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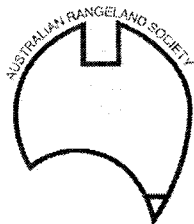
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PRESCRIPTIONS FOR THE REHABILITATION OF RIVER FRONTAGES IN THE TROPICAL AND  
SUB-TROPICAL GRASSLANDS OF WA - WITH PARTICULAR REFERENCE TO THE FITZROY  
RIVER FRONTAGE

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## INTRODUCTION

Interest by land managers in rehabilitating these once highly productive pastures has led to research to formulate rehabilitation guidelines (1).

Different key constraints will lead to selection of different rehabilitation options. The 'option choice' flow diagram proposed in this paper is based on a number of research findings and observations of the Fitzroy River Frontage where three major land units are to be found. The land unit characteristics, constraints, and pertinent findings are outlined in the next sub-sections.

## LEVEE CRESTS

Levee crests, are commonly the areas of highest elevation on the frontage, are characterised by medium to coarse textured soils, and originally supported Frontage Grass Pastures (2). The major constraints to rehabilitation are stock control, surface soil crusting, flooding, and availability of a source of perennial pasture seed.

Rehabilitation work on a levee crest area (Collins Yard) in the 1960s indicated that chisel ploughing and seeding with birdwood and buffel grass (*Cenchrus setiger* and *C. ciliaris*) in concert with stock removal could be very successful.

## LEVEE BACK SLOPES

Levee back slopes originally contained duplex soils and supported Frontage Grass Pasture. Much of the A horizon has been removed to expose medium clay soils which are commonly sodic, occasionally saline.

The major constraints to rehabilitation are grazing control, soil sodicity, salinity, extremely low water infiltration (test averages = 17 mm/24 h), perennial pastures seed availability, and floodwater inundation. Chisel cultivation has been found to be not only ineffective in re-establishing perennial pastures, but detrimental to soil moisture conditions one year after cultivation.

A combination of chisel cultivation, application of suitable soil ameliorants and seed has been effective in establishing perennial pasture species (*Cenchrus ciliaris*, *C. setiger*, *Astrebla squarrosa*) on such soils (3,4). Soil amelioration with cultivation and seeding is expensive, and likely to be only suited to small areas which act as source of seed to surrounding country.

Water ponding has been shown to improve soil moisture status, dramatically decrease salinity (5), increase soil cracking in sealing sodic clays, and increase species diversity within two years.

Most forms of ponding will breach under the onslaught of fast flowing floodwaters, making the technique unsuitable for such flood prone areas. Motor grader-built full circle ponds withstand flooding better than other grader-built or tractor-implement-built pond banks (Addison, *per comm*). In areas of shallow, slow moving inundation, therefore, full circle ponds built by motor grader may be appropriate. (Bulldozer-built banks have not been tested in this environment).

## BACK PLAINS

The back plains land unit is characteristically at a lower elevation than the other land units described, has little slope, and has self mulching heavy clay soils which support Mitchell grasslands (*Astrebla* spp.).

Since this land unit tends to become intractable during wet seasons it is naturally protected from grazing during the growing period. Where back plains have become degraded the principal cause is excessive dry season grazing pressure. A seed source of native perennial grasses is normally still available, and the back plain clay soils tend to be particularly fertile (6). The major rehabilitation constraint, therefore, is grazing control during the dry season.

## PRESCRIBING REHABILITATION OPTIONS

Figure 1 provides a flow chart through key constraints to what appear to be the most promising rehabilitation options, based on the findings and observations quoted.

These are broad options, destined for more specific site testing to identify the optimum of rehabilitation activities.

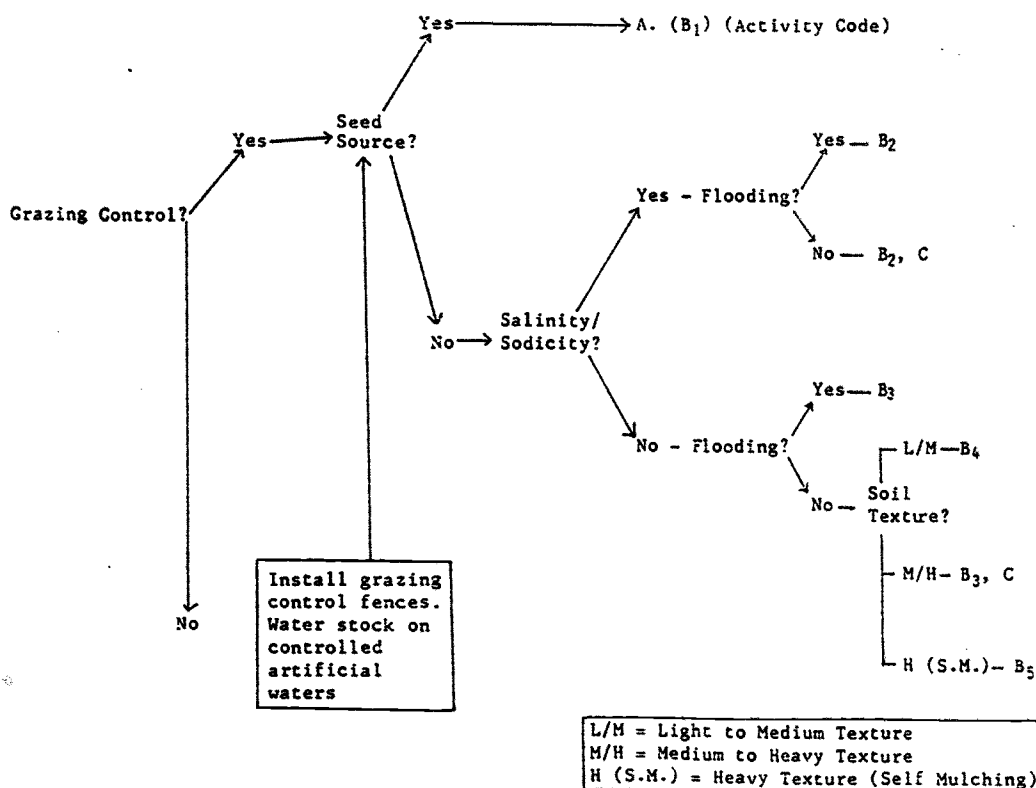


Figure 1

### Key to Activity Codes

- A Manipulate grazing to allow new plants to establish during the wet season.
  - B1 Cultivate 3-4 strips close to the seed source to encourage seed lodgement.
  - B2 Cultivate, soil amelioration and seed in fenced seed source areas. Then A (possibly B1).
  - B3 Cultivate and seed in fenced seed source areas. Then A (possibly B1).
  - B4 Cultivate and seed broadscale. Then A.
  - B5 Broadcast seed into fenced seed source areas. Then A.
- (The scale of the 'B' options is dependent on finance).  
C Water ponding (with cultivation and/or seeding as soil conditions dictate).

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