

# **Snow as a defining character of the alpine/subalpine fauna**

Ken Green

Australian Institute of Alpine Studies, National Parks and Wildlife Service,  
Australia

1998

Keywords: snow, climatology, climate changes, global warming, alpine fauna, Alps, Australia.

## **Abstract**

There is an obvious decline in animal species abundance with increased altitude within the latitudinal band of south-eastern mainland Australia which encompasses the Australian Alps. Among the vertebrates, there is only one endemic mammal species, four frogs and five reptiles. The greatest degree of endemism occurs among the invertebrates.

In the Australia Alps it is the snow rather than the altitude that determines the composition of the fauna. Snow plays an important role in protecting some animals from winter cold and at the same time limits opportunities for other animals. Examples of what limits the spread of animals into the mountains abound in the mammals and birds. Among the mammals some are excluded by habitat - lack of suitable tree hollows for example may limit the upward movement of possums. There are others that are limited by snow; the kangaroos and wallabies cannot move easily in snow and they may not be able to access food. These animals, excluded because of winter snow are also uncommon in summer. Birds such as lyrebirds and wrens which come right up to 1500m but not generally above are comparatively sedentary and are therefore excluded by persistent snow cover.

How predicted changes in climate will affect the alpine fauna depends very much on whether change is more towards a best-case scenario (least temperature increase, greatest precipitation increase) or worst-case scenario (greatest temperature increase, greatest precipitation decrease). We can gain some idea of the effects of global warming on the fauna by analogy, by looking at slightly warmer, moister areas in the first case and in the second by examining the reaction of the local fauna to years of excessively shallow snow. The effects of increased moisture and temperature would be a mainland alpine environment more similar to that in the Tasmania high country, with a climate similar to the cold wet areas of the montane forest below 1500m which are not favoured by small mammals. Currently these areas have a depauperate small mammal fauna and with a slight altitudinal increase the lowering of

temperature actually ameliorates conditions because once the snow cover is established mammals are protected in the subnivean space from the worst of the cold and wet.

An alternative scenario is that there might be slight warming and decreased precipitation, but with temperatures in the past few years dropping to as low as  $-23^{\circ}\text{C}$  at Charlottes Pass, even with global warming there will still be cold nights, cold weeks or cold months. We might see the paradoxical situation of global warming leading to the exposure of the animals to colder conditions because there is less snow to insulate them. This was the case in 1982 when temperatures as low as  $-8^{\circ}\text{C}$  recorded under the snow caused a decline in numbers of small mammals and groups of insects such as grasshoppers. Ponds would normally be insulated beneath the snow in winter but in June-July 1996 when the snow cover was late coming the temperature dropped to below  $-2^{\circ}\text{C}$  indicating that the water was solid ice - probably right down through the mud layer. The situation with shallow snow and animals is not, however cut and dried. Birds are not greatly affected by cold - more by food supply and the shorter duration of snow in 1982 led to the earlier flowering of Royal Grevillea and so there was an earlier and bigger influx of birds - mainly honeyeaters but without a great impact on the number of species.

---

#### 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:

Australian Institute of Alpine Studies  
National Parks and Wildlife Service  
PO Box 2228  
Jindabyne NSW 2627  
Australia

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