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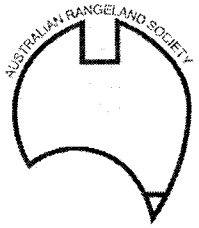

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RANGELAND ASSESSMENT PROGRAM: NEW SOUTH WALES DATA MANAGEMENT

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INTRODUCTION

The Rangeland Assessment Program is a long term activity in NSW to monitor patterns in range condition and trend, and to develop extension contacts between CaLM staff and landholders focussed on range management issues. CaLM staff collect data annually from 330 permanent sites. Landholders collect management and rainfall figures. Information is exchanged and discussed during site visits. The program regularly generates massive volumes of data that need to be stored and manipulated in a computer data management system.

DATA MANAGEMENT SPECIFICATIONS

A system to manage the data needs to:

* faithfully record site data
* intercept errors and missing data
* enable data to be checked for validity
* safeguard data against corruption or loss
* store raw data
* manipulate and transform raw data into required outputs
* minimise delay between data collection and production of outputs

INPUTS - TYPES OF DATA COLLECTED

A site is defined by four 300m long transects. On each visit information is collected along transects, within 52 regularly spaced quadrats and from the whole site. As well, records are kept of invariant site data such as soil type, paddock area, distance to water.

Transect data
* density of bushes, percentage canopy cover of shrubs and trees measured by Belt Transect and Step Pointing

Quadrat data
* biomass and frequency of pasture plants (grasses, forbs) measured by Dry Weight Rank and Comparative Yield
* soil surface cover ranking

Whole site data
* assessment of range condition on a 5 point scale
* description of indicators of range condition
* management recommendations
* stock movements in and out of the paddock containing the site
* management actions and environmental events affecting the site
* monthly rainfall

All plant abundance data is collected at species level using 4 character code symbols to denote botanical names.

OUTPUTS

Calculations are performed on the quadrat and transect raw data measurements to produce a site summary in two major formats:

* summary text files and database files listing
  - abundance, lifeform and desirability of plants species
  - soil surface cover
  - whole site data

The text files are printed as reports to be given to landholders with an added photograph of the site.

* Sites x Attributes matrix for multivariate analysis where attributes include plant species abundance, soil surface cover and other site data such as soil type, rainfall, management, range condition rating.

IMPLEMENTATION - STAGE 1

At present data sheets filled out by field staff and landholders are sent to Condobolin where a data entry operator enters them into a computer database. dBASE IV programs have been developed to provide data entry control, detect errors and missing data, check data, perform calculations, summarise the data and generate reports. The most frequent data problems are missing data and invalid or illegible plant species codes. The drawbacks of these procedures are:

* late error interception and difficulty in making corrections
* a second handling of the data which introduces further errors
* a slow labour intensive process
* delays in the production of outputs
* centralised control of information remote from the field staff

IMPLEMENTATION - STAGE 2

Data sheets are about to be replaced by an Atari Portfolio palmtop computer as the means of data collection. CaLM is developing a QuickBASIC data entry program for the Atari, now in its final stage of field testing. The Atari data files will be downloaded to office computers running the existing dBASE IV programs. When fully operational the Atari will provide:

* storage capacity on RAM cards for one week's worth of field data
* field operation for 100 hours on a set of replaceable D cell batteries
* operation by means of menus and prompts allowing ADD, EDIT, VIEW and SUMMARY of data
* data entry at usual field speed (about 2 minutes per quadrat)
* entry of species codes from the keyboard or programmable function keys
* structured data entry:
  - defined formats to accept quadrat, transect, whole site data
  - selection of alternate formats while walking a transect
  - warnings of duplicate or blank data
* error interception for:
  - invalid species codes
  - plants entered into incorrect vegetation layer(pasture,bush,tree)
  - rare or unlikely species for the habitat
* data summary:
  - species list for a site showing biomass, % frequency, % canopy cover, density
  - summary of soil surface conditions

The program has been written to be modifiable to allow for any future changes in the data collection techniques.

CONCLUSIONS

The large volume of data regularly generated by the Rangeland Assessment Program requires an integrated system of field and office computers to capture data, control its structure and content, store it and perform summaries and analysis. The dBASE IV and QuickBASIC programs being developed by CaLM aim to give:

* a fully electronic system where data is entered once in the field and then managed by computer
* minimal delay between data input and production of outputs
* information control decentralised to field staff.