

## Lucy Cranwell Memorial Lecture, 5 October, 2011

### The South Island High Country: Its ecology, conservation values and sustainable management

Presented by Alan Mark, FRSNZ, KNZM, Emeritus Professor  
Department of Botany, University of Otago

Alan outlined the considerable extent of the Crown pastoral leasehold lands of the South Island high country, which covers some 20% of the South Island (~10% of New Zealand's land surface), located in the lee and rain-shadow of the Southern Alps. Its unique and distinctive landscape was highlighted with some brilliant images from Marlborough through to northern Southland, but its ecological degradation associated with more than 150 years of pastoral farming was of continuing concern. Alan has been addressing this over much of his research career, and particularly through funding by the Hellaby Indigenous Grasslands Research Trust, of which he was its first Research Fellow, in 1960. Alan described some of his studies with the Trust, particularly his clarification of the snow tussock's tolerance, even adaptation, to fire but its marked intolerance to mammalian grazing during the post-fire recovery period. Rather than the eastern snow tussocks being relic species, as was claimed by a government ecologist's committee in 1954, Alan showed that the tussocks (Fig. 1) were well adapted to the range of environments associated with their wide altitudinal range on the Central Otago mountains.

Alan's research also revealed exceptionally high water yields from the upland snow tussocklands, up to 80% of the measured rainfall of ~1500mm on fog-prone sites, which he attributed to a combination of low water consumption (evapo-transpiration) and very efficient interception of fog (up to half a litre of water an hour by a single snow tussock when there was no measurable rain). Exotic pine forest, by comparison, yielded 23% less water from an adjacent catchment on the Lammerlaw Range, emphasising the need to assess the trade-offs between water and wood/carbon before deciding on a forestation of our upland tall tussockland, particularly in water supply catchments.

Alan also traced the progress with tussockland conservation through the high country, from its late beginnings in the mid-1960s through to today, with ten South Island tussockland conservation parks, amounting to >500,000 ha, plus many additional

conservation areas. Much of this protection has been through tenure review of the Government's leasehold high country lands, plus some whole-property purchases, over the last 15 years. We also heard of several threats to the high country: wilding conifers (which are now being addressed in most areas), wind farms and agricultural intensification (particularly for dairying as in the Mackenzie Basin). Accounts of several other detailed ecological studies, from demography of three alpine *Myosotis* species, to alpine patterned mires, a snowfence, a century-old sheep graveyard, and possible ecological impacts of global warming (as a contribution to the international GLORIA programme), contributed to an enjoyable and informative evening for us far-away Aucklanders.

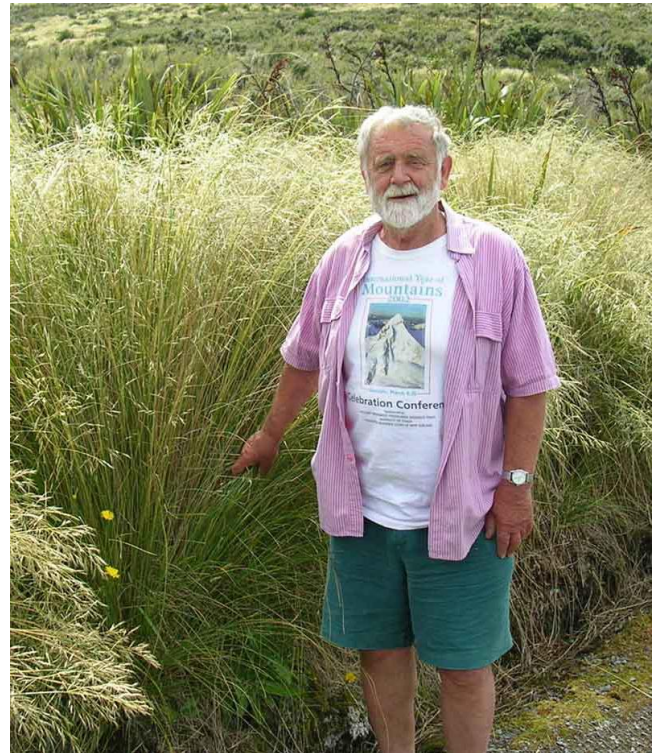


Fig. 1. Alan Mark among flowering snow tussocks (*Chionochloa rigida*), Flagstaff, Dunedin, 2006.