The snow season forecast: probably lighter and higher by 2020

Falls Creek Ski Lifts Pty Ltd

CSIRO's study predicts significantly reduced snow cover and depth in the Alps towards 2020. Falls Creek, and the other big resorts, will have to increase artificial snow-making efforts.

It is expected that winter tourism and alpine ecosystems will need to adjust to significant reductions in depth, duration and height of the regular snow cover in the Australian Alps because of climate change.

Government and industry bodies sponsored a CSIRO Atmospheric Research study that assessed future changes in cover in 2020 and 2050 from the projections of nine different climate models, and resulted in a new climate-driven snow model being specially developed.

In estimating the likely range of changes, two broad scenarios were considered: lowest impact – where only slight warming occurs and precipitation increases; and highest impact – where warming is greater and precipitation decreases. The results suggest that, with projections out to 2020, the Australian ski industry will need to plan for investments in adaptation measures – such as snow-making capability – to ensure viability is maintained.

According to the study range, by 2020, as things warm up, snow will probably cover the mountains by between 5 and 40 fewer days a year, maximum snow depths will decrease and occur earlier in the winter, and the snowline will recede higher up the slopes meaning the total area covered shrinks by 10 to 40%. On Kosciuszko, the September snow line is projected to rise 30 to 165 metres.

By 2050, there is much greater certainty in the projections, and the duration of snow cover reduces by 15 to 100 days, the deepest snow reduces by 10 to 99%, and the total area of snow cover shrinks by 20% to 85%. The figures, of course, range greatly depending on the particular spot in the Alps and the relevant elevation.

Snow-making provides one of the main ways ski resorts can adapt to the cover changes. At our higher, popular resorts, like Mt Perisher, Mt Thredbo and Falls Creek, a good skiing surface could be maintained in 90% of years up to 2020 by ramping-up the number of snow-guns by between 10 and 140%, with slightly greater increases needed at lower resorts like Mt Selwyn, Mt Buller and Lake Mountain.

While the CSIRO researchers looked especially at the capacity of current snow-machines, they point out that these figures don't take into account probable improvements in technology, or the fact that the availability of water for snow making may be more limited in future – especially under the higher impact scenario bringing much less precipitation to the Alps.

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In fact an additional benefit of CSIRO's snow modelling work has been the insight that it has provided ecologists and alpine conservation managers into the possible effects of reduced snow, rain, and melt waters on the specially adapted alpine ecosystems. With such changes happening over a relatively short ecological time frame, scientists will be able to use this modelling work to think ahead about possible adaptive measures for flora and fauna.

Dr Ken Green, an ecologist with the NSW National Parks Service, has been recording the dynamics of Australia's alpine ecosystems for many years. He expects, and in fact is already seeing, significant effects of reducing snow fall in the Alps.

'Since the 1960s, there has been a 50% reduction in the snow patch communities reliant on long-lasting snow for a cool moist environment, and the spring migration of birds to the Alps has become months earlier because less snow has meant earlier flowering of alpine plants,' he said.

Dr Green is predicting some big impacts on ecosystems as conditions change faster than flora and fauna can adapt.

'We are expecting predatory animals such as feral cats and foxes to move higher up the mountains because, with warming, snow is becoming denser and thinner allowing them to find alpine prey more easily – such as the native broad-toothed rat, which nests under deep protective snow.'

'Some unstudied but unique ecosystems are at risk, like those of the alpine lake ice which harbour specially adapted algae, bacteria and other small animals. Already the ice is melting in early October compared to December in the 1960s.'

The results of the CSIRO study were incorporated into the Victorian Alpine Resorts Strategy for 2020, released by Environment Minister Thwaites on 12 June 2004.

More information:

Hennessy, K., Whetton, P., Smith, I., Bathols, J., Hutchinson, M., and Sharples, J. (2003) *The impact of climate change on snow conditions in mainland Australia*, CSIRO Atmospheric Research.
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