The impact of the Cairn Gorm Conservation Strategy on upland biodiversity.

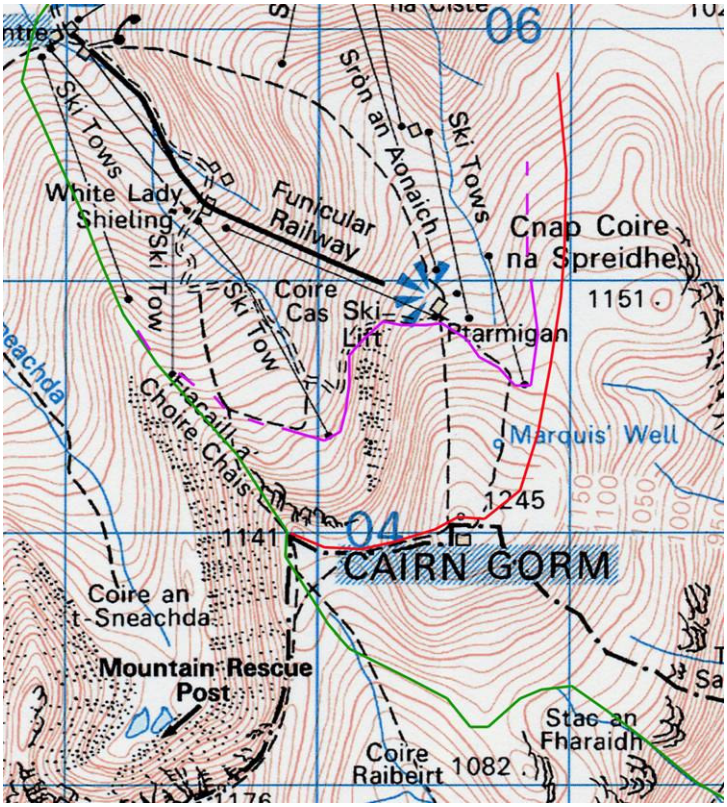
Cathy Mordaunt

CairnGorm Mountain Ltd, Cairn Gorm Ski Area, Aviemore PH22 1RB

Background

The Cairn Gorm funicular was completed in December 2001, following over a decade of planning and associated controversy. The planning consent required a Section 50 agreement to manage the direct and indirect impacts of the development, with a planned expansion of non-skiing visitors of over 1000% on the funicular relative to the chairlifts that it replaced. The Section 50 agreement is there to protect the natural heritage of the area and to ensure that the developments, particularly but not exclusively, the funicular, do not adversely affect the integrity of the adjoining *Natura* sites.

Figure 1. Limits of the *Natura* site and the Cairn Gorm ski area.



The eastern boundary of the *Natura* sites can be seen in Figure 1, marked in green. The red line marks the upper extent of the leased Ski Area, including the summit of Cairn Gorm. For practical purposes, the patrolled ski area follows a much lower line through Coire Cas, round the top of the Ptarmigan tow and down the east wall of the Ciste, marked in purple.

The greatest concern was the number of people taking the train versus the chairlift in summer and their potential egress from the Ptarmigan. Estimates were in the order of 165,000 for the funicular, rather than approximately 15,000 by the end of the chairlifts' lives. This sort of increase in numbers could clearly have significant impacts, which were already high for the Cairn Gorm plateau.

The mechanism for limiting these potential impacts is the Closed System, now known as the Conservation Strategy at CairnGorm Mountain. The system requires that non-skiing visitors do not leave the Ptarmigan building and viewing terrace, while in winter skiing visitors and ski spectators may not access the *Natura* sites via the funicular. In practice,

this means that visitors during the non-skiing season are confined to the Ptarmigan building and viewing terrace, while during the skiing season, skiers, boarders and ski spectators are required to stay within the patrolled ski area. Thus there is no permissible short-cut to the Cairn Gorm plateau, Ben MacDui and the A'an basin for walking, climbing, skiing or bird watching.

Delivery of the legal requirements

The big questions are:

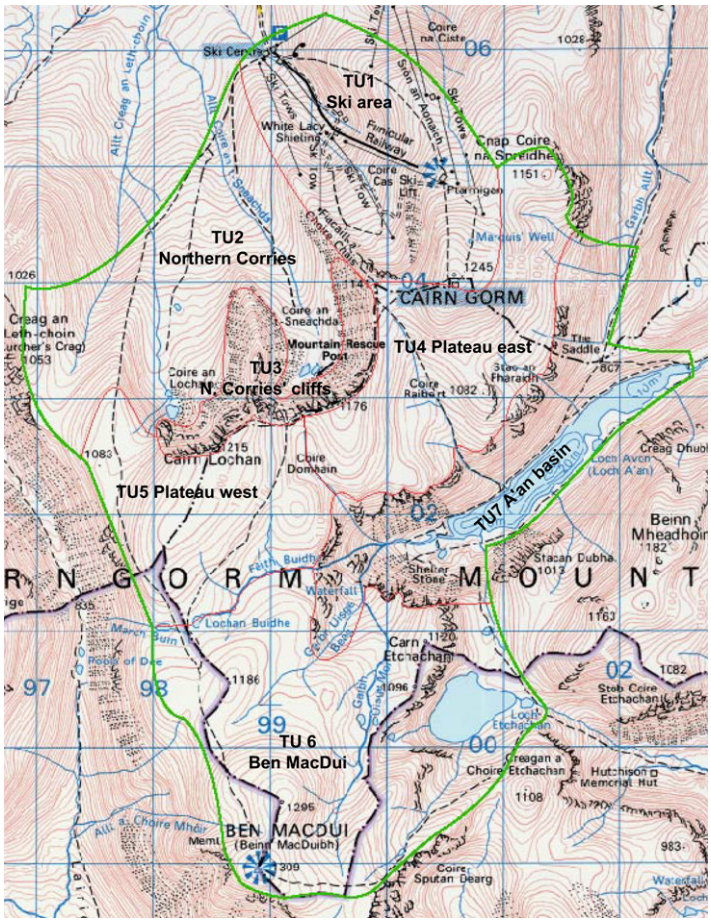
- Does this system work?
- Is the short-cut to the plateau effectively eliminated?
- Is the system leaky, and if so, how leaky is it?
- Do people agree with the system and understand why it is there?
- Are there other knock-on effects of introducing this system?
- Finally, is it beneficial to the ecology and biodiversity we are trying to protect and enhance?

The Detailed Monitoring Scheme

The Detailed Monitoring Scheme (DMS) tackles general objective 3 of the Visitor Management Plan or VMP, *"..to identify and monitor visitor impacts as a direct result of the funicular development, and thereby guide future management."* It describes the range of objectives and available tools that may be required to meet the needs of the Section 50 agreement. Reserve powers over and above those currently in force may be called on to ensure that the development does not adversely affect the *Natura* sites.

The area covered by the DMS is large – approximately 30 km^2 – to cover the full range of potential direct and indirect impacts of the changes of the funicular development, with over half of it lying at or above 1000 m asl (Figure 2).

Figure 2. Boundary of the monitoring area, shown in green.



Aspects monitored

The most significant subjects for monitoring are the visitors themselves. They are observed

throughout the monitoring area as they go about their activities and they are also questioned as returning walkers, climbers, birders etc and as funicular passengers. There are several people counters that monitor visitors walking along paths within the area.

The state of footpaths and habitats in those areas where trampling is known to occur is monitored, as is dotterel due to its status as a qualifying species for the *Natura* designation and one most likely to be affected by human disturbance. Geomorphology, soils and bryophyte springs and flushes also form part of the suite of subjects and the whole area is covered by an aerial survey at 1:5,000.

Identifying impacts as a direct result of the funicular requires good pre-funicular baselines with which to compare the present conditions. These were initiated in 1997 and completed in 2000. Some of the baseline surveys were good. Others proved to be unsuccessful in delivering the repeatability and power required to monitor for change. This is problematic when it comes to assessing the impact of the new management measures in real, statistically significant terms, though it is often possible to offer an informed view.

The aspects monitored are repeated as required. Currently, habitats, footpaths, dotterel and a range of visitor surveys are carried out annually while geomorphology ground images, aerial images and the bryophyte spring survey are carried out every five years.

Fieldwork issues

One of the main delivery problems is working in the conditions often found on the plateau. High average annual wind speeds and a potential temperature range from -10 to +40 ^{o}C create a wide range of unsuitable fieldwork conditions. Fieldwork requires 2 or 3 diary days for delivery of one successful field day owing to difficult conditions and a Dictaphone is more useful than paper for recording data. PDAs are generally not useable, so data still has to be laboriously transferred to spreadsheets by hand.

Permanent markers have limited use and are prone to loss. Relocation with GPS is not without problems, with errors of up to 1000 m found in the area. Most fieldwork is now focussed around permanent features such as boulders or other ground characteristics and all such “markers” are carefully recorded using photography.

Results and discussion

One of the most surprising findings from the Visitor Questionnaire survey is that there is a very high level of agreement with the conservation strategy (Figure 3). There is also general understanding of why the system is in place, with 71% knowing the reason for the restrictions (Figure 4).

While the vast majority agree with the system, there is a very large percentage of funicular visitors who would access the hill using the funicular if the restrictions were not in place. There is also a significant proportion of the walking population that would use the funicular to access the hill if they could (Figure 5). Combining the data of funicular passenger numbers of 165,000 per annum and a conservative estimate derived from the observation survey and people counters of a total population of 65,000 summer walkers, an estimate of the total potential egress from the Ptarmigan building, if it were completely unmanaged,

Figure 3. Level of agreement with the access restrictions from the Ptarmigan building from funicular passengers.

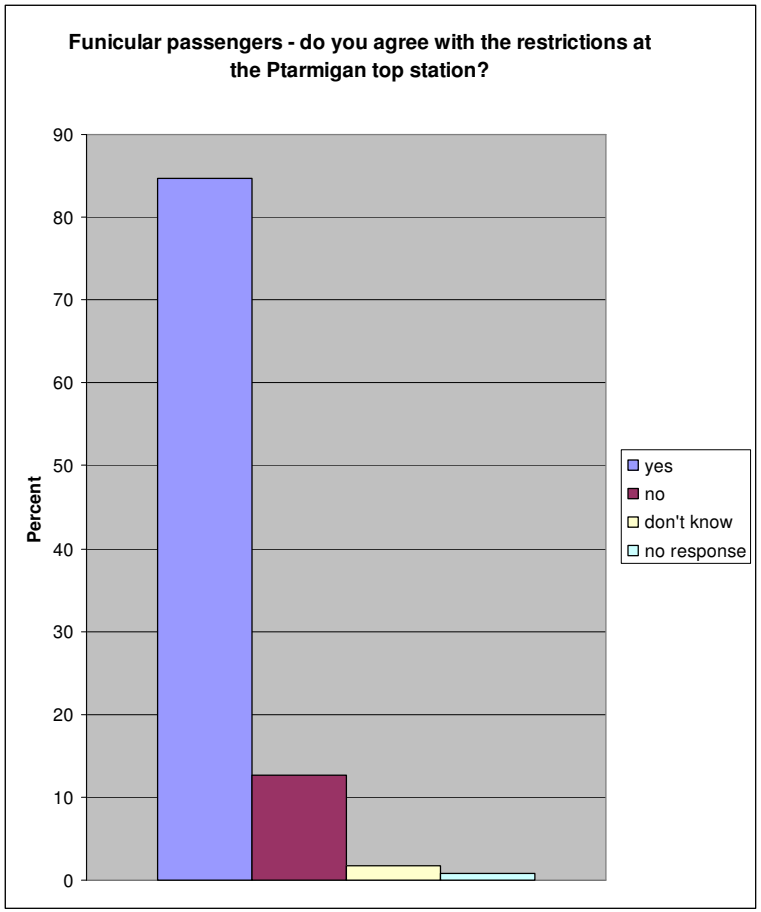


Figure 4. Level of use of the funicular to access the mountain from the Ptarmigan building, were that possible; funicular passengers.

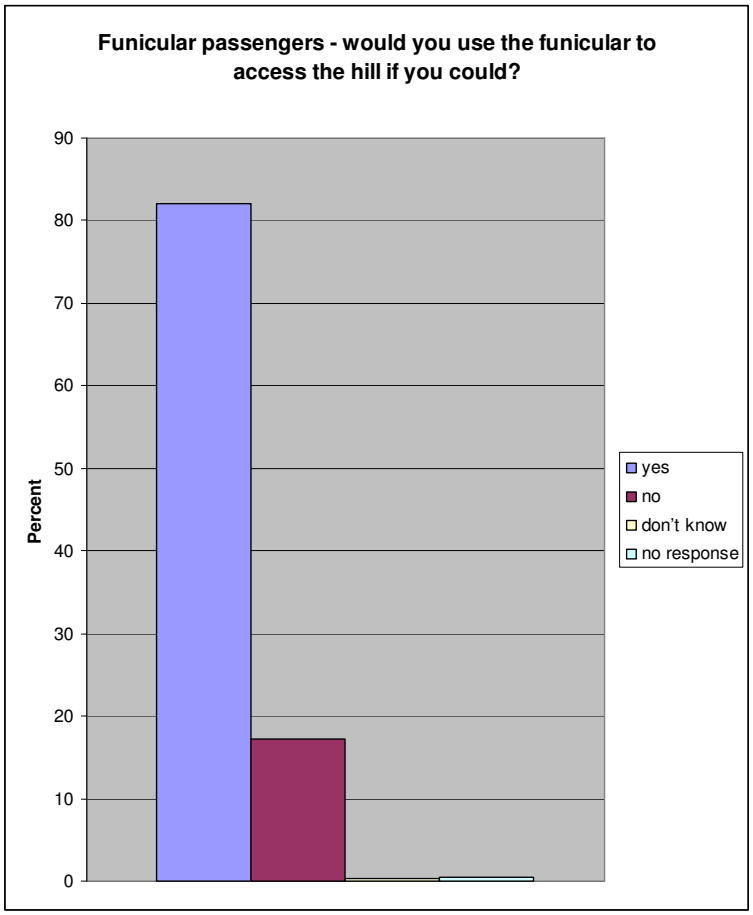
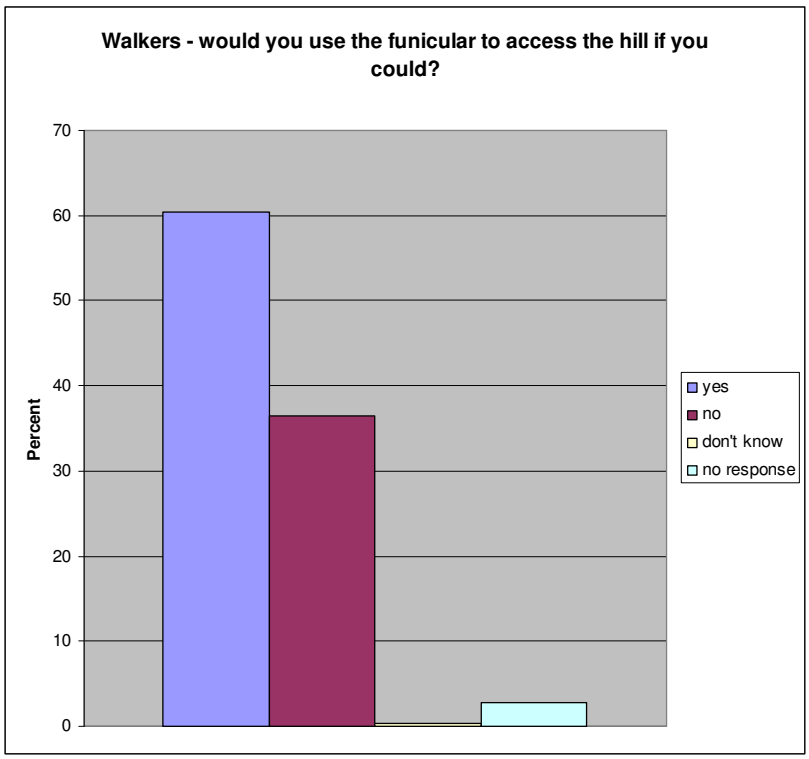


Figure 5. Level of use of the funicular to access the mountain from the Ptarmigan building, were that possible; walkers.



can be extrapolated (Figure 6). This would probably lead to between 30,000 and 40,000 people accessing the *Natura* sites, which would clearly be ecologically unsustainable and fully justifies SNH's objections prior to the Section 50 agreement.

The data from the Coire Cas car park counter, combined with an average occupancy of 3 people per car, gives a total number of visitors to the car park in the region of 450,000 per annum. There is no real change to the total number of cars in the car park pre- and post-funicular, but there is a significant change in the seasonal distribution (Figure 7). The increase in summer numbers is offset by a reduction in winter numbers.

Skier numbers for the funicular were based on an average of 150,000 skier days per winter; they are now at 1/3 of that level. This pattern is reflected in the whole Scottish ski industry (Figure 8) that now has a total equal to that predicted in the funicular planning for Cairn Gorm alone. This is at least partly the result of the greater ease of

Figure 6. Potential numbers annually exiting the Ptarmigan building in an unmanaged system. The legend categories refer to the potential distance walked: short walk - 10 minute or so; top of CG - top of Cairn Gorm; down the hill - back to the car park; 2 hours + - a walk long enough to access the Natura sites; other - any other specified activity eg birdwatching, climbing on Stag rocks etc.

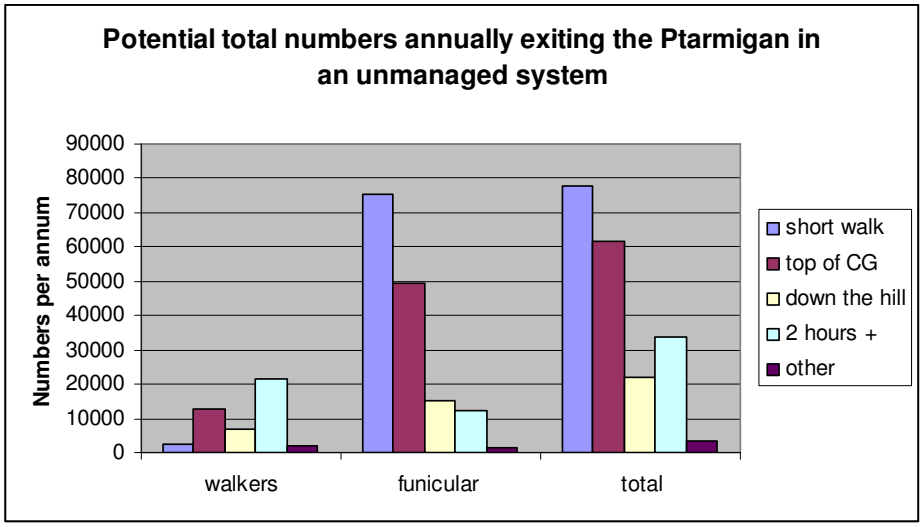


Figure 7. Car park vehicle numbers, 1997 to 2005.

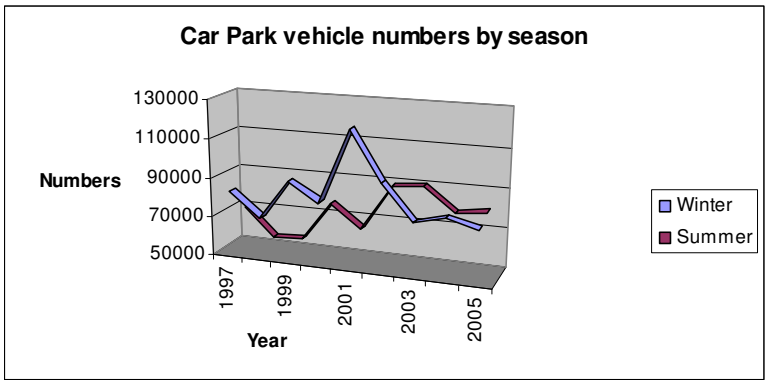
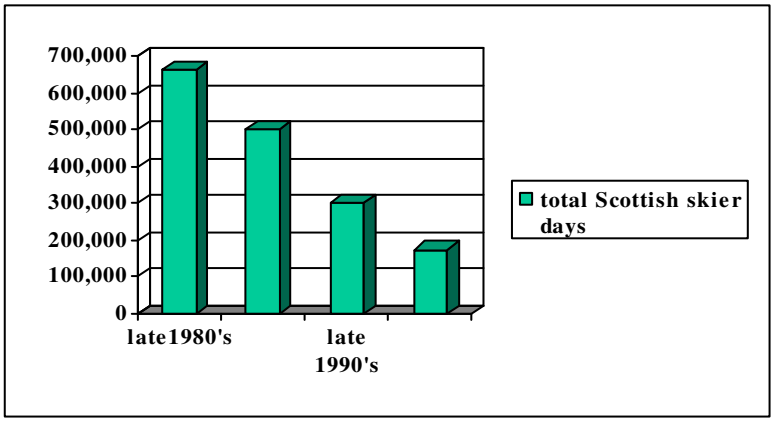


Figure 8. Total Scottish skier days over the past 20 years.



access to Europe and North America for skiing, and the associated reduction in price, but it is also related to climate change and a reduction in the reliability of snow at Cairn Gorm.

Summer visitor numbers have been in the range 160,000 to 180,000. Monitoring shows that there is only a very small amount of leakage from the Ptarmigan building, at very most 0.4% of the total non-skiing visitor numbers. The success of the system is largely thanks to the extensive use of interpretation on site, where the conservation value of the system is promoted. This reduction from the pre-funicular chairlift access in summer of approximately 15,000 visitors has not yet shown a change on the ground in terms of footpaths or habitats, except where active reinstatement has taken place.

One area where a change is beginning to show on the ground is in dotterel breeding success. They show no change in their core area, but there has been an increase in the last 2 years on Cairn Gorm – with 7 successful breeding attempts in both of the past 2 years compared with the average of 4 in the pre-funicular surveys. More data are going to be required to give statistically significant results and to make any connection with the change in numbers on Cairn Gorm, but there is an indication of a trend.

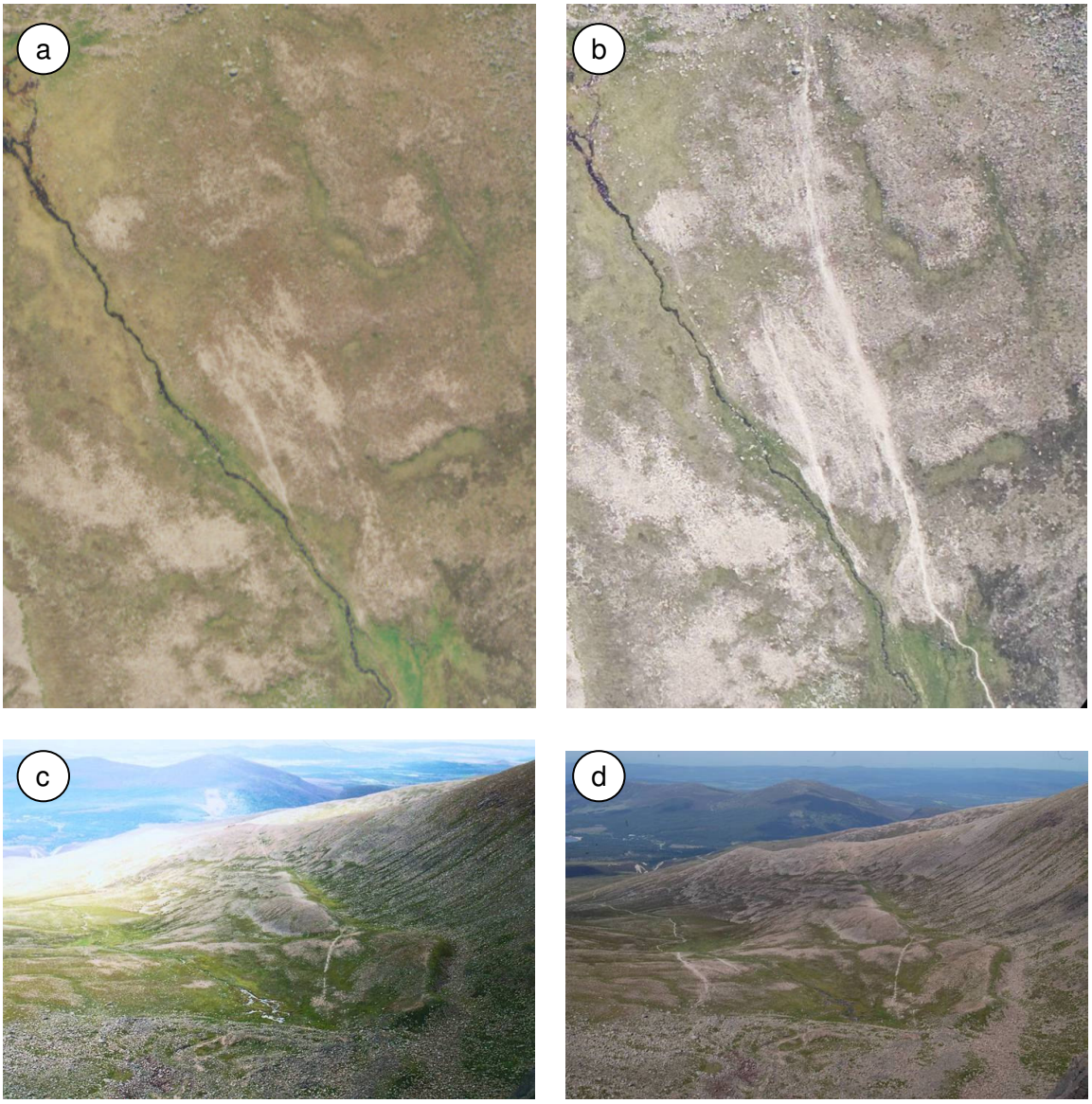
One bird nested within 400 m of the Ptarmigan building and about 50m of the summit path. He

Figure 9. Male dotterel incubating 3 eggs close to the Cairn Gorm summit path, June 2006.

successfully hatched 3 eggs and was counted in the survey in 2006 (Figure 9).

The first aerial survey was flown in 2000 and repeated in 2006. There are very few changes to observe, with one or two notable exceptions, as illustrated in Figure 10. Changes here are the direct result of footpath construction leading into Coire an t-Sneachda. The end of the newly constructed path can be seen in the bottom RH corner of the 2006 aerial image (Figure 10b). Diffusion of trampling over a wider area had less obvious impacts – concentrating it really shows the level of use and a significant change in erosion. The same changes can be seen in the geomorphology ground photos of the same site, again retaken this year (Figures 10c, 10d). The path in question is on the LHS of the 2006 image (Figure 10d).

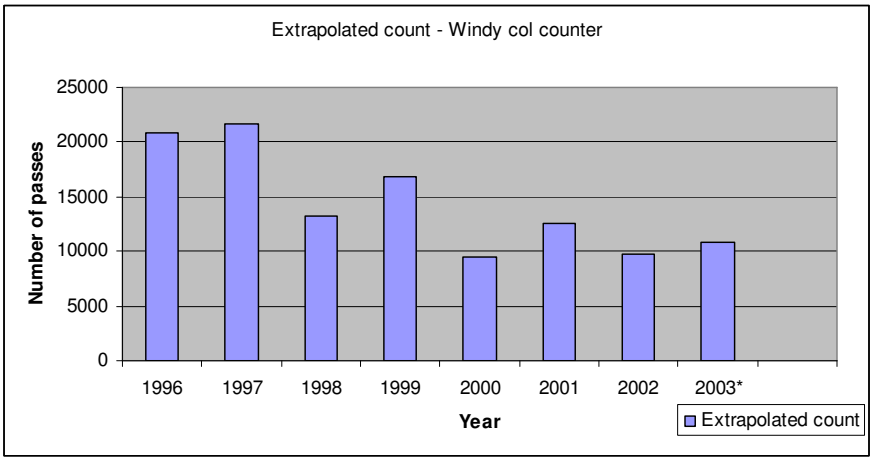
Figure 10. Top of path into Coire an t-Sneachda. a) aerial photo, 2000; b) aerial photo, 2006; c) ground photo, 2000; d) ground photo, 2006.



From an ecological point of view, clearly defined routes that people stick to are much better than a wide dispersal of impacts. But there is no connection between issues like this and the funicular development. So there is a growing trend for wider use of the scheme in terms of information for general management, rather than that directly related to the funicular development.

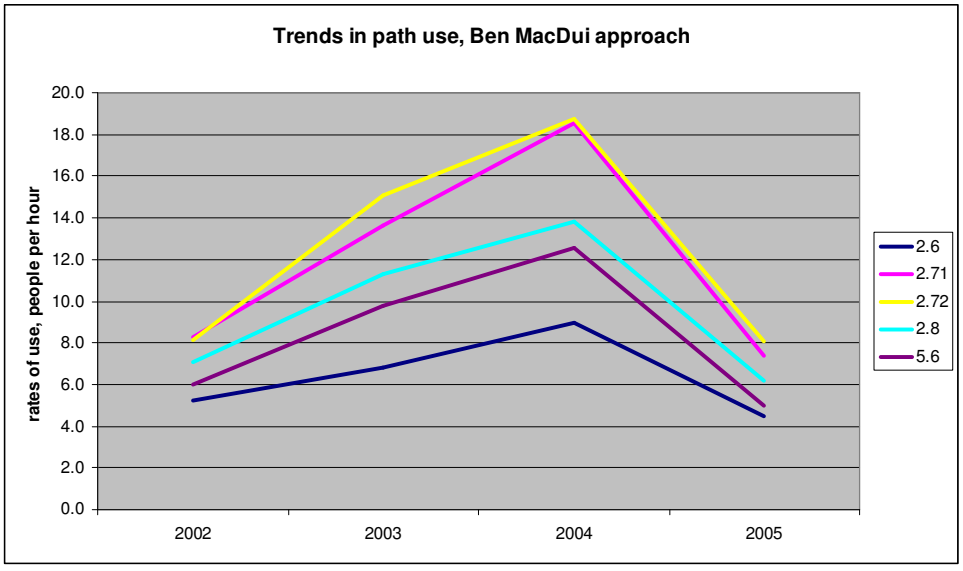
Changes in footpath-use are not straight forward. Some are very obviously less than pre-funicular, such as the level of use on the Cairn Gorm summit path which is down to 30% of its pre-funicular use and is directly related to the funicular, and the data from the counter at Windy col, on the rim of Coire an t-Sneachda, which may or may not be due to the funicular (Figure 11).

Figure 11. People counter data from Windy col, rim of Coire an t-Sneachda.



Others, such as the peaks and troughs seen in the Ben MacDui path data (Figure 12), do not appear to bear any relationship to the funicular development, nor to such simple factors as weather. Other factors, such as the creation of the National Park or something as simple as the publication of a new guide book or magazine article, could be more viable explanations for this pattern of use.

Figure 12. Ben MacDui approach from Lochan Buidhe, levels of use 2002-2005. The legend refers to numbered segments of path from Lochan Buidhe to the top of Ben MacDui, in sequence 5.6, 2.6, 2.71, 2.71, 2.8, with 5.6 closest to Lochan Buidhe and 2.8 closest to the summit of Ben MacDui.



There is a general reduction in the amount of off-path use on the plateau as well as a longer term trend with falling numbers on the rim of the corries route. This may be related to changing demographics, an ageing population and the wider range of possible recreational activity available to young people.

Conclusions

The DMS shows that the management measures designed to protect the biodiversity of the Cairngorms plateau are, in this case, working. Visitors agree with the measures and that proportion will only grow, making the system increasingly viable. Knowledge of the reasons behind the measures encourages appropriate behaviour and will lead to more secure and potentially greater biodiversity.

We should not be frightened to encourage those behaviours that benefit a sound mountain ecosystem. By engaging visitors from local communities as well as the wider national and global community, we give value to upland biodiversity and an understanding and sense of ownership that encourages participation in change for the better.