Cairngorms NATIONAL PARK
Pàirc Nàiseanta a' Mhonaidh Ruaidh

STRATEGY

Cairngorm and Glenmore
Strategy

Strategic Environmental Assessment
Environmental Report

December 2015

Appendix 2: Environmental Baseline

Topic 5: Material Assets

Topic 5: Material Assets

In SEA terms Material Assets may cover a range of apparently disparate environmental concerns, including natural resources, geodiversity, waste, infrastructure and property. Many can be scoped out of the SEA for the Cairngorm and Glenmore Strategy, while others may be dealt with under other topics. For example, soil and water are covered by their own topics. The issues covered within this section therefore, are:

- Geoconservation; and
- Transport infrastructure.

Geoconservation

> "…*geological heritage constitutes a natural heritage of scientific, cultural, aesthetic, landscape, economic and intrinsic values, which needs to be preserved and handed down to future generations.*"
>
> Council of Europe (2004).

Geoconservation involves recognising, protecting and managing sites and landscapes identified as important for their rocks, fossils, minerals, or other geological or geomorphological features of interest. Some of the concepts of geoconservation are still being developed; however, in some areas a good deal has been achieved, particularly in the creation of the UK Geodiversity Action Plan (UK GAP) and Scotland's Geodiversity Charter.

There are many definitions of 'geodiversity', but the majority are variations on similar wording (see Gray, 2008, 2013; Sharples, 1993). Broadly, it may be defined as:

"*The variety of rocks, minerals, fossils, landforms, sediments and soils, together with the natural processes which form and alter them*" (Bruneau *et al.* 2011, p. 3).

As well as being of scientific and cultural importance, geodiversity makes an immense contribution to Scotland's economy, as a source of energy and materials, and as a visitor attraction through its contribution to our unique landscape. Crucially, geodiversity underpins biodiversity through providing mosaics of landforms, soils, water, nutrients and natural processes to support our nationally and internationally important habitats, species and ecosystems (Scottish Geodiversity Forum, 2013; Bruneau *et al.* 2011; Gordon *et al.* 1998, 2001; Haynes, *et al.* 1998; Jonasson *et al.* 2005).

Protecting Geodiversity

There are a range of designations that help to safeguard geodiversity within the Cairngorms National Park, including Sites of Special Scientific Interest (SSSI) and Geological Conservation Review (GCR) Sites. Indeed, geodiversity is part of the special qualities of the National Park.

The landscapes of the Cairngorms National Park have a remarkable history stretching back to some 700 million years. The processes that have led to these old landscapes can be traced today in the rocks, landforms and soils beneath our feet and in the shapes of the straths and mountains around us (Gordon *et al.* 2006; Thomas *et al.* 2004). These landscapes incorporate a wealth of information about past environmental change and in particular, the Cairngorm Mountains are considered to be one of the finest examples in the world of glaciated granite mountains, notable for their distinctive plateau surfaces, tors and glacially sculptured features. These mountains therefore represent a precious scientific, educational, environmental and Earth heritage asset (Kirkbride *et al.* 2010).

There are 6 Mixed SSSI (sites with both biological and geological notifiable features) within the close proximity of, covering an area of some 553 km^2 (see **Figure 45**, p. 118).

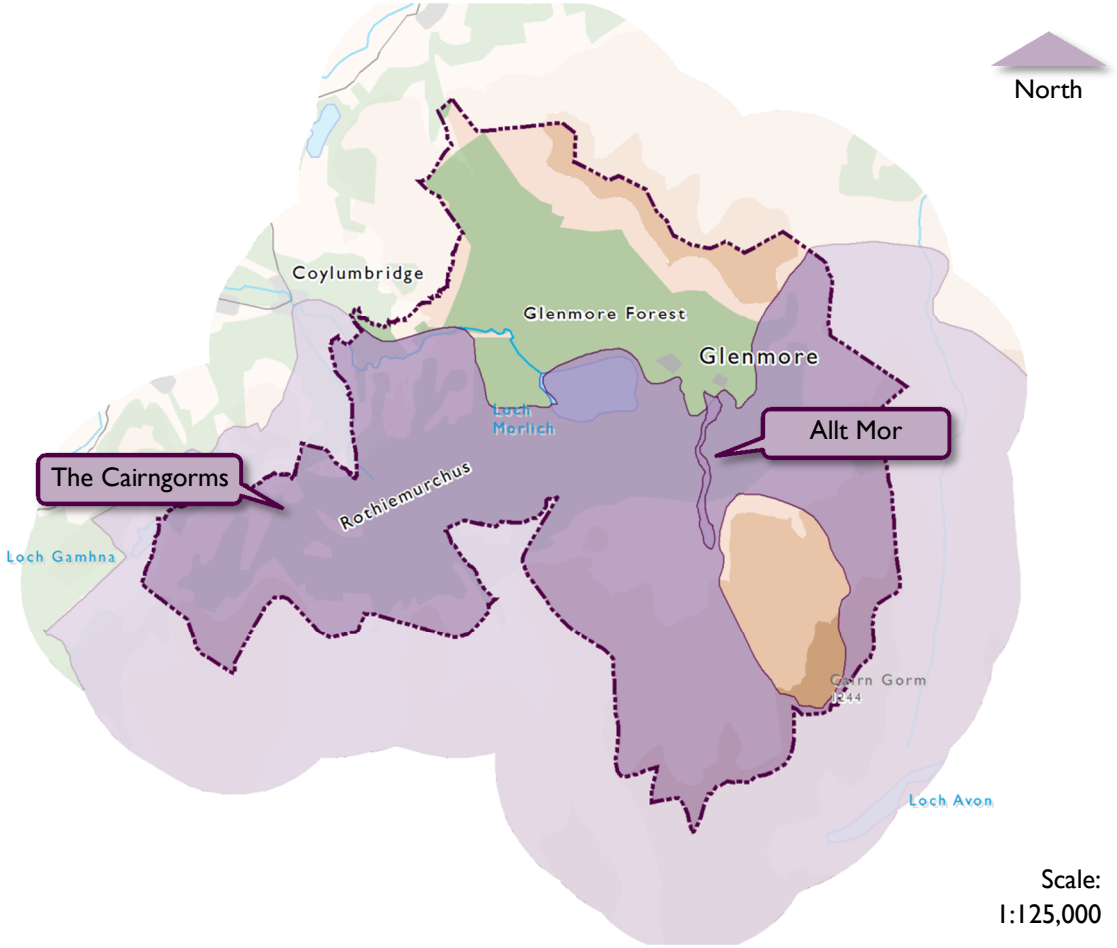

Figure 37 Geological Conservation Review Sites within the Cairngorm and Glenmore area.

Further protection is given to The Cairngorms and Allt Mor Geological Conservation Review sites (**Figure 37**).

The The Cairngorms GCR site covers most of the Cairngorm Plateau and overlaps a large part of the Cairngorm and Glenmore Strategy area. The site covers an area of approximately 526 km^2 and is listed for its exceptional assemblage of pre-glacial, glacial, glaciofluvial and periglacial features. Together these features provide a great wealth of information for interpreting landscape evolution and environmental change in the uplands during the Quaternary.

Allt Mor covers an area of 34.43ha and is entirely located within the Glenmore and Cainrgorm area. The site represents an excellent example of a steep mountain torrent whose flood history and planform adjustment (channel position) has been reconstructed over the last 40 years.

SNH along with the BGS have also compiled a detailed spatial inventory of the geomorphology of the Cairngorm Mountains core area, which also includes around two thirds of the area covered by the Cairngorm and Glenmore Strategy (Kirkbride & Gordon, 2010) (**Figure 38**).

The inventory identifies the location and extent of the main landform assemblages: landforms of glacial erosion; landforms of glacial and glaciofluvial deposition; relict periglacial landforms; and postglacial and contemporary landforms and processes. The spatial data is complemented by descriptions of the landforms and additional information on larger landscape features, the survival of relict non-glacial features and details of Lateglacial and Holocene palaeoenvironmental records. Together, they provide a basic source of information for the development of conservation management and interpretation of the Cairngorm Mountains.

The inventory highlights that understanding the links between geodiversity and biodiversity is particularly crucial for conservation management in dynamic environments such as the Cairngorm Mountains, where natural processes (e.g. floods, sediment transport and flow regimes) maintain habitat diversity and ecological functions. It also highlights that consideration of geomorphological sensitivity is a vital part of working in sympathy with natural processes, in assessing natural hazards and implementing sustainable management of ecosystems, particularly under future climate change scenarios.

The inventory recommends that geomorphology is integrated in current monitoring programmes in the Cairngorm Mountains and that much more could be done to raise wider awareness of geodiversity interests within the overall framework for interpretation within the Cairngorms National Park.

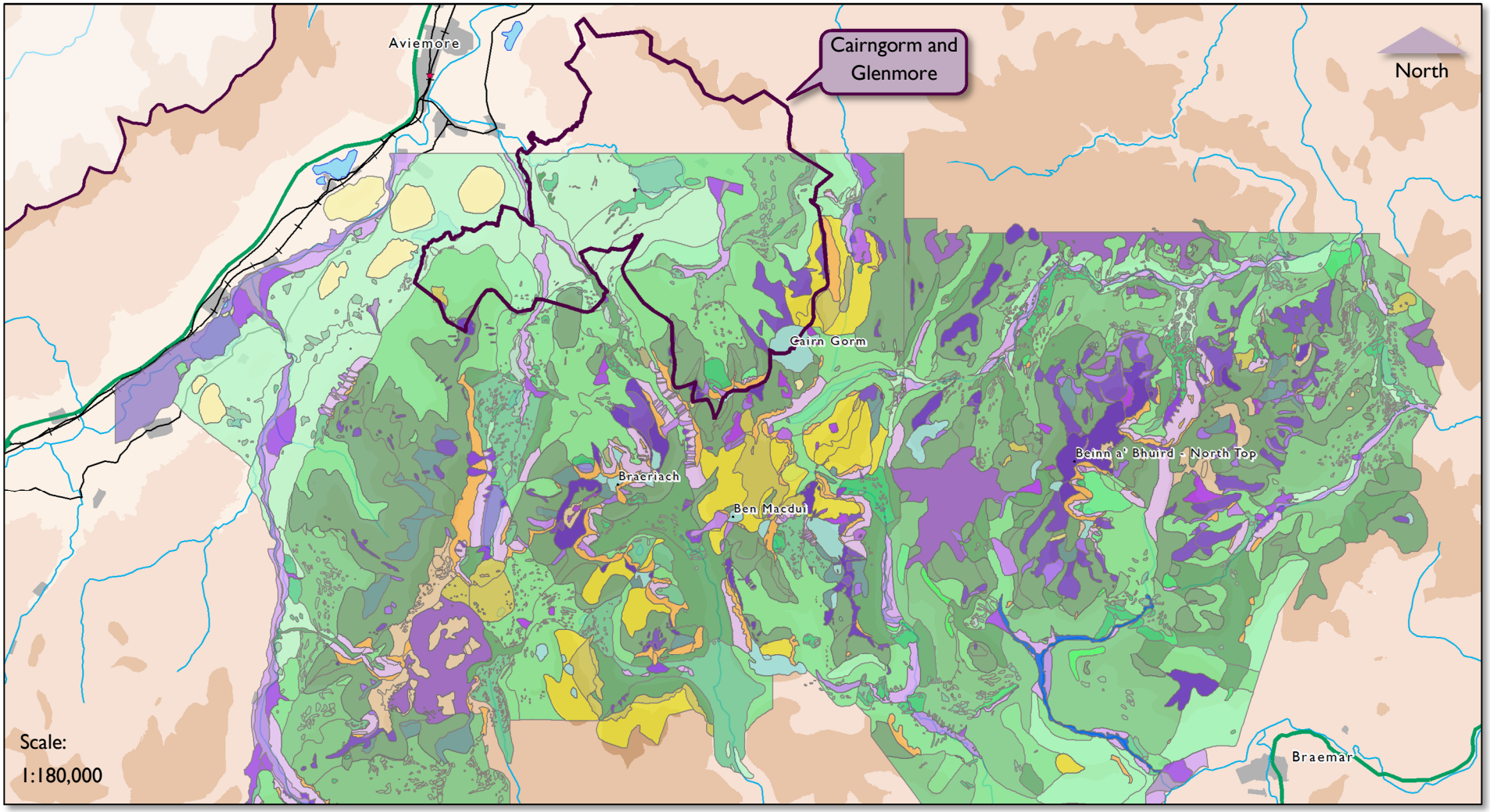

Figure 38 Geomorphological heritage of the Cairngorm Mountains (legend on p. 108) (Kirkbride & Gordon, 2010).

Postglacial and contemporary landforms and processes

- Active river corridor
- Debris cone
- Debris slope
- Large scale rockfall deposits
- Partially vegetated wind stressed surface
- Peat
- Postglacial active alluvial fan surface
- Postglacial relict alluvial fan surface
- Postglacial river terraces and alluvium
- Semi-permanent snow patch and melt-out deposits
- Snow avalanche modified debris slope
- Sparse vegetation
- Wet flushes and snowmelt drainage
- Wetland

Relict periglacial landforms

- Blockfield
- Boulder lobes
- Patterned ground
- Rock glacier deposits
- Solifluction sheets and lobes

Landforms of glacial erosion

- Corrie headwall
- Ice-scoured bedrock
- Roche moutonnée
- Thin regolith covered rock

Landforms of glacial and glaciofluvial deposition

- Boulder and drift limit
- Delta deposit
- Dissected drift
- Eskers
- Former lake shoreline
- Ice-contact slope
- Ice-marginal kame
- Kames and kettled kame
- Kettle hole
- Meltwater channel (bedrock)
- Meltwater channel (drift)
- Moraine
- Moraine limit
- Undifferentiated drift
- Undifferentiated glaciofluvial deposits
- Undifferentiated ice-marginal deposits

Other landform types

- Rock outcrop
- Stable vegetated surface
- Tor

Issues include raising awareness of geodiversity *per se*, as well as the links between geodiversity and other elements of the landscape and land use (Kirkbride & Gordon, 2010).

Within the context of the National Park, the diversity of Earth heritage interests also offers potential opportunities for local involvement in income-generating tourism.

Transport Infrastructure

Road

The National Park benefits from relatively good transport infrastructure and services compared to many other rural areas in Scotland. Four A Class roads, namely the A9, A93, A95 and A86 connect the area with Inverness, Moray, Aberdeenshire, Perth and Kinross and the West Coast.

The A9 (**Figure 39**) is currently the subject of the A9 Dualling Strategy, which aims to link up the road's existing sections of dual carriageway to create a continuous Category 7 All Purpose Dual Carriageway between Inverness and Perth.

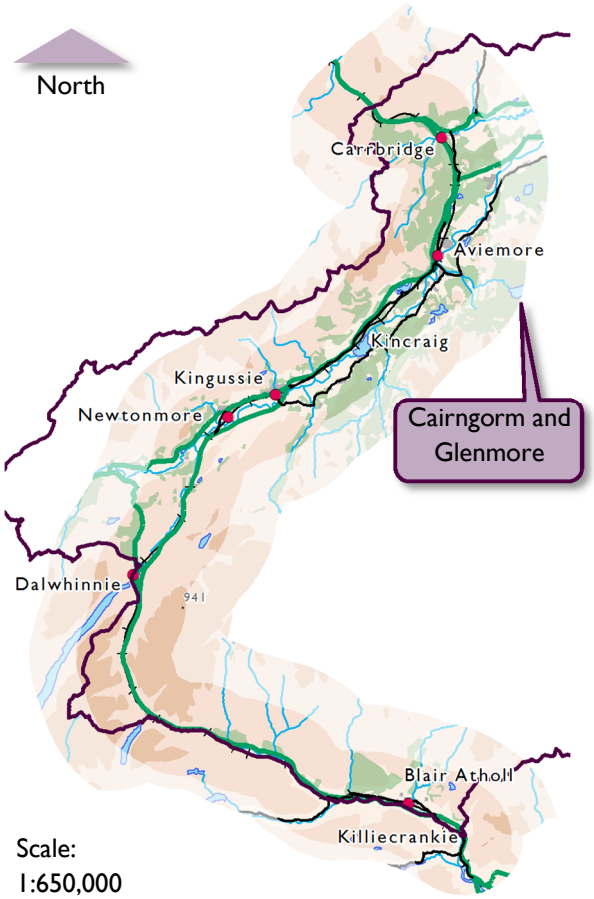

Figure 39 The A9 in the Cairngorms National Park.

It's one of the biggest infrastructure projects in Scotland's history and will involve the:

- Full grade separation of junctions to remove at-grade junctions;
- Grade separated junctions to provide direct links, over and under, the A9 for non-motorised user crossing / access;
- No gaps in the central reserve, to prevent right-turns across carriageways;
- Hard shoulder strips at least 1m width;
- Route, signage and lighting design to minimise overall visual impact (Transport Scotland, 2013, p. 1).

Once complete, the project is anticipated to provide the following benefits:

- Improved road safety and reduction in accident severity;
- Improved journey times and reliability;
- Safe crossing points to link non-motorised user routs and public transport facilities;

- Improved access to tourist and recreation sites;
- Improved trunk road transport infrastructure supporting sustainable economic growth, and resilience to climate change (Transport Scotland, 2013, pp. 1-2).

It is therefore anticipated that the programme could have implications for the Cairngorm and Glenmore area, which may result in cumulative or in-combination effects that demand consideration.

The reliance on the National Park's road infrastructure is demonstrated through the relatively high instances of car ownership within the National Park (**Figure 40** and **Figure 41**). According to the 2011 Census around 85% of households had access to a car or van, which is higher than the Scottish level of around 70%. Consequently, Cairngorm and Glenmore are easily accessible to a large proportion of the area's population and any improvements could lead in an increase in car journeys to the area.

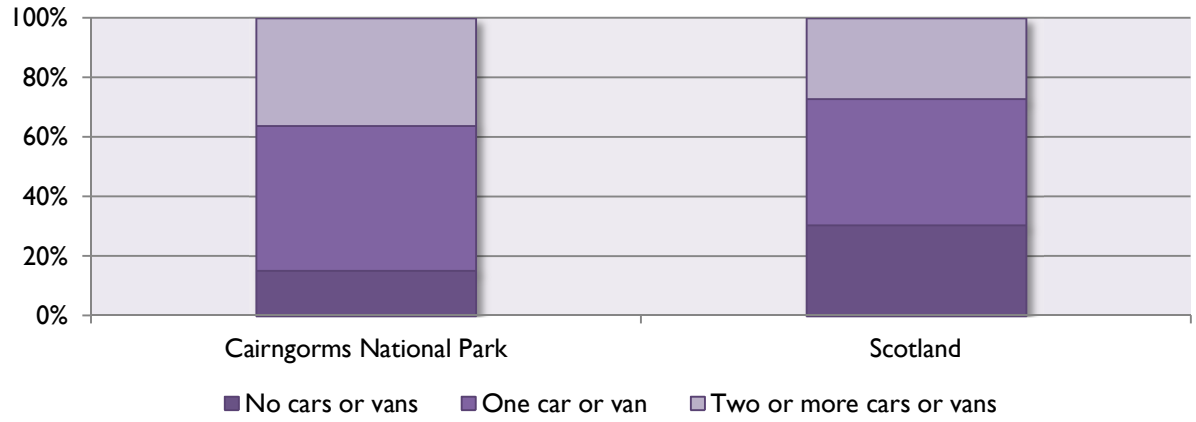

Figure 40 Proportion of households with access to a car or van (Census table LC1401SC).

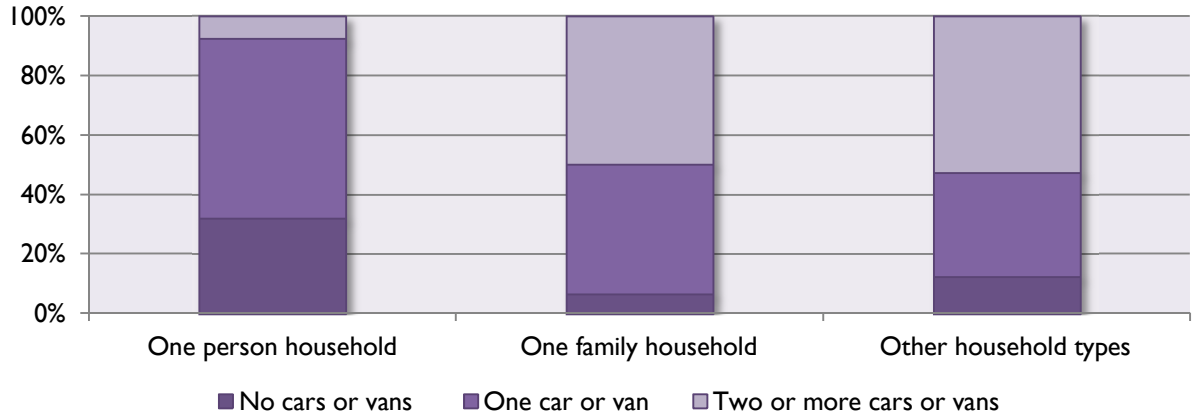

Figure 41 Household composition by car or van availability in the Cairngorms National Park (Census table LC1401SC).
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For further information on variables, see www.scotlandscensus.gov.uk/variables.

Rail

The Highland Main Railway Line which runs between Inverness and Perth runs through the National Park, with stations at Carrbridge, Aviemore, Kingussie, Newtonmore, Dalwhinnie and Blair Atholl. Much of the line is single track, and trains coming in opposite directions are often timed to arrive at stations at the same time, where crossing loops permit them to pass.

If the annual passenger usage at stations, which is based on sales of tickets, is taken as an indicator of the overall use of the line, then there is an indication that its popularity has increased significantly within the National Park over the last 10 years (**Figure 42** and **Table 11**).

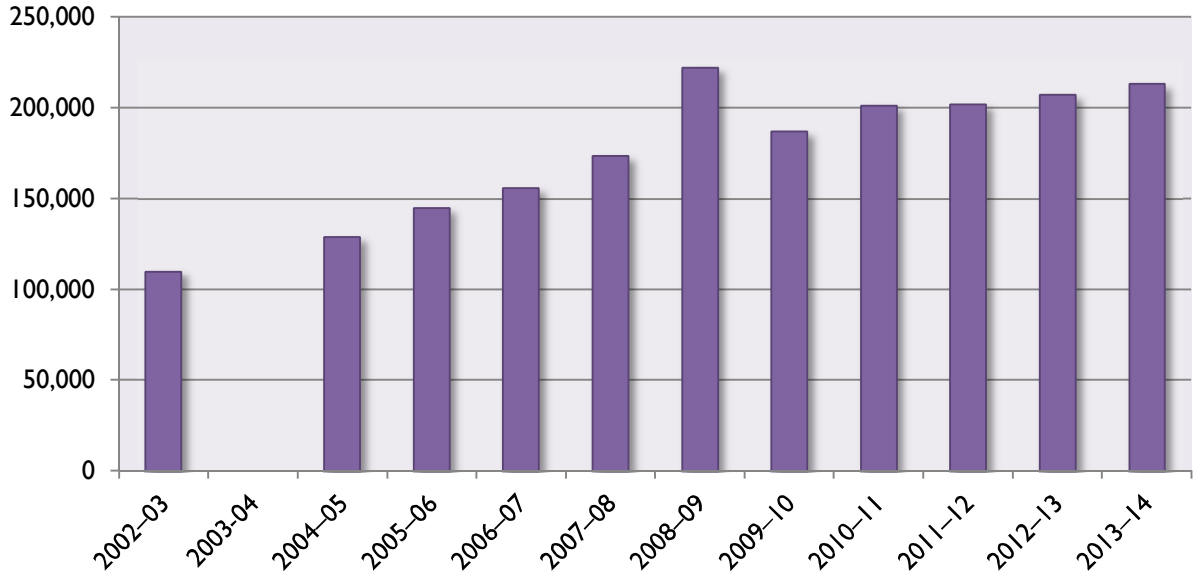

Figure 42 Total annual passenger usage within the Cairngorms National Park (Office of Rail and Road, 2014). No data is available for 2003-04.

Table 11 Annual passenger usage at stations within the Cairngorms National Park (Office of Rail and Road, 2014).

Name	2002–03	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14
Carrbridge	1,531	1,910	2,987	3,954	5,438	4,232	4,500	5,118	5,636	4,454	5,540
Aviemore	70,272	80,977	91,456	101,294	115,431	152,528	124,972	132,336	132,052	136,456	141,311
Kingussie	23,815	27,725	30,045	32,135	33,416	42,618	35,838	38,544	40,298	40,954	41,400
Newtonmore	4,184	5,396	6,815	6,631	7,060	8,358	7,972	9,484	9,406	8,958	8,326
Dalwhinnie	2,066	1,619	2,013	1,774	1,975	2,644	2,208	1,894	1,984	2,172	2,472
Blair Atholl	8,313	11,708	11,896	10,491	10,443	11,716	11,572	13,948	12,608	14,280	14,084
Total	110,181	129,335	145,212	156,279	173,763	222,096	187,062	201,324	201,984	207,274	213,133

Key Messages

Material assets cover a wide range of environmental concerns.

The Strategy's area falls within the Cairngorms GCR site which is listed for its exceptional assemblage of pre-glacial, glacial, glaciofluvial and periglacial features. Furthermore, detailed mapping of much of the area's geomorphology is available.

Transport infrastructure, while good along the National Park's main corridors, is poor elsewhere in the National Park. The development of new infrastructure, in particular the dualling of the A9, may result in cumulative effects when implemented alongside the Strategy.

Rail use is on the increase, although the reliance on private transport remains high.

Inter-relationships with other topics

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