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THE USE OF RANGELAND INVENTORIES

E.J. Turner

Introduction

Land system mapping of the resources of the arid and semi-arid lands in Queensland is continuing. To date, some 31 million hectares of pastoral land have been mapped. The reports have either been printed or are soon to be printed. The need for these resource inventories has long been recognised. The basic biological data collected has been used by quite diverse organisations. Users at the State level include:

(a) Irrigation and Water Supply Commission in selecting potential irrigation areas.

(b) Valuer-General's Department - as an aid in assessing valuations in South West Queensland.

(c) National Parks and Wildlife - to identify those areas which should be set aside for public use. Research in U.S.A. indicates that the land system concept can be used to evaluate habitat suitability for wildlife. (Hawes and Hudson 1976).

(d) Co-ordinator General - bases its recommendations for regional development upon an appreciation of land systems.

The land system concept is also suitable for planning extension and research at the property level. The D.P.I. in Queensland used the land system approach for planning the development of new properties in the Brigalow Scheme (Turner 1975). All properties were mapped at the land unit level and development was planned after each land unit was assessed in terms of its potential and possible limitations. The various land units were then grouped into management classes which were really indicators of areas of different potential. These management classes established the priorities for property development.

The land system concept also lends itself to ecological research, in particular condition and trend (Dyksterhuis 1949). If trials are confined to one land unit in a particular land system, then variability between sites should be minimal. Ideally, reactions to land use on any one particular unit should be capable of extrapolation to the same unit in another locality. Research along these lines is presently being undertaken by Orr (personal communication) who is studying the effects of grazing pressure on *Astrebla* grasslands within one particular land system.

Condition assessments

Assessments of the status of major vegetation communities in WARLUS Part IV were made in winter 1974. Soil measurements were also done as they were considered necessary in any long term monitoring programme.

Methods

The wheel point method was used with a sample size of 3 x 300 points over a triangular course. This was considered sufficient to give an estimate of basal cover and botanical composition. Roberts (1972) reports that 500 wheel points is adequate for botanical composition but greater than 500 is necessary for basal cover. Soil samples were taken to establish surface variability and to investigate the variability in bulk density on the 0-10 cm layer. Nine sample points were used at each site and a soil sample taken every 100 wheel points.

Results

(a) Soils: The results for two major vegetation communities are summarised in Table 1. It is intended to publish the complete data later.

Table 1. Mean Values and Coefficients of Variation.

Acid and bicarbonate extractable P showed large coefficients of variation. The difference in nutrient levels of samples taken beneath the tree canopy and inter-canopy zone was very marked (Edye *et al.* 1964, christie 1975). Coefficients of variation were low for pH, total K and bulk density. Moderate coefficients of variation were recorded for total N, exchangeable and replaceable K. C.E.C. showed low coefficients of variation at the higher values and increased variation at the lower values. This has been attributed to the limitations of analysis (Ahern unpublished data).

(b) Vegetation: The results are summarised in Table 2.

TABLE 2 - Summary of data.

	Site	% Basal cover	% Bare	No. species recorded
Mitchell grass (grey cracking clays)	1	3.0	53	15
	2	6.5	25	10
	3	4.3	56	19
	4	7.0	33	21
	5	2.0	91	15
Eucalypt woodlands (red earths)	1	1.2	45	11
	2	2.0	54	16
	3	2.0	71	14
	4	2.7	67	11
	5	3.2	52	16
	6	2.5	57	17

TABLE 1 - Mean values and coefficients of variation %

		Bulk Density	pH	Total N %	Acid P ppm	Bicarb P	Repl. K	Exch. K meq/100g	% TSS	P %	Total K %	Total S %	CEC meq/100g	Ca++ meq/100g
1.	Mitchell Grass Downs (cracking clays) Ug 5.22	Mean 0.74	8.1	.082	143	15.8	1.1	1.68	.028	.051	1.35	.027	56	48
		cv 12	3	21	40	25	20	16	13	27	5	21	10	8
2.	Eucalypt Woodland "Desert" (sandy red earths Gn 2.12	Mean 1.53	6.7	.035	6	5	0.41	0.47	0.007	0.027	0.46	0.007	6	2.7
		cv 6	9	11	29	25	10	11	13	13	5	19	14	21

Discussion

(a) Soils: The results indicate the sampling technique was suitable for obtaining bulk density samples. Bulking of soil samples will be necessary to obtain mean values for nutrients at a particular site.

(b) Vegetation: The results indicate for sampling at that time of the year, % bare is a good indicator of "condition".

Basal cover for the *Astrebla* grasslands varied 2.0 to 7.0% and averaged 4.6%.

Basal cover for the eucalypt woodland, ranged 1.2 to 3.2% and averaged 2.3%. These variations could be attributed to grazing intensities, seasonal rainfall and time of sampling. Basal cover figures tend to be related to soil type, with higher values obtained on the heavier textured soils.

Potential use of rangeland inventories

We are presently sampling on a fixed grid pattern. Sampling is done at 20 000 m grid points determined by the Australian metric grid. All sites are suitably marked so they can be easily re-located by other research workers. We are using 1:250 000 LAND SAT (1973) imagery as an aid in compiling the inventories. The inventories could be used in conjunction with LAND SAT imagery for short term or seasonal monitoring of the open *Astrebla* grasslands. Quantitative measurements of vegetation (basal cover, yield) would be necessary to establish a relationship with spatial signature. This relationship could then be used to monitor the effects of management practices.

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