Projected snow cover and the future of snow sports at Cairn Gorm

Description

Creative photography? Is snow making at these low altitudes sustainable? Photo taken from BBC news story (see below)

Two days ago the Cairngorms National Park Authorityâ??s publication of research on projected future snow lie attracted a fair amount of publicity, with headlines misleadingly suggesting that snow could be gone from the Cairngorms by 2080 (see here for example). That research is due to be considered by the CNPA Board on Friday. It forms the appendix to a paper on how the CNPA should respond to the Climate Emergency (see here). The main paper, titled â??Net zero with natureâ•, is silent about the implications of the findings for the future of downhill skiing and the research itself explicitly states that *â??Due to time constraints we were not able to compile more location specific (e.g. ski resort) dataâ•.*

The research provides a welcome opportunity to look at the implications of global warming for snow sports. More specifically, this post takes a look at the implications for Cairn Gorm and the long awaited masterplan which has been promised by Highlands and Islands Enterprise.

The research findings

The research findings, compiled by staff at the James Hutton Institute under the auspices of Climate X Change, are carefully framed and worded, with numerous caveats. The findings are based on meteorological records from Balmoral 1918-2018 (apparently the most complete set of observations in the Cairngorms) and observations of snow lie between 1969 and 2005 from White Hillocks 24km away in Glen Clova. This was one of 140 sites in Scotland which formed part of the Snow Survey of Great Britain, which was undertaken by various volunteers between 1945-2007. White Hillocks is the site with the longest records which is reasonably close to Balmoral which is why it was chosen.

The basis of the research is far from ideal, as the report acknowledges, not least because as every skier and mountaineer knows, snow conditions can be radically different on the eastern and western side of the Cairngorms.

What amazed me is that the researchers were not able to access data on snow lie from the ski centres. Highland and Island Enterpriseâ??s predecessor, the Highlands and Islands Development Board, took over the Cairn Gorm estate in 1971 from the Forestry Commission to promote skiing. Had they recorded snow lie between then and now, a period of almost 50 years, we would now be in a very good position to take rational decisions about the future of skiing at Cairn Gorm based on climate science. I will ask HIE, under FOI, for all data they and Cairngorm Mountain Scotland Ltd do have but am not hopeful. What we do know that is Highlands and Islands Enterprise allowed Natural Retreats to remove Winter Highlandâ??s webcam from the Scottish Ski Club Hut back in 2017 (see here) because didnâ??t want any independent or impartial recording at Cairn Gorm.

Returning to the research, extrapolating from past trends based on these two data sources and postulating future temperature rises, the main conclusions should not be surprising to anyone who recalls the days when you used to drive up to the ski centres between walls of snow. The current trends of less snow, lying for much less of the year, will continue unless we somehow manage to stop global warming. More specifically snow cover will become increasing rare in October and November (any snowy season will be much shorter with some years experiencing no snow) and will increasingly be restricted to higher altitudes.

The research does briefly consider how this might affect downhill snow sports:

â?• The results of this exercise are in Figure 5, and can be compared to the ski centre elevation ranges:
â?¢ Cairngorm: 630 to 1150m
â?¢ Glenshee: 650 to 920m
â?¢ Lecht: 580 to 780m
Note the bulk of ski activity lies in the 600 â?? 800 m elevation range. The trend for the number of days of snow cover below 400m and 400-600m elevation ranges simulated (Figure 51) all approach zero by 2080, but with large variations between climate model ensemble members and years. At elevation ranges 600-800m and over 800m, the trend indicates a reduction by more than a half of the current number of days with snow cover, with some climate projections indicating potential for very few days with snow cover even at higher elevations.â?•

The research didnâ??t say was that all snow cover will have disappeared by 2080, rather it presented a picture of gradually increasing snow loss:

â??2020-2030: similar amounts and level of annual variation of snow cover to the past at all elevations. Some years likely to be similar or even possibly greater snow cover than in the past.

â?¢ 2030-2040: declining snow cover but with similar levels of annual variation to the past at all elevations. Some years likely to be similar to the past but not achieving the larger quantities or spatial coverage of snow cover, especially at the low- to mid-range elevations.
â?¢ 2040-2050: rate of decline increases at all elevations to approximately half of historic long-term average snow cover. Average amounts of snow cover similar to the lowest levels seen in the past.
â?¢ 2050-2080: continued increasing rate of decline particularly at higher elevations, approaching <25 days above 600m on average, but with some years where the largest amount of snow cover is similar to the historic low amounts. There is potential for some years to have no snow even at the highest elevationsâ?•

The implications of the research for snow sports at Cairn Gorm and in the Cairngorms

The clear message from the research is that sufficient snow for downhill snowsports is going to become an increasingly rare occurrence, particularly at lower elevations. It seems likely that in the medium term downhill snowsports will become unviable first at the Lecht, the lowest of the ski resorts, then at Glenshee.

Cairn Gorm, however, is much higher and ironically, after the decades of mismanagement, is the one place where it looks like downhill snowsports might still be possible in 50 years time. The implicatins with ski infrastructure having a life expectancy of say 40-50 years, is that investment in such infrastructure at Cairn Gorm could still be justified.

Indeed, from a recreational point of view there is a strong argument that if snow lie is likely to last longer at Cairn Gorm than elsewhere, it should be the priority area for any future investment in ski infrastructure, from lifts to snow making machines. This is actually an argument about the national interest. If we want people still to be able to experience the joys of downhill snowsports in Scotland, the most likely place we are likely to be able to sustain that is at Cairn Gorm.

That doesnâ??t mean to say ANY snow sports development at Cairn Gorm is sensible, infrastructure needs to be based on where snow lies now and is likely to lie into the future. Indeed the research reinforces the fact that placing new ski infrastructure low down on the mountain is likely to fail. HIEâ??s proposed new beginnerâ??s ski area by the Day Lodge in Coire Cas (see here for example), together with snow machines, is located at c630m, at the bottom of the 600-800m elevation where the research shows snow lie is becoming increasingly problematic. HIEâ??s plans therefore appear far from wise.

Yesterday HIE issued a news release about the opening of Cairn Gorm mountain for winter sports on Saturday. In this they stated their snow machines have been creating 96 tonnes of snow every day since the beginning of October (see here). What they didnâ??t say â?? and the photo supplied to the BBC which is featured above has been taken from an angle that makes the area covered by artificial snow appear as large as possible â?? is how much of this snow has melted since 1st November and therefore how much snow all that diesel has created (see here). (NB HIE has now stated on Facebook that the vegetable diesel which they intend to use will NOT be based on palm oil).

CMSL webcam today. Its not been cold enough for the snow cannons to make any snow which raises questions about how sensible it is to place snow making machines in the area just to the left of this view.

With predicted downpours today it will be interesting to see how much snow survives into the weekend . Whatever happens, what the research tells us is the area near the day lodge appears unlikely to be sustainable as a beginnerâ??s ski area, artificial snow or not. The snow machines need to be located higher up the hill.

The highest area for snowsports at Cairn Gorm is of course the Ptarmigan bowl and the research re-inforces the fact that this is where snowsports are most likely to be able to continue in future. Lift access to the Ptarmigan bowl therefore needs to be at the centre of any new masterplan for Cairn Gorm. The planning challenge comes with how best to link this area with the most reliable areas of snow lie lower down the mountain.

The SE Group report commissioned by HIE (see here) prioritised Coire Cas for the development of new ski lift infrastructure with any connection to the Ptarmigan bowl coming at a later stage. Neither this nor the arguments HIE used for rejecting new infrastructure in Coire na Ciste was based on any analysis of snow cover. The highest point in Coire Cas, at 1000m, is barely higher than the bottom of the Ptarmigan bowl lifts and, even if new pistes were bulldozed through the Coire, as the SE Group proposed, there are some serious questions about the viability of snowsports here in the medium term. Moreover, where snow ends up lying is not just about altitude, its about where snow is redistributed by the wind and exposure to rain which does more than anything to melt snow. Coire Cas is very exposed to both.

Unfortunately, the voluntary organisations who recently launched Cairn Gorm: A Vision for the Future while rightly stating that any plan for the future should take account of the effects of global warming also

suggested that the staring point for any new ski infrastructure should be Coire Cas. That doesnâ??t appear based on any analysis of snow cover and should not be used to give any credence to HIEâ??s current attempts to confine any future developments to Coire Cas. The voluntary organisations are right to insist there needs to be a proper masterplan for Cairn Gorm but this needs to start with an analysis of snow lie.

The Save the Ciste Campaign has in fact done much of this work. While the bottom of Coire Cas is higher than the bottom of Coire na Ciste its also far more exposed to the prevailing wet south westerly winds which melts the snow. Coire na Ciste is also narrower than Coire Cas, forming a V-shape rather than a U-shape, and as a consequence traps wind blown snow creating a natural run for skiers:

Coire na Ciste 19th November after snow fall â?? note the extent of the burn that is visible. Photo Credit Alan Brattey

Coire na Ciste 21st November 2019. Note how the upper section of the burn has filled in. Photo credit Alan Brattey.

The two photos show how snow has been redistributed across the hillside and started to form a base along the Allt na Ciste. This line could still provide one of the best natural downhill ski runs in Scotland. Unfortunately HIE removed the connecting lift infrastructure without any consultation (see here). The main problem with this run had been that at the very bottom â?? visible above the dark ridgeline in the photo â?? there was sometimes insufficient snow cover to connect the run with the lifts that used to be here. That is why the Save the Ciste group suggested that snow making machines should be placed here, utilising hydro energy from the Allt na Ciste, and why this area â?? which is sheltered â?? would be good for beginners.

The worth of any masterplan for Cairn Gorm should be judged by how far it looks at the various options for new lift infrastructure based on an proper analysis of snow lie and the impact of rising temperatures. An analysis of likely future snow cover might also suggest other options for the location of lifts and snow machines which have so far not been considered. Only once future snow lie has been established, will it be possible to look at the financial viability of any new or repaired infrastructure. This should b based on the cost of the investment, the whole lift costs of that infrastructure and the likely number of days when snowsports will be possible during the life of that infrastructure.

What happens if snow sports are no longer viable?

Suppose, however, that after a proper analysis of snow lie, the conclusion was reached that snow sports at Cairn Gorm was not sustainable even in the medium term (without say levels of government subsidy that were judged unacceptable). In that scenario, the business case for repairing the funicular railway would collapse. For the justification for the funicular has always been linked to the continuation of snowsports on the mountain. In the first place it was claimed it would provide more reliable access for beginnerâ??s to the Ptarmigan bowl, claims that have been disproved by history but are in any case now redundant because modern lifts can operate in windy conditions. Secondly, the funicular was justified as enabling Cairngorm Mountain to operate year round â?? maintaining jobs â?? as a means of bringing income to the mountain. Actually the opposite has happened but if a decision was taken NOT to invest in new snow sports infrastructure, any justification for repairing the funicular would disappear. Instead, in that scenario, the rational thing to do is remove the funicular and all the other infrastructure, apart from visitors facilities, and let the mountain return to nature.

What needs to happen

Prompted by the research commissioned by the CNPA, this post has argued that BEFORE any decisions are taken at Cairn Gorm, there needs to be a proper analysis of likely future snow lie at Cairn Gorm. Any future planning applications, the masterplan and decisions about the funicular all need to based on a proper scientific look at likely snow lie at Cairn Gorm over the next 60 years given continued global warming.

What this should entail is that:

- HIE should make public all information/data it holds that relates to snow lie at Cairn Gorm (images, data on operation of lifts etc etc)
- A reputable scientific body â?? the staff at the James Hutton institute would seem well placed to do this â?? should be asked to analyse that data against the records of the weather station at the top of the mountain and use this to predict areas where snow is most likely to lie in future. This would then form the basis for ALL planning at Cairn Gorm.
- The Scottish Government should put a decision about the repair of the funicular on hold and ONLY take decisions about this once a plan for NEW ski infrastructure has been developed and agreed.
- The Scottish Government should remove HIE from Cairn Gorm and get another body to run Cairngorm Mountain (Scotland) Ltd. Serious consideration should be given to asking one of the other ski resort operators, who have developed significant expertise in how we can maximiseng snowsports potential in times of lean snow, to become involved in managing the business (alongside the local community and conservation organisations).
- The Cairngorms National Park Authority should require that the long promised masterplan for Cairn Gorm is based on a proper analysis of future snow lie
- The CNPA should refuse to grant PERMANENT planning permission for any developments on Cairn Gorm, particularly the new beginnerâ??s ski area, until this work on snow lie has been completed and agreed by stakeholders

Category

1. Cairngorms

Tags

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