



The Australian Rangeland Society

RANGE MANAGEMENT NEWSLETTER

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Range Assessment Newsletter

Produced by Officers of the C.S.I.R.O. Riverina Laboratory on behalf of the
N.S.W. Range Assessment Committee

Address: The Editor, Range Assessment Newsletter, C.S.I.R.O., Private Bag, P.O. Deniliquin, N.S.W. 2710

No. 75/1 May, 1975

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EDITORIAL

The members of the N.S.W. Range Assessment Committee are very pleased that "The Australian Rangeland Society" was formed at a meeting held in Canberra on 19th January 1975 and formally registered under the Companies Act of Western Australia on 13th February 1975.

This issue of the Range Assessment Newsletter is serving as a news medium for items submitted under the "range assessment" banner, and under the auspices of The Australian Rangeland Society. Its publication has been delayed to enable members of the Society to make contributions. It is intended that this arrangement will continue for the next issue of the Range Assessment Newsletter, after which the Society will issue a Newsletter in its own right.

The Council of the Society is seeking contributions for the Newsletter from the membership on the following and related matters:

1. Range assessment
2. Details of proposed experiments and investigations
3. Research problems - asking for suggestions
4. Discursive articles on the nature of rangeland use
5. Administration of rangeland
6. Financial situations as it affects rangeland operators
7. Management strategies for rangeland - in operation or proposed
8. Alternative uses for rangeland
9. Personal pars.

All contributions should be sent to Mr. Graeme Tupper, Editor, Range Assessment Newsletter, at the above address.

From the comments published in this and previous Newsletters, and the developments within The Australian Rangeland Society, it seems that the Range Assessment Newsletter will have served its purpose after the publication of the next issue. The Newsletter of the Society will include items on range assessment, and many other aspects of range management and range research.

This issue of the Newsletter contains letters to the Editor, a message from Mr. David G. Wilcox, President of The Australian Rangeland Society, news items relating to the Society, articles on the use of photographic techniques in the assessment of rangelands, and some references from South Africa.

Next Newsletter. Contributions should reach the Editor by 1st August 1975 to meet a mailing deadline of 1st September.

GRAEME TUPPER
On behalf of the Committee

LETTERS

From - David W. Goodall, Senior Research Fellow, CSIRO Division of Land Resources Management, Canberra, A.C.T.

You ask for comments on the title and aim. I rather agree with your comment that the word "range" is foreign to Australian tradition, and should be replaced if possible. The phrases which occur to me are "Grazing land" and "Pastoral land". I would rather favour the latter; it is in line with Australian practice, and expresses rather exactly, I think, the intended range of subject-matter. But is it really intended to restrict the Newsletter to "Assessment"? I would have thought that other aspects of management would inevitably have to be referred to from time to time.

From - Graham N. Harrington, Senior Research Scientist, CSIRO Division of Land Resources Management, Deniliquin, N.S.W.

Despite the several suggestions in the third Range Assessment Newsletter, I cannot agree that a new title Range Science Newsletter (or Range Research) would be an improvement. The words research and science embrace all sorts of connotations (even amongst scientists) of being divorced from economic and social reality. I could not agree more with Brian Roberts (Range Assessment Newsletter 74/3) when he warns us to be wary of the impractical or disinterested specialist and to eliminate jargon. Surely the whole philosophy behind the study of Range Condition and Trend is to develop an ability to synthesize all available information on the rangeland environment and to build a RANGE MANAGEMENT strategy. The specialist studies within Range Condition and Trend are interpretative ones such as identifying increasers and decreasers. The especial role of range assessors is to try to apprehend principles of generality from studies in limited locations in order that they may have a wider influence and, most important of all, to build a bridge between the students and manipulators of the rangelands. The manipulators, usually graziers, are students too, but lack a scientific education. They are, therefore, interested in the subject but difficult to influence. If the Range Assessment Newsletter is to fulfill a practical role it should be couched in terms which the grazier will understand, even though it is not expected to get a wide circulation amongst graziers. Keeping the language plain will keep all of our feet on the ground and make sure we can communicate outside our esoteric circle when the time is right. In accordance with this argument I would suggest that "Range Assessment" is not an immediately understood term and that Range Management Newsletter would be better. "Range" might then be defined in parentheses as "natural and semi-natural grassland and woodland" irrespective of rainfall and climate *a la* J. A. Taylor, Range Assessment Newsletter 74/2.

AUSTRALIAN RANGELAND SOCIETY

Mr. D. G. Wilcox, President, Australian Rangeland Society, 54 Broome St., Cottesloe, W.A. 6011.

I very much appreciate being able to use the Range Assessment Newsletter to communicate with members of the Australian Rangeland Society. The purpose of this letter is to let members know of the progress to date.

We have been incorporated as a Society under the Companies Act of Western Australia, which means that we may commence undertaking various classes of business on your behalf. One of the first things we will be doing will be to produce the quarterly Newsletter so that one of the aims of the Society, namely the attainment of better communication between members can be achieved. I hope that the members will use this Newsletter and the Society's production as a sounding board for their views and opinions so that the Society will be able to represent the corporate mind of those connected with rangeland and its uses in Australia.

Elsewhere in this Newsletter there is a reference to the First International Rangeland Congress to be held in U.S.A. during 1978. It's interesting to note the content of the programme as suggested by the organising committee.

They propose plenary papers on the following possible subjects:

A. Plenary Papers (possible subjects)

1. Rangelands in the world economy
2. Grazing management on a seasonal basis
3. Combinations of animal species for efficient rangeland use
4. The use of shrubs in rangeland improvement
5. Impacts and management of grazing intensity
6. The future of rangeland use
7. History of the profession
8. The range management system and its simulation
9. Impacts of governmental policy on rangeland management

B. Volunteer sessions (possible subjects)

1. Genetics and breeding of range plants
2. Establishment and early management of range vegetation
3. Ecology and physiology of grasslands
4. Nutrition of range plants
5. Survey and inventory procedures
6. Utilization and management of shrubs
7. Range improvements
8. Seasonal grazing schemes
9. Impacts of degree of herbage utilization by animals
10. Multiple kinds of managed range animals
11. Fire as a tool in rangeland management
12. Techniques useful in decision making on rangelands
13. Nutritional deficiencies in grazing animals
14. Forage nutritive value, intake and metabolism of ruminants
15. Behaviour of grazing animals
16. Cycling of nutrients on rangeland
17. Disease and insect problems on rangeland
18. Energy transfer studies
19. Rumen digestion
20. Economic appraisal of rangeland practices
21. Rangeland rehabilitation - soil management
22. Rangeland rehabilitation - revegetation
23. Measuring and using range utilization
24. Managing the intensity of grazing

The breadth of interest contained within the subjects listed here serves to illustrate the many facets of rangeland use and the number of disciplines which have a concern for rangelands. It may be because it is an international conference, but it seems to me that the organisers have forgotten to include economists, financiers and administrators in the sessional arrangements.

So far about 30 have joined the Society and the Council would like to see more do so. The strength of the Society will depend upon the size of its membership and indeed its capacity to produce a worthwhile journal for Australian rangeland practice will depend upon a membership of some size. If you haven't applied for membership please do so, and if you want application forms write to -

Alan Payne
C/- Department of Agriculture
Jarrah Road
SOUTH PERTH, W.A. 6151.

INTERNATIONAL RANGELAND CONGRESS
DENVER, COLORADO, U.S.A.
LATE AUGUST OR EARLY SEPTEMBER 1978

The Society of Range Management in America have let us have the following information on the First International Rangeland Congress they are proposing for 1978.

"Objectives:

The aim of the Congress is for all range managers to gain a better understanding of the worldwide rangeland ecosystem; its contributions to the economic life of developed as well as lesser developed countries; the political and social constraints which aid

or hinder development; and the fundamental biology of animals, plants, and soils in the system. This objective is to bring people and ideas together and to give all rangeland users the benefits of the range profession's combined international know-how. It will be attained through:

1. Exchange of ideas and information on field trips, presentation of papers at organized meetings, and symposium discussions.
2. Better acquaintanceship of range managers from all countries, thereby facilitating a continuous exchange of ideas and information.
3. Publication of the proceedings for permanent record.
4. Establishment of a continuing organization for international rangeland affairs and future Rangeland Congresses.

Justification:

Rangelands amount to approximately 50 per cent of the earth's surface and no organized effort exists which has the welfare of these hectares as its primary objective. The Grassland Congress has for 13 meetings given very little billing to ecological management of rangeland. A motion at the business meeting in Helsinki a few years ago to eliminate range from that Congress's program failed by a slim majority. No more than a dozen range professionals found the 3rd International Meeting on Animal Production in May 1973 interesting enough to attend. SRM has given up organizing international sections because they need to be independent, each within its own political, economic and social sphere. The need is for an International Congress of these independent societies to promote a worldwide exchange while maintaining country and regional integrity."

The registration fee is expected to be \$U.S.50 and the Society is planning merely to break even on the project. Although this announcement is made well in advance of the meeting, it is given here so that Australian Rangeland Society members may plan their attendance. Although we are a fledgling Society, the Council proposes to support the Society of Range Management in the venture. We expect that the effort we will be able to sustain will be only of encouragement and a willing medium of communication.

ARID SHRUBLANDS

Proceedings of the Third Workshop of the United States/Australia Rangelands Panel, Tucson, Arizona, 1973. Edited by D. N. Hyder.

An early copy of this publication has been received by the Australian Rangeland Society and is reviewed here for the interest of members of the Society.

The workshop took the form of companion papers from the U.S. and Australia given in three broad divisions - background, aspects of the biology of arid shrublands and the constraints on utilisation of shrublands.

R. M. Moore and C. M. McKell with J. R. Goodwin describe the shrublands of Australia and the U.S. with respect of their structure and location. Moore's article is illustrated with some relevant maps on the distribution of shrublands and he refers to the significance of shrublands in Australia where they support about 49 million sheep and 28 million cattle. McKell and Goodwin make reference to the lack of interest shown virtually up to this time in shrublands in U.S.A. and emphasise their importance as forage and erosion control species.

Structure and function in shrublands and the significance of climax are discussed in two masterly papers by R. O. Slatyer and H. F. Heady. Both authors stress that the concept of climax needs to be reviewed. Slatyer complains of the general failure to incorporate human activity as part of ecosystem function. Heady presents a view of climax inseparable from concepts of stability in the system, stressing the complexity of the climax concept. He points out the continual integration of all available data which range managers using the concept as a managerial tool have to make in order to adhere to the principle.

Tueller's paper deals with the application of climax, sub climax, post climax and condition criteria in the management of arid shrublands.

T. N. Shiflet describes the use of the range site concept on range assessment in U.S.A. in his paper. R. A. Perry deals with the emergence of the range site concept in Australia and with the evolution of range assessment theory which is beginning in Australia.

A series of papers by Graetz, Morton and Hull and C. Wayne Cook discuss aspects of shrub forage utilisation. Graetz highlights the mixture of folk-lore and fragmentary research findings which are used to manage shrublands in Australia.

The final series of papers on the constraints of operating shrubland grazing enterprises deal with a number of the facets of the environment influencing pastoralists and administrators. The conflicting demands, for instance, for durable wildlife habitats, recreation and pastoralism are comparatively new to the Australian scene, but well known in the United States. These papers place the shrubland grazing environment in a well documented setting and are of a high standard.

Members of the Society and others can purchase this publication from the Treasurer, Mr. K. M. W. Howes, for the sum of \$4.00 surface mail or \$5.00 airmail. Mr. Howes' address is C/- Division of Land Resources Management, CSIRO, Private Bag, Wembley, W.A. 6014.

THE PHOTOPPOINT PROGRAMME IN ARID SOUTH AUSTRALIA

Brendan G. Lay - Arid Lands Ecologist, S.A. Department of Agriculture

This programme had its origins in 1970, while I was attempting to re-evaluate the quantitative work of Jessup (1951) on chenopod shrublands around Coober Pedy. Although armed with all of Jessup's original photographs, notes etc., I experienced the frustration which most of us have felt from time to time, caused by the often impossible task of re-locating these old photographs.

As a result I was determined that any photos which I took of rangeland vegetation should not suffer the same fate. From the outset I used a method of recording the location of these photos so that anyone, years hence, could take a repeat photo from the exact spot.

The method involves the erection of a durable marker post, which is usually a piece of undressed local timber (*Acacia aneura*, *A. sowdenii*, or *Casuarina decaisneana* etc.). The decision to use rough timber posts rather than "prepared" markers (treated pine, steel star posts etc.) was made after much discussion and trial. They have the following advantages:-

1. They are likely to outlast other posts in many soils.
2. It is not necessary to cart them long distances in a vehicle where space is usually at a premium.
3. They are easier to find again, particularly in scrub country.
4. It is easier to attach labels to timber than to steel.
5. They are less likely to be removed or otherwise vandalized.
6. A hole at least 60 cm deep needs to be dug; this enables the soil profile to be described at each site.
7. They are adaptable - one can select the size of post required.
8. They are cheap!

A point to be borne in mind here is that much of the arid-zone in S.A. is more than 800 km from the sources of supply of most materials, and cartage is often a serious drain on meagre financial or physical resources.

Photographs are taken from the top of the post, which is suitably trimmed for ease of placement of the camera. For stereopairs the second photo is taken from about 40 cm to the right of the post. A thick aluminium label is attached to the post, bearing initials, date, and photoprint number. All details of vegetation, exact location (cross-referenced where possible) and herbarium collection numbers, are recorded in notebooks, as well as photographic details.

Prints from the photoprints are filed on 5" x 8" cards, together with all relevant information. A copy is sent to the manager of the station concerned, and we are finding that they are generating a good deal of interest.

In the past year or so, other state government departments, particularly the Pastoral Board of the Department of Lands, have expressed interest in the programme. The Pastoral Board will now be extensively involved in the setting up of photopoints while on inspection of particular leases, as well as re-photographing old ones.

We now have an informed liaison group and this will ensure that only one system of numbered photopoints is set up in arid areas of South Australia. It will also ensure that all opportunities are taken for re-photographing these points, which are often in remote, seldom-visited areas.

It is anticipated that the programme will be extended to the bench-mark or reference areas set up when resource inventory surveys, or broadscale range assessment programmes, get underway. In addition, old photos from pastoral lease records, and archives, are being systematically searched with a view to re-location.

Over 200 points have been set up thus far throughout arid South Australia and in unoccupied parts of Western Australia and southern Northern Territory. Already valuable documentation of vegetation response over the recent record wet period has been obtained. We are currently having an official government plate made for each post, to lessen the likelihood of inadvertent vandalism.

My final point is that we would appreciate any feedback, particularly on whether or not it is desirable to have Australia-wide co-ordination or some central file of such points.

N.B. A paper on this is currently being written for publication.

Reference: Jessup, R.W. (1951). The Soils, Geology and Vegetation of North-Western South Australia. Transactions of the Royal Society of South Australia, 74: 189-273.

LARGE SCALE AERIAL PHOTOGRAPHS IN RANGELAND RESEARCH

Ron Hacker, W.A. Department of Agriculture

In recent years there has been an upsurge of interest in Australia in the use of large scale aerial photographs in rangeland research. The interest has been sparked largely by American work in this field and also by the obvious advantages which the technique offers under Australian conditions.

Large scale photography represents basically a data acquisition system. Furthermore it represents a rapid acquisition system and one that can be operated efficiently and relatively inexpensively over large areas. It is probably these advantages, more than any others, which make the technique attractive for Australian conditions where rangeland research can often be hampered by the problems of distance and lack of personnel.

Acquisition of Imagery

In the context of rangeland research, large scale photography usually implies imagery acquired at an original scale of about 1:600 to 1:1200. Imagery at such scales is particularly useful in the arid zone since individual shrubs and grass tussocks are readily resolved and soil surface conditions are clearly reflected.

Photography at these scales, however, places some serious limitations on the type of hardware required for effective operation. In particular, rapid camera cycling rates and fast shutter speeds are necessary and in consequence low altitude systems have basically developed around the use of 70 mm cameras such as the Vinten (used particularly in Australia) and the Maurer KB-8 (used in the U.S.). These cameras are light weight, highly portable, capable of high film advancement rates and can operate at shutter speeds of up to 1/2000 sec. In addition, the 70 mm format permits the production of prints which, at a size of 9" x 9", are four power enlargements of the original image, are of convenient size for field use and will be at extremely large scales (1:150 - 1:300). Resolution on the ground at such scales is of the order of a few centimeters, so the images obviously provide a very detailed picture of the area under investigation.

The method of mounting the camera in the aircraft and the choice of aircraft are important practical considerations. In Western Australia, low level photography for range management studies is flown using a Cessna 182. Such aircraft have several advantages. Cabin space is adequate, they are relatively cheap to hire, and air speed can be reduced safely to a range suitable for photography (70-80 knots), while cruising speed is still sufficient to reduce time spent on ferry flights between photographic locations.

The camera is mounted, in our operations, on the side of a modified aircraft door (Figure 1). The door is cut down and a clear perspex shield protects the camera operator-navigator from the slip stream while permitting adequate forward vision. Sighting holes in the camera mounting bracket permit vertical sighting when the aircraft is over the target. Navigation is purely visual, yet the system, despite its simplicity, is effective. The camera door can be fitted to the aircraft in a matter of minutes and stows easily in the back of the cabin during ferry flights.



Figure 1. Camera mounting on Cessna 182

Marking of target areas on the ground is a vital part of any photographic mission. Flight lines and photographic plots in Western Australia are marked with white painted car tyres. These provide markers which are cheap, durable, easily seen from the air and which, at least in sheep country, will stay permanently in position after placement. In areas grazed by cattle however, they need to be staked into the ground to ensure their permanent location. Known distances between tyre centres provide the reference for scale determination on the photos.

Experience in W.A. has indicated the importance of keeping photographic targets relatively small. Plots should be no longer than 200 m and only one plot should be included in any flight line. The problem of keeping the aircraft in a straight and level position is the limiting factor in this situation.

Standardized instructions for the establishment of flight lines and plots have been developed and copies are available (Dept. of Agriculture, Kalgoorlie) should any reader be interested.

Films and Processing

Both false colour and colour films have been used in West Australian work as well as in other areas of Australia and the U.S. It is difficult however to make any firm recommendation as regards film type since each offers certain advantages. For

example, we find false colour film particularly useful for reflecting soil surface conditions. Ideally, of course, both types should be used together. However, for general ease of handling and processing, colour film (Ektachrome MS Aerographic, type 2448 or Aerocolour negative, type 2445) has the advantage, and the former type, in particular, has been used predominantly in W.A. operations.

Processing of exposed film (either false colour or colour type 2448) offers two choices. Film may be processed directly to a positive, for which both films are designed, or by means of a modified developing procedure, to a negative. Processing to the negative offers the advantage that the colour balance of the prints subsequently produced can be varied at will so that an optimal colour balance for interpretive purposes can be achieved. Furthermore, the prints produced are second generation images rather than the third generation images which would be produced if prints were derived from the positive transparency after the production of an intermediate negative. This latter objection to positive processing should be overcome however, by the development of a new photographic paper, Ektachrome RC type 1993, which permits production of prints direct from the positive transparency. To date, all film used in West Australian work has been processed to the negative and enlarged hard copy prints (9" x 9" in format) of the desirable colour balance have been subsequently produced.

It should be noted here that negative processing of false colour film is not recommended by Kodak. Nevertheless it is possible and can be done successfully.

The Uses of Large Scale Photographs

Many rangeland studies involve the detection of trend in range condition. It is particularly in this area that large scale photographs have a role to play in range research. Such photographs form an ideal base for mapping and recording the individual plants in an area under study, and sequential photography of fixed sites can thus provide a quantitative means of trend evaluation.

Even those plants which are too small to be resolved will not be overlooked since their presence will be indicated on the overlay produced when photos are marked up in the field. At the same time, the photograph provides a permanent, visual record of the changes taking place. The significance of this factor, from an extension point of view, should not be underestimated.

In addition to data regarding plant densities and botanical composition, large scale photographs may also be used to make estimates of plant cover, density of animal pads and, in some instances, quantitative assessments of soil surface condition, e.g. relative areas of sealed and unsealed surface.

Such measurements may have the advantage over ground measurements that operator bias may be reduced, since strict conventions can be established to determine, in marginal cases, whether a "hit" or "miss" should be recorded. If a line intercept technique is used rather than a dot grid, the problem of tape alignment through vegetation is eliminated. The failure of photographs to resolve small plants is a potential problem in relation to cover estimates, but the likely error will be very small.

In arid zone pastures, particularly shrublands, vegetation is sparse and plants usually occur as recognizable individuals. Large scale photographs are a useful medium for obtaining data relating to interplant or point to plant distances, and thus may be of value in ecological studies which demand this type of data, e.g. studies of plant distributions.

Furthermore, by overlaying the photograph with a grid drawn to the appropriate scale on clear acetate, quadrat data relating to frequency or density of species can be easily extracted without the need for laborious field work and site disruption which such work may necessarily involve. The potential of this procedure for other studies in statistical ecology (e.g. pattern analysis of the Greig Smith type) seems considerable.

The technique can also be used to monitor seasonal conditions within specific research paddocks, e.g. in studies in which a permanent record of seasonal conditions (as they reflect the plane of nutrition available to grazing animals) would be useful.

Other uses for the technique may well be developed in future. Large scale photographs could be used as the last step in a multi-stage sampling procedure involving small scale photography and possibly satellite imagery. In this role they would be used to provide a detailed view of sample areas so that the interpretation of smaller scale imagery could be improved.

The greatest potential however appears to lie in the use of large scale photography as an aid in monitoring range trend. As the management of Australian rangelands becomes more astute, particularly at the government level, so the need for quantitative data reflecting range trend will increase. It is data concerning trend based on extensive monitoring programmes which will be vital for the future administration of Australian rangelands. The technique would appear to have an important role to play in this respect.

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Membership form for The Australian Rangeland Society. Detach and send, with cheque, to Mr. K. M. W. Howes.

THE AUSTRALIAN RANGELAND SOCIETY

Mr. K. M. W. Howes,
Hon. Treasurer,
Australian Rangeland Society,
CSIRO,
Private Bag,
WEMBLEY, W.A. 6014.

Dear Sir,

I

of

 State and Country

apply for membership of the Australian Rangeland Society and agree to be bound by the regulations of the Society as stated in the Memorandum and Articles of Association in existence from time to time.

I enclose fifteen dollars (Australian currency) being my subscription for the year 1975.

Signature

Date

Date of Approval of Council

Entered in register of members

Date

Signed) Members
) of
Signed) Council