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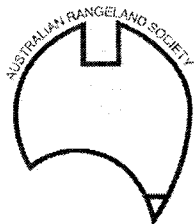
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**THE EFFECT OF SITE CONDITION, EXCLOSURE AND CONTOUR FURROWING  
ON PASTURE CHANGES OVER A FIVE YEAR PERIOD.**

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**INTRODUCTION AND METHODS**

Vegetation changes were studied from 1986 to 1991 at a site 70 km north of Broken Hill in the semi-arid pastoral area on eight occasions in relation to: condition class (good, moderate and poor); contour furrowing; and exclosure from 1986 to 1991. Step pointing was used to measure bare ground %, stable ground cover % (i.e. perennial and biennial species) and total species present at each site.

**RESULTS**

Results are presented in relation to the effects of condition; effects of contour furrowing and exclosure; the establishment of artificial contour linear gilgais.

Condition

The importance of condition in relation to: bare ground %; total species number; and stable ground cover % during prolonged dry periods is shown in

Table 1.

	<u>Stable Ground Cover % at times when Bare Ground % is Highest</u>			<u>Variations in Total Bare Ground %</u>	<u>Variation Total Spp No.</u>
Good	24%	20%	26%	50%-20%	19-31
Moderate	22%	19%	9%	45%-17%	18-27
Poor	11%	13%	10%	78%-55%	3-13

Table 1 - Effect of condition class on measured parameters

Differences between good and poor sites are obvious, while differences between good and moderate sites are less well defined, but are expected to diverge with the length and severity of dry periods.

Furrowing and Exclosure

Contour furrowing and exclosure from sheep grazing decreased bare ground by 57% and increased stable ground cover from 10% to 29%. Total species recorded increased by more than double over five years.

Table 2

	<u>1986</u>	<u>1991</u>	<u>%</u>
Poor (Control)	73	74	+1
Poor + furrow + grazed	81	60	-26
Poor + furrow + exclosure	68	29	-57
Moderate	46	40	-13
Good	48	45	-6

Table 2 - Changes in bare ground % from 1986 to 1991

Contour furrowing decreases bare ground % however, reduced grazing pressure and furrowing created the conditions necessary for an improvement in condition (change of state) to occur on the poor site. (Reduced grazing pressure can be by control of rabbits, goats, kangaroos and/or livestock or through higher than average rainfall events).

## Artificial Gilgai Development

Artificial run-on zones were created over a three year period. The separation of run-on and run-off zones contributes to improvements in ground cover. The degradation process is closely related to moisture harvesting ability. As bare ground % is similar between upper furrow zones and poor (control) site, the additional cover along the furrow is the bonus in terms of stability.

Table 3

	<u>Bare Ground %</u>		<u>Stable Ground Cover %</u>		<u>Total Spp</u>	
	1986	1991	1986	1991	1986	1991
Lower Zone (run-off)	92	16	2	50	6	27
Upper Zone (run-on)	80	65	11	12	14	15

Table 3. Effect of contour furrow run-on/run-off zones on measured parameters

## DISCUSSION AND CONCLUSIONS

This investigation highlights the need to:

- 1) Define Good, Moderate and Poor Condition (for each landtype) in relation to what is currently considered important.
- 2) Understand which parameters can be used as indicators of condition and how these parameters vary under climate and management.
- 3) Determine the level of management intervention required to achieve desirable changes in Condition State.

These results provide evidence of the benefits of Contour Furrowing as a rangeland reclamation technique. Under heavy grazing furrowing reduced bare ground % by 26% and increased the total number of species recorded. Heavy grazing however prevented increases in stable ground cover.

Bare ground % is useful as an indicator of the ability of the landscape to harvest seed, water and dung (nutrients).

Stable ground cover % is useful as an indicator of stability of soil and pasture when comparing within particular land unit types.

Total species present is useful as an indicator of the temporal stability of the pasture (and therefore soil) under highly variable conditions.

To be meaningful, these important RELATIVE indicators of stability and productivity need to be compared with benchmarks (actual or subjective) over reasonably extensive time periods.

This investigation also demonstrated the potential to establish artificial contour linear gilgais by contour furrowing. This is indicated by the divergence in the upper (run-off) and lower (run-on) furrow zones in bare ground %, stable ground cover %, and total species. This divergence illustrates the relationship between moisture availability, run-off and rangeland deterioration. In this investigation the similarities between the poor site and the upper run-off furrow zone suggests that the gains from furrowing can be measured by the additional vegetation growth in the run-on furrow zone.