

APPLICATION ABSTRACTS

Sediment yield in the Barrier Range before and after European settlement

R. J. Wasson and R. W. Galloway

To what extent did European settlement increase erosion in Australia's rangelands? The volume of sediment yielded by Umberumberka catchment near Broken Hill in the 3000 years before 1850 was compared with sediment yield since that date as estimated from siltation in Umberumberka reservoir. The rate of sediment yield is an indication of the rate of erosion and was about 50-90 times higher after the arrival of Europeans. It was also higher before 3000 years ago but not as high as it was after 1850. Since the early 1940s, the rate of sedimentation in the reservoir has declined. While this decline may be partly due to better management and the disappearance of rabbits, it also coincides with a long-term change in rainfall. Similar changes of sediment yield and rainfall have been noted at very different catchments elsewhere in south-eastern Australia. Possibly the decline in sediment yield is mainly due to the climatic change and could be reversed by a return to pre-1940s conditions.

Cattle mustering efficiency using helicopters in a monsoonal savanna woodland

T.H. McCosker and A.R. Eggington

Repeated helicopter usage is often reputed by industry to lower mustering efficiency and create cattle handling problems. In the survey described in this paper, mustering efficiency remained high after an average of seven, and up to nine, helicopter musters. Maintenance of tractability was attributed to the tailing by horsemen which cattle received before and after yarding. Mustering efficiency and rate were measured on ten groups of Brahman cross breeders over four years. These cattle were mustered during a supplementation experiment on "Mount Bunday" station in the Darwin district of the Northern Territory.

Helicopter mustering efficiency of breeders averaged 97% over 58 musters. Mustering efficiencies of steers and calves were similar to those for breeders but bulls averaged only 74%. This makes controlled mating a difficult proposition under extensive pastoral conditions. Mustering rate at the first round (April-May) was 69 adults/hour compared to 102 adults/hour at the second round (August-September). The higher rate at the second round was thought to be mainly due to fewer calves and the absence of bulls but factors such as cattle condition and improved visibility after burning may also have been influential. Factors which influenced mustering rate and hence cost, included knowledge of animal behaviour, pilot skill, air and ground co-ordination, ground crew skill, burning and animal husbandry techniques e.g. controlled mating and weaning.

Evaluation of factors affecting surface runoff on alpine rangeland in Victoria

H. van Rees and R.C. Boston

Alpine areas in Victoria are important water catchments and nature reserves. The influence of cattle grazing on vegetation cover, water runoff and the botanical composition of the vegetation are currently under investigation. This paper reports on the relationship of surface runoff, and time to runoff initiation, to soil moisture, rainfall intensity, slope and the percentage vegetation cover in the grassland community. A 'portable' rainfall simulator was used in this experiment. It is concluded that existing soil moisture was the major factor influencing runoff rates, while time to runoff initiation was influenced by existing soil moisture, slope and rainfall intensity. The percentage vegetation cover (in the range commonly found in alpine areas) did not have a significant effect on runoff and time to runoff initiation. This implies that management practices aimed at increasing vegetation cover (i.e. by a reduction in grazing pressure) may not have a significant effect on runoff rates.

An economic perspective to the population management of commercially harvested kangaroos

D. Collins and K. Menz

In this article an economic framework for reconciling conflicts regarding the appropriate population level of commercially harvested kangaroo species is presented. The nature of conflicts is examined as well as why private markets are unable to effectively resolve these conflicts. The extent to which the present management regime for kangaroos accords with an economic perspective is considered. No judgment can be made about the appropriateness of current harvest levels due to data limitations.

Nurture the land: My philosophies of pastoral management in central Australia

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The continued productivity of Australia's arid and semi-arid pastoral industry is dependent on the correct stocking of rangelands and the reclamation of degraded country **now**. Over the past 25 years as a pastoralist, I have applied management principles and techniques which I believe are also generally applicable throughout Australia's rangelands. During that time, we have reduced stock numbers, cleared our station of a hefty debt, substantially improved the station and the quality of the herd, undertaken considerable land reclamation work and seen the condition of productive grazing country improve. This article describes how it has been achieved in the hope that some of these management principles might gain wider acceptance throughout pastoral Australia.

Prescribed fire in mallee rangelands and the potential role of aerial ignition.

J.C. Noble

Prescribed fire is probably the most powerful management option available to managers of mallee rangelands. Not only is wildfire control facilitated by periodic removal of perennial fuels but herbage productivity can also be significantly increased following the strategic use of prescribed fire. This article describes the application of prescribed fire on several mallee properties in western New South Wales. Operational requirements including firebreak preparation, communication, ground fire control units, weather and fire forecasting, are described in some detail.

Aerial ignition demonstrated its effectiveness in enabling fuel over large areas (up to 10,660 hectares) to be rapidly ignited in 1-2 hours while suitable weather conditions prevailed. Case studies, including some economic analysis, of prescribed fires imposed on three mallee properties with contrasting soil, vegetation and fire histories using aerial ignition, are also presented as appendices.

Land use in Australia's rangelands

M.D. Young, P.A. Walker and K.D. Cocks

This paper attempts to summarize, for the whole of Australia's rangelands and for each state, the way in which lands of varying suitability for pastoralism (called viability prospects) are used for grazing, Aboriginal occupation and conservation.

The analysis shows that nationally, Aboriginal lands are generally those with lower viability prospects and that rangeland vegetation types with generally high viability prospects (e.g. Mitchell grass) are so widely grazed that little of their area is available for conservation purposes.

Goat and sheep grazing in shrub-infested semi-arid woodlands of New South Wales.

B.H. Downing

Grazing by goats is recommended in poplar box woodland or areas heavily encroached on by shrubs. Goats might be encouraged to eat unpalatable shrubs as a result of pretreatment of the rangeland by fire or mechanical pushing, and by stocking the goats at a suitable rate with supplementary feeding. Sheep and goats could be stocked together in mulga woodland provided goat numbers were kept sufficiently low and did not overly compete with sheep for herbaceous feed. Belah-rosewood country is best suited for sheep, but goats could be safely introduced in many areas to combat shrub encroachment. Cattle would be used to graze excess grass growth following a good rainy season, and help control spargrass (*Stipa* spp.) seeds.

Recolonisation by rabbits (*Oryctolagus cuniculus*) after warren destruction in western New South Wales

I. Parer and B.S. Parker

Ripping reduced the number of rabbit warrens on a property to a very low level. After the cessation of ripping the number of warrens remained low for three years. The next three years had above average rainfall and during this period the number of warrens increased to a level similar to that prior to ripping although the average size of warrens was smaller. Rabbits from neighbouring properties were thought to be a major factor in causing the increase. Because no rabbit control was carried out during the increase phase the return on the original investment of time and money that had been made in the destruction of warrens was much lower than it could have been.