The impacts of predicted changes in snow regimes on the distribution of alpine vegetation

Roger Good

National Parks and Wildlife Service, Australia

1998

roger.good@npws.nsw.go.au

Keywords: snow, vegetation, climatology, climate changes, Alps, Australia.

Abstract

Snow has been a dominant weather feature which has influenced the occurrence and distribution of plant communities in the Australian Alps. Snowfalls per se are considered to have had little direct influence on the vegetation but it is and has been the responses of plant species to the depth and length of snowpack, and the temperature and moisture regimes which have been associated with the snowfalls over many years, which have given the alpine area its characteristic plant communities and floral landscape. Long term vegetation in any biophysical zone has to endure great ranges in climatic conditions. The climatic conditions of the alpine zone are no exception, with very wide temperature ranges in summer and extreme minimum temperatures in winter. This variability is also apparent with the amount, distribution and the number of days each year on which snow falls.

Moisture stress is experienced by the vegetation in both winter and summer, while severe wind conditions are a regular feature at any time during the year, particularly in late autumn, winter and spring. As a consequence, the vegetation has evolved and survives under the harshest of climatic conditions.

Global warming has been predicted to lead to major changes in global climates and hence have a considerable impact on the occurrence and distribution of snow in the Alps. Research suggests that with the predicted temperature rises and precipitation increasingly occurring as storm rains, temperature and moisture regimes conducive to snowfall may, in the future occur only in the vicinity of the highest peaks of the Alps. The impact that this rise in snowline may have on the vegetation is difficult to assess but a consideration of the origin and structural forms of the alpine plant species enables a prediction to be made, that the number of species will change little but the occurrence, distribution and extent of several plant communities will decline significantly, such that more species will be of very limited distribution or become considered as rare and threatened. These species will predictably be the

present obligate alpine species and several of the alpine endemics. eg. *Dichosciadium ranunculaceum, Colobanthus nivicola, C. pulvinatus and Euphrasia alsa.*

A consequent feature of the predicted reduction in the spatial and temporal snow cover will be the increased length of exposure of the plant species and communities to the high levels of ultra-violet light which occurs at high elevations. The influence of this in terms of plant distribution is difficult to ascertain but it is expected that the increased radiation will result in mutations and changes in plant morphology in some genera and species. Over time increased speciation will predictably occur and endemism increase from the current level of approximately eleven percent. Hybridisation will similarly increase in several genera such as, *Ranunculus, Craspedia, Luzula* and *Oreomyrrhis* which all exhibited increased hybridisation during the many years of alpine grazing.

Notes to readers

This is an abstract of a paper presented at: The Global Threats to the Australian Snow Country Conference held at the Australian Institute of Alpine Studies, Jindabyne, Australia. 17-19 February 1998.

To read all abstracts presented at the Global Threats to the Australian Snow Country Conference, go to:
http://www.aias.org.au/newsletters/newslet1.html#snow

The author may be reached at:

Manager, Natural Heritage Unit
National Parks and Wildlife Service
P.O. Box 2115
2620 New South Wales
Australia
Tel: 02 62989718
Fax: 02 62994281

The Mountain Forum would like to thank Ken Green and the Australian Institute of Alpine Studies for their permission to include this abstract in our Mountain Forum Online Library.