddenham undulating downs site during the period November 1986 to December 1987. Error bars indicate $\pm$ one SE.   | <b>54</b> |
| <b>Figure 4.4</b> Predicted and observed standing dry matter and total soil moisture at the Charleville mulga sandplain site during the period November 1986 to December 1987. Error bars indicate $\pm$ one SE.  | <b>56</b> |
| <b>Figure 4.5</b> Predicted and observed standing dry matter and total soil moisture at the Airlie Alluvial plains site during the period November 1988 to February 1990. Error bars indicate $\pm$ one SE.   | <b>57</b> |
| <b>Figure 4.6</b> Predicted and observed standing dry matter and total soil moisture at the Lisnalee Buffel grass site during the period January 1989 to November 1990. Error bars indicate $\pm$ one SE.   | <b>58</b> |
| <b>Figure 4.7</b> Predicted and observed standing dry matter and total soil moisture at the Maxvale soft mulga site during the period September 1988 to February 1990. Error bars indicate $\pm$ one SE.  | <b>59</b> |
| <b>Figure 4.8</b> Predicted and observed standing dry matter and total soil moisture at the Turn Turn mulga sandplain site during the period September 1988 to February 1990. Error bars indicate + one SE.   | <b>60</b> |
| <b>Figure 4.9</b> Predicted and observed standing dry matter and total soil moisture at the Wittenburra Open hard mulga site during the period September 1988 to September 1989. Error bars indicate + one SE.  | <b>61</b> |
| <b>Figure 4.10</b> Predicted and observed standing dry matter and total soil moisture at the Wittenburra Enclosed hard mulga site during the period September 1988 to November 1989. Error bars indicate $\pm$ one SE.  | <b>62</b> |
| <b>Figure 4.11</b> Predicted and observed standing dry matter and total soil moisture at the Wongalee spinifex heathland site during the period September 1988 to February 1990. Error bars indicate $\pm$ one SE.  | <b>63</b> |
| <b>Figure 4.12</b> Comparison of predicted and observed standing dry matter yields (kg/ha) from validation of the GRASP model with data from all of the treatments in the Arabella grazing trial (Beale 1985) on mulga pastures near Charleville in south-west Queensland.                      | <b>66</b> |
| <b>Figure 4.13</b> Comparison of predicted and observed standing dry matter yields (kg/ha) from validation of the GRASP model with data from each of the grazing utilisation treatments in the Arabella grazing trial (Beale 1985) on mulga pastures near Charleville in south-west Queensland. | <b>67</b> |
| <b>Figure 4.14</b> Predicted and observed standing dry matter and total soil moisture using the data of Christie (1978) to validate the GRASP model to mulga pastures near Charleville in south-west Queensland.  | <b>68</b> |
| <b>Figure 4.15</b> Predicted and observed standing dry matter using the data of Noble (1992) (pers. comm.) to validate the GRASP model to mulga pastures near Louth in north-west New South Wales.  | <b>69</b> |
| <b>Figure 4.16</b> Predicted and observed standing dry matter and total soil moisture using the data of Christie (1981) to validate the GRASP model to mitchell grass pastures near Charleville in south-west Queensland.   | <b>70</b> |

|                    |   |           |
|--------------------|---|-----------|
| <b>Figure 4.17</b> | Predicted and observed standing dry matter using the data of Christie (1981) to validate the GRASP model to mitchell grass pastures on Burenda near Augathella in south-west Queensland.  | <b>71</b> |
| <b>Figure 4.18</b> | Predicted and observed standing dry matter using the data reported by Beale (1985) to validate the GRASP model to mitchell grass pastures in the grazing utilisation trial on Burenda near Augathella in south-west Queensland.   | <b>72</b> |
| <b>Figure 4.19</b> | Annual, summer and winter rainfall between 1975 and 1989 and long-term average rainfall for Burenda (25°46' South 146°44' East) near Augathella in south-west Queensland.   | <b>73</b> |
| <b>Figure 4.20</b> | Rainfall and predicted growth from the GRASP forage production model for the Charleville site between 1960 and 1992 using climatic data for Charleville. Data reported by Ebersohn (1970) and Christie (1978b) are shown for validation.  | <b>75</b> |
| <b>Figure 4.21</b> | The relationship between predicted growth and cumulative evapo-transpiration and rainfall for twenty rainfall locations for the years 1960 to 1992 for parameters describing the Charleville site from simulations using the GRASP forage production model.                             | <b>76</b> |
| <b>Figure 4.22</b> | The relationship between growth simulated by the GRASP forage production model for the 32 years 1960 to 1992 and cumulative evapo-transpiration and cumulative rainfall using the Charleville rainfall location and parameters describing the Charleville site.                         | <b>77</b> |
| <b>Figure 4.23</b> | The temporal variation in water use efficiency (evapo-transpiration and rainfall) calculated from output from the GRASP forage production model over the period 1960 to 1992 using the Charleville rainfall location and parameters describing the Charleville site.                    | <b>78</b> |
| <b>Figure 4.24</b> | The spatial variation in rainfall use efficiency over the study region in south-west Queensland using growth simulated by the GRASP model for twenty locations for the 32 years 1960 to 1992 using parameters describing the Charleville site.  | <b>79</b> |
| <b>Figure 5.1</b>  | A vapour pressure deficit index (VPDI) as a function of latitude and longitude developed from AUSTCLIM average climatic data for 12 locations across south-west Queensland.   | <b>91</b> |
| <b>Figure 5.2</b>  | Comparison between Scanlan's (1984) and Beale's (1971) relationships between tree basal area (m <sup>2</sup> /ha) and forage yield potential.   | <b>93</b> |
| <b>Figure 5.3</b>  | The relationship between forage yield potential and foliage projected canopy cover (FPC%) for a range of tree and shrub species on a range of land systems in south-west Queensland (I.F. Beale pers. comm.).   | <b>93</b> |
| <b>Figure 5.4</b>  | The relationship between foliage projected canopy cover (FPC%) of mulga ( <i>Acacia aneura</i> ) and tree basal area (TBA m <sup>2</sup> /ha).  | <b>94</b> |
| <b>Figure 5.5</b>  | A comparison of relationships predicting forage yield potential as a function of foliage projected canopy cover (I.F. Beale pers. comm. ___ and Scanlan (1984) ---).  | <b>94</b> |
| <b>Figure 5.6</b>  | The relationship between the forage growth for a land system calculated (i) using an average of the growths estimated from each 50m segment using STC data from each segment and (ii) using ATC data from all transects representing a land system to estimate a singular growth value. | <b>96</b> |
| <b>Figure 5.7</b>  | The linear relationship between "safe" levels of forage utilisation derived from consensus data and an index of land system fertility (ratio of land zone rainfall use efficiency to maximum standard rainfall use efficiency (SRUE)).  | <b>99</b> |

|                    |  |            |
|--------------------|--|------------|
| <b>Figure 5.8</b>  | Location of the five benchmark properties used to estimate "safe" levels of forage utilisation in south-west Queensland.   | <b>100</b> |
| <b>Figure 5.9</b>  | The relationship between (a) average livestock numbers (DSE/km <sup>2</sup> ) and average annual forage grown (kg/ha) and (b) average annual total intake (kg/ha) and average annual forage grown (kg/ha) on the 38 land systems on the 3 benchmark properties used to estimate 'safe' levels of utilisation of forage grown in south-west Queensland (Letters denote land zones described by Dawson (1974, Mills and Lee 1990)).  | <b>101</b> |
| <b>Figure 5.10</b> | The hypothesised curvilinear relationship between 'safe' levels of forage utilisation derived from consensus data and an index of land system fertility (ratio of land zone rainfall use efficiency to maximum standard rainfall use efficiency (SRUE)) used in the calculation of 'safe' grazing capacities for individual properties in south-west Queensland.   | <b>102</b> |
| <b>Figure 5.11</b> | Location of the 46 properties of Passmore (1990) for comparison of actual stocking rates and calculated grazing capacities for the years 1986 to 1988 in south-west Queensland.  | <b>104</b> |
| <b>Figure 5.12</b> | Frequency distribution of forage utilisation for the years 1986 to 1988 on the 46 properties of Passmore (1990) in south-west Queensland using actual rainfall and livestock numbers.  | <b>105</b> |
| <b>Figure 5.13</b> | Frequency distribution of forage utilisation for 46 properties in south-west Queensland using long term average rainfall and average livestock numbers for each property for the period 1986 to 1987 (a.), and Department of Lands rated livestock numbers (b.).   | <b>106</b> |
| <b>Figure 5.14</b> | Annual change in flock size (%) in relation to forage utilisation (%) for 1986 to 1987 and 1987 to 1988 for 46 properties of Passmore (1990) in south-west Queensland. There was no significant relationship between change in flock size and utilisation.   | <b>106</b> |
| <b>Figure 5.15</b> | Comparison of livestock ratios (a) owner livestock numbers : calculated grazing capacity and property size, (b) owner livestock numbers : calculated grazing capacity and flock size, (c) owner livestock numbers : Department of Lands rated carrying capacities and property size, (d) owner livestock numbers : Department of Lands rated carrying capacities and flock size, (e) Department of Lands rated carrying capacities : calculated grazing capacity and property size and (f) Department of Lands rated carrying capacities : calculated grazing capacity and flock size for 46 grazing properties in south-west Queensland during the period 1986 to 1988. | <b>107</b> |
| <b>Figure 5.16</b> | The ratio of average livestock numbers to calculated "safe" livestock numbers in relation to 7 measures of land condition (cover %) on the 46 properties of Passmore (1990) in south-west Queensland during the period 1986 to 1988.   | <b>108</b> |
| <b>Figure 5.17</b> | Utilisation (%) of calculated average forage growth (kg/ha) in the four treatments (20%, 35%, 50% and 80% utilisation of end of summer standing dry matter) in the Arabella grazing trial (Beale 1985) conducted near Charleville.   | <b>110</b> |
| <b>Figure 5.18</b> | The fluctuation in wool prices (c/kg clean) from 1973 to 1994. (Source: The National Council of Wool Selling Brokers of Australia)   | <b>111</b> |

- Figure 6.1.** Location of 20 grazing properties in south-west Queensland selected by two grazier consultants to apply and evaluate a model for calculating “safe” long-term grazing capacities of individual properties. The WARLUS land system map areas of (I) Dawson (1974) and (III) Mills and Lee (1990) are shown dotted. **116**
- Figure 6.2** Comparison between calculated "safe" grazing capacities and average livestock numbers on 18 grazing properties in south-west Queensland selected by two grazier consultants applying and evaluating a methodology for estimating "safe" long term grazing capacities of individual properties (slope nsd 1.0, intercept nsd 0.0 P<0.05). **120**
- Figure 6.3** Comparison of livestock ratios (a) owner assessed grazing capacities : calculated grazing capacity and property size, (b) owner assessed grazing capacities : calculated grazing capacity and flock size, (c) owner assessed grazing capacities : Department of Lands rated carrying capacities and property size, (d) owner assessed grazing capacities : Department of Lands rated carrying capacities and flock size, (e) Department of Lands rated carrying capacities : calculated grazing capacity and property size and (f) Department of Lands rated carrying capacities : calculated grazing capacity and flock size for 20 grazing properties in south-west Queensland selected by two grazier consultants applying and evaluating a model for estimating ‘safe’ long-term grazing capacities of individual properties. **122**
- Figure 10.1** Predicted and observed standing dry matter and total soil moisture using the data of Christie (1978) to validate the GRASP model to mulga pastures near Charleville in south-west Queensland (Same data as Figure 4.14 on Page 68). **173**
- Figure 10.2** Predicted and observed standing dry matter using the data of Beale (1975) to validate the GRASP model to mulga pastures at 'Halton' near Charleville in south-west Queensland. **174**
- Figure 10.3** Predicted and observed standing dry matter using the data of Orr *et al.* (in prep.) to validate the GRASP model to buffel grass pastures on cleared gidyea country in the 'Eastwood' grazing trial (0.4 ha/DSE treatment) near Blackall in south-west Queensland. **174**
- Figure 10.4** Predicted and observed standing dry matter using the data of Roe and Allen (1945,1993) to validate the GRASP model to mitchell grass pastures in the 'Gilruth Plains' grazing trial (1 DSE/2ha treatment) near Cunnamulla in south-west Queensland. **175**

## List of Tables

|   |           |
|---|-----------|
| <b>Table 1.1</b> Value of the major agricultural commodities (\$ 000) produced in south-west Queensland (Shires of Barcoo, Blackall, Bulloo, Diamantina, Isisford, Murweh, Paroo, Quilpie and Tambo) from 1988/89 to 1993/94. (Australian Bureau of Statistics)   | <b>1</b>  |
| <b>Table 2.1</b> Monthly climatic data for Charleville (26° 25'S 146°16'E elev. 306m)   | <b>6</b>  |
| <b>Table 2.2</b> Comparison of indices for drought and climatic variability for three locations in Queensland.  | <b>7</b>  |
| <b>Table 2.3</b> Stocking strategies on three main pasture types found in semi-arid Australian rangelands.  | <b>14</b> |
| <b>Table 3.1</b> Site descriptions for primary productivity measurements in south-west Queensland.  | <b>23</b> |
| <b>Table 3.2</b> Comparison of rainfall totals (mm) for each site over the observation periods with average and median values for corresponding periods from the nearest long-term recording stations. Deviation from median shown.   | <b>25</b> |
| <b>Table 3.3</b> Perennial grass basal area (%) and tree basal area (m <sup>2</sup> /ha) of sites measured once at the end of the growing season.   | <b>28</b> |
| <b>Table 3.4</b> Summary of primary productivity results, rainfall, soil moisture and calculated evapo-transpiration (ET Cum.) (calculated between sample date) for nine sites in south-west Queensland from October 1986 to November 1990 (Legend at end of Table 3.4).  | <b>29</b> |
| <b>Table 3.5</b> Bulk densities (g/cm <sup>3</sup> ) for the Biddenham (cracking clay) and Charleville (sandy red earth) sites at 10cm increments to a depth of 1m.   | <b>32</b> |
| <b>Table 3.6</b> Comparison of peak yield (kg/ha) and net growth rate (kg/ha/day) to other growth measures, site characteristics and climatic variables.  | <b>36</b> |
| <b>Table 3.7</b> Correlation matrix presenting Correlation Coefficients (R values) between net growth and other measures of growth, site characteristics and climatic variables. (Legend shown in Table 3.6)  | <b>37</b> |
| <b>Table 3.8</b> Regression equations relating net growth rate to soil, vegetative and climatic variables.  | <b>39</b> |
| <b>Table 3.9</b> Comparison of standing dry matter yield (kg/ha) and net growth rates (kg/ha/day) with cumulative evapo-transpiration (ET)(mm), water use efficiency (WUE) (kg/ha/mm evapo-transpired water), a moisture index (ET/Pan) (cumulative evapo-transpiration/cumulative pan evaporation) and vapour pressure deficit (VPD) (hPa) over summer and winter at nine sites in south-west Queensland from October 1986 to November 1990. | <b>40</b> |
| <b>Table 3.10</b> Correlations between measures of growth over summer and winter to site characteristics and climatic variables (Correlation Coefficient R shown).  | <b>41</b> |
| <b>Table 4.1</b> Availability of data and appropriate calibration parameter data for validation of the GRASP model to south-west Queensland (y=data was available, n=no data available).  | <b>48</b> |
| <b>Table 4.2</b> The 20 daily rainfall stations used in simulation studies examining the spatial and temporal variability of water use efficiencies for eight land systems in south-west Queensland.  | <b>48</b> |
| <b>Table 4.3</b> Regressions of predicted (Y) and observed (X) standing dry matter yields and total soil moistures from the GRASP grass production model for nine sites in south-west   | <b>53</b> |

Queensland from October 1986 to November 1990. Student's t test calculated to determine whether slope nsd 1.0 (y or n) and intercept nsd 0.0 (y or n) at the 5% and 1% level.

|                  |  |           |
|------------------|--|-----------|
| <b>Table 4.4</b> | Predicted and observed peak yields for nine sites in south-west Queensland from October 1986 to November 1990. (Observed peak yields from Table 3.5 in Chapter 3.)   | <b>64</b> |
| <b>Table 4.5</b> | Regressions of predicted (Y) and observed (X) standing dry matter yields and total soil moistures from the GRASP grass production model for five sites in south-west Queensland where data was available for validation of the model. Student's t test calculated to determine whether slope nsd 1.0 (y or n) and intercept nsd 0.0 (Y or n) at the 5% and 1% level).  | <b>65</b> |
| <b>Table 4.6</b> | Spatial regressions using data for twenty rainfall locations between growth (kg/ha)(G) simulated by the GRASP model and cumulative rainfall (Ra) and evapo-transpiration (ET) in south-west Queensland for 32 years (1960-92) using parameters describing the Charleville site.  | <b>76</b> |
| <b>Table 4.7</b> | Temporal regressions for 32 years (1960-92) at one location (Charleville) between growth (kg/ha)(G) simulated by the GRASP model and cumulative rainfall (Ra) and evapo-transpiration (ET) using parameters describing the Charleville site.   | <b>77</b> |
| <b>Table 4.8</b> | Regressions between Longitude (Long), Latitude (Lat) and average rainfall use efficiencies (RUE) (kg/ha/mm) for the 32 years 1960-92 derived from simulation studies using the GRASP model with rainfall data from twenty locations in south-west Queensland and regional overall average rainfall use efficiency (ARUE).  | <b>80</b> |
| <b>Table 4.9</b> | Comparison of annual, summer and winter water use efficiencies (evapo-transpiration) for the Charleville site derived from (1) experimental data from Chapter 3 (Tables 3.5 and 3.8), (2) simulation using 32 years of Charleville daily climate (1960 to 1992), (3) average from twenty locations in south-west Queensland (Table 4.2) over 32 years (1960 to 1992), (4) slope of the regression between growth and evapo-transpiration at Charleville (Table 4.7) and (5) slope of the regression between growth and evapo-transpiration for twenty locations in south-west Queensland over 32 years (1960 to 1992) (Table 4.6). | <b>83</b> |
| <b>Table 5.1</b> | Site data from the Western Arid Region Land Use Studies (WARLUS) Parts I-IV (Dawson and Ahern 1974, Turner and Ahern 1978, Mills and Ahern 1980 and Ahern and Mills 1990) for comparison with rainfall use efficiencies standardised to Charleville's location and climate (SRUE (kg/ha/mm)). Maximum and minimum values across WARLUS shown.  | <b>88</b> |
| <b>Table 5.2</b> | Calculated standard rainfall use efficiencies (SRUE kg/ha/mm) for the WARLUS land systems of Dawson and Ahern 1974 (Part I), Turner and Ahern 1978 (Part II), Mills and Ahern 1980 (Part IV) and Ahern and Mills 1990 (Part III).  | <b>89</b> |
| <b>Table 5.3</b> | Estimated average standard rainfall use efficiencies (kg/ha/mm) for the 15 major land types in WARLUS parts I-IV. (* denotes land systems with observations from Chapters 3 and 4)   | <b>90</b> |
| <b>Table 5.4</b> | Average annual vapour pressure deficits (VPD) (hPa) estimates from AUSTCLIM for 12 stations used to estimate the VPD Index.  | <b>90</b> |
| <b>Table 5.5</b> | "Safe" treatments in five grazing trials conducted on three western Queensland native pasture communities used to examine the relationship between utilisation (Util) of   | <b>97</b> |

average annual forage grown (FG), average annual forage eaten (Eaten) and the maximum observed nitrogen uptake (Nup) as an indicator of site fertility.

|                  |  |            |
|------------------|--|------------|
| <b>Table 5.6</b> | Estimates of “safe” levels of utilisation of average annual forage grown using a consensus approach for 15 land zones (Dawson 1974, Mills and Lee 1990) in south-west Queensland.  | <b>98</b>  |
| <b>Table 5.7</b> | Sensitivity analysis examining change in grazing capacity (%) for individual land systems following a $\pm 10\%$ variation in parameters and selected input data in the equations used to estimate a grazing capacity.   | <b>103</b> |
| <b>Table 6.1</b> | Total area, average rainfall, average foliage projected cover (fpc%) of trees and shrubs and total cover for the 13 of the 15 land zones (Dawson (1974) and Mills and Lee (1990)) encountered in the assessment of 77 land systems on 20 grazing properties in south-west Queensland. (Detailed data for the 77 land systems presented in Appendix 9). | <b>119</b> |
| <b>Table 6.2</b> | Pre-1989 Department of Lands (DOL) rated carrying capacities, average owner grazing capacities, calculated "safe" grazing capacities and grazing capacity ratios for twenty properties in south-west Queensland assessed by grazier consultants.   | <b>121</b> |
| <b>Table 6.3</b> | Comparison of tree, shrub and total woody cover from regional scale surveys of land condition in south-west Queensland.  | <b>124</b> |
| <b>Table 6.4</b> | Strengths and weaknesses of the grazing capacity model as developed in Chapter 5 and applied to properties in south-west Queensland.   | <b>126</b> |
| <b>Table 7.1</b> | Limitations identified in the GRASP model (version GVT74) during calibration to nine sites and validation with 6 data sets from south-west Queensland and the impact of these limitations on the estimation of “safe” grazing capacities.  | <b>128</b> |
| <b>Table 8.1</b> | Dry matter yield, green cover, nitrogen concentration of plant tops (where measured) and cumulative rainfall for nine sites in south-west Queensland from October 1986 to November 1990.   | <b>132</b> |
| <b>Table 8.2</b> | Soil moisture for three layers (0-50cm, 50-100cm, 0-100cm), cumulative rainfall and cumulative evapo-transpiration for nine sites in south-west Queensland from October 1986 to November 1990.   | <b>135</b> |
| <b>Table 8.3</b> | Percent composition of dry matter yield by weight at the Biddenham (mitchell grass) and Charleville (mulga pastures) native pasture primary productivity sites from October 1986 to November 1987.   | <b>138</b> |
| <b>Table 8.4</b> | Ground cover at the Biddenham (mitchell grass) and Charleville (mulga pastures) native pasture primary productivity sites from October 1986 to November 1987.  | <b>139</b> |