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CONDITION ASSESSMENT IN PRACTICE

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In 1976, the Animal Industry and Agriculture Branch of the Department of the Northern Territory commenced a systematic survey of pasture conditions on cattle stations in the Alice Springs district. To date, seven stations covering approximately 14,300 sq. km. have been assessed.

The ultimate use of the survey is to assess a grazing capacity for the watered area on each station from current pasture condition. This assessment has application at all levels in the grazing industry including:-

1. Use by station management -
   (a) to match stock numbers and classes to feed supplies available throughout the year.
   (b) to plan and operate property budgets.
   (c) to assess property development and maintenance programmes.

2. Use by lending institutions as a criterion for granting loans.

3. Use by Lands Branch administration to establish pastoral leases of a viable size and to set equitable land rentals.

4. Use by the Animal Industry and Agriculture Branch
   (a) for the prevention of pasture deterioration or soil erosion
   (b) to assess the effects of drought, fire or flood and assist in the preparation of policies to prevent or ameliorate the effects of natural disasters and provide assistance.
   (c) for advice to station managers on the improvement of the productive potential of their pastoral leases.
   (d) to compare the potential of investment in pastoral lands with other alternatives.

Method of Condition Assessment

A definable procedure is followed for the planning and conduct of each station survey.

1. Mapping

The different land types are interpreted on 1 : 80,000 scale aerial photographs using the "Land System" classifications of Perry *etal* (1962).* These photograph patterns are then mapped onto the 1 : 250,000 scale station map. The station map allows greater mapping accuracy than is available with the 1 : 1,000,000 scale Perry *etal* (1962) map. Where prior knowledge of a particular area does not agree with the Perry *etal* (1962) description, a different interpretation has been placed on that photograph pattern. The land system boundaries and classifications on the station map are checked in the field at the time of survey and where necessary, corrections made.

2. Site Selection

A minimum of one condition assessment is made of the most susceptible land system that is accessible at each watering point. The decision on susceptibility is based on the following criteria:-

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(a) the pasture's palatability to cattle and hence the grazing pressure that it will experience.
(b) the importance of that area to animal production
(c) the significance of that land system's area in relation to the total area watered from the bore.
(d) the sensitivity of that area to disturbance e.g. risk of erosion following over-utilization of the pasture.

Time available in the field is a limiting factor and it is not considered worthwhile to sample from watering points that are surrounded entirely by spinifex sandplain or mulga shrubland with a perennial understorey. Both of these communities have low grazing capacities and are relatively stable to grazing. Sampling sites are selected at approximately 3 km from the watering point as a compromise between the sacrifice area, and the region of low utilization at a considerable distance from water. Studies by Low Et al (1973) have shown that in a well watered paddock where the maximum distance that cattle could forage from permanent water was 10.4 km, cattle rarely grazed beyond 8 km even when vegetation was sparse and dry. For less well watered stations, it was observed that cattle grazing out as far as 9.5 km only did so when pasture condition was poor and that these cattle were losing weight. To avoid estimates of grazing capacity that would result in over-utilization of pasture at an intermediate distance from water and weight loss in cattle through the distance involved in foraging, the watered area in this survey has been set at a radius of 8 km from the watering point. On this basis, four of the seven stations so far assessed are fully watered.

In the field, a check is made that the survey point selected on the aerial photograph is typical of the ecounit within the land system which is to be assessed. If the site is atypical, then an attempt is made to locate a more representative sampling area at some other point in the surrounding area. If still unsuccessful then a site is chosen in the next major land system that is accessible.

3. Condition Assessment

When satisfied that the sampling site is suitable, a numbered picket is driven in, a colour photograph taken and the site location permanently marked on theaerial photograph. The condition assessment is made over a five to ten hectare area round the site peg using the 'Standards for Testing and Assessing Range Condition' (STARC) developed by CSIRO and the Animal Industry and Agriculture Branch. (Lendon and Lamacraft, 1976). This involves listing all the grass and forb species present and assessing the percentage contribution of each species to the total dry weight of the pasture. The major species are estimated individually to the nearest 5% with the minor species being grouped as 'Other Grasses' or 'Other Forbs' and assessed similarly. Finally, a condition score is arrived at by comparing the pasture composition of the site against that of the reference for the same ecounit. For example, two different ecounits occur in the Bushy Park (Perry et al, 1962) land system; Mulga (Acacia aneura) with annual grass understorey and Mulga with perennial grass understorey. Areas of each ecounit in excellant condition have been located and the pasture composition of the appropriate area is used as the benchmark against which to score the same ecounit when encountered on survey.

It has been necessary to construct pristine pasture compositions in the absence of suitable exclosed relicts. As an example, areas of the Calcareous Shrubby Grassland ecounit that have rarely been grazed by cattle have been so drastically altered by rabbits that it is impossible to locate areas in undisturbed condition.

4. Recording of Data

A coding sheet has been developed by the CSIRO division of Land Resources Management in Alice Springs for the recording of site location, soil characteristics,

pasture composition, trend indicators and station management details. This information is then in an available form for punching onto cards and sorting by computor.
Several advantages of the STARC method have thus far become apparent. This progress has been tempered to some extend by problems still requiring attention.

Advantages of Condition Assessment Method.

1. A permanent record of assessment sites is obtained.

2. A numerical and photographic record of condition at each site allows an objective measurement of trend on a resurvey and a direct comparison with other sites in the same ecounit.

3. The method is used directly. Once pasture composition has been determined, it can be compared against the relict and a numerical condition score obtained whilst in the field.

4. The method is easy to use. Training involves the repeated estimation of species composition inside quadrats and the cutting and weighing of these species. This continues until a sufficient degree of accuracy is obtained between actual pasture composition and the assessment given by each operator. Since individual and bulked species are estimated to the nearest 5%, then each assessor's estimates should ideally come within a 5% range of the actual pasture composition on each assessment.

When individual operators are confident in their assessments, further cutting and weighing is only necessary as a periodic check and following a pasture growth season where there have been significant species compositional changes.

5. A satisfactory level of between-operator repeatability is achieved in the individual assessments made at each site. In homogenous plant communities (e.g. Mitchell grass or Mulga/Perennial grass) individual assessments of pasture condition are very similar and condition scores obtained by each operator rarely differ by more than five percentage points.

The variability amongst operators increases in the more diverse communities where up to ten equally important species can occur (e.g. the Cottonbush (Maireana aphylla) flat ecounit of the Hamilton (Perry et al 1962) land system). Where such communities are likely to be encountered on survey, an attempt is made to have at least two pasture ecologists present. The consensus pasture composition is then a good estimate of the actual pasture composition.

6. The assessment method is a rapid and systematic technique for assessing the condition of the important land systems on a station. Six to seven sites can be covered in a day and a station of 2,500 sq km in five days.

Problems Requiring Attention

1. It is not always possible to use the pasture composition of the reference area as the benchmark against which to score survey sites without some allowance first being made for rainfall variability.

Most of the present reference areas are located close to Alice Springs (275 mm average rainfall) and although a site selected in the more arid regions is recognizably similar to the ecounit in which the defined relict occurs, the lower rainfall may mean changes in species composition. For example, productive perennial grasses (Enteropogon acicularis, Digitaria

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coenicola) that form a significant part of the Open Woodland ecounit reference are often lacking in the survey area. The problem arises in deciding whether climate, soil factors etc. prevent the successful existence of these species or whether they have disappeared through overgrazing. If the latter is the case, then the site can be scored against the reference pasture composition and down-rated in condition accordingly. However, if environmental conditions apart from grazing by cattle prevent the existence of these species, then the benchmark must be modified so as not to penalize these areas in condition.

2. Differences in seasonal rainfall over the extensive Alice Springs district (370,000 sq km in area) can be a problem in comparing survey sites against the reference areas. Unless general rains have fallen over the whole area, different seasonal rains can produce significantly different pasture compositions between the survey and reference areas. Unless allowances for different seasonal conditions are made in the proportion of each species allowed in the reference and site, a biased condition score for the site may be obtained.

3. A problem can arise in the assessment of preferred pastures if no allowance is made for the utilization of the more palatable species. Failure to make this allowance may mean that a low proportion of total weight contributed by the preferred species, due to transitory heavy grazing, results in an incorrent condition score for the site. A shower of rain could quickly restore this loss through the regrowth of perennials and the germination of annuals. It is different to decide what level of utilization should be allowed before penalizing the site in condition.

4. The widespread fires experienced in 1976 have presented a problem in station assessments. Unless the reference area has also been burnt, it is not yet known what recovery period is necessary for a fair and meaningful assessment of burnt areas. 'Fireweeds' (e.g. Solanum spp) make up a considerable proportion of the regrowth following a fire, and these species lower condition when assessed against the unburnt relict. A period of perhaps two complete growth seasons may be required to allow re-establishment.

5. It is not yet known what sampling density around each watering point is required to obtain a comprehensive picture of each land system's condition class. At present, sampling from each water usually means that the major land systems are sampled five to eight times on each station although this is dependant on station area and the density of watering points.

This problem is currently being investigated as a research project by the CSIRO Division of Land Resources Management in Alice Springs.

6. No definitive relationship has yet been derived between the current condition class of an ecounit and the number and productivity of stock that can be safely grazed on it.

Tentative recommendations have been made from estimates of seasonal forage production on different pasture types and knowledge of animal preferences , requirements and likely levels of utilization. This is a forage supply method for determining the grazing capacity of areas in excellent condition which is then modified by the current condition score to give a lower grazing capacity.

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Conclusion

The STARC method of condition assessment provides a simple and rapid technique for determining the condition of grazing areas on pastoral leases in Central Australia. However, several problems still remain for the proper implementation of the method and the interpretation of the condition scores obtained.

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