Cairn Gorm Mountain – Review of Visitor Management Plan to explore access options at Ptarmigan Top Station

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Executive Summary

The Visitor Management Plan has been in place while the Cairngorm Funicular Railway has been in operation and has ensured that there have been no measurable impacts on the Natura designated sites from funicular users. The detail monitoring has been used to confirm the state and pressures on the habitats and species and has shown that the 'closed system' and associated visitor management on the estate has led to recovery of impacted habitats from the previous operations of the chairlift. The environmental conditions on the mountain means that the rate of recovery is slow and habitats remain susceptible to changes in visitor use.

With the re-opening of the funicular in 2023, this review has been undertaken to investigate the options and implications for further evolution and adaptation of the Visitor Management Plan to allow managed access from the funicular stations. A proactive, near real-time, management system is proposed that will help to monitor and respond to patterns of visitor use around the upper part of the mountain and the plateau. This innovative system will take some time to test and implement and a precautionary approach to expanding access will be taken, to ensure there continues to be no measurable impact on the Natura designated sites as a result of the operation of the Funicular.

The objective is to allow more visitors to experience the high mountain environment first-hand and provide opportunities to enhance their understanding and enjoyment of this special place.

Monitoring framework

The VMP broadly reflects a DPSIR (Driver-Pressure-State-Impact-Response) Framework (OECD, 1993), which is generally reliant on cause-and-effect relationships to inform Societal Responses (or management responses, in the case of the VMP). A DPSIR framework can, theoretically, be used to intervene in a system to minimise or reverse impacts caused by (in the case of Cairn Gorm) visitor pressures. However, the although the monitoring scheme aspect of the VMP was modified to focus on Pressure variables, it has been unable to identify reliable Indicators that allow proactive management (i.e. interventions that prevent impacts rather than responding to impacts). Data analysis has been done annually, which is not conducive to adaptive management.

Alternative frameworks, such as Visitor Use Management or Limits of Acceptable Change also have significant weaknesses at the 'granular scale' of Cairn Gorm Estate. These would require a determination of 'carrying capacity' beyond which an intervention would be required. This would be a somewhat arbitrary figure and it would be extremely challenging to differentiate pressures and impacts associated with funicular users from those of other visitors.

Previous monitoring under the VMP demonstrates that there is generally a significant time lag between the actions of visitors and measurable changes to the environment, with the possible exception of responses of breeding birds to disturbance. However, the data available for dotterel indicates that the effects of disturbance by funicular users are not significant in breeding success and therefore monitoring of population or breeding status is not an effective indicator of disturbance.

Measurement of path condition using the Upland Path Advisory Group methodology of Amber Survey was not designed to differentiate change at an appropriate sensitivity to be useful for monitoring and it is challenging to attribute any changes recorded to funicular users. The technique has relevance in assessing condition of paths for the purposes of maintenance and management, but the full survey has no further benefit to the VMP. However, the photographic dataset produced through the Amber Survey has value in qualitatively demonstrating change at fixed locations, without the encumbrance of accurate fixed-point-photography methodologies for image analysis.

Aerial imagery can be used to analyse habitat condition and the extent of trampling, and enhancements in technology have brought down the cost and improved the viability of producing repeatable datasets. However, it is not currently possible to provide 'real-time' data or detect early indicators of change to inform management decisions.

The Indicators of State and Impact are therefore not considered to provide the basis of a robust monitoring framework for adaptive management. They would not give confidence to the Funicular Operator or s50 signatories in responding to changes in visitor use or ensuring compliance with management rules that may be required. This means that better Indicators of Pressure need to be found for monitoring the effects of adaptations to the VMP.


Summary of monitoring to 2019

A Detailed Monitoring Scheme has been in place throughout the operation of the Cairn Gorm Funicular, as part of the Section 50 agreement (under the conditions of planning consent). A review of the monitoring between 2003 and 2018 was produced in 2020 by the Reporting Officer (Walking-the-Talk, 2020).

The analysis of ticket sales indicates that the Closed System (whereby access from the Ptarmigan Top Station is restricted whenever skiing is not operational) accounted for 1.6 million visits during its

operation with 15,000 managed visits from the Ptarmigan Top Station, as part of the Walks @ The Top guided walk programme.

Figure 1 Summary of ticket sales (May - October) as part of the Closed System
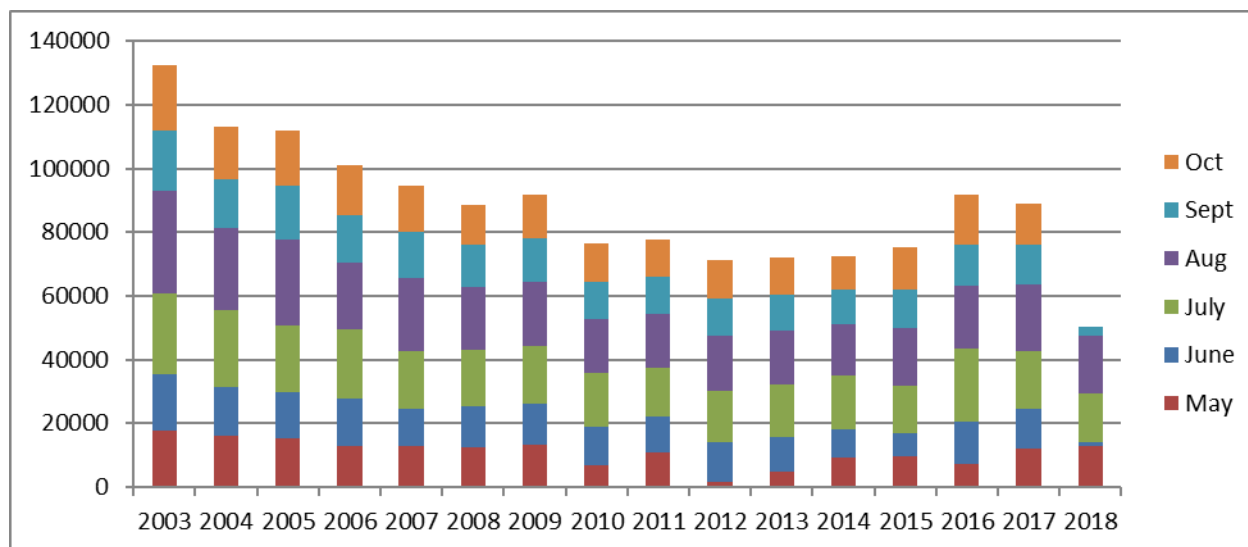
The automatic people counters provide an indication of wider visitor use of the estate, showing that the Closed System reduced the visitor pressure at Cairn Gorm summit and the operation of the funicular has had no significant impact on visitor patterns on other parts of the estate.

Figure 2 Automatic people counter data (modelled daily counts) for selected paths 1996 - 2018
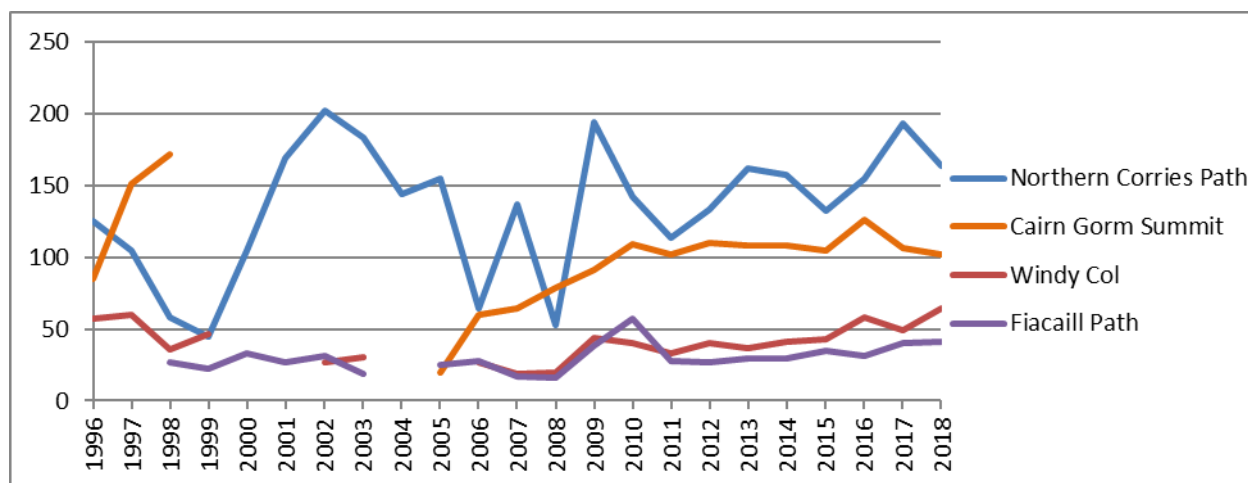
The summary highlights the positive impact of the Closed System and path management interventions to minimise the impact of visitors on habitats and species that are protected as part of the designated Natura sites and further habitat monitoring undertaken in 2020 (not yet included in the monitoring reports) confirms that there has been a measurable decrease in bare ground, and increase in species' colonisation of monitored areas during the operation of the funicular – this represents partial-recovery of damage caused as a result of visitor pressure during the operation of the previous Chairlift.

Drivers of change to the VMP

The VMP is focussed on the operation of the funicular but also considers wider issues of visitor management on the estate – this report is restricted to the potential implications of changes to the VMP through altering access arrangements at the Ptarmigan Top Station and potential pressure on the environment as a result. Although this report is not concerned with the construction or repair of the funicular itself, it may be a reasonable assumption that some form of uplift facilities would have been constructed when the chairlift was decommissioned, meaning that non-existence of the funicular would not equate to zero visitor impact on Cairn Gorm and the adjoining designated sites.

Having been in operation for almost 20 years, the Visitor Management Plan has facilitated the collection of monitoring data that allows the Operator to, not unreasonably, assert that the operation of the funicular railway has not had a detrimental impact on the adjoining designated sites and that the protocols for visitor management, along with path repair and maintenance have resulted in partial recovery of habitats that had previously been impacted by the operation of the chairlift.

The repair and refurbishment of the funicular railway will mean that there is an opportunity to reassess whether the visitor management systems, related to the operation of the funicular, are proportionate to the risk of impact on the environment and specifically to the features of the designated sites on and around Cairn Gorm Estate.

The economic opportunities of offering excursions and potentially open access from the Ptarmigan Top Station are probably the strongest driver for change – this case has been put forward by a range of individuals and organisations, although it is beyond the scope of this work to review the economics of the situation. The opportunity for visitors to leave the Ptarmigan Top Station gives the potential to enhance the visitor experience, bringing benefits in physical and mental health as well as opportunities to enhance their knowledge and enjoyment of the site. Arguments have also been made that providing first-hand experience of the mountain environment is a means for enabling and enhancing respect for a range of environmental issues.

If the attraction of egress from the Ptarmigan Top Station were to lead to higher visitor numbers, it would be incumbent on the Operator to understand the implications of these visits and therefore the monitoring scheme needs to be adapted alongside any changes to access arrangements around the Ptarmigan Top Station.

The Masterplan indicates a staged approach to changing the VMP and this is assumed to mean that a number of different access arrangements will be tested. The challenge for adapting the VMP is to take account of the constraints for different operating situations, the costs of implementing those changes and the benefits that are likely to accrue.

In order to satisfy the obligations of the s50 agreement, the Operator will need to continue to demonstrate that there are no adverse effects on the integrity of the designated Natura Sites at each operating stage. In practice, it would be reasonable to work within more closely defined parameters that will facilitate high standards of operation, commensurate with Cairn Gorm's status, rather than simply aiming to remain above a legal limit of impact. This would include minimising potential impacts on habitats within the Ski Area as well as preventing additional pressure on the designated Natura sites – for the purposes of describing the working parameters, this is termed 'Significant Additional Pressure' (i.e. a nominal threshold above which additional visits would be likely to have measurable impact, if not managed). It is unlikely that Significant Additional Pressure would be encompassed by a static number or limit as there are a range of factors that would need to be examined (timing, location, ground

conditions, weather, personal behaviour, group sizes, status / proximity of protected species). Therefore, this term will be used to describe conditions that are to be avoided at any point in time, or cumulatively, with a foreseeable and/or unacceptable (to s50 signatories) impact on the environmental condition of the area around the Ptarmigan Top Station or designated Natura sites.

There will be a close relationship between a high-quality visitor experience and ensuring that visitors are able to remain on robust surfaces without overcrowding. This may lead to a self-determined capacity for visits where higher numbers would lead to more management controls that change the nature of the experience or make operations unviable.

Operational scenarios
To aid the analysis of different scenarios and potential operational stages, a number of assumptions have been made in order to ensure that there is no Significant Additional Pressure on the designated Natura sites:

- People will not be able to leave the Ptarmigan Top Station with a dog (except a trained assistance dog)
- People will be expected to remain on surfaces that are durable and maintained.
- People will be expected to remain within the Ski Area (i.e. not encouraged or facilitated to explore beyond this Area).
- The Operator will have the means and resources to monitor visitor behaviour (or its outcomes) and intervene if there are measurable impacts on the designated sites or the Ski Area.

The following scenarios represent a range of 'interventions' to physically manage or influence behaviour of funicular users. They do not necessarily represent actual operational stages, or desirable end-points. There may also be combinations or other interventions that could be trialled in response to early feedback. In each scenario a minimum level of information is assumed to be given to all visitors to explain the constraints and reason for the management arrangements.

Closed system
Funicular users are not allowed beyond the Ptarmigan Top Station (i.e. outside the building or beyond the viewing area). This is the existing arrangement for general users of the funicular during non-skiing operations.

Accompanied only
Funicular users are permitted to join a guided visit beyond the Ptarmigan Top Station and the accredited guide is responsible for ensuring that all members of the party remain on managed paths or within agreed areas (e.g. for wildlife watching). This has previously been implemented through the "Walks @ the top" programme. It may be possible for a limited number of groups (unquantified at present) to visit the designated sites on predetermined routes.

One-to-one engagement
Funicular users are permitted to leave the Ptarmigan Top Station during suitable weather conditions, and agree that they will remain on managed paths and not enter the designated sites. One or more members of staff will be on site at times when the Ptarmigan Top Station is 'open' to help people to comply with this agreement. Engagement will be direct, to encourage rather than enforce (there are no legal mechanisms to physically divert people). It may be necessary to limit numbers on the basis of capacity of staff to monitor and engage.

Geofencing

Funicular users agree to self-manage their visit with the aid of a device (smartphone app or dedicated GPS device). GPS tracking provides alerts to the device when users stray beyond a virtual boundary, which can be set according to the associated risk – e.g. greater frequency of alert depending on the distance from a managed path or into the designated sites. Data could be live-tracked for each device or downloaded after the visit.

Prior Information

Funicular users agree to self-manage their visit based on information about plateau sensitivities and recommended activities / destinations / behaviour provided before leaving the Ptarmigan Top Station. This could include audio-visual materials and/or access to a smartphone app. Users may be asked to report on their visit on return to the Ptarmigan Top Station.

Unconstrained

Funicular users are allowed to leave the Ptarmigan Top Station with no restrictions – this could include 1-way uplift tickets.
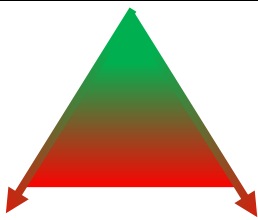
Analysis of data requirements for evidence-based decision making

It is not necessary to collect data from every visitor in order to identify whether there is any 'leakage' within the intended management stage. However, it is necessary to have confidence that the monitoring data reflects the full range of behaviour, pressures and impacts.

Data should demonstrate that there is no bias in the sampling. Using a technique where the sample is 'self-selecting' introduces bias. Techniques that are not randomised can introduce bias. The level of bias could be enough to invalidate the monitoring. Reliance on self-reporting would be considered bias. Selective reporting (e.g. not picking up the range of behaviour by inappropriate sampling) would introduce bias.

The monitoring 'hypothesis' is that, providing they remain on managed paths and do not enter the designated sites, funicular users will have a minimal impact during their visit. As highlighted above, the Indicators of State and Impact will not provide a robust basis for monitoring short- and medium-term changes and the Indicators of Pressure will be more effective. This means that monitoring of different operational arrangements will focus on visitors and their behaviours during the time that they are on site. The main aspect of data collection, to confirm visitor compliance, relates to their location during their visit, relative to managed paths and the designated sites.

It is reasonable to assume that higher numbers and greater freedom of movement represents higher risk of 'leakage' into the designated Natura sites and away from hardened surfaces and therefore the monitoring data will need to demonstrate that controls are effective in mitigating the risks at each operational stage. It is possible that once behaviours are confirmed that monitoring intensity can be reduced for a given stage: sampling rates can be reduced, providing they still meet the criteria of unbiased. The following table indicates the relationship between the operating scenario and initial monitoring required.

Scenario	Risk level	Monitoring required
Closed system	None	
Accompanied only	Negligible	
One-to-one engagement	Low - Medium	
Geofencing (app or device)	Low – medium	
Prior information	Medium – high	
Unconstrained	High – very high	

Visitor location data

A range of data sources can be used, some of which are more relevant to particular stages, but may be used in combination.

Ticket sales and use

An automatic entry system based on scanning tickets would make monitoring of time spent outside the Ptarmigan Top Station relatively simple. The dwell time could be established for every ticket holder as well as flow rates for exit and entry. The data is unlikely to provide sufficient detail in isolation, particularly when considering changes to operation stages, but these methods could provide simple indicators that could be used to flag changes in behaviour that might need further investigation. For example, in a stable situation, where behaviour patterns have emerged, measurably increased dwell-time might indicate changes to where people are going, triggering additional monitoring or retrieval / analysis of other data, and potentially a management response.

Manual observations

A visitor observation method was implemented in 2004 but on the advice of the Reporting Officer was discontinued. There are challenges in developing a manual observation system that provides data that is representative of user behaviour and can be quantified. In particular the differentiation of funicular users from other visitors is likely to be problematic. A simplified scheme with instances of off-path use could be possible, and face-to-face interviews with people within the designated sites might reveal the proportion of funicular users who venture into these areas. Sampling rates would need to considered and this is a resource-intensive method if used for a long period. However, it may be a useful 'ground truth' for other methods.

Fixed point counts

Systems such as RFID could potentially be used to log when people reach a given point or series of points, similar to automatic people counters but based on a 'passive tag' issued to people exiting the Ptarmigan Top Station. Off-the-shelf systems are unknown, but the technology is well proven in retail and commercial situations for asset tracking. Similar systems are used for event timing. Essentially a fixed 'reader' is located on site (12v systems are available) which transmits a radio signal and activates the passive tag. Tags can be re-used and could be used as a pass to the building (i.e. to ensure it has value to the customer).

Tags would be linked to the ticket-holder allowing specific (GDPR compliant) information to be monitored. It could be used for 'checking in' and logging visitors at particular places but may be less useful for detecting 'leakage'. The range for triggering RFID readers is the limiting factor and could be up to a maximum of 10m from the reader in fair conditions, but may be 1-5m in real world situations.

Systems based on Bluetooth would be less 'inclusive' and it would difficult to ensure that all visitors have a device with Bluetooth (switched on). Range is likely to be similar to RFID for the detectors but

could be up to 20m. Linking the device to the ticket-holder is also more challenging unless an app is developed with this capability.

GPS Tracking on a smartphone
A smart phone app could be used to track movement with GPS and log locations – this can be done on the customers' phones or on a device supplied by the Operator for the duration of the visit. All customers would need to give their consent under GDPR and the data would be subject to strict processing protocols.

Geofencing, where the app produces an alert when the phone is outside a given area, can be used to encourage people to comply with conditions of carriage and potentially invalidate a return ticket.

The potential advantages of a smartphone app are that it could be integrated with the 'visitor experience' and used year-round (i.e. a Cairn Gorm app that is for skiers and summer visitors). Tickets could be managed on smartphones and interpretive materials could be included. In-app restrictions could be implemented to avoid mis-use (e.g. freely available app with basic functionality useful for general visitors or interacting with facilities; additional features that are activated by purchase of ticket, user interaction and/or location based).

Ground-up development may be necessary as adapting commercially available apps may constrain the functionality. For example, some geofencing plug-ins use WiFi rather than GPS for location to avoid battery drain, meaning that they would be ineffective near or beyond the summit. It is likely that the app would need to be developed for both iOS and Android in order to be effective.

Potential issues with relying on apps
This aspect of monitoring is reliant on people downloading the app to their phone, or having enough devices available to give at least one to each party. Partial uptake would introduce bias into the monitoring (self-selection). Use of geolocation data is covered under GDPR and therefore people will need to give their consent to share location and the processing will need to be GDPR compliant.

There are a number of risks associated with app-based monitoring, especially where the customer's device is being used:

Battery life – customers may not have sufficient battery life to enable GPS tracking and battery optimisation functions on phones may block or disable the app from running when the battery level is low. This is a foreseeable high risk – advanced information of the requirement for a fully charged phone may help to mitigate this, along with charging facilities within the Ptarmigan Top Station. Feedback on apps that are battery intensive generally get poor feedback on App Stores.

Reliance on the app for 'emergency' situations – customers may assume that they are safe in a hostile physical environment by using the app, or that it gives them an option to be rescued. Although it would be very useful for people to be able to navigate back to the Ptarmigan Top Station, the balance of 'duty of care' and 'personal responsibility' needs to be carefully considered. The level of risk will vary according to how accustomed people are to mountain environments, but is likely to be relatively high.

Groups not sticking together – in some situations it is possible that a party may split up and one or more member explores while others wait. There is no realistic method of mitigating this risk and it may not represent a significant proportion of visitors.

Location tracking disabled – app users may not give permission for tracking or could manually disable location features on their phone. This is a foreseeable high risk, probably most likely in those who

intend to leave the Ski Area. There are no viable means of negating the risk as the app needs to be GDPR compliant as well as technically valid. However, if necessary, it may be possible to give enough warning to people that they risk being refused re-entry if they cannot confirm that they have remained in the Ski Area.

Location data not downloaded – app users may switch off data and WiFi to prevent the app from transmitting data. This is a medium level risk, but availability of (free) WiFi within the building may be enough of an incentive for most visitors.

There is no way to anticipate the level of deliberate non-compliance, and setting up the app in a way that makes this obvious but not intrusive will perhaps minimise the negative reaction to tracking. Where a customer disables or does not give consent for location data their ticket could be temporarily invalidated or certain features disabled (e.g. the map is locked). Likewise, the ticket could be invalidated if geofencing alerts are dismissed repeatedly. This could be managed so that a customer needs to manually reactivate the ticket on re-entry, which is logged against their account – repeated non-compliance could then mean they are flagged as a potential risk (in a GDPR compliant manner). This would also provide a tally of non-compliance as a proportion of visitors to demonstrate the effectiveness of the app monitoring.

Minimum requirements for an app
- GPS location logging (with upload to server – options for live data upload or on return to Ptarmigan Top Station via WiFi or NFC reader)
- Base map showing important features, such as managed paths and the boundaries of designated sites. This could be Ordnance Survey quality but possibly blank outside Ski area to discourage use / navigation in these areas
- Geofencing – alarm / vibration / alert when a given distance from a path (e.g. 20m) and within the designated sites

Optional features
- Purchase of tickets / services on Cairn Gorm Mountain
- Ticket management (linked to location) – e.g. straying a given distance into designated area or switching off / blocking location invalidates ticket (with warnings on app).
- Interpretation (notably location-based information and possibly augmented reality)
- Logging and user download / sharing of ski stats (not required or desirable for Ptarmigan Top Station exit)

Comparison of different techniques
There are risks and compromises associated with different data collection techniques, which would affect the accuracy and confidence in the analysis of monitoring. It is likely that high quality data would be required for each 'operational stage' in order to demonstrate that there is no Significant Additional Pressure, but it may be possible to scale back the monitoring effort if patterns of use become established. The following table summarises some of the relative merits of each technique.

Measure	Cost	Rationale	Indicator
Length of time outside Ptarmigan Top Station	Negligible – based on ticket timing exit / re-entry	less than 1 hour is unlikely to reach the designated sites	Can be used as a basic guide to likely maximum distance
Number of visitors per hour	Negligible – based on ticket timing exit	High numbers more likely to cause crowding on paths and therefore 'leakage'	Can be used as a maximum density of visitors
Manual observation of visitor behaviour	High staff cost – ongoing, potentially long-term	Appropriate sampling of visitor location	Can be used for compliance
Fixed point (e.g. RFID or Bluetooth)	High start-up. RFID reader(s), power supplies, cards. On-going costs (re-usable cards) for equipment maintenance	Confirm whether a customer passes a given point(s) – could indicate routes taken	Proportion of people using certain areas
GPS tracking	High start-up. App development. Possibly devices for test phase. On-going cost for app data management	Track movement across a wide area. Dependent on good uptake	High accuracy mapping of visitor behaviour

Additional monitoring

The main purpose of monitoring within the VMP is to inform decision-making, and as such this study focusses on aspects that are essential rather than desirable. Other elements of monitoring could be undertaken in tandem, to increase the efficiency of data collection, and these may inform the Operator about business decisions and/or contribute to the wider knowledge and understanding of Cairn Gorm Estate and neighbouring land.

The potential cumulative pressure, state and impact of funicular users, as well as other visitors, can be measured through the existing methods within the monitoring strategy: habitat assessment (step-pointing method), repeat photography of fixed locations on selected paths and automatic people counter data. In addition, targeted aerial surveys linked to habitat assessment areas may be useful visual indicators of change, although quantitative analysis at the required scale would be challenging.

The wider programme of monitoring, using automatic counters, can be used to confirm whether there are changing patterns of recreation from people who are not using the funicular. This could be an important indicator of whether there is any displacement effect resulting from the operation (recommencement) of the funicular and any changes to the VMP. The data collected during the non-operational period is of particular interest, but needs to be viewed in the context of Covid-19 and the significant changes to visitor patterns that were seen as a result.

Adaptive management options – when and how to intervene

Staged adjustments
At each stage, an estimate of the number of funicular users entering the Designated Sites (e.g. per day or month) and people off-path within the Ski Area would be needed along with patterns that can be determined from the data (e.g. seasonal, weather related, time of day, locations).

Prior to moving to another stage, the following conditions could be met:

- evidence of no Significant Additional Pressure caused by the current stage
- additional monitoring (if required) and potential mitigation measures for the new stage
- cumulative dataset of monitoring and mitigation measures for each stage to date

At the inception of a new stage, it will be necessary to use near real-time data to determine whether there is 'leakage' and its significance. Although it is not possible to place an absolute number of people entering the designated sites as unacceptable, it is likely to be in the order of hundreds per annum rather than thousands. Where the data indicates that leakage is nearing a threshold of, for example, 300 people annually, or 50 people in May / June around an area with dotterel, a management response is required to reduce or eliminate the leakage and/or its potential for impact. This could be to revert to a previous stage that met the threshold required, additional resources to reduce the leakage (e.g. more staff on site to encourage compliance) or other actions appropriate to the risks (including path management, as outlined below).

It is reasonable to expect that the Operator should demonstrate its competence to influence behaviour as an indicator of successful management of different operational stages.

Repair and maintenance of paths
A key part of visitor management is helping people minimise their impact on the environment through an ongoing programme of repair and maintenance of upland paths. This applies to all visitors to Cairn Gorm estate and the there is a long-standing commitment to path management within the VMP. Changes to the access arrangements at the Ptarmigan Top Station could increase the pressure on existing managed routes or may lead to the development of new desire lines. It is likely that monitoring data will help to identify emerging pressures that could potentially be mitigated through path works.

Whilst it may not be desirable or acceptable to develop new paths within the designated Natura sites, additional protections to reduce the spread of people on and from existing routes may be a reasonable response. Within the Ski Area, there may be greater flexibility to respond to visitor preferences by 'hardening' links between existing paths or providing more robust alternatives to those desire lines. All such work should be guided by the principles of Upland Path Management (see Hunt et al, 2015 and 2016).

Specific provision of additional infrastructure
An option for proactively managing expectations or demand would be to construct additional infrastructure near the Ptarmigan Top Station to act as a focus for visitors. The rationale would be that this type of provision would cater for the 'needs' of the majority of visitors, satisfy the perception of having a 'destination' or activity and potentially provide a high-quality mountain environment experience for people who may otherwise be unable to gain first-hand experience of Cairn Gorm's upper mountain zone.

Whilst the design or design parameters of such a feature are beyond the scope of this report, a number of key principles and potential risks can usefully be outlined:

- It would be reasonable to expect the infrastructure to be as accessible as possible, within the confines of the mountain environment, but also providing options that are relevant to the 'sense of place' remain important.
- Loops are more popular than out-and-back and can reduce the sense of crowding, as well as pressure on path margins, where people would need to pass each other.

- Architectural or artistic statements may not be appropriate, even if they are considered desirable, if they have a landscape scale impact (there are many examples of other sites where well-intentioned installations have changed the meaning or atmosphere of a location).
- Specific infrastructure could facilitate enhance interpretation journeys through the use of technology (e.g. integrated within an app that monitors location / behaviour)
- Popularity of a 'feature' on social media could bring negative as well as positive outcomes leading to unintended consequences for other aspects of management.

Implications of non-compliance

The revised objectives of the VMP would include avoiding Significant Additional Pressure on the designated Natura sites and therefore people who use the funicular as a means to enter the designated site would be considered non-compliant. Likewise, people not remaining on managed paths within the Ski Area could also be considered non-compliant. Customers should primarily be encouraged to comply by default, but it would be prudent to explore whether there are measures that could be put in place to act as a deterrent to non-compliance. Any such measure must fit within the legal frameworks of nature conservation, land reform, human rights, equalities and GDPR.

The Nature Conservation act 2004 introduced measures against reckless disturbance of protected species, but the viability of relying on this for proving damage to the designated features as a result of a recreational visit to the designated sites would be limited at best, and possibly of negligible value. The exception could be related to dotterel during the breeding season, if information has been provided and people choose to ignore it.

The Land Reform Act (Scotland) 2003 gives everyone a right of responsible access and there is no reasonable case for introducing a restriction on entering the designated site, unless it applies to everyone. It may not be possible to remove that right as a result of having used the funicular except by the enactment of a specific bye-law. This would need to be considered by the Access Authority (Cairngorms National Park Authority) and could be challenged in court – legal opinion and drafting of a bye-law could be expensive and may not be successful. This is not a recommended course of action, and is included within the report for reference only.

The terms of carriage may be a more useful instrument for discouraging customers from straying into the designated area or away from managed paths – in reality, it will be very difficult to prevent, but the terms could be invalidated if it can be proven that the customer has breached the contract. A reasonable penalty for breach could include refusal of entry for the return journey. It would be, however, difficult to make the use of an app, or sharing of location data, mandatory under GDPR.

Implications for compliance

It may be more effective to use positive reinforcement rather than punishment / penalty as a tool of visitor management. The Operator may have tools or financial incentives available to provide a reward or at least the appearance of reward for those visitors who fully comply with the conditions of carriage. For example, a surcharge could be added to the ticket for visitors who wish to leave the Ptarmigan Top Station, which could be refunded (or applied as a 'discount') to those who comply (assuming that a monitoring scheme is in place that can be linked to the customer).

Recommendations

a) Confirm and agree (with S50 signatories) the incremental stages of operation, and associated mitigations / monitoring proposals ("access arrangements"), where visitors are permitted to leave the Ptarmigan Top Station and the Middle Station.

b) Confirm the costs of developing and implementing the access arrangements as part of the business case for changes to the VMP.

c) Develop a smartphone app and that can be used to track and geo-fence visitors leaving the Ptarmigan Top Station (with appropriate GDPR provisions).

d) Test and trial the app under verifiable conditions (e.g. members of guided groups) and adapt its functionality based on feedback.

e) Develop a monitoring platform that can show patterns of use by funicular users, based on the GPS data derived from the app – to be integrated into the daily, weekly and seasonal operational procedures and reporting (i.e. allowing adaptive management, rather than retrospective analysis).

f) Amend the Visitor Management Plan and associated monitoring protocols and agree these changes with S50 signatories.

g) Develop the core messages and interpretive opportunities to engage visitors who intend to leave the Ptarmigan Top Station, to ensure that they are prepared for their mountain experience and understand the constraints and opportunities of their visit.

h) [Continue to] Provide training to all guides that lead visits from the Ptarmigan Top Station to ensure that they understand the sensitives and opportunities for high quality mountain experiences.

i) Ensure that Ranger presence is available during times when the Ptarmigan Top Station access arrangements are operational, to engage with visitors and help them to enjoy the high mountain environment in a responsible manner with least impact on the environment.

j) Explore opportunities to integrate the visitor management functionality of the app with information / interpretation and commercial / retail opportunities for year-round use (e.g. tickets, lift-passes, additional services, on-site purchases, augmented reality).

k) Identify sections of path that are currently un-managed, or at risk of damage from visitors leaving the Ptarmigan Top Station.

l) Identify potential new infrastructure, including paths close to the Ptarmigan Top Station, that will provide a high-quality mountain experience for visitors with the aim of meeting the expectations of a significant proportion of funicular users.

m) Continue to maintain the network of people counters across the Estate and analyse the patterns of use alongside any changes to the VMP provisions at the Ptarmigan Top Station.

Next steps

If the recommendations are accepted, and implemented, the perceived priorities for action are outlined below – these do not represent a full implementation plan and there are parallel 'ongoing' tasks related to existing path management and visitor monitoring that are not included.

By April 2023	Write a full specification of a Cairn Gorm Mountain app for mobile devices – the range of features and functions required across the Operator's service provision – and select the most appropriate framework for development
By May 2023	Invite competent software developers to submit costed proposals to deliver functionality of the core location tracking features of an app
By June 2023	Confirm the 'operational stages' for changes to the VMP and controls / mitigations associated with each stage.
By June 2023	Appoint software developer to create an app and test geofencing / location tracking functions with staff and 'trusted' volunteers
By August 2023	Amend and deploy a prototype app for use with guided walks including the data management and monitoring platform
By September 2023	Identify paths in need of management to facilitate managed exit and any dedicated infrastructure to enhance the visitor experience around Ptarmigan Top Station
By December 2023	Review and update the app and integrate ticket management / service provision functions
By March 2024	Deploy the app for use with managed exit – e.g. limited numbers per day with weekly review of results
By June 2024	Add interpretation and ski-sports functionality (e.g. snow conditions / personal performance stats etc) to the app
By September 2024	Review the operation of the app and ongoing data analysis protocols

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