

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 National Park, 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;
- Energy;
- Waste;
- Transport infrastructure; and
- Broadband 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 16 Geological and Mixed SSSI within the National Park, covering an area of some 680 km² (around 15% of the Park's area) (see **Figure 84**, p. 171).

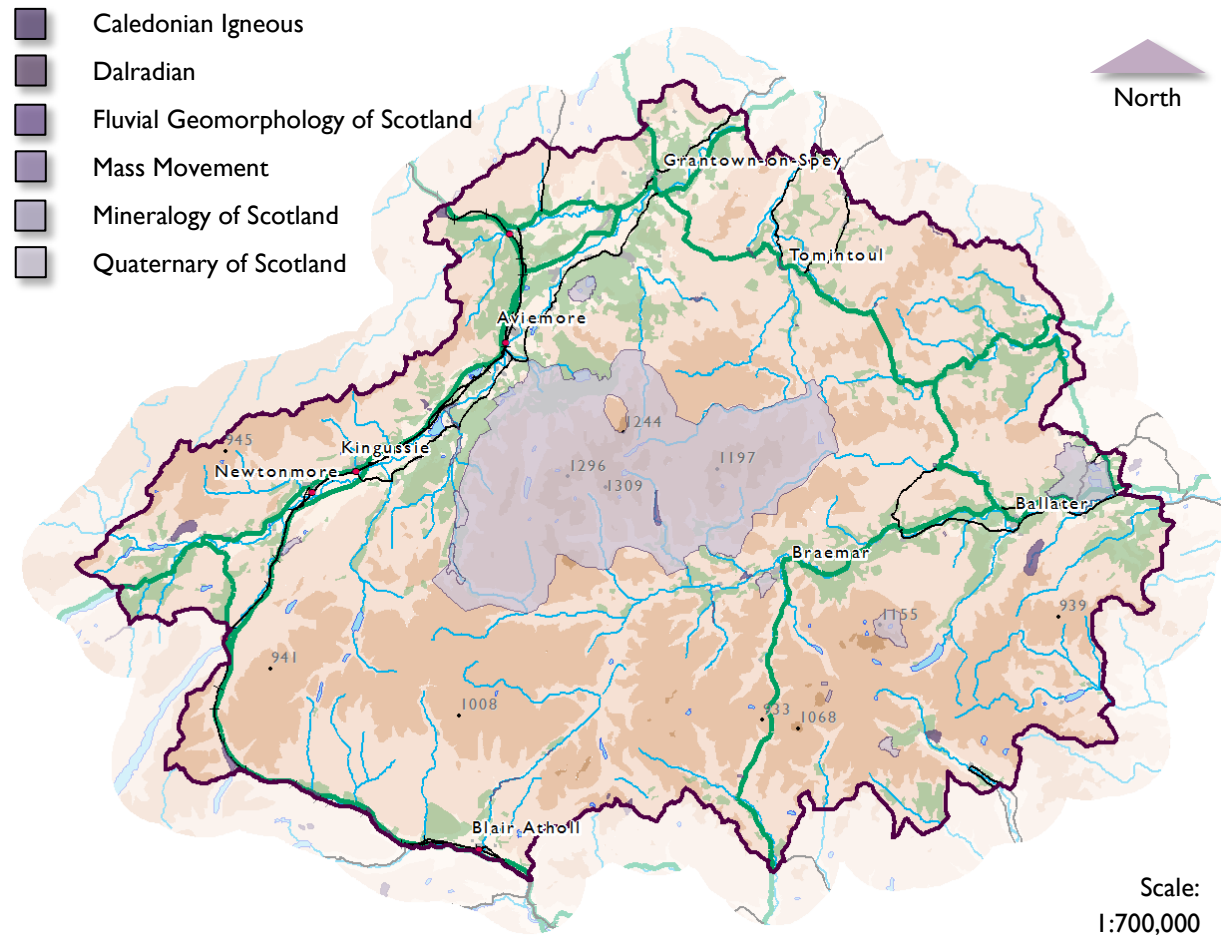


Figure 55 Geological Conservation Review Sites within the Cairngorms National Park by GCR Block Description. Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Natural Heritage.

Further protection is given to certain areas, which includes areas both within and outwith SSSIs, by the 39 GCR sites within or overlapping the National Park boundary (**Figure 55** and **Figure 56**). Combined they cover an area of around 592 km², the vast majority of which lies wholly within the National Park itself. In fact, the vast majority of this area (around 526 km²) is attributed to a single GCR site, the Cairngorms Mountains (site 2284), which is listed for its exceptional assemblage of pre-glacial, glacial, glaciofluvial and periglacial features.

Although British Geological Society (BGS) mapping is available for the whole National Park, detailed geomorphological information is more limited. However, SNH along with the BGS have compiled a spatial inventory of the geomorphology of the Cairngorm Mountains core area (Kirkbride & Gordon, 2010) (**Figure 57**).

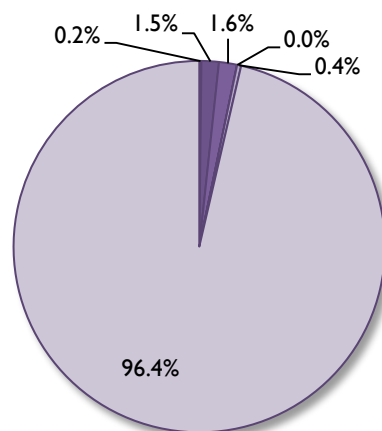


Figure 56 Area covered by GCR Site block description (legend on p. 130).

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

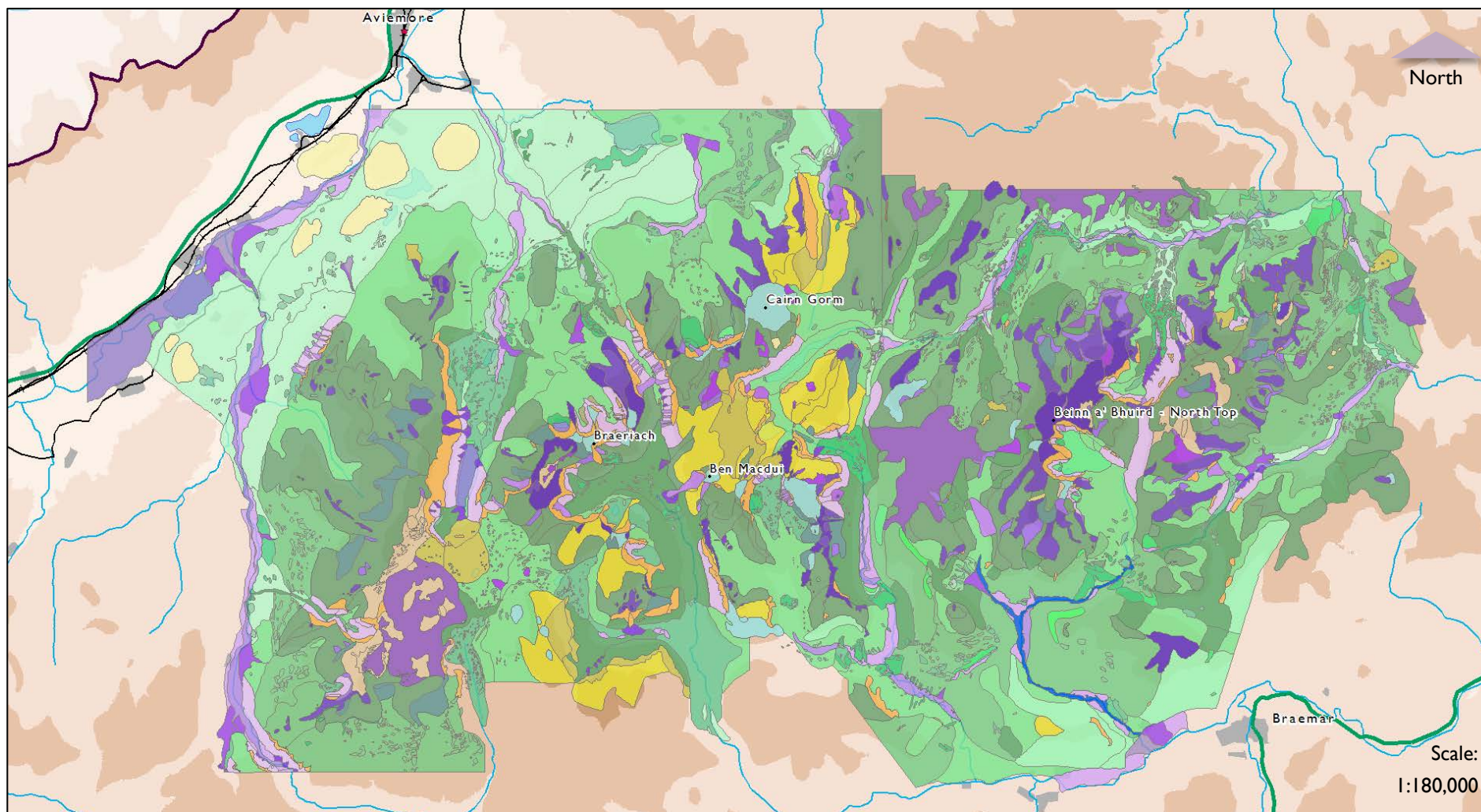





















Figure 57 Geomorphological heritage of the Cairngorm Mountains (legend on p. 133) (Kirkbride & Gordon, 2010).

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Natural Heritage.





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

Cairngorms National Park. 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.

Energy

Because the CNPA has historically implemented quite restrictive policies on energy, developments of energy generating infrastructure have been relatively minor. Since 2010 there have only been 24 planning applications approved by the CNPA, giving a total installed capacity of around 4.2 Megawatts (MW). Of these, 14 were for hydroelectric schemes, 5 were wind turbines, 3 were biomass boilers and 2 were solar panel arrays (**Figure 58**).

It should be noted that the CNPA is a ‘call in’ authority and therefore planning applications in the National Park are decided by either the relevant local

authority or by the CNPA. The CNPA only ‘calls in’ and determines the bigger and most sensitive applications, while the rest are determined by the relevant local authority.

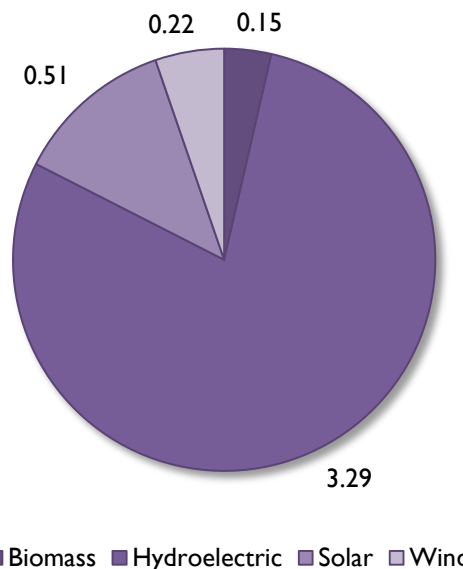


Figure 58 MW of installed renewable energy generation permitted by the CNPA since 2010.

Wind turbines, hydro schemes or large solar panel farms are likely to be ‘called in’, however smaller scale developments may not be. Furthermore, installing certain renewable energy technologies, such as

solar panels and biomass boilers is within the permitted development rights of householders and businesses provided certain conditions are met. Therefore, figures quoted within this section do not offer a comprehensive indication of the amount of energy generated within the National Park.

There is therefore currently a gap in the data available for renewable energy generation within the National Park that will need to be addressed for the SEA of the NPPP.

Beauley-Denny Line

In 2010 Scottish Ministers granted consents to install a 400kV overhead electricity transmission line to replace an existing 132kV overhead transmission line between Beauly and Denny.

The proposed route for the replacement line will result in a reduction in the length of the transmission line and in the number of towers going through the Cairngorms National Park (**Figure 59**). The length of

the replacement line in the National Park will be 28 km, supported by 76 towers. It will replace the existing line, which is 36 km long and supported by 128 towers. The proposed route is on the boundary of the National Park and avoids settlements and popular tourist routes as far as possible.

Although the project is due to be completed in November 2015, a major operation will continue during 2015/16 to decommission and dismantle the original 132kV line and reinstate access tracks and ground disturbed by construction activity. Good progress was made during 2014 with the majority of the original 132kV towers being removed along the A9 between Dalwhinnie and Trinafour. Good progress has also been made to install replacement circuits between Etteridge and Boat of Garten, which will allow the removal of a further 40 km of existing overhead lines supported by steel towers. 53 km of 132kV overhead transmission line between Boat of Garten and Cairnmore has already been removed (Scottish and Southern Energy, 2015).

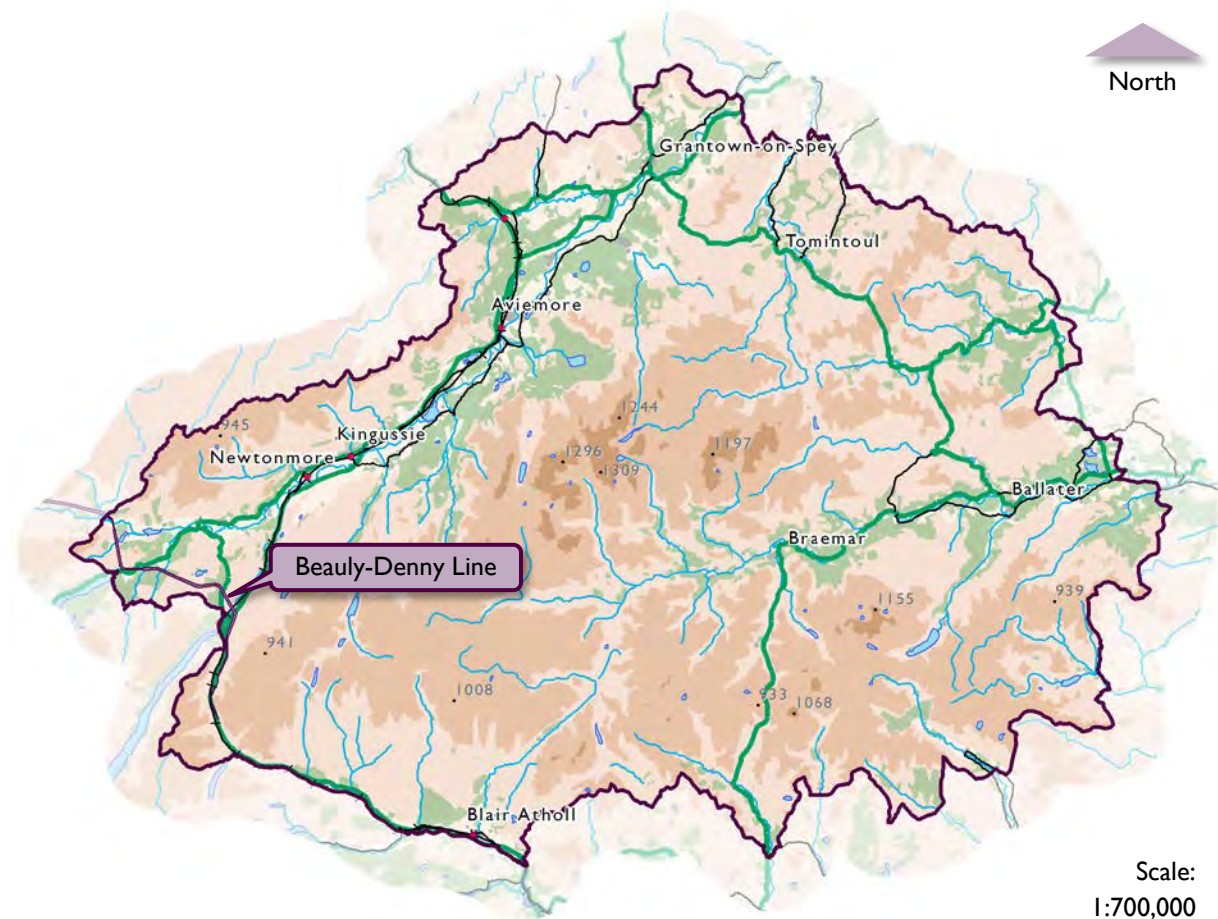


Figure 59 The Beauly-Denny Line.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority.

Waste

Estimates of household waste and recycling for Local Authority (LA) areas for 2011-2014 are recorded by SEPA. Specific data for Scotland’s national parks is not available and therefore to get an approximation of the Cairngorms National Park’s contribution further assumptions need to be made.

Mid-year population estimates have been used as a proxy for proportionally attributing the waste produced and recycled for the LAs that cover the National Park’s area to the National Park itself (see **Appendix 3** for further details). It is recognised that this is a blunt means of estimation; indeed estimates based on estimates should always be treated with caution. However, in the absence of detailed National Park specific information, the information presented in **Figure 60**, **Figure 61** and **Table 13** offer a ‘best-guess’ and a generalised baseline for measurement over the plan period.

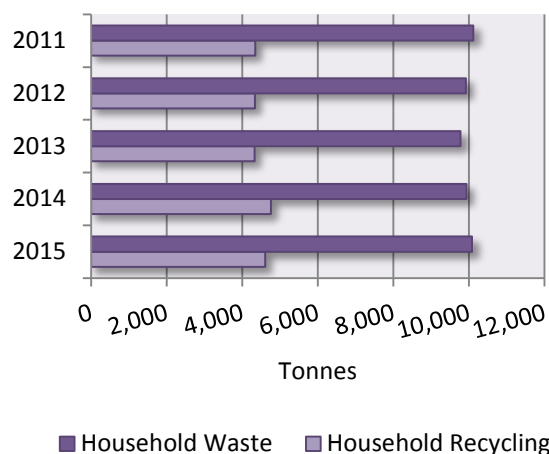


Figure 60 Estimated household waste produced in Cairngorms National Park.

(Source: www.environment.scotland.gov.uk/get-interactive/data/household-waste)
 Table 13 Estimated household waste produced and recycled in the Cairngorms National Park.
 (Source: www.environment.scotland.gov.uk/get-interactive/data/household-waste)

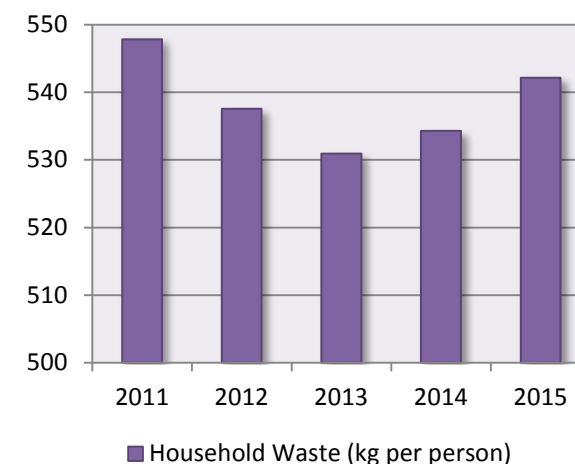


Figure 61 Estimated household waste per person in Cairngorms National Park.

	2011	2012	2013	2014	2015
Household Waste (tonnes)	10,113	9,923	9,779	9,935	10,080
Household Waste (kg per person)	548	538	531	534	542
Household Recycling (tonnes)	4,340	4,335	4,326	4,759	4,608
Recycling Rate	42.9%	43.7%	44.2%	46.6%	45.8%

According to this estimate the household waste per person is higher than the Scottish average, which for 2014 was 460 kg per person. However, it is estimated that the recycling rate is higher than the Scottish average, which in 2014 was 43.6%.

It should be recognised that the Cairngorms National Park is not responsible for waste management in the area, with this function falling to the Local Authorities that cover its area. The NPPP may however play a role in waste reduction, contributing the objectives of the Scottish Zero Waste Plan (Scottish Government, 2010), by promoting the waste hierarchy of reduce, reuse and recycle

Transport Infrastructure

Road

The National Park benefits from relatively good transport infrastructure and services compared to many other rural areas in Scotland (**Table 14**). 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 62**) 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. 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).



Figure 62 The A9 in the Cairngorms National Park.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority.

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 routes 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 will have significant implications for the NPPP, which may result in cumulative or in-combination effects that demand consideration.

Networks of other A, B, C and unclassified roads provide access to other parts of the National Park. The area's geography means that links between certain parts of the National Park are relatively poor. A notable example is the route between Badenoch and Strathspey and Deeside, with the principle road, the A939 being susceptible to inclement weather.

The Scottish Index of Multiple Deprivation (SIMD) gives an indication some of the accessibility issues faced by certain parts of the part, with 11 of the 24 data zones used to define the National Park falling within the Index's most deprived 10% in terms of geographic access to services (see **Figure 63** and **Figure 64**). It should be noted that such a situation is not unexpected for such a rural area, and none of the National Park's data zones rank highly in terms of overall deprivation.

Table 14 Approximate road infrastructure (in km), and the Authority responsible for its maintenance, in the Cairngorms National Park (Source: Local Authorities).

Local Authority	A Class (Trunk)	A Class	B Class	C Class	Unclassified	Total ⁵
Aberdeenshire ⁶	-	-	-	-	-	-
Angus ⁷	0	0	65.363	49.499	5.979	120.841
Highland ⁸	128	40.7	106.7	69.9	169.9	515.2
Moray	0	18.1	24.4	10.6	24.6	77.7
Perth & Kinross	43.54 ⁹	16.6	15.16	0.34	23.0	124.3

⁵ Figures may not sum due to rounding.

⁶ Data has not been received from Aberdeenshire Council.

⁷ Angus Council does not keep a record of road length within the National Park. Therefore the figures quoted are for public roads in Angus that cross into the National Park.

⁸ Figures refer to the Badenoch & Strathspey Area of Highland Council.

⁹ Trunk A Roads value managed by Perth & Kinross Council includes only one side of the dual carriageway along Glen Garry.

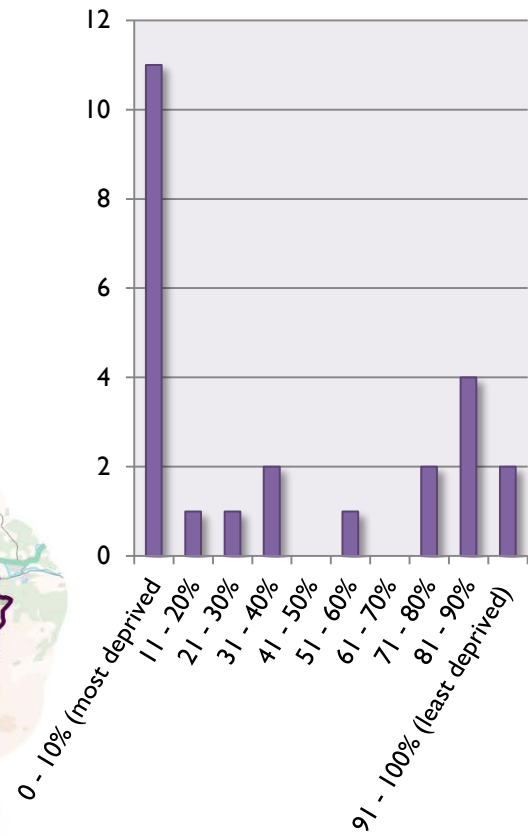
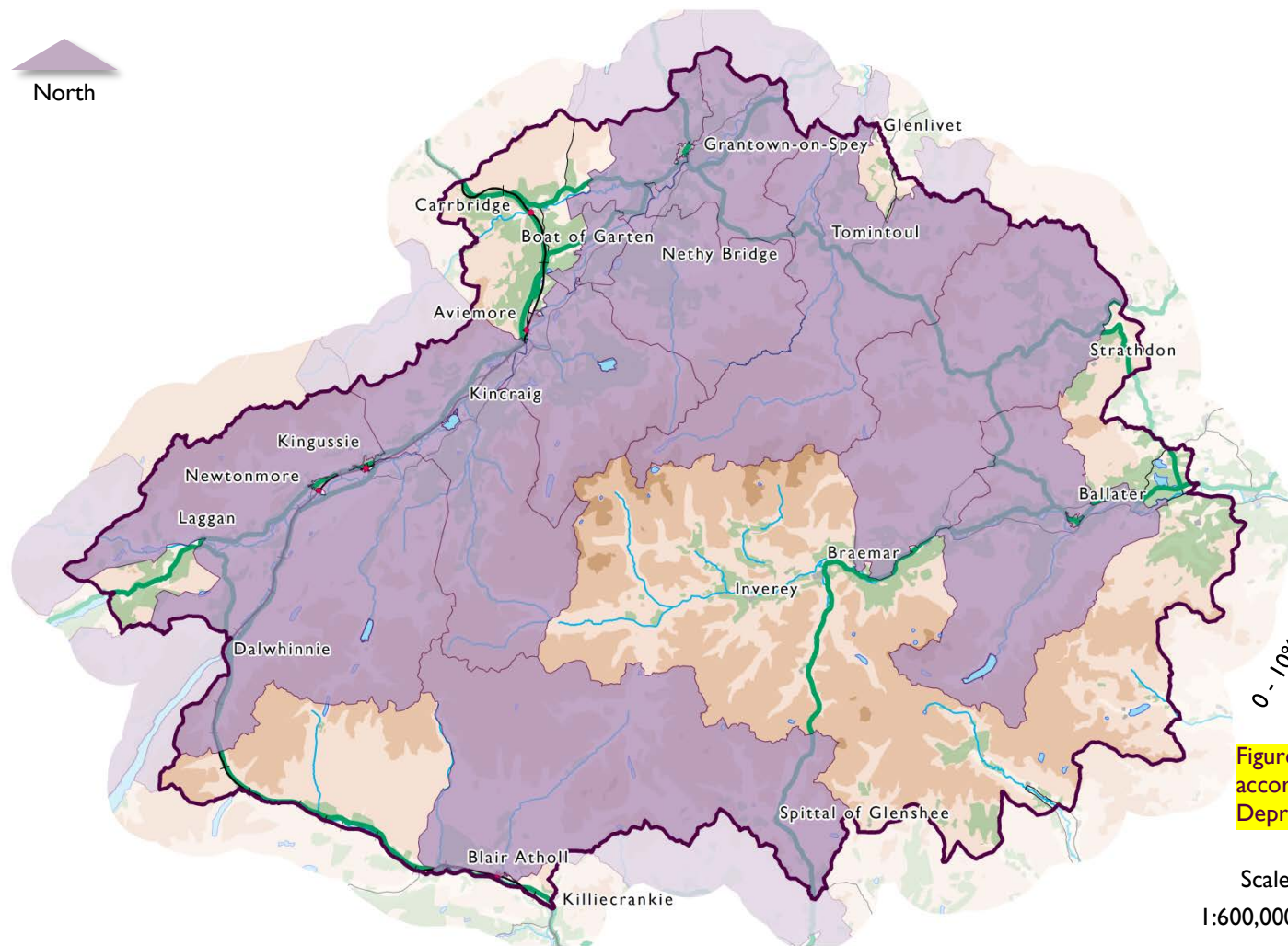


Figure 63 Data zone distribution by decile according to Geographic Access to Services Deprivation (SIMD, 2016)

Scale: 1:600,000

Figure 64 Data zones ranked within the 10% most deprived according to drive times (SIMD 2016).

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Government.

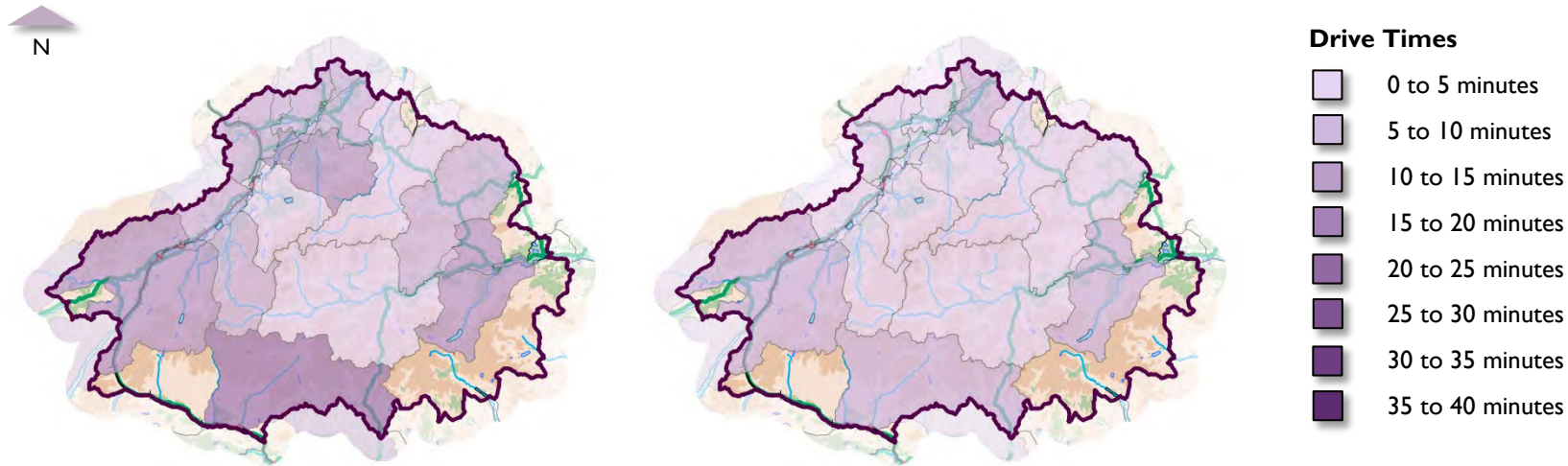


Figure 65 Average drive time to a GP surgery (SIMD, 2016). Figure 66 Average drive time to a Post Office (SIMD, 2016).

All drive time maps are produced at a scale of 1:1,400,000 when printed at A4.

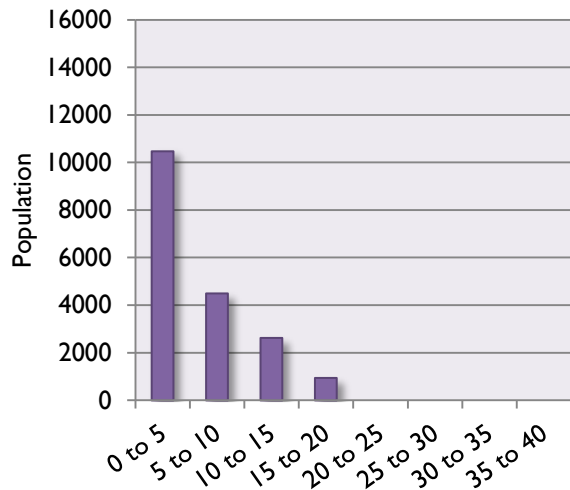


Figure 67 Population distribution by average drive time (minutes) to a GP surgery (SIMD, 2016).

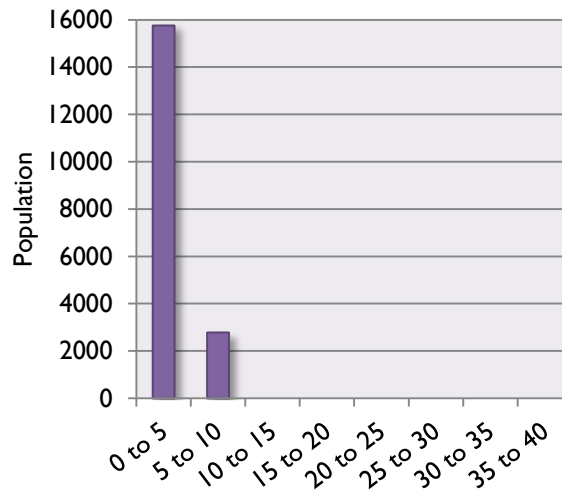
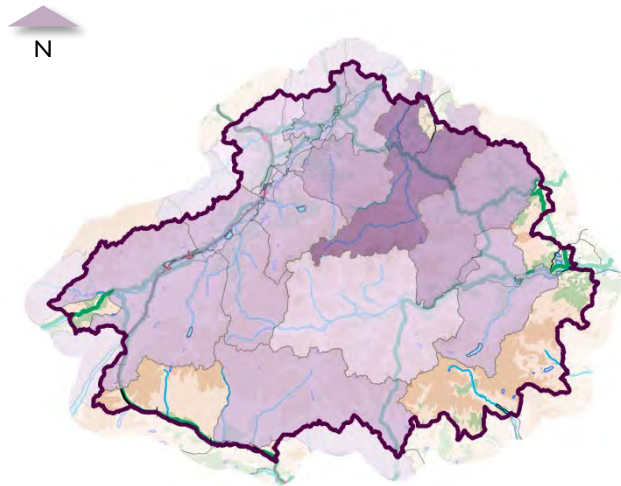


Figure 68 Population distribution by average drive time (minutes) to a Post Office (SIMD, 2016).

To maintain consistency with SIMD data, population data is based on 2016 mid-year estimates.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Government.



Drive Times

- 0 to 5 minutes
- 5 to 10 minutes
- 10 to 15 minutes
- 15 to 20 minutes
- 20 to 25 minutes
- 25 to 30 minutes
- 30 to 35 minutes
- 35 to 40 minutes

Figure 69 Average drive time to a petrol station (SIMD, 2016).

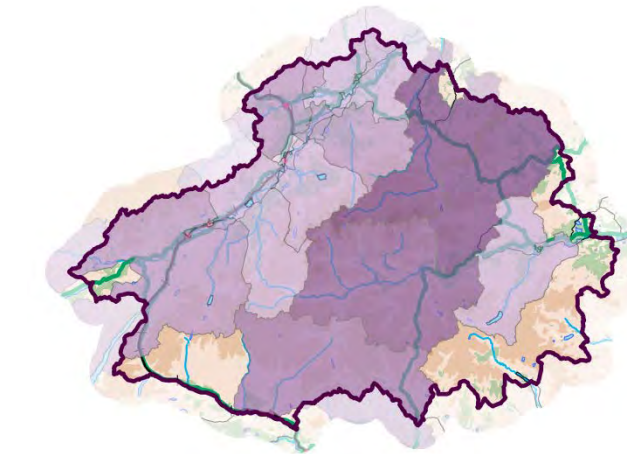


Figure 70 Average drive time to a retail centre (SIMD, 2016).

All drive time maps are produced at a scale of 1:1,400,000 when printed at A4.

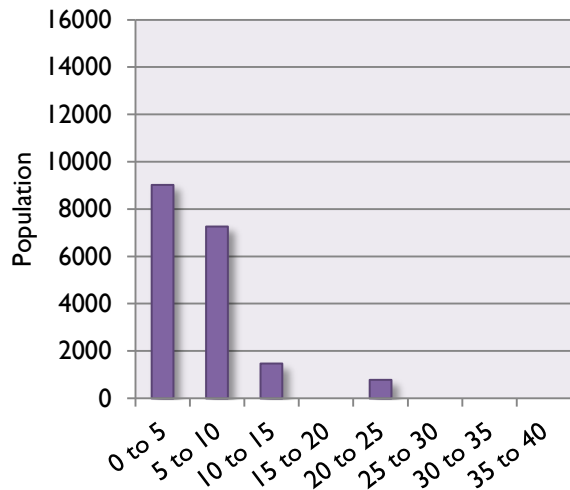


Figure 71 Population distribution by average drive time (minutes) to a petrol station (SIMD, 2016).

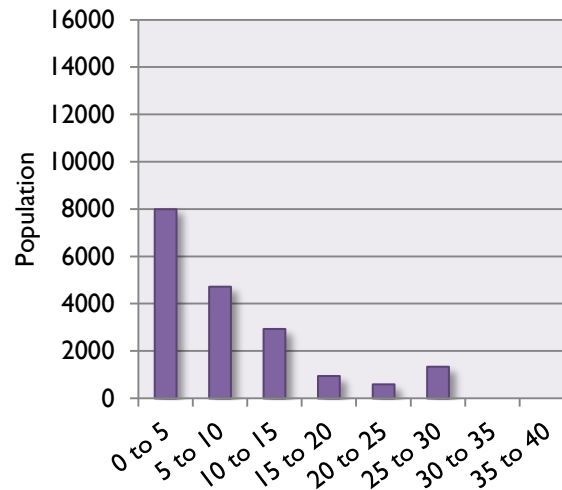


Figure 72 Population distribution by average drive time (minutes) to a retail centre (SIMD, 2016).

To maintain consistency with SIMD data, population data is based on 2016 mid-year estimates.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Government.

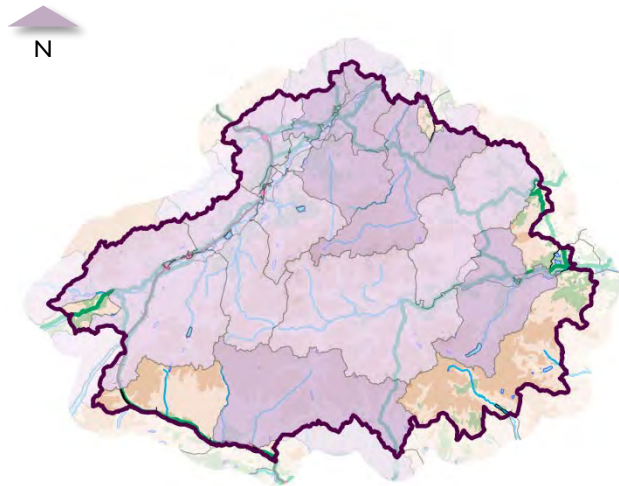


Figure 73 Average drive time to primary school (SIMD, 2016).

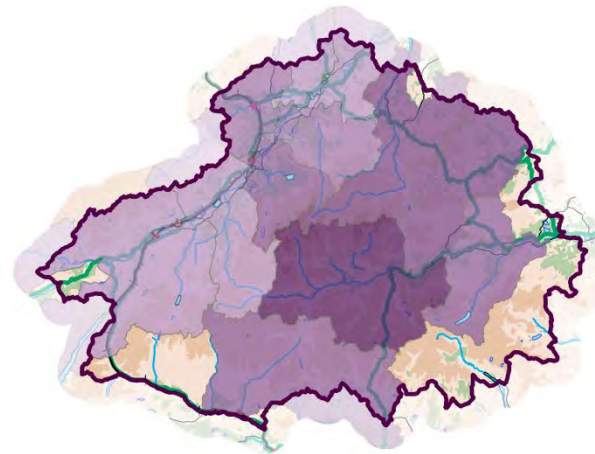


Figure 74 Average drive time to secondary school (SIMD, 2016).

Drive Times

- 0 to 5 minutes
- 5 to 10 minutes
- 10 to 15 minutes
- 15 to 20 minutes
- 20 to 25 minutes
- 25 to 30 minutes
- 30 to 35 minutes
- 35 to 40 minutes

All drive time maps are produced at a scale of 1:1,400,000 when printed at A4.

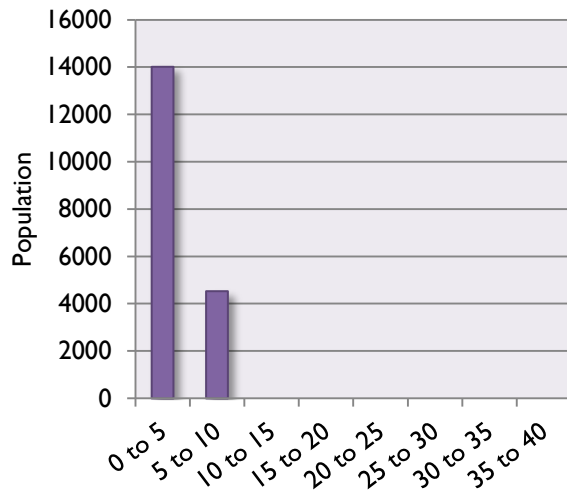


Figure 75 Population distribution by average drive time (minutes) to primary school (SIMD, 2016).

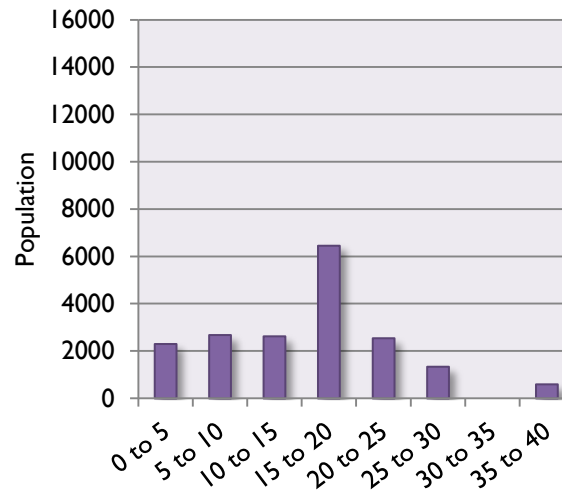


Figure 76 Population distribution by average drive time (minutes) to secondary school (SIMD, 2016).

To maintain consistency with SIMD data, population data is based on 2016 mid-year estimates.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Government.

Drive time data provided in **Figure 65** to **Figure 76** also demonstrates the nature of the National Park’s road infrastructure, with the population often having to travel for a long time to reach key services. Of particular significance are the times needed to travel from the Braemar area to reach the nearest secondary school or retail centre.

The rurality of the area is also demonstrated through the relatively high instances of car ownership within the National Park (**Figure 77** and **Figure 78**). 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%. As a result, a high proportion of the National Park’s population have a reliance on the area’s road infrastructure.

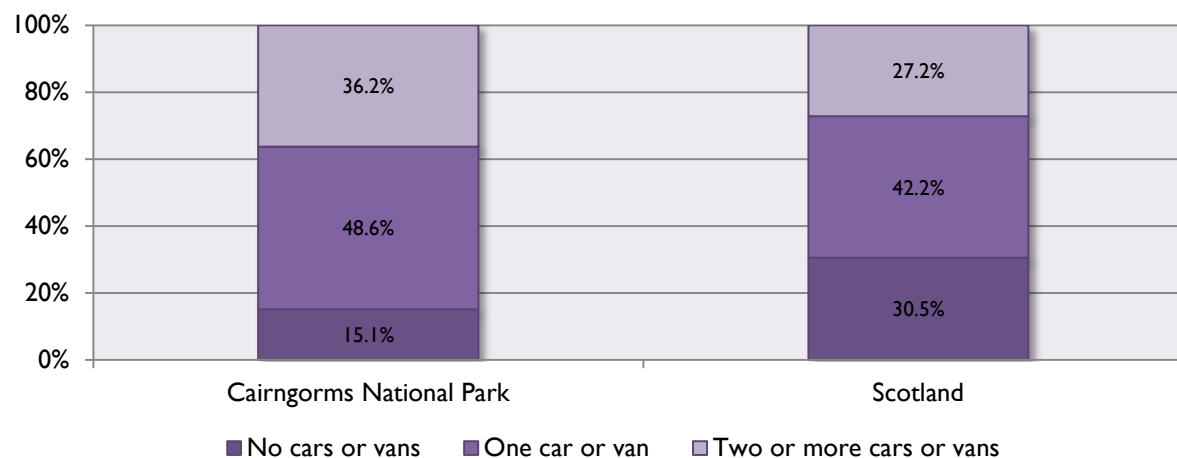


Figure 77 Proportion of households with access to a car or van (Census table LCI401SC).

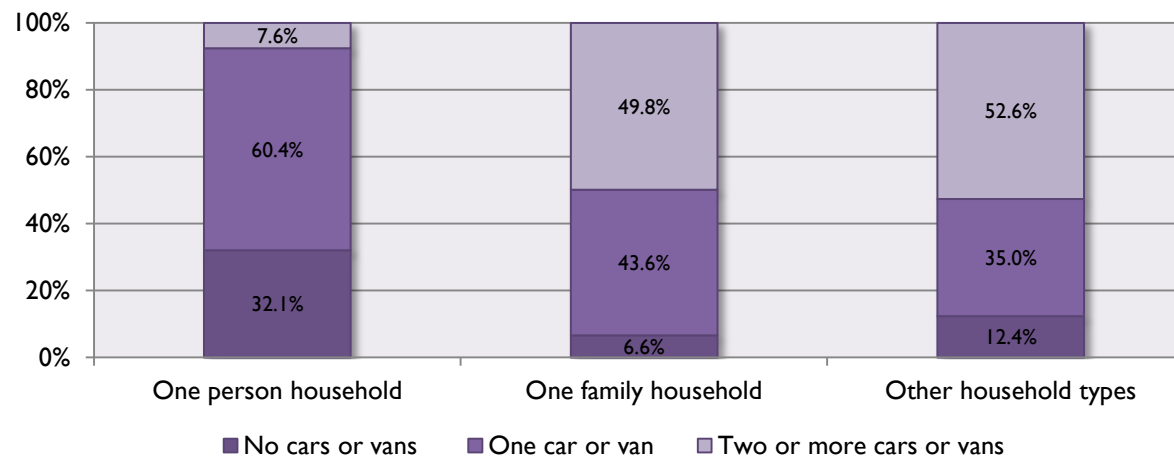


Figure 78 Household composition by car or van availability in the Cairngorms National Park (Census table LCI401SC).

Crown copyright 2014.

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 17 years (**Figure 79** and **Table 15**).

The data on fare types also gives an indication of the types of journey being made. For example, while, season ticket use remains extremely low (around 4%) relative to Scotland (around 28%) and the UK as a whole (around 39%), their increase in their use between 1997 and 2016, particularly at Aviemore station, may offer an insight

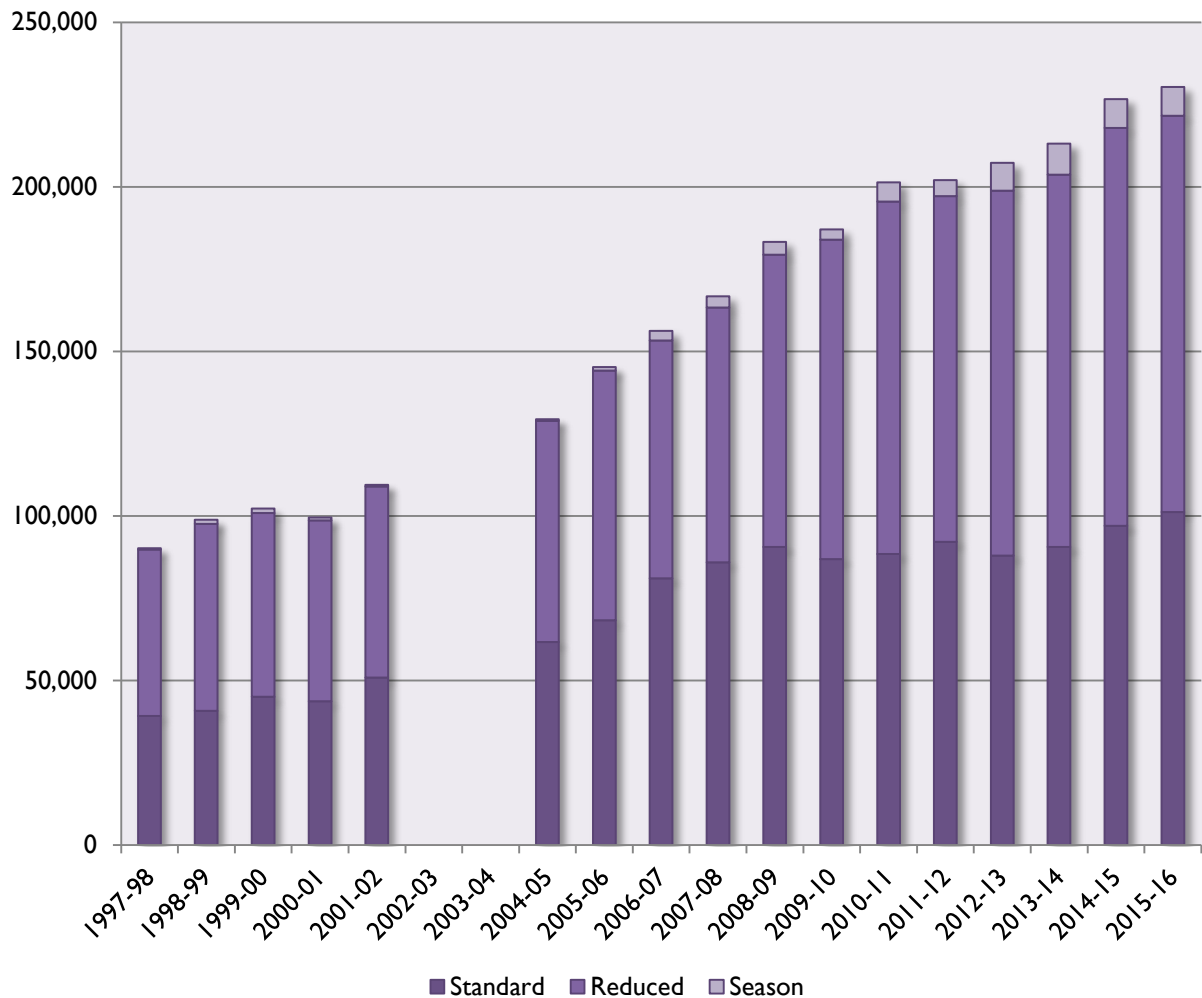


Figure 79 Total annual passenger usage (the sum of entrances and exits) by fare type at stations within the Cairngorms National Park (Source: www.orr.gov.uk/statistics/published-stats/station-usage-estimates)¹⁰.

¹⁰ No fare information is available for 2002-03, while no data at all is available for 2003-04.

into the impact of the town's significant population growth over the past 15 years has had (see **Topic 8: Population and Human Health** (p. 250) for further information).

Table 15 Annual passenger usage at stations (the sum of entrances and exits) within the Cairngorms National Park 1997 – 2016 (Source: www.orr.gov.uk/statistics/published-stats/station-usage-estimates).

Station Name	97-98	98-99	99-00	00-01	01-02	02-03	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16
Carrbridge	2,365	2,030	2,432	2,441	1,930	1,531	1,910	2,987	3,954	5,508	3,796	4,500	5,118	5,636	4,454	5,540	6,256	6,898
Aviemore	53,872	61,358	61,795	62,338	70,230	70,272	80,977	91,456	101,294	108,353	121,090	124,972	132,336	132,052	136,456	141,311	150,724	152,082
Kingussie	17,565	18,856	21,196	19,207	22,585	23,815	27,725	30,045	32,135	33,416	38,054	35,838	38,544	40,298	40,954	41,400	42,522	42,850
Newtonmore	3,528	3,868	4,013	4,146	4,062	4,184	5,396	6,815	6,585	7,060	7,446	7,972	9,484	9,406	8,958	8,326	8,636	9,432
Dalwhinnie	2,080	1,974	1,937	2,027	2,062	2,066	1,619	2,013	1,774	1,975	2,296	2,208	1,894	1,984	2,172	2,472	2,460	2,392
Blair Atholl	10,710	10,776	10,893	9,341	8,573	8,613	11,708	11,896	10,491	10,443	10,580	11,572	13,948	12,608	14,280	14,084	16,062	16,652
Total	90,120	98,862	102,266	99,500	109,442	110,481	129,335	145,212	156,233	166,755	183,262	187,062	201,324	201,984	207,274	213,133	226,660	230,306

Internet Infrastructure

Good digital connectivity is increasingly seen as a basic service that is required by residents, businesses, students, visitors and the public sector.

There are currently 28 telephone exchanges that cover the Cairngorms National Park, not all of which are located within its boundary. Combined they service around 15,065 telephone connections (not all within the National Park area) of which 13,682 are classed as residential and 1,176 as non-residential. All 28 exchanges are enabled to provide ADSL broadband, with all but two providing connection speeds up to 8 Mb/s. The two that are not equipped for these speeds are the Clova (ESCLO) and Advie (NSADV) Exchanges, which only provide speeds of up to 512 Kb/s (SamKnows, 2015). Average speeds across the National Park are however currently in the 5-6 M/bs range (Broadband Speedchecker, 2015).

A survey of 634 National Park households and businesses conducted in 2011/2012

found that 93.7% had access to broadband, with 1.7% claiming to use dial-up and 4.4% not to have any internet access at all. Speed was however found to be an issue for many, with 43.3% rating their connection as slow or very slow (Cairngorms National Park Authority, 2013).

Following the survey, a Digital Connectivity Audit was carried out by Broadband Strategies Limited (2012). The study concluded that the following targets should be set for all premises within the National Park:

- A minimum download speed of 2 Mbit/s and 350 Kbps upload with better than 150 ms latency and a contention ratio of 100:1 or better for residents and 50:1 or better for business by 2014.
- An average download speed of 10 Mbit/s down and 4 Mbit/s up, for all residents by 2015.
- Access to high speed broadband for all residents and businesses by 2020

Since then, high-speed fibre broadband networks have been programmed for expansion across most of the National Park’s area by the end of 2016 (Figure 80). Once complete, Tomintoul will become the highest village in Scotland to be connected to high-speed fibre broadband (Digital Scotland, 2015).

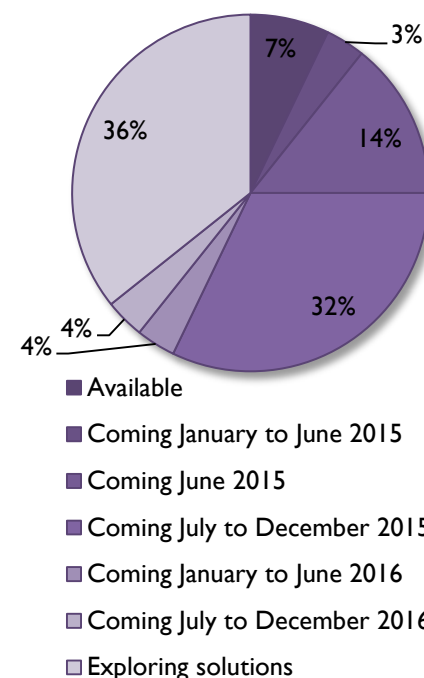


Figure 80 Timetable for rollout of high-speed fibre broadband networks for telephone exchanges servicing the Cairngorms National Park (Digital Scotland, 2015).

Key Messages

Material assets cover a wide range of environmental concerns.

39 GCR sites within or overlapping the National Park boundary; combined they cover an area of around 592 km².

The CNPA have permitted around 4.2 MW of renewable energy since 2010 although gaps remain in the data relating to total energy production. The upgrade of the Beuley-Denny line is nearing completion.

The level of household waste produced appears to be reducing while recycling rates appear to be increasing.

Transport infrastructure, while good along the National Park's main corridors, is poor elsewhere in the National Park, resulting in long drive times and high levels of deprivation in SIMD domains relating to access. The development of new infrastructure, in particular the dualling of the A9, may result in cumulative effects when implemented alongside the NPPP.

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

The National Park's internet infrastructure is currently being upgraded, although plans are yet to be confirmed for a third of the exchanges servicing the area.

Inter-relationships with other topics

➤ Topic 1: Climatic Factors	88
➤ Topic 2: Air	97
➤ Topic 3: Water	101
➤ Topic 4: Soil	118
➤ Topic 6: Biodiversity, Fauna and Flora	148
➤ Topic 7: Landscape and Cultural Heritage	221
➤ Topic 8: Population and Human Health	250

Topic 6: Biodiversity, Fauna and Flora

“Biodiversity – the variety of Life on Earth – makes our planet habitable and beautiful. We depend on it for food, energy, raw materials, air and water that make life possible and drive our economy. We look to the natural environment for equally important things like aesthetic pleasure, artistic inspiration and recreation.”

European Commission Natura 2000.

The Cairngorms National Park is a haven for nature and wildlife and is of great significance for Scotland and the UK. The National Park covers less than two per cent of the UK landmass but is home to 25% of its rare animal, insect, lichen, fungi and insect species. Habitats are rich and varied and include the montane alpine plants high on the Cairngorms plateaux, the sources of renowned salmon rivers the Spey, Dee, Tay and South Esk and stands of trembling Aspen in Strathspey which support rare insects and fungi.

Protected Areas

Protected areas represent the very best of Scotland's landscapes, plants and animals, rocks, fossils and landforms. Their protection and management will help to ensure that they remain in good health for all to enjoy, both now and for future generations.

The Cairngorms National Park is home to a number of areas designated to meet the needs of international directives and treaties, national legislation and policies as well as more local needs and interests.

National Designations

National designations cover a range of different types of protected area, including Natural Nature Reserves (NNR) and Sites of Special Scientific Interest (SSSI), both of which are located within the Cairngorms National Park. The National Park is also home to a number of non-statutory protected sites, such as the RSPB reserve at Loch Garten.

National Nature Reserves

NNRs are statutory nature reserves designed under Part III of the National Parks and Access to the Countryside Act 1949. Most reserves have habitats and species that are nationally or internationally important so the wildlife is managed very carefully. However, people are also encouraged to enjoy NNRs too and so most have some form of visitor facilities that are designed to ensure recreational activities are not pursued without heed for the wildlife and habitat that exists there.

The Cairngorms National Park is home to 11 NNRs¹¹ (**Table 16** and **Figure 81**), which cover a combined area of around 513 km².

¹¹ While the Cairngorms NNR, Dinnet Oakwood NNR and Morrone Birkwood NNR are technically declared NNRs (see **Table 16**), they are under review and not managed or promoted as NNRs.

The NNRs are run by a range of organisations. For example, most of the Abernethy and Inch Marshes NNRs are also managed as part of RSPB reserves.

Table 16 National Nature Reserves in the Cairngorms National Park.

Site Code	Name	Year Est.	Area (ha)
5013	Cairngorms	1954	25,963.63
5020	Craigellachie	1960	257.46
5023	Dinnet Oakwood	1966	30.8
5032	Glen Tanar	1979	4,186.76
5051	Morrone Birkwood	1972	226.48
5054	Muir of Dinnet	1977	1,166.17
8628	Insh Marshes	2003	695.18
8670	Corrie Fee	2005	165.38
10097	Invereshie and Inshriach	2007	3,730.86
10098	Glenmore	2007	2,119.49
10099	Abernethy	2007	12,753.81

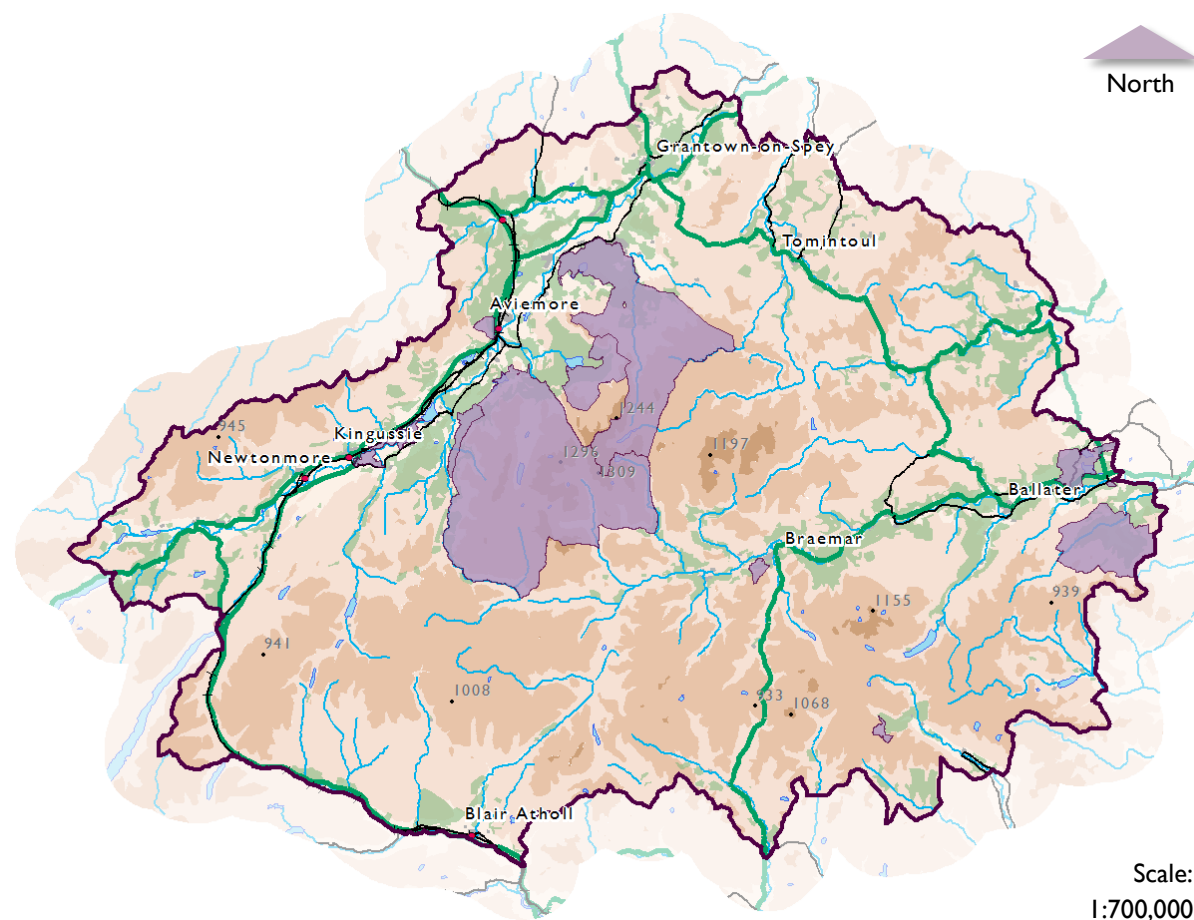


Figure 81 National Nature Reserves in the Cairngorms National Park.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Natural Heritage.

Sites of Special Scientific Interest

Designated under the Nature Conservation (Scotland) Act 2004, SSSIs are those areas of land and water that SNH considers to best represent Scotland’s natural heritage - its diversity of plants, animals and habitats, rocks and landforms, or a combinations of such natural features (see **Table 17** and **Figure 82** to **Figure 87**).

They are the essential building blocks of Scotland's protected areas for nature conservation and therefore many are also designated as Natura 2000 sites.

SSSIs designated solely for geological or physiographical features are also covered in **Topic 4: Soil** (p. 118) and **Topic 5: Material Assets** (p. 129).

A simple colour scheme has been used to highlight the condition of interests, the key to which is provided:

Features in ‘Favourable’ condition.
Features that are in ‘Unfavourable’ condition.
Features that have not been monitored to date.

Table 17 Condition of Biological and Mixed SSSIs located within the Cairngorms National Park.

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
9	Abernethy Forest	Mixed	5793.46	5793.46	Basin fen	Favourable	No negative pressures identified	18/10/2014
					Beetle assemblage	Favourable	Over-grazing	17/11/2002
					Breeding bird assemblage	Favourable	No negative pressures identified	23/04/2013
					Capercaillie (<i>Tetrao urogallus</i>), breeding	Favourable	Under-grazing	19/04/2014
					Crested tit (<i>Lophophanes cristatus</i>), breeding	Favourable	No negative pressures identified	03/05/1998
					Dragonfly assemblage	Favourable	Forestry operations, other	01/08/2013
					Fluvial Geomorphology of Scotland	Favourable	Invasive species	06/04/2007
					Fungi assemblage	Favourable	Over-grazing, under-grazing	01/10/2014

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
					Invertebrate assemblage	Favourable	Trampling	01/08/2013
					Lichen assemblage	Favourable	No negative pressures identified	25/06/2010
					Native pinewood	Favourable	Game/ fisheries management	30/09/2008
					Osprey (<i>Pandion haliaetus</i>), breeding	Unfavourable	No negative pressures identified	14/06/2013
					Quaternary of Scotland	Favourable	No negative pressures identified	03/05/2007
					Raised bog	Favourable	No negative pressures identified	12/08/2014
					Scottish crossbill (<i>Loxia scotica</i>), breeding	Favourable	No negative pressures identified	28/03/2012
					Subalpine dry heath	Unfavourable Recovering Due to Management	Burning, under-grazing	27/09/2004
					Vascular plant assemblage	Favourable	Maintenance activities	28/03/2007
30	Aldclune and Invervack Meadows	Biological	16.61	16.61	Lowland calcareous grassland	Unfavourable	Under-grazing	22/08/2012
44	Allt Mor	Geological	40.68	40.68	Fluvial Geomorphology of Scotland	Favourable	No negative pressures identified	27/04/2007
53	Alvie	Biological	339.01	339.01	Goldeneye (<i>Bucephala clangula</i>), breeding	Favourable	No negative pressures identified	15/05/2013
					Hydromorphological mire range	Favourable	No negative pressures	13/07/2011

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
							identified	
					Invertebrate assemblage	Favourable	Forestry operations, over-grazing	16/07/2013
					Upland oak woodland	Unfavourable Recovering Due to Management	Over-grazing	20/07/2005
161	Beinn a' Ghlo	Mixed	8084.76	7763.08	Breeding bird assemblage	Favourable	Game/ fisheries management	20/06/2013
					Bryophyte assemblage	Favourable	No negative pressures identified	17/08/2013
					Caledonian Igneous	Favourable	No negative pressures identified	24/11/2010
					Dalradian	Favourable	No negative pressures identified	25/04/2002
					Upland assemblage	Favourable	No negative pressures identified	22/07/2010
					Upland birch woodland	Favourable	No negative pressures identified	30/07/2004
					Vascular plant assemblage	Favourable	Agricultural operations	29/08/2002
223	Blair Atholl Meadow	Biological	0.55	0.55	Lowland calcareous grassland	Unfavourable Recovering Due to Management	Agricultural operations	17/07/2007
235	Bochel Wood	Biological	197.87	197.55	Upland birch woodland	Favourable	No negative pressures identified	19/06/2000
282	☐ - ○ ∪	Biological	4974.75	4974.75	Breeding bird assemblage	Favourable	Over-grazing,	01/07/2003

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
							recreation / disturbance	
					Bryophyte assemblage	Favourable	Trampling	31/12/2005
					Dystrophic loch	Favourable	Over-grazing	02/07/2004
					Invertebrate assemblage	Favourable	No negative pressures identified	15/08/2011
					Lichen assemblage	Favourable	No negative pressures identified	03/10/2010
					Montane assemblage	Unfavourable	Over-grazing	16/07/2006
					Quaternary of Scotland	Favourable	No negative pressures identified	26/07/2011
					Vascular plant assemblage	Unfavourable	Over-grazing, to be identified	31/08/2009
288	Cairngorms	Mixed	29226.7	29226.7	Breeding bird assemblage	Favourable	Over-grazing, recreation / disturbance	15/07/2006
					Bryophyte assemblage	Favourable	Natural event	18/08/2005
					Dotterel (<i>Charadrius morinellus</i>), breeding	Favourable	Over-grazing, recreation / disturbance, trampling	01/07/2011
					Dystrophic and oligotrophic lochs	Not monitored to date	No negative pressures identified	N/A
					Fluvial Geomorphology of Scotland	Favourable	Forestry operations	30/04/2003
					Fungi assemblage	Favourable	Over-grazing, recreation / disturbance	20/10/2010
					Golden eagle (<i>Aquila chrysaetos</i>), breeding	Favourable	Recreation/disturbance	21/10/2007
					Invertebrate assemblage	Favourable	Agricultural operations, other	30/08/2013

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
					Lichen assemblage	Favourable	Over-grazing	19/08/2010
					Mineralogy of Scotland	Favourable	No negative pressures identified	30/08/2006
					Native pinewood	Unfavourable Recovering Due to Management	Over-grazing, under-grazing	27/01/2009
					Ptarmigan (<i>Lagopus muta</i>), breeding	Favourable	Recreation/disturbance	17/07/2004
					Quaternary of Scotland	Favourable	Climate Change, recreation / disturbance	07/08/2003
					Snow bunting (<i>Plectrophenax nivalis</i>), breeding	Favourable	Recreation / disturbance, other	24/07/2004
					Upland assemblage	Not monitored to date	No negative pressures identified	N/A
					Vascular plant assemblage	Favourable	Natural event	05/10/2006
291	Cairnwell	Biological	22.96	22.96	Alpine calcareous grassland	Favourable	Over-grazing	20/08/2008
					Vascular plant assemblage	Favourable	Over-grazing	20/07/2011
415	Coyles of Muick	Biological	122.52	122.52	Calaminarian grassland and serpentine heath	Favourable	No negative pressures identified	25/07/2012
					Subalpine flushes	Favourable	No negative pressures identified	08/07/2008
					Vascular plant assemblage	Favourable	No negative pressures identified	25/07/2012
Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
419	Craig Leek	Biological	185.13	185.13	Bryophyte assemblage	Unfavourable Recovering Due to Management	Under-grazing	24/07/2009
					Native pinewood	Favourable	Over-grazing	10/09/2009
					Subalpine calcareous grassland	Favourable	Invasive species	01/08/2006
					Upland assemblage	Unfavourable	Forestry operations, under-grazing	16/07/2012
					Upland birch woodland	Unfavourable Recovering Due to Management	Over-grazing	14/07/2011
					Vascular plant assemblage	Favourable	No negative pressures identified	21/11/2013
428	Craigellachie	Biological	379.85	379.85	Moth assemblage	Favourable	Other	13/08/2014
					Upland birch woodland	Favourable	Burning	23/07/2009
429	Craigendaroch	Biological	67.07	67.07	Upland oak woodland	Favourable	No negative pressures identified	10/07/2013

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
452	Crathie Wood	Biological	193.34	29.06	Invertebrate assemblage	Favourable	Agricultural operations, over-grazing	05/08/2013
					Juniper scrub	Favourable	Burning, plant pests and diseases, under-grazing	18/09/2012
					Native pinewood	Favourable	Plant pests and diseases	13/08/2009
					Rocky slopes (includes inland cliff, rocky outcrops, chasmophytic vegetation)	Favourable	No negative pressures identified	18/09/2012
					Upland birch woodland	Favourable	No negative pressures identified	18/09/2012
1697	Creag Clunie and the Lion's Face	Biological	251.94	251.94	Bryophyte assemblage	Not monitored to date	No negative pressures identified	N/A
					Capercaillie (<i>Tetrao urogallus</i>), breeding	Unfavourable	Over-grazing, under-grazing	31/03/2011
					Elm Gyalecta lichen (<i>Gyalecta ulmi</i>)	Favourable	Invasive species	11/02/2003
					Lichen assemblage	Not monitored to date	No negative pressures identified	N/A
					Native pinewood	Unfavourable Recovering Due to Management	Invasive species, over-grazing	08/08/2011
					Scottish crossbill (<i>Loxia scotica</i>), breeding	Favourable	No negative pressures identified	01/03/2015
455	Creag Dhubh	Biological	1052.31	1052.31	Upland birch woodland	Unfavourable	Over-grazing	03/07/2009
457	Creag Meagaidh	Biological	7033.13	507.19	Breeding bird assemblage	Favourable	Over-grazing, recreation / disturbance, trampling	26/06/2013

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
					Rocky slopes (includes inland cliff, rocky outcrops, chasmophytic vegetation)	Favourable	Natural event	30/09/2005
					Upland assemblage	Favourable	Trampling	30/09/2005
					Upland birch woodland	Favourable	No negative pressures identified	10/09/2015
					Vascular plant assemblage	Favourable	Natural event	04/09/2011
460	Creag nan Gamhainn	Biological	15.75	6.2	Broad-leaved helleborine (<i>Epipactis helleborine</i>)	Favourable	Maintenance activities	28/08/2012
					Lowland calcareous grassland	Favourable	Invasive species	28/08/2012
					Lowland neutral grassland	Favourable	No negative pressures identified	14/07/2008
					Northern brown argus (<i>Aricia artaxerxes</i>)	Favourable	Maintenance activities	14/07/2008
					Springs (including flushes)	Favourable	No negative pressures identified	21/07/2011
					Upland birch woodland	Favourable	No negative pressures identified	16/07/2002
490	Dalnabo Quarry	Geological	0.28	0.28	Mineralogy of Scotland	Favourable	Natural event	18/10/2007
514	Dinnet Oakwood	Biological	19.73	19.73	Upland oak woodland	Favourable	Invasive species, no proactive management, over-grazing	12/07/2002

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
541	Drumochter Hills	Biological	9688.13	7625.11	Breeding bird assemblage	Favourable	Over-grazing, recreation / disturbance	25/04/2003
					Fluvial Geomorphology of Scotland	Favourable	No negative pressures identified	11/10/2011
					Montane assemblage	Favourable	No negative pressures identified	31/07/2006
					Vascular plant assemblage	Unfavourable	Burning, over-grazing, water management	15/08/2003
593	Eastern Cairngorms	Mixed	16503.4	16503.4	Arctic charr (<i>Salvelinus alpinus</i>)	Favourable	No negative pressures identified	18/07/2008
					Breeding bird assemblage	Favourable	Burning, game/ fisheries management	14/06/2013
					Bryophyte assemblage	Unfavourable	Air pollution	31/07/2010
					Dystrophic and oligotrophic lochs	Favourable	Game/ fisheries management	21/06/2010
					Fluvial Geomorphology of Scotland	Favourable	Water management	15/01/2003
					Fungi assemblage	Not monitored to date	No negative pressures identified	N/A
					Invertebrate assemblage	Favourable	Forestry operations	04/07/2013
					Lichen assemblage	Not monitored to date	No negative pressures identified	N/A
Native pinewood	Unfavourable Recovering Due to Management	Natural event, over-grazing	01/04/2008					

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
					Quaternary of Scotland	Favourable	Recreation/disturbance	07/08/2003
					Upland assemblage	Not monitored to date	No negative pressures identified	N/A
					Vascular plant assemblage	Favourable	Burning, over-grazing, recreation / disturbance	31/08/2010
1696	Fafernie	Biological	252.44	252.44	Breeding bird assemblage	Favourable	Over-grazing, recreation / disturbance	30/04/2003
					Dotterel (<i>Charadrius morinellus</i>), breeding	Favourable	Burning, recreation / disturbance	31/05/1999
646	Fodderletter	Biological	3.08	1.19	Lowland acid grassland	Favourable	No negative pressures identified	14/07/2008
					Springs (including flushes)	Favourable	No negative pressures identified	25/06/2013
1709	Forest of Clunie	Biological	19476.6	233.8	Black grouse (<i>Tetrao tetrix</i>), breeding	Favourable	Burning, natural event, over-grazing	14/05/2009
					Breeding bird assemblage	Favourable	Water management	29/05/2009
					Hen harrier (<i>Circus cyaneus</i>), breeding	Unfavourable	Burning, natural event, over-grazing	29/05/2009
					Osprey (<i>Pandion haliaetus</i>), breeding	Favourable	No negative pressures identified	01/08/2010
					Short-eared owl (<i>Asio flammeus</i>), breeding	Unfavourable	Burning	29/05/2009
670	Garbh Choire	Biological	229.32	229.32	Alpine flush	Favourable	Over-grazing	22/06/2011
					Bryophyte assemblage	Unfavourable Recovering Due to Management	Over-grazing	27/10/2004

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
					Snowbed	Not monitored to date	Over-grazing	N/A
					Spring-head, rill and flush	Unfavourable Recovering Due to Management	Over-grazing	10/07/2006
					Upland assemblage	Unfavourable	Natural event, Over-grazing, Trampling	03/08/2012
					Vascular plant assemblage	Unfavourable Recovering Due to Management	Over-grazing	16/07/2005
693	Glas Tulaichean	Biological	456.43	456.43	Vascular plant assemblage	Favourable	Natural event	13/07/2010
702	Glen Callater	Biological	1513.01	1513.01	Alpine blue-sow-thistle (<i>Cicerbita alpina</i>)	Not monitored to date	No negative pressures identified	N/A
					Alpine heath	Favourable	No negative pressures identified	30/07/2015
					Blanket bog	Unfavourable	Natural event, trampling	30/07/2015
					Breeding bird assemblage	Favourable	Game/ fisheries management	21/06/2013
					Bryophyte assemblage	Favourable	No negative pressures identified	30/10/2010
					Mineralogy of Scotland	Favourable	No negative pressures identified	10/07/2013

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
					Oligotrophic loch	Favourable	No negative pressures identified	09/07/2009
					Spring-head, rill and flush	Favourable	Over-grazing, trampling	05/09/2001
					Tall herb ledge	Favourable	Under-grazing	30/07/2015
					Upland assemblage	Not monitored to date	No negative pressures identified	N/A
					Vascular plant assemblage	Unfavourable	Natural event, over-grazing	04/08/2006
705	Glen Ey Gorge	Mixed	41.24	41.24	Dalradian	Favourable	No negative pressures identified	31/07/2012
					Subalpine dry heath	Favourable	Over-grazing	24/05/2013
					Tall herb ledge	Favourable	No negative pressures identified	31/07/2012
708	Glen Fender Meadows	Biological	96.15	96.15	Lowland calcareous grassland	Favourable	No negative pressures identified	02/08/2002
					Lowland dry heath	Unfavourable Recovering Due to Management	Agricultural operations, over-grazing	02/06/2014
					Springs (including flushes)	Unfavourable Recovering Due to Management	Under-grazing	02/09/2004
					Vascular plant assemblage	Favourable	Over-grazing	09/08/2014
710	Glen Garry	Geological	28.59	0	Dalradian	Favourable	No negative pressures identified	29/01/2001

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
724	Glen Tanar	Mixed	4180.09	4142.25	Capercaillie (<i>Tetrao urogallus</i>), breeding	Unfavourable	No negative pressures identified	30/04/2014
					Fungi assemblage	Favourable	No negative pressures identified	26/10/2009
					Invertebrate assemblage	Favourable	Forestry operations, under-grazing	26/06/2013
					Native pinewood	Favourable	Invasive species	08/04/2010
					Scottish crossbill (<i>Loxia scotica</i>), breeding	Favourable	No negative pressures identified	23/03/2012
					Subalpine dry heath	Favourable	No negative pressures identified	17/11/2009
726	Glen Tilt Woods	Biological	15.02	9.4	Upland mixed ash woodland	Favourable	No negative pressures identified	15/08/2000
1665	Glenmore Forest	Biological	1440.38	1440.38	Capercaillie (<i>Tetrao urogallus</i>), breeding	Favourable	Proactive on-site management	30/04/2009
					Narrow-headed ant (<i>Formica exsecta</i>)	Favourable	Conservation activities, Inter-specific competition, No proactive management	30/08/2013
					Native pinewood	Favourable	Game/ fisheries management	16/06/2008
					Quaternary of Scotland	Not monitored to date	No negative pressures identified	N/A
					Scottish crossbill (<i>Loxia scotica</i>), breeding	Not monitored to date	No negative pressures identified	7/03/2012
					Vascular plant assemblage	Favourable	No negative pressures identified	23/07/2007

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
742	Green Hill of Strathdon	Biological	640.77	640.77	Calaminarian grassland and serpentine heath	Favourable	Over-grazing	02/08/2002
					Moorland juniper	Favourable	Burning	29/07/2011
					Subalpine dry heath	Favourable	Burning, over-grazing	15/08/2008
					Subalpine flushes	Favourable	No negative pressures identified	29/07/2011
807	Inchrory	Mixed	1089.93	1089.93	Mountain whorl snail (<i>Vertigo alpestris</i>)	Favourable	No negative pressures identified	17/07/2013
					Northern brown argus (<i>Aricia artaxerxes</i>)	Not monitored to date	No negative pressures identified	N/A
					Quaternary of Scotland	Favourable	No negative pressures identified	31/10/1999
					Upland assemblage	Not monitored to date	Burning, over-grazing, trampling, under-grazing	N/A
					Vascular plant assemblage	Favourable	Burning, over-grazing, trampling	09/06/2008
858	Kinlochlagan Boulder Beds	Geological	6.13	6.13	Dalradian	Favourable	No negative pressures identified	08/01/2014
864	Kinveachy Forest	Biological	5325.7	3728.87	Breeding bird assemblage	Favourable	No negative pressures identified	08/06/2007
					Native pinewood	Favourable	No negative pressures identified	24/06/2008
887	Ladder Hills	Biological	4357.94	4357.94	Alpine heath	Favourable	Game/ fisheries management	04/07/2013
					Blanket bog	Favourable	Agricultural operations, burning	03/09/1999

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
					Mineralogy of Scotland	Favourable	No negative pressures identified	31/03/2006
					Subalpine dry heath	Unfavourable	Burning, over-grazing, recreation / disturbance	09/04/2007
					Upland assemblage	Unfavourable	Agricultural operations, burning	04/07/2013
968	Loch Brandy	Biological	98.98	98.98	Bryophyte assemblage	Favourable	Recreation / disturbance	31/10/2010
					Oligotrophic loch	Favourable	Recreation / disturbance	01/07/2004
981	Loch Etteridge	Geological	114.94	114.94	Quaternary of Scotland	Favourable	Agricultural operations, extraction, recreation / disturbance	28/03/2000
1014	Loch Moraig	Biological	33.46	33.46	Mesotrophic loch	Favourable	No negative pressures identified	01/07/2010
					Springs (including flushes)	Favourable	No negative pressures identified	23/07/2008
					Vascular plant assemblage	Favourable	No negative pressures identified	29/07/2010
1065	Loch Vaa	Biological	44.6	44.6	Beetles	Favourable	No negative pressures identified	12/07/2010
					Goldeneye (<i>Bucephala clangula</i>), breeding	Unfavourable	Recreation/disturbance	30/06/2007
					Slavonian grebe (<i>Podiceps auritus</i>), breeding	Unfavourable	Game/ fisheries management, natural event, recreation / disturbance	30/06/2007

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
1108	Lower Strathabon Woods	Biological	293.47	0	Upland birch woodland	Favourable	Over-grazing, under-grazing	20/08/2010
					Upland oak woodland	Favourable	Over-grazing	29/08/2002
					Wet woodland	Favourable	No negative pressures identified	29/08/2002
1180	Monadhliath	Biological	10671.1	7120.93	Black mountain moth (<i>Glacies coracina</i>)	Favourable	No negative pressures identified	26/06/2014
					Blanket bog	Unfavourable	Trampling	03/11/2004
					Breeding bird assemblage	Favourable	Over-grazing	19/06/2008
					Dotterel (<i>Charadrius morinellus</i>), breeding	Unfavourable	Over-grazing, recreation / disturbance	01/07/2011
					Upland assemblage	Favourable	Over-grazing	03/11/2004
					Vascular plant assemblage	Favourable	Over-grazing	06/08/2015
1190	Morrone Birkwood	Biological	328.34	328.34	Alpine heath	Favourable	Over-grazing	03/06/2014
					Basin fen	Favourable	No negative pressures identified	02/08/2013
					Bryophyte assemblage	Favourable	No negative pressures identified	06/09/2013
					Fungi assemblage	Favourable	No negative pressures identified	18/10/2012
					Invertebrate assemblage	Favourable	Under-grazing	25/06/2013
					Juniper scrub	Unfavourable Recovering Due to Management	Over-grazing	11/10/2009
					Quaternary of Scotland	Favourable	No negative pressures	04/06/2014

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
							identified	
					Rocky slopes (includes inland cliff, rocky outcrops, chasmophytic vegetation)	Not monitored to date	No negative pressures identified	N/A
					Spring-head, rill and flush	Favourable	No negative pressures identified	03/06/2014
					Subalpine calcareous grassland	Favourable	No negative pressures identified	03/06/2014
					Subalpine flushes	Favourable	No negative pressures identified	03/06/2014
					Upland birch woodland	Unfavourable Recovering Due to Management	Over-grazing	12/11/2009
					Vascular plant assemblage	Favourable	Over-grazing, recreation / disturbance	03/08/2005
1194	Morven and Mullachdubh	Biological	2508.35	2345.72	Alpine heath	Favourable	No negative pressures identified	16/08/2000
					Blanket bog	Favourable	No negative pressures identified	11/11/2012
					Breeding bird assemblage	Favourable	Burning, game / fisheries management, wildlife crime	13/07/2013
					Moorland juniper	Favourable	Over-grazing, plant pests and diseases, under-grazing	04/09/2008
					Upland assemblage	Not monitored to date	No negative pressures identified	N/A

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
					Vascular plant assemblage	Favourable	No negative pressures identified	04/08/2015
1212	Muir of Dinnet	Mixed	2308.59	15.54	Breeding bird assemblage	Unfavourable Recovering Due to Management	No proactive management	31/08/2004
					Dragonfly assemblage	Favourable	No negative pressures identified	31/10/2012
					Greylag goose (<i>Anser anser</i>), non-breeding	Unfavourable	No negative pressures identified	10/12/2012
					Hydromorphological mire range	Favourable	Invasive species	N/A
					Invertebrate assemblage	Favourable	No negative pressures identified	31/10/2012
					Lowland dry heath	Favourable	No proactive management	30/07/2013
					Lowland wet heath	Unfavourable	Over-grazing	24/07/2015
					Oligo-mesotrophic loch	Favourable	Invasive species, water quality	25/06/2004
					Quaternary of Scotland	Favourable	Forestry operations	30/06/2000
1241	North Rothiemurchus Pinewood	Mixed	1509.75	1509.75	Breeding bird assemblage	Favourable	No negative pressures identified	17/06/2014
					Capercaillie (<i>Tetrao urogallus</i>), breeding	Favourable	Proactive on-site management	30/04/2010
					Crested tit (<i>Lophophanes cristatus</i>), breeding	Favourable	No negative pressures identified	17/03/2005
					Fungi assemblage	Favourable	Forestry operations, over-grazing, recreation	02/10/2014

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
							/ disturbance, under-grazing	
					Invertebrate assemblage	Favourable	No negative pressures identified	20/08/2013
					Lichen assemblage	Favourable	Over-grazing	21/08/2010
					Native pinewood	Favourable	Invasive species	22/05/2008
					Osprey (<i>Pandion haliaetus</i>), breeding	Unfavourable Recovering Due to Management	Other	20/06/2010
					Quaternary of Scotland	Favourable	No negative pressures identified	11/06/2003
					Scottish crossbill (<i>Loxia scotica</i>), breeding	Favourable	No negative pressures identified	12/02/2012
					Vascular plant assemblage	Favourable	Under-grazing	23/07/2010
1243	Northern Corries, Cairngorms	Mixed	1966.37	1966.37	Breeding bird assemblage	Favourable	Recreation / disturbance, other	11/07/2013
					Quaternary of Scotland	Favourable	No negative pressures identified	26/06/2003
					Scrub	Favourable	No negative pressures identified	28/07/2008
					Upland assemblage	Favourable	No negative pressures identified	03/04/2007
					Vascular plant assemblage	Favourable	No negative pressures identified	05/10/2006
1274	Pass of Killiecrank	Biological	62.24	5.55	Fly assemblage	Favourable	No negative pressures identified	03/08/2010

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
	ie				Upland oak woodland	Unfavourable	Invasive species	28/09/2006
1335	Red Craig	Geological	105.43	105.43	Caledonian Igneous	Favourable	No negative pressures identified	20/07/2001
1361	River Feshie	Geological	598.82	598.82	Fluvial Geomorphology of Scotland	Favourable	Flood defence works	27/04/2007
					Quaternary of Scotland	Favourable	Flood defence works	28/07/2011
1699	River Spey	Mixed	1958.79	346.3	Atlantic salmon (<i>Salmo salar</i>)	Favourable	Invasive species	20/10/2004
					Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)	Unfavourable	Invasive species, extraction, invasive species, water quality, wildlife crime	30/09/2014
					Otter (<i>Lutra lutra</i>)	Favourable	Over-grazing	08/09/2004
					Sea lamprey (<i>Petromyzon marinus</i>)	Favourable	No negative pressures identified	07/11/2011
1364	River Spey - Insh Marshes	Biological	1158.77	1158.77	Arctic charr (<i>Salvelinus alpinus</i>)	Favourable	Game/ fisheries management	17/07/2008
					Breeding bird assemblage	Favourable	No negative pressures identified	31/07/2001
					Flood-plain fen	Favourable	Trampling, water management	20/07/2011
					Invertebrate assemblage	Favourable	Over-grazing	20/08/2013
					Mesotrophic loch	Favourable	Invasive species, recreation / disturbance	30/07/2010
					Osprey (<i>Pandion haliaetus</i>), breeding	Favourable	Recreation / disturbance	07/09/2009
					Otter (<i>Lutra lutra</i>)	Favourable	Over-grazing	08/09/2004
					Vascular plant assemblage	Favourable	Invasive species, over-	09/07/2007

Site Code	Name	Type	Total Area (ha)	Are in CNP (ha)	Interest	Summary Condition	Pressures	Visit Date
							grazing	
					Whooper swan (<i>Cygnus cygnus</i>), non-breeding	Favourable	Recreation / disturbance	28/03/2010
1504	Struan Wood	Biological	82.82	0	Beetles	Favourable	No negative pressures identified	28/06/2013
					Rannoch roller moth (<i>Ancylis tineana</i>)	Favourable	No negative pressures identified	03/08/2012
					Upland birch woodland	Unfavourable	Over-grazing	20/06/2013

There are 59 SSSIs within or overlapping the National Park. Of these, 50 have biological notifiable features, covering an area of around 1,120 km² (or 25% of the National Park's area). Of these, 28 have at least one notifiable interest that is in unfavourable condition. 5 SSSIs, namely Aldclune and Invervack Meadows, Blair Atholl Meadow, Craigendarroch, Creag Dhubh and Garbh Choire, have no interests in favourable condition.

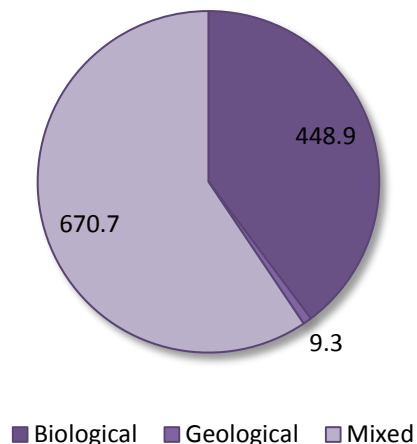


Figure 82 Area (km²) covered by the three types of SSSI within the Cairngorms National Park.

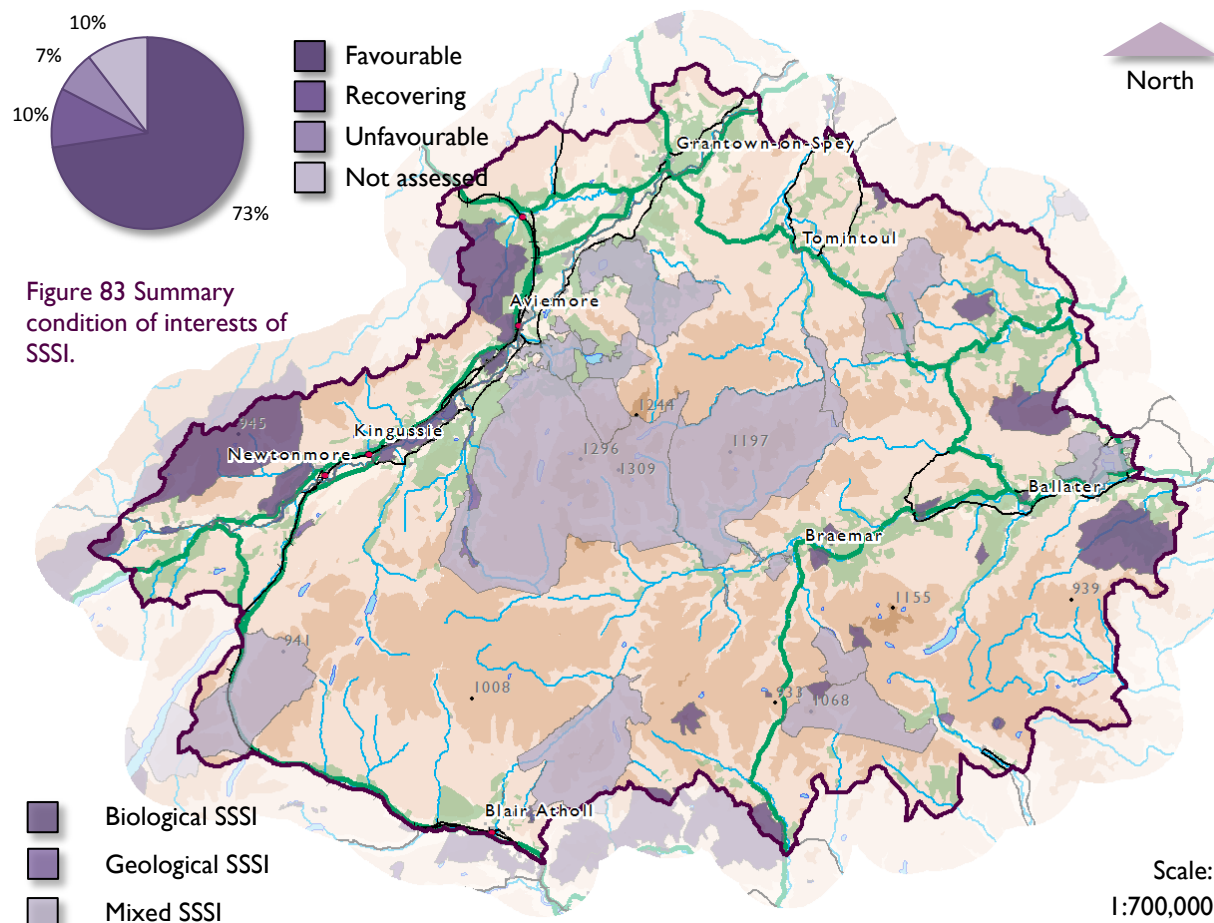


Figure 84 Sites of Special Scientific Interest by type within and overlapping the Cairngorms National Park Authority.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Natural Heritage.

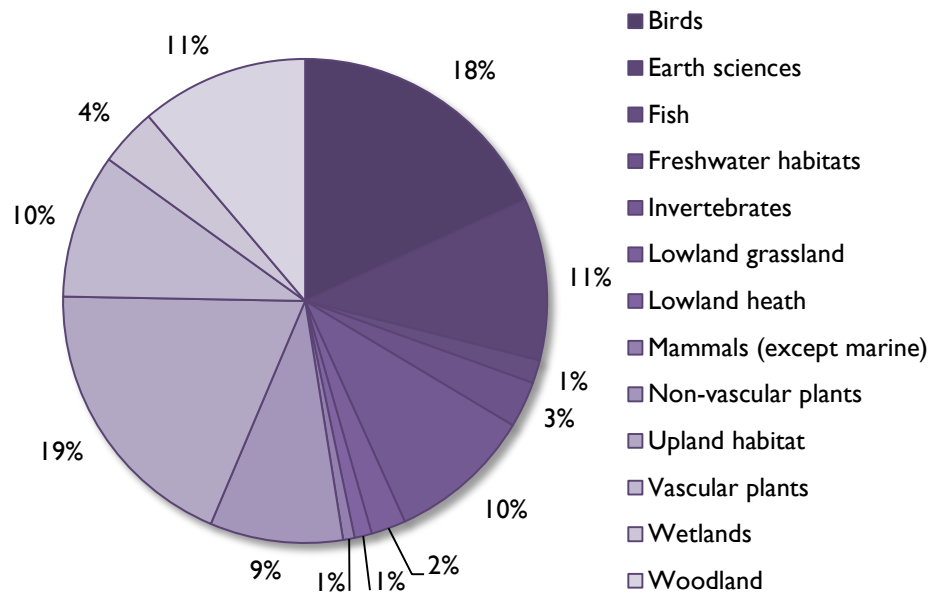


Figure 85 Category of interests of SSSIs within the Cairngorms National Park.

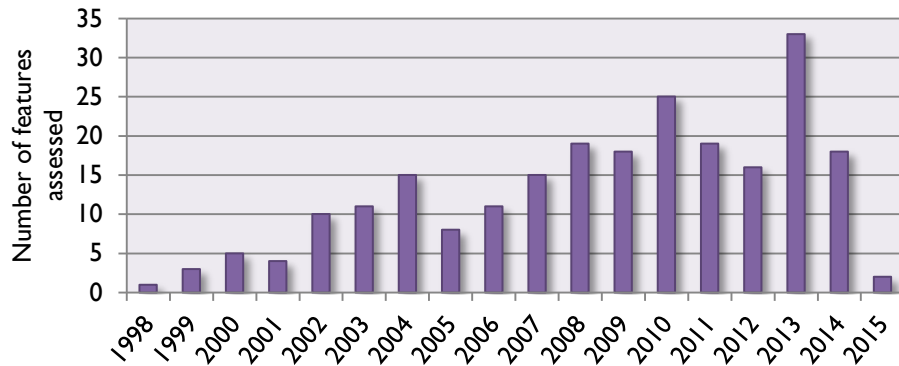


Figure 86 Year of latest assessed visit of interests of SSSIs within the Cairngorms National Park.

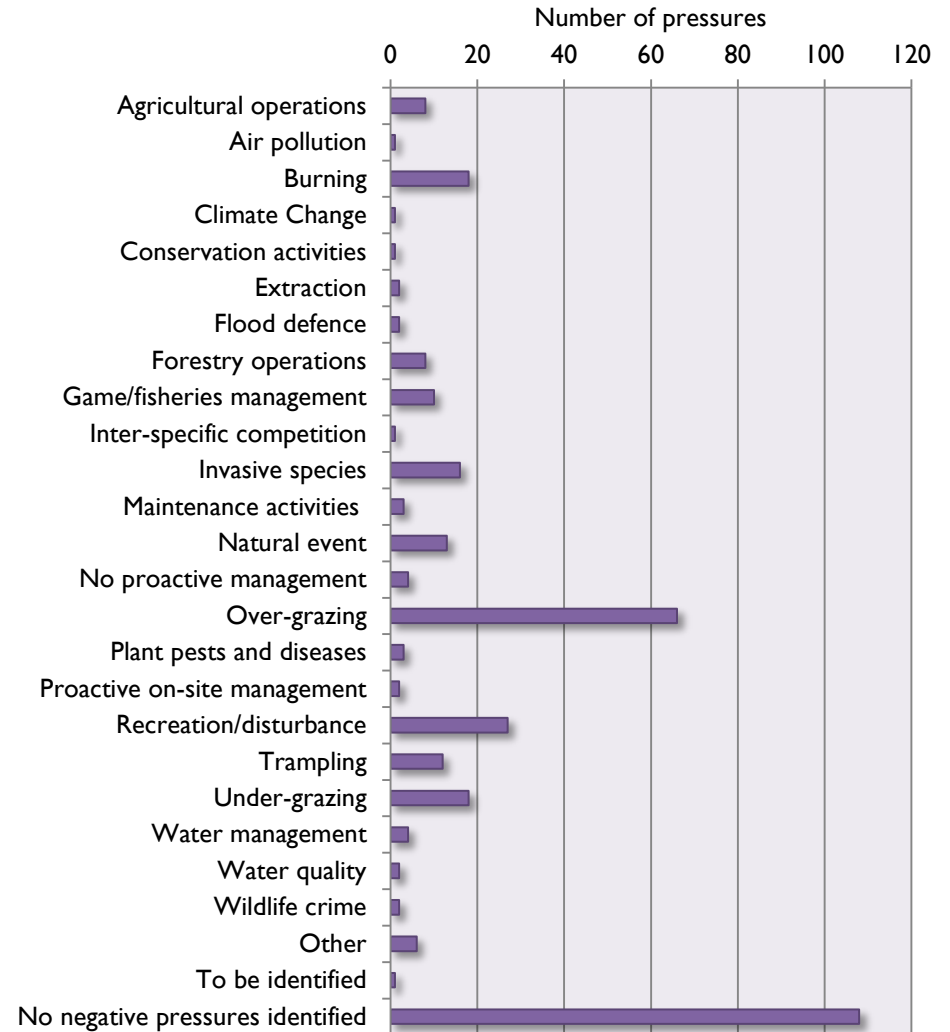


Figure 87 Pressures on interests of SSSIs within the Cairngorms National Park.

International Designations

Natura 2000 Network

Nearly half of the Cairngorms National Park is designated within the Natura 2000 network, sites which are considered the best for wildlife in Europe.

There are two types of Natura 2000 site within the National Park, namely Special Areas of Conservation (SAC) and Special Protection Areas (SPA).

SACs (**Table 18** and **Figure 88 to Figure 92**) are strictly protected sites designated under the EC Habitats Directive. Article 3 of the Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). The listed habitat types and

species are those considered to be most in need of conservation at a European level (excluding birds). Of the UK's 78 Annex I habitat types (of which 26 are marine and coastal and therefore not relevant to the National Park), 33 occur in the National Park. Of the UK's 33 Annex II species (of which 4 are marine and coastal and therefore not relevant to the National Park), 10 are native to, and normally resident in, the National Park.

SPAs (**Table 19** and **Figure 93 to Figure 94**) are strictly protected sites classified in accordance with Article 4 of the EC Birds Directive. They are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species. 35 of these Annex I species can be found within the Cairngorms National Park, with SPAs designated to protect populations of 15 of them.

Table 18 and **Table 19** provide information on SACs and SPAs both within and overlapping the Cairngorms National Park. Sites are listed with their qualifying features, the latest assessment of their respective conditions and when the assessments took place and the key pressures affecting the features.

A simple colour scheme has been used to highlight the condition of qualifying features, the key to which is provided below:

Features in 'Favourable' condition.

Features that are in 'Unfavourable' condition.

Features that have not been monitored to date.

Table 18 Special Areas of Conservation within the Cairngorms National Park.

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
UK0012957	Beinn a' Ghlo SAC	8084.76	7762.25	Base-rich fens	Unfavourable	Trampling, over-grazing.	22/07/2010
				Dry grasslands and scrublands on chalk or limestone	Favourable	No negative pressures identified	22/07/2010
				High-altitude plant communities associated with areas of water seepage	Favourable	No negative pressures identified	22/07/2010
				Species-rich grassland with mat-grass in upland areas	Favourable	No negative pressures identified	22/07/2010
				Plants in crevices on acid rocks	Favourable	No negative pressures identified	22/07/2010
				Alpine and subalpine heaths	Favourable	No negative pressures identified	22/07/2010
				Blanket bog	Favourable	Burning	22/07/2010
				Montane acid grasslands	Unfavourable Recovering Due to Management	Over-grazing	19/08/2004
				Plants in crevices on base-rich rocks	Favourable	No negative pressures identified	19/08/2004
				Dry heaths	Unfavourable Recovering Due to Management	Burning, over-grazing.	19/08/2004
				Acidic scree	Favourable	No negative pressures identified	19/08/2004
Hard-water springs depositing lime	Unfavourable	Burning, over-grazing.	19/08/2004				

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
				Geyer's whorl snail (<i>Vertigo geyeri</i>)	Favourable	No negative pressures identified	22/07/2010
				Round-mouthed whorl snail (<i>Vertigo genesii</i>)	Favourable	No negative pressures identified	22/07/2010
UK003002781	Ballochbuie SAC	1881.73	1881.73	Bog woodland	Unfavourable Recovering Due to Management	Over-grazing	02/08/2011
				Caledonian forest	Unfavourable Recovering Due to Management	Over-grazing	08/08/2011
				Blanket bog	Unfavourable Recovering Due to Management	Burning	05/05/2006
				Plants in crevices on acid rocks	Favourable	No negative pressures identified	01/11/2006
				Dry heaths	Unfavourable Recovering Due to Management	Burning	01/11/2006
				Wet heathland with cross-leaved heath	Unfavourable Recovering Due to Management	Burning	01/11/2006
				Plants in crevices on base-rich rocks	Favourable	No negative pressures identified	23/11/2004

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
				Otter (<i>Lutra lutra</i>)	Favourable	No negative pressures identified	12/11/2011
UK0012821	Caenlochan SAC	5975.28	5975.28	Mountain willow scrub	Unfavourable	Climate change, over-grazing, plant pests and diseases	23/08/2012
				Acidic scree	Unfavourable	Over-grazing	30/08/2012
				Montane acid grasslands	Unfavourable	Climate change, over-grazing	18/09/2012
				High-altitude plant communities associated with areas of water seepage	Favourable	No negative pressures identified	18/09/2012
				Tall herb communities	Favourable	No negative pressures identified	18/09/2012
				Plants in crevices on base-rich rocks	Favourable	No negative pressures identified	18/09/2012
				Dry heaths	Unfavourable	Burning, over-grazing	16/07/2006
				Plants in crevices on acid rocks	Favourable	No negative pressures identified	16/07/2006
				Blanket bog	Unfavourable	Burning, over-grazing	16/07/2006
				Alpine and subalpine heaths	Unfavourable	Climate change, over-grazing	16/07/2006
				Base-rich fens	Unfavourable	No negative pressures identified	16/07/2006
				Base-rich scree	Favourable	No negative pressures identified	16/07/2006
				Grasslands on soils rich in heavy metals	Favourable	No negative pressures identified	16/07/2006
				Species-rich grassland with mat-grass in	Unfavourable	No negative pressures	16/07/2006

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
				upland areas		identified	
UK0016412	Cairngorms SAC	50903.74	50903.74	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	Favourable	No negative pressures identified	23/06/2010
				Acid peat-stained lakes and ponds	Favourable	No negative pressures identified	24/06/2010
				Caledonian forest	Unfavourable Recovering Due to Management	Invasive species; under-grazing	27/01/2009
				Dry grasslands and scrublands on chalk or limestone	Unfavourable	Over-grazing; under-grazing; over grazing	03/04/2007
				Blanket bog	Unfavourable	Over-grazing	03/04/2007
				Tall herb communities	Favourable	No negative pressures identified	03/04/2007
				Hard-water springs depositing lime	Favourable	Over-grazing	03/04/2007
				Alpine and subalpine heaths	Unfavourable	Burning; over grazing; Recreation / disturbance	03/04/2007
				Dry heaths	Unfavourable	Burning	03/04/2007
				Plants in crevices on acid rocks	Favourable	Recreation / disturbance	03/04/2007
				Acidic scree	Favourable	Recreation / disturbance	03/04/2007
				Mountain willow scrub	Unfavourable	Over-grazing	03/04/2007
				Wet heathland with cross-leaved heath	Unfavourable	Over-grazing	03/04/2007
				Species-rich grassland with mat-grass in	Unfavourable	Trampling; under-	03/04/2007

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
				upland areas		grazing	
				Plants in crevices on base-rich rocks	Unfavourable	Invasive species	03/04/2007
				Juniper on heaths or calcareous grasslands	Favourable	No negative pressures identified	03/04/2007
				Very wet mires often identified by an unstable 'quaking' surface	Favourable	No negative pressures identified	08/04/2007
				Montane acid grasslands	Favourable	Recreation / disturbance	14/07/2006
				High-altitude plant communities associated with areas of water seepage	Unfavourable	Over-grazing	15/10/2006
				Bog woodland	Favourable	Over-grazing	05/09/2002
				Green shield-moss (<i>Buxbaumia viridis</i>)	Favourable	Forestry operations	02/05/2006
				Otter (<i>Lutra lutra</i>)	Unfavourable	Recreation / disturbance	22/09/2011
UK 0030122	Coyles of Muick SAC	135.16	135.16	Grasslands on soils rich in heavy metals	Favourable	No negative pressures identified	03/08/2006
UK0012955	Creag Meagaidh SAC	6144.58	507.19	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	Favourable	No negative pressures identified	10/06/2010
				Plants in crevices on base-rich rocks	Favourable	No negative pressures identified	15/08/2010
				Plants in crevices on acid rocks	Favourable	No negative pressures identified	08/08/2005
				Alpine and subalpine heaths	Unfavourable	Over-grazing	01/09/2005
				Mountain willow scrub	Unfavourable Recovering Due to	Over-grazing	01/09/2005

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
					Management		
				Tall herb communities	Unfavourable	Over-grazing	30/09/2005
				Wet heathland with cross-leaved heath	Unfavourable	Burning, game / fisheries management, over-grazing	30/09/2005
				Montane acid grasslands	Unfavourable	Over-grazing	30/09/2005
				Dry heaths	Unfavourable	Burning, over-grazing	30/09/2005
				Blanket bog	Unfavourable	Burning, over-grazing	30/09/2005
				Acidic scree	Unfavourable	Over-grazing	30/09/2005
UK0013584	Creag nan Gamhainn SAC	15.75	15.75	Hard-water springs depositing lime	Favourable	No negative pressures identified	21/07/2011
UK0030134	Dinnet Oakwood SAC	19.73	19.73	Western acidic oak woodland	Favourable	Invasive species, no proactive management, over-grazing	12/07/2002
UK0012942	Drumochter Hills SAC	9445.56	7382.22	Alpine and subalpine heaths	Unfavourable	Over-grazing, trampling	05/07/2006
				Montane acid grasslands	Unfavourable	Over-grazing, trampling	06/07/2006
				Plants in crevices on acid rocks	Unfavourable	Over-grazing	06/07/2006
				Dry heaths	Unfavourable	Burning	06/07/2006
				Mountain willow scrub	Unfavourable	Over-grazing	06/07/2006
				Wet heathland with cross-leaved heath	Unfavourable	Burning, over-grazing, trampling	06/07/2006
				Blanket bog	Unfavourable	Burning, over-grazing, trampling	06/07/2006
				Species-rich grassland with mat-grass in upland areas	Unfavourable	Under-grazing	06/07/2006
Acidic scree	Favourable	No negative pressures	06/07/2006				

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
						identified	
				Tall herb communities	Favourable	No negative pressures identified	08/08/2013
UK0012756	Glen Tanar SAC	4180.09	4142.25	Caledonian forest	Favourable	Invasive species	08/04/2010
				Wet heathland with cross-leaved heath	Favourable	No negative pressures identified	21/11/2009
				Dry heaths	Favourable	Under-grazing	23/10/2003
				Blanket bog	Favourable	Burning	31/10/2003
				Otter (<i>Lutra lutra</i>)	Favourable	No negative pressures identified	23/09/2012
UK0030159	Green Hill of Strathd on SAC	640.77	640.77	Dry heaths	Favourable	Burning, over-grazing	15/08/2008
				Grasslands on soils rich in heavy metals	Favourable	Burning	15/08/2008
				Juniper on heaths or calcareous grasslands	Favourable	Over-grazing	02/08/2002
UK0019812	Insh Marshes SAC	1158.78	1158.78	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	Favourable	Invasive species, recreation / disturbance	30/07/2010
				Alder woodland on floodplains	Favourable	Flood defence works, invasive species, no proactive management, over-grazing, water management	19/05/2009
				Very wet mires often identified by an unstable 'quaking' surface	Favourable	No negative pressures identified	04/10/2002
				Otter (<i>Lutra lutra</i>)	Favourable	Over-grazing, other	08/09/2004

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
UK0019812	Insh Marshes SAC	1158.78	1158.78	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	Favourable	Invasive species, recreation / disturbance	30/07/2010
				Alder woodland on floodplains	Favourable	Flood defence works, invasive species, no proactive management, over-grazing, water management	19/05/2009
				Very wet mires often identified by an unstable 'quaking' surface	Favourable	No negative pressures identified	04/10/2002
				Otter (<i>Lutra lutra</i>)	Favourable	Over-grazing, other	08/09/2004
UK0012759	Kinveachy Forest SAC	2849.36	2232.59	Bog woodland	Favourable	No negative pressures identified	24/06/2008
				Caledonian forest	Favourable	No negative pressures identified	24/06/2008
UK0030179	Ladder Hills SAC	4357.94	4357.94	Dry heaths	Unfavourable	Burning, over-grazing, recreation / disturbance	09/04/2007
				Blanket bog	Favourable	Agricultural operations, burning	03/09/1999
				Alpine and subalpine heaths	Favourable	No negative pressures identified	03/09/1999
UK0030210	Monadhliath SAC	1061.11	7121.03	Blanket bog	Unfavourable	Trampling	23/09/2004

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
UK0012894	Morrone Birkwood SAC	318.4	318.4	Base-rich fens	Favourable	Trampling	03/06/2014
				Hard-water springs depositing lime	Favourable	Invasive species, over-grazing	03/06/2014
				High-altitude plant communities associated with areas of water seepage	Favourable	Invasive species, trampling	03/06/2014
				Dry grasslands and scrublands on chalk or limestone	Favourable	No negative pressures identified	03/06/2014
				Juniper on heaths or calcareous grasslands	Unfavourable Recovering Due to Management	Over-grazing	11/10/2009
				Alpine and subalpine heaths	Favourable	Over-grazing, recreation / disturbance	01/07/2008
				Geyer's whorl snail (<i>Vertigo geyeri</i>)	Unfavourable	No negative pressures identified	30/06/2013
UK0019958	Morven & Mullachdubh SAC	916.76	916.76	Juniper on heaths or calcareous grasslands	Favourable	Burning, no proactive management, over-grazing, plant pests and diseases	25/01/2005
UK0019959	Muir of Dinnet SAC	415.76	415.76	Very wet mires often identified by an unstable 'quaking' surface	Unfavourable Recovering Due to Management	Invasive species	30/08/2008
				Clear-water lakes or lochs with aquatic vegetation and poor to moderate	Favourable	Invasive species, water quality	25/06/2004

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
				nutrient levels			
				Dry heaths	Unfavourable Recovering Due to Management	No proactive management	16/02/2001
				Degraded raised bog	Favourable	Agricultural operations, invasive species	30/06/2000
				Otter (<i>Lutra lutra</i>)	Favourable	Natural event, water quality	04/10/2012
UK0030251	River Dee SAC	2446.82	1368.59	Otter (<i>Lutra lutra</i>)	Favourable	No negative pressures identified	06/10/2012
				Atlantic salmon (<i>Salmo salar</i>)	Favourable	Agricultural operations, invasive species, water management, water quality	21/07/2011
				Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)	Unfavourable	Development, invasive species, water management. To be identified, other	07/08/2003
UK0030262	River South Esk SAC	478.62	103.48	Atlantic salmon (<i>Salmo salar</i>)	Unfavourable	Agricultural operations, climate change, forestry operations, invasive species, over-grazing, water management, water quality	29/07/2011
				Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)	Unfavourable	Invasive species, water management, wildlife crime	13/09/2009

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
UK0019811	River Spey SAC	5729.48	4181.76	Sea lamprey (<i>Petromyzon marinus</i>)	Favourable	No negative pressures identified	07/09/2011
				Otter (<i>Lutra lutra</i>)	Favourable	Over-grazing; other	18/09/2012
				Atlantic salmon (<i>Salmo salar</i>)	Unfavourable	Agricultural operations; invasive species; water management	04/09/2011
				Freshwater pearl mussel (<i>Margaritifera margaritifera</i>)	Unfavourable	Extraction; invasive species; water quality; wildlife crime	30/09/2014
UK0030312	River Tay SAC	9497.72	233.94	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels	Favourable	Water management	12/08/2009
				Atlantic salmon (<i>Salmo salar</i>)	Favourable	Game/ fisheries management, invasive species, water management, water quality	19/09/2011
				Sea lamprey (<i>Petromyzon marinus</i>)	Favourable	Development, water management, water quality	30/11/2007
				River lamprey (<i>Lampetra fluviatilis</i>)	Favourable	Development, water management, water quality	30/11/2007
				Brook lamprey (<i>Lampetra planeri</i>)	Favourable	Development, water management, water quality	30/11/2007
				Otter (<i>Lutra lutra</i>)	Favourable	Agricultural operations, invasive species,	03/04/2004

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
						recreation / disturbance, water management	
UK0030348	The Maim SAC	484.58	484.58	Dry heaths	Unfavourable	Burning	12/06/2006

There are 23 SACs within or overlapping the National Park (**Figure 89**), covering an area of around 1,063 km² (or 24% of the National Park's area). Of these, 16 have at least one qualifying feature that is in unfavourable condition. 4 SACs, namely Monadhliath, River South Esk, Kinveachy Forest and The Maim, have no qualifying features in favourable condition. It should be noted that the majority of the River South Esk SAC is located outwith the National Park boundary and therefore the CNPA has only limited influence over its status.

Significant pressures on qualifying features are burning and over-grazing (**Figure 92**).

Around 53% of the land area protected as an SAC falls within the Cairngorms SAC, which is the third largest in Scotland.

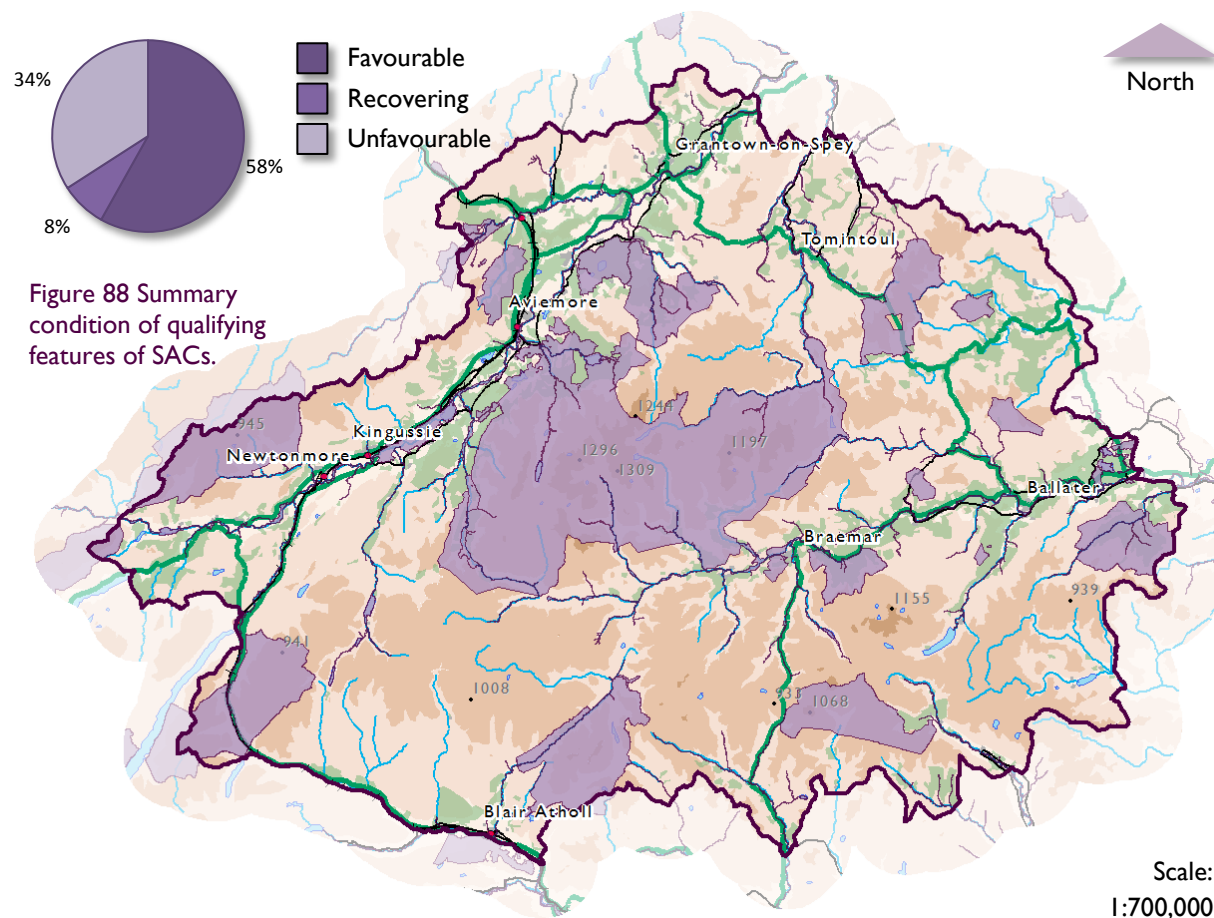


Figure 89 Special Areas of Conservation within the Cairngorms National Park.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Natural Heritage.

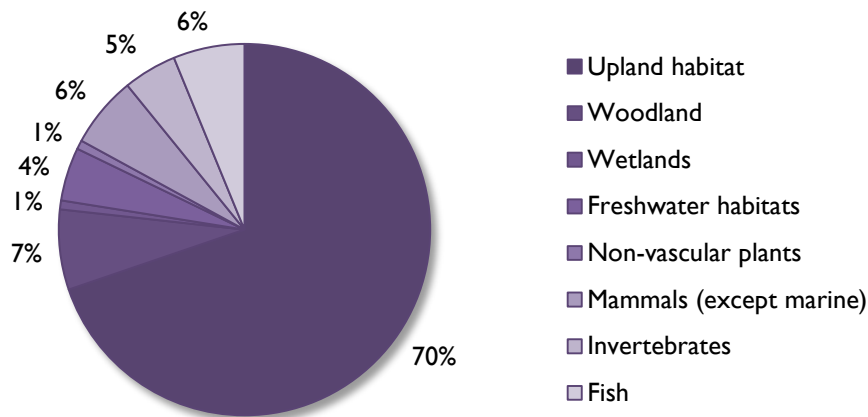


Figure 90 Category of qualifying features of SACs within the Cairngorms National Park.

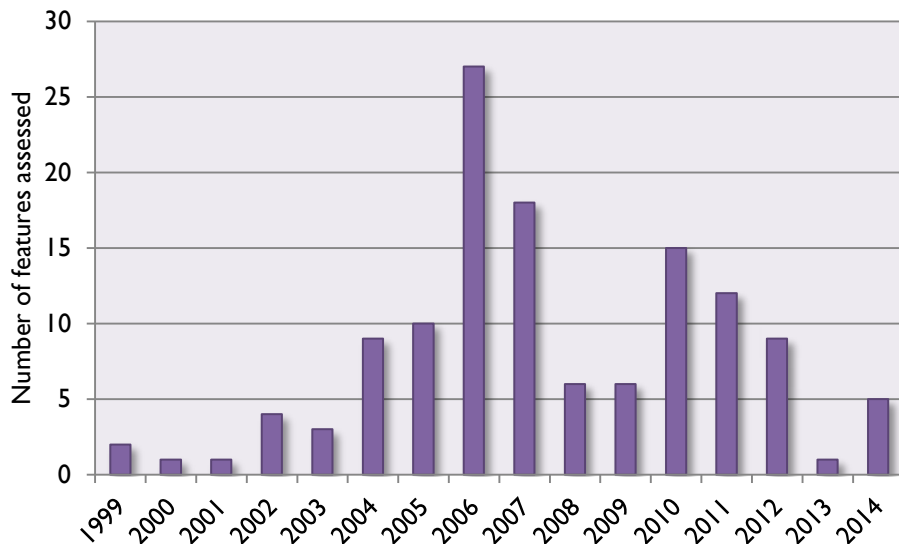


Figure 91 Year of latest assessed visit of qualifying features of SACs within the Cairngorms National Park.

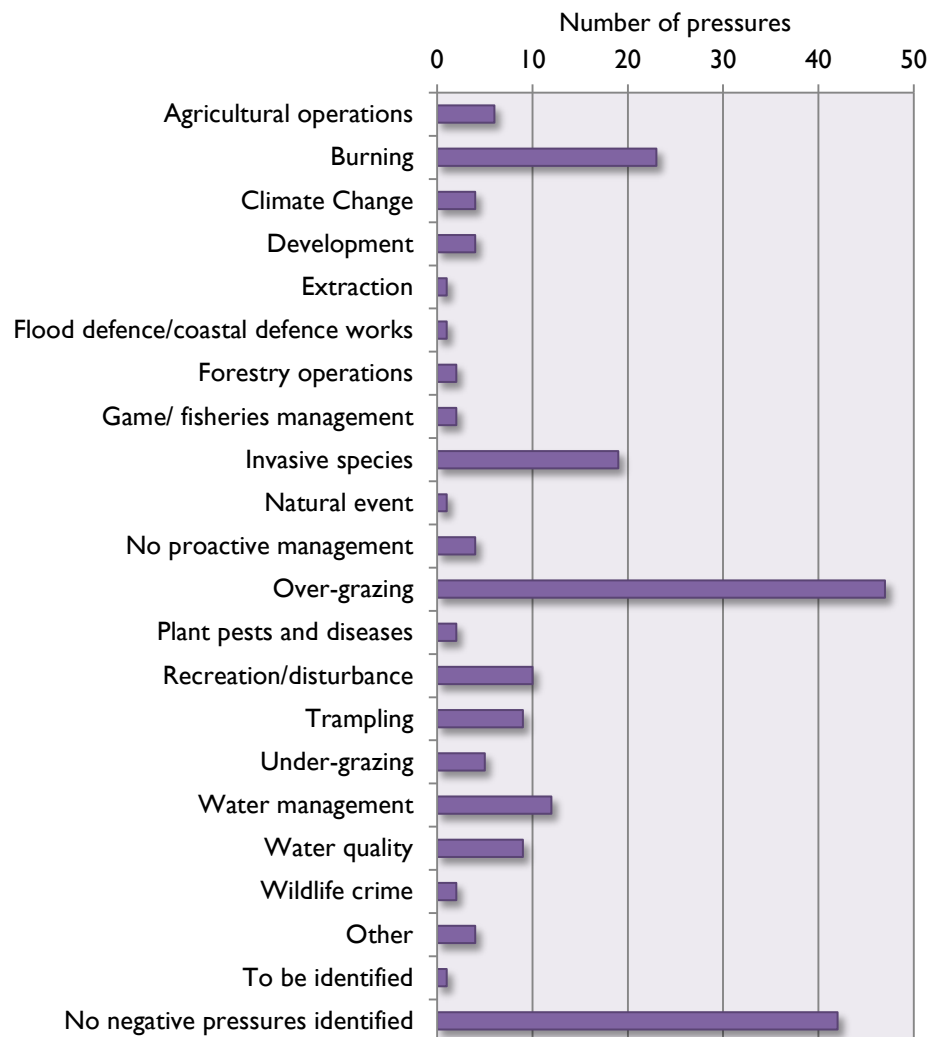


Figure 92 Pressures on qualifying features of SACs within the Cairngorms National Park.

Table 19 Special Protection Areas within the Cairngorms National Park.

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
UK900256 I	Abernethy Forest SPA	5793.46	5793.46	Capercaillie (<i>Tetrao urogallus</i>), breeding	Favourable	Under-grazing	28/04/2009
				Osprey (<i>Pandion haliaetus</i>), breeding	Favourable	No negative pressures identified	31/05/2007
				Scottish crossbill (<i>Loxia scotica</i>), breeding	Favourable	No negative pressures identified	28/03/2012
UK9020297	Anagach Woods SPA	392.78	392.78	Capercaillie (<i>Tetrao urogallus</i>), breeding	Unfavourable	Recreation / disturbance	29/04/2015
UK9002781	Ballochbuie SPA	1881.73	1881.73	Capercaillie (<i>Tetrao urogallus</i>), breeding	Unfavourable	Forestry operations, natural event, over-grazing, under-grazing.	14/04/2014
				Scottish crossbill (<i>Loxia scotica</i>), breeding	Favourable	No negative pressures identified	01/03/2015
UK9004011	Caenlochan SPA	5975.28	5975.28	Dotterel (<i>Charadrius morinellus</i>), breeding	Favourable	Over-grazing, recreation / disturbance	01/01/1999
				Golden eagle (<i>Aquila chrysaetos</i>), breeding	Favourable	Over-grazing, recreation / disturbance	04/12/2009
UK9002241	Cairngorms SPA	50903.74	50903.74	Capercaillie (<i>Tetrao urogallus</i>), breeding	Favourable	No negative pressures identified	25/04/2011
				Merlin (<i>Falco columbarius</i>), breeding	Not monitored to date	No negative pressures identified	N/A
				Osprey (<i>Pandion haliaetus</i>), breeding	Favourable	No negative pressures identified	01/06/2006
				Golden eagle (<i>Aquila chrysaetos</i>),	Favourable	Game / fisheries	31/07/2009

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
				breeding		management	
				Dotterel (<i>Charadrius morinellus</i>), breeding	Unfavourable	Recreation / disturbance; over-grazing	01/07/2011
				Scottish crossbill (<i>Loxia scotica</i>), breeding	Favourable	No negative pressures identified	14/03/2012
				Peregrine (<i>Falco peregrinus</i>), breeding	Favourable	Recreation / disturbance	30/06/2002
UK9020308	Cairngorms Massif SPA	187504.1	173254.6	Golden eagle (<i>Aquila chrysaetos</i>), breeding	Favourable	Plant pests & diseases; proactive onsite management	31/08/2003
UK9001801	Craigmore Wood SPA	654.09	654.09	Capercaillie (<i>Tetrao urogallus</i>), breeding	Unfavourable	No onsite activities identified	20/04/2014
UK9002161	Creag Maegaidh SPA	6144.58	507.19	Dotterel (<i>Charadrius morinellus</i>), breeding	Unfavourable	No negative pressures identified	01/07/2011
UK9002301	Drumochter Hills SPA	9445.56	7382.22	Dotterel (<i>Charadrius morinellus</i>), breeding	Favourable	Other	11/02/2004
				Merlin (<i>Falco columbarius</i>), breeding	Unfavourable	Burning, over-grazing	31/08/2004
UK9004381	Forest of Clunie SPA	19349.38	905.22	Osprey (<i>Pandion haliaetus</i>), breeding	Favourable	No negative pressures identified	01/08/2010
				Merlin (<i>Falco columbarius</i>), breeding	Unfavourable	Burning, natural event, over-grazing	29/05/2009
				Hen harrier (<i>Circus cyaneus</i>), breeding	Unfavourable	Burning, natural event, over-grazing	29/05/2009
				Short-eared owl (<i>Asio flammeus</i>), breeding	Unfavourable	Burning	29/05/2009

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
UK902771	Glen Tanar SPA	4180.09	4142.25	Capercaillie (<i>Tetrao urogallus</i>), breeding	Unfavourable	Forestry operations, recreation / disturbance, under-grazing	18/04/2011
				Hen harrier (<i>Circus cyaneus</i>), breeding	Favourable	No negative pressures identified	19/07/2010
				Osprey (<i>Pandion haliaetus</i>), breeding	Favourable	Forestry operations, recreation / disturbance	13/10/2010
				Scottish crossbill (<i>Loxia scotica</i>), breeding	Favourable	No negative pressures identified	23/03/2012
UK9002581	Kinveachy Forest SPA	2849.36	2232.59	Capercaillie (<i>Tetrao urogallus</i>), breeding	Favourable	No negative pressures identified	15/05/2008
				Scottish crossbill (<i>Loxia scotica</i>), breeding	Favourable	No negative pressures identified	27/03/2012
UK9002951	Ladder Hills pSPA	4240.4	4240.4	Hen Harrier (<i>Circus cyaneus</i>), breeding	Not monitored to date	No negative pressures identified	N/A
UK9002751	Loch Vaa SPA	44.6	44.6	Slavonian grebe (<i>Podiceps auritus</i>), breeding	Unfavourable	Natural event, recreation / disturbance	30/06/2007
UK9002281	Lochnagar SPA	1431.28	1431.28	Dotterel (<i>Charadrius morinellus</i>), breeding	Favourable	Over-grazing, recreation / disturbance	31/05/1999
UK9002791	Muir of Dinnet SPA	157.6	157.6	Waterfowl assemblage, non-breeding	Unfavourable	No negative pressures identified	01/12/2012

Site Code	Name	Total Area (ha)	Are in CNP (ha)	Qualifying Feature	Summary Condition	Pressures	Visit Date
				Greylag goose (<i>Anser anser</i>), non-breeding	Unfavourable	No negative pressures identified	05/11/2010
UK9002231	River Spey – Insh Marshes SPA	1158.87	1158.87	Hen harrier (<i>Circus cyaneus</i>), non-breeding	Favourable	No negative pressures identified	22/02/2010
				Wigeon (<i>Anas penelope</i>), breeding	Unfavourable	Natural event, recreation / disturbance	30/05/2009
				Osprey (<i>Pandion haliaetus</i>), breeding	Favourable	Recreation / disturbance	07/09/2009
				Whooper swan (<i>Cygnus cygnus</i>), non-breeding	Favourable	No negative pressures identified	31/12/2000
				Spotted crake (<i>Porzana porzana</i>), breeding	Favourable	No negative pressures identified	31/12/2000
				Wood sandpiper (<i>Tringa glareola</i>), breeding	Unfavourable Recovering Due to Management	Forestry operations	31/12/2000

There are 15 SPAs within or overlapping the National Park (**Figure 94**), covering an area of around 2,013 km² (or 45% of the National Park's area). Of these, 9 have at least one qualifying feature that is in unfavourable condition. 3 SPAs, namely Craigmore Wood, Creag Meagaidh and Muir of Dinnet have no qualifying features in favourable condition.

With around 1,733 km² of its 1,875 km² within the National Park, The Cairngorms Massif SPA contributes 68% of the land protected as an SPA within the National Park. It is the largest in Scotland. There are currently no public records on the condition of the breeding population of Golden eagle (*Aquila chrysaetos*) in the SPA, which is its only qualifying feature.

There is also one area currently under consideration for designation as a SPA. If Ladder Hills is designated then it will create an additional 42 km² of land within the National Park protected under the Birds Directive.

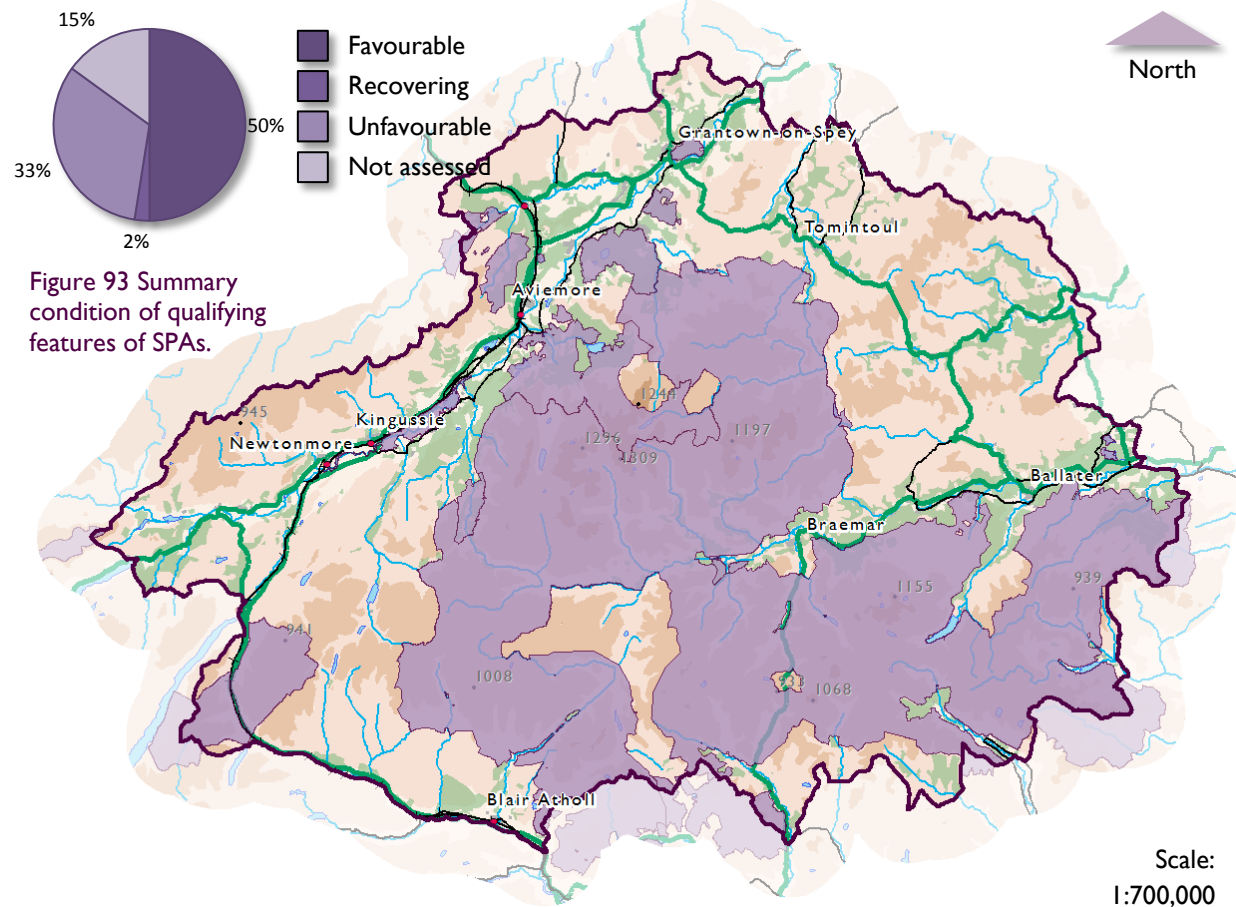


Figure 94 Special Protection Areas within the Cairngorms National Park.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Natural Heritage.

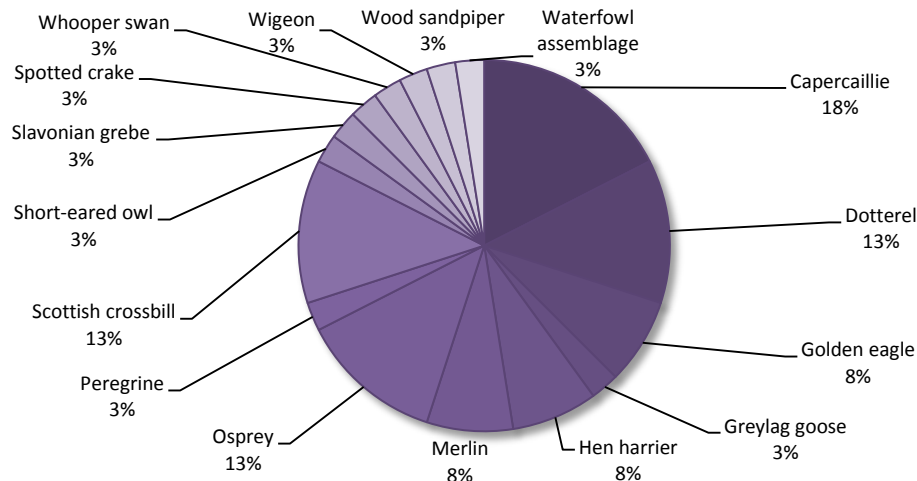


Figure 95 Qualifying features of SPAs within the Cairngorms National Park.

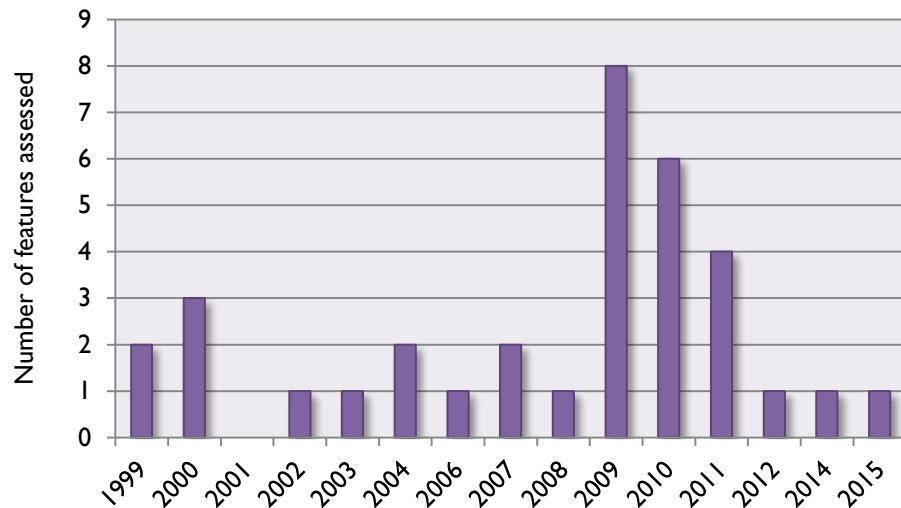


Figure 96 Year of latest assessed visit of qualifying features of SPAs within the Cairngorms National Park.

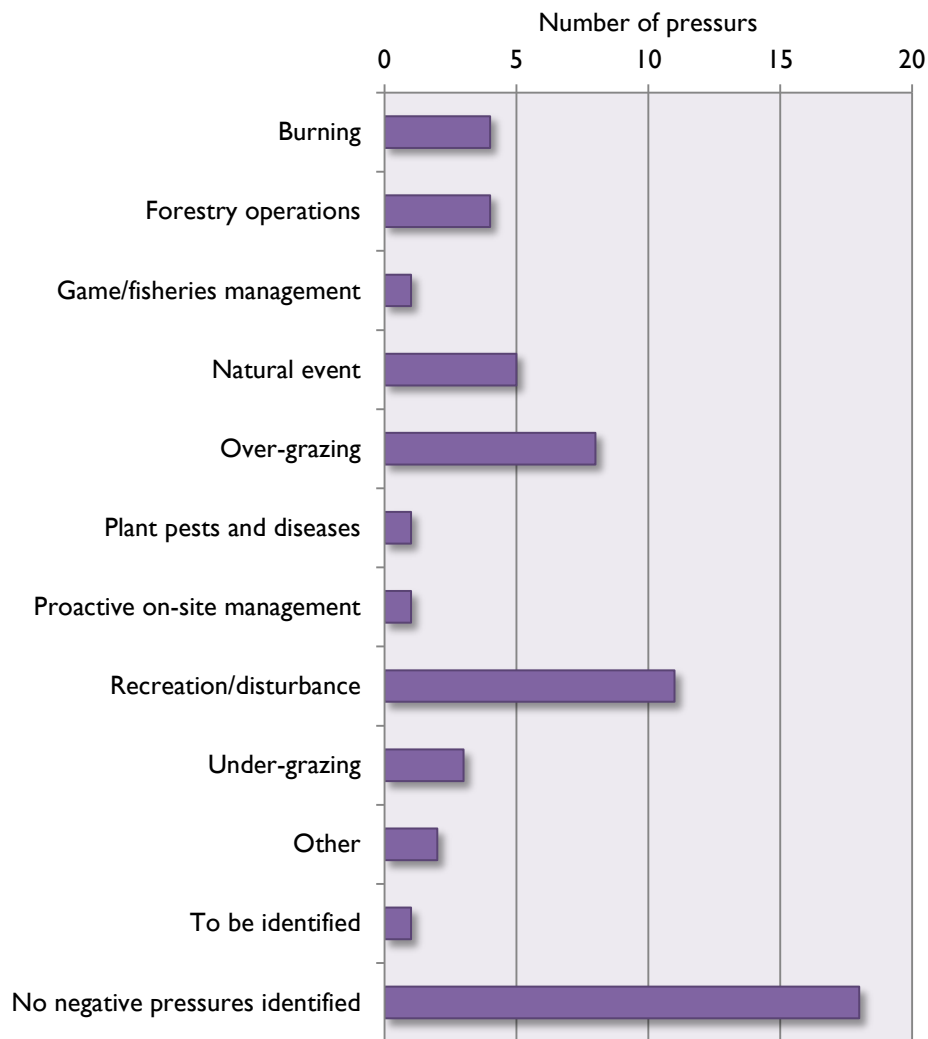


Figure 97 Pressures on qualifying features of SPAs within the Cairngorms National Park.

Ramsar Convention

The National Park is also home to three wetlands of international importance that have been designated under the Ramsar Convention (Table 20 and Figure 98). All are wholly located within the Cairngorms National Park. The designation recognises the fundamental ecological functions of these areas as well as their economic, cultural, scientific, and recreational value.

Table 20 Ramsar Convention Sites within the Cairngorms National Park.

Site Code	Name	Area (ha)
UK13002	Cairngorm Lochs	172.99
UK13049	Muir of Dinnet	157.60
UK13053	River Spey - Insh Marshes	1158.77

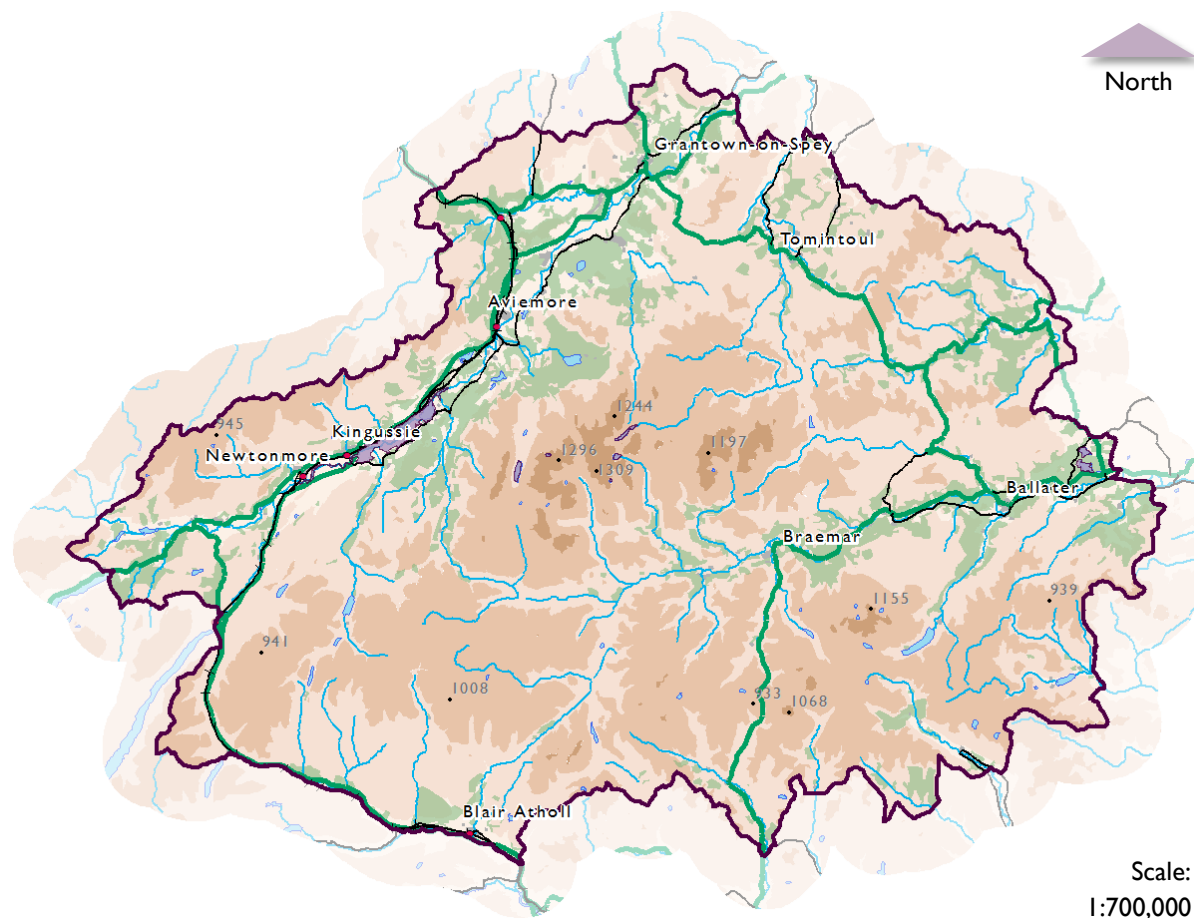


Figure 98 Ramsar Sites within the Cairngorms National Park.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Natural Heritage.

Non-Statutory Designations

The National Park contains a number of non-statutory designations (**Figure 99**). The RSPB runs 2 Nature Reserves within the National Park namely, Loch Garten and Insh Marshes. Both encompass areas of statutory designation, with the former covering most of Abernethy NNR and SPA and the latter, Inch Marshes NNR and SPA.

Loch Garten is best known for its osprey, but is also an important site for capercaillie, crested tit, goldeneye and Scottish crossbill. Insh Marshes is home to an important assemblage of wetland birds, including curlew, lapwing, redshank, snipe and whooper swan.

The National Park contains one Biogenetic Reserve at Muir of Dinnet. This is part of a European network of ‘living laboratories’ representative of various types of natural environment found in Europe. The purpose of Biogenetic Reserves has now been overtaken by that of Scotland’s national nature reserve network and so the designation is rarely referred to.

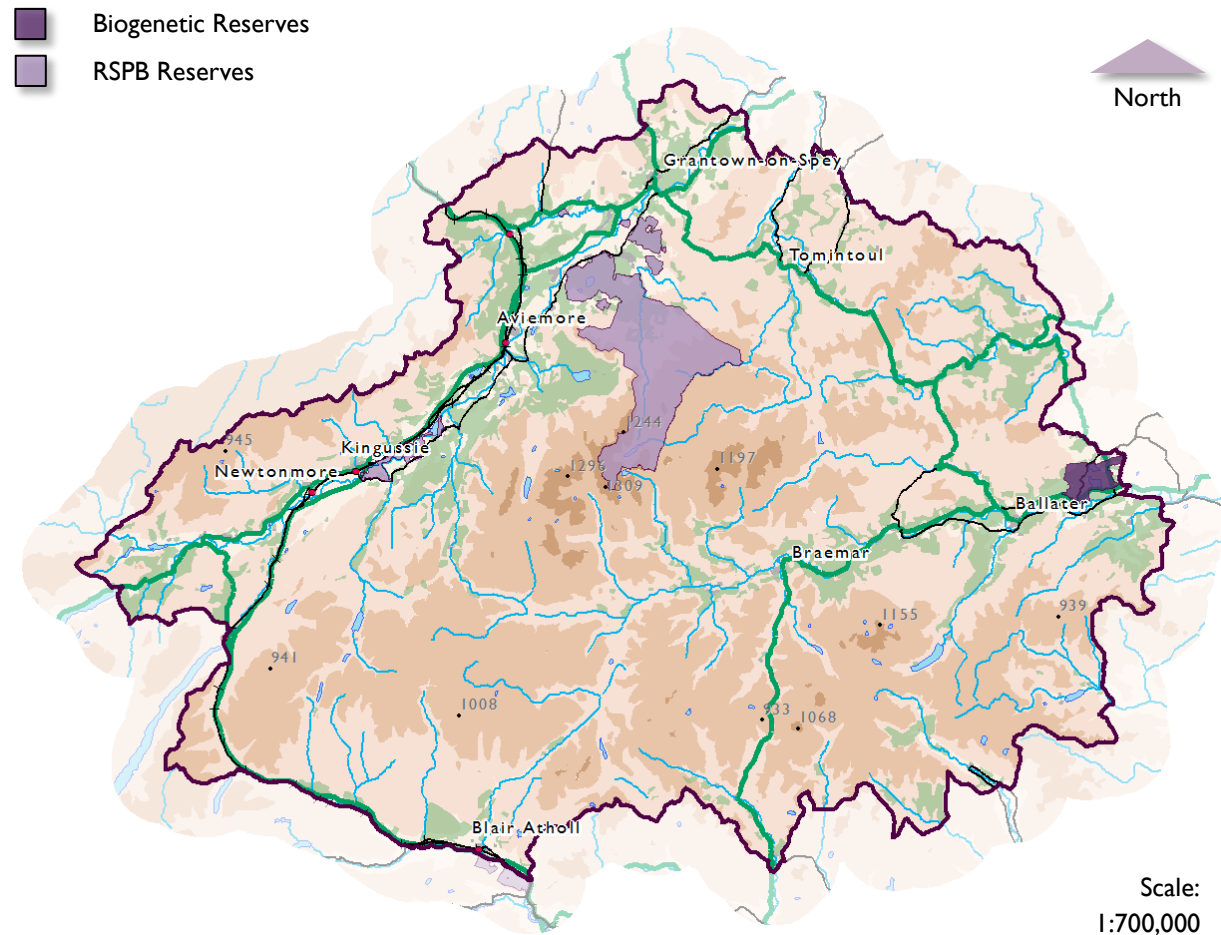


Figure 99 RSBP and Biogenetic Reserves in the Cairngorms National Park.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Natural Heritage.

Important Species and Habitats

There are around 1,200 species considered to be important for nature conservation within the National Park. Of these, 26 have been identified for priority action within the Cairngorms Nature Action Plan (CNAP) 2013-2018.

The CNAP also identifies the National Park’s threatened habitats, which are broader than those afforded special protection as designated sites. For the purpose of discussing them and the priority species that depend on them, they are described here under four headings, namely:

- Woodlands (p. 196),
- Freshwater, Wetlands & Wet Grassland (p. 208),
- Uplands (p. 214), and
- Lowlands (p. 217).

Woodlands

The Cairngorms National Park contains the most extensive tracts of Caledonian forest in Britain, comprising pine, juniper and broadleaved species (**Figure 100**). It also

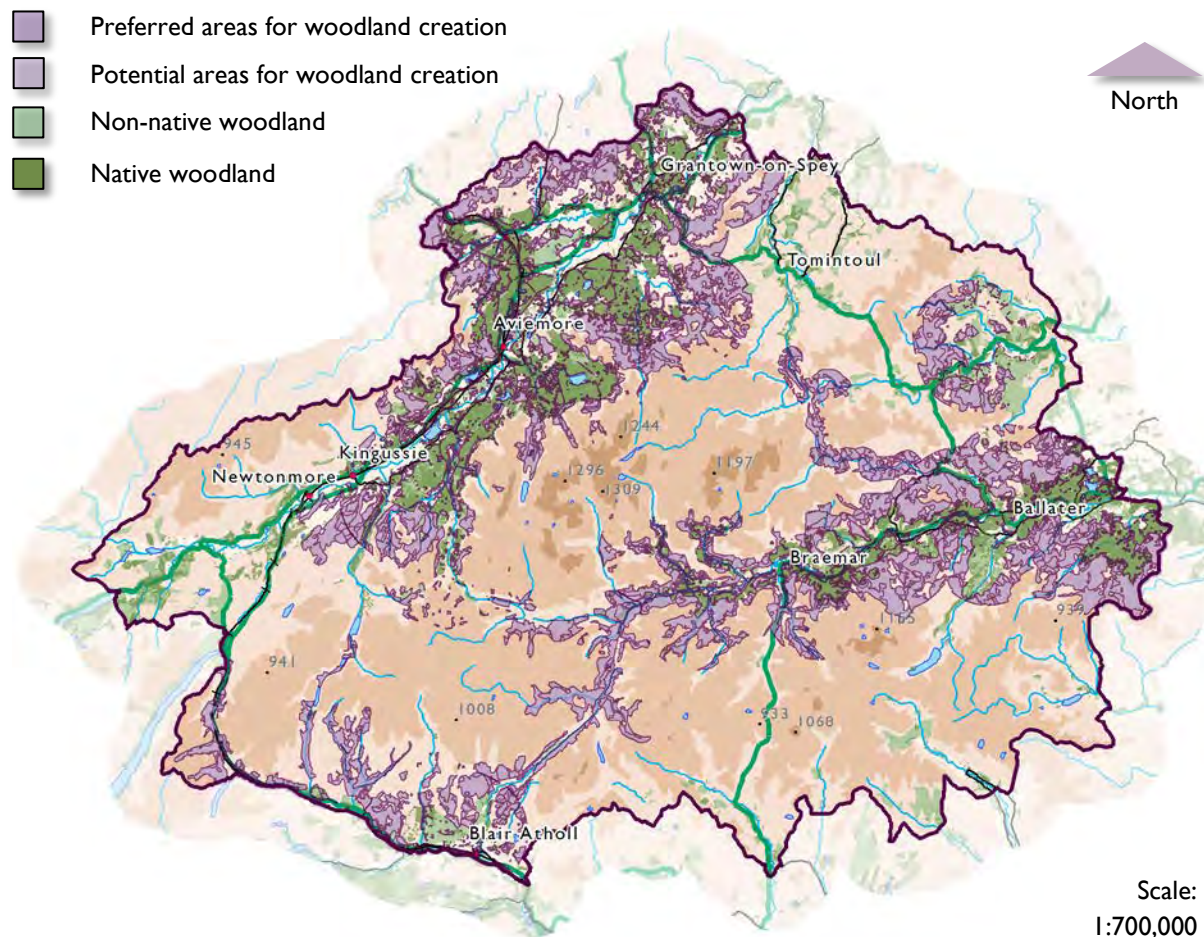


Figure 100 Preferred and potential areas for targeting woodland creation in the Cairngorms National Park.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Forestry Commission Scotland.

contains the best examples in Scotland of bog woodland, montane willow scrub and stands of aspen. Native tree species comprise around 79% of these woodlands, representing a quarter of the entire Scottish native woodland resource.

Strathspey, Strath Avon, Glenlivet, Donside, Deeside and the Angus Glens combined contain an extensive, varied and predominantly native network of forest habitats. This is one of the most valuable ecological networks in Britain and one of the most widely recognised special qualities of the Cairngorms National Park.

Key woodland types found within the National Park are:

- Caledonian Pinewoods,
- Conifer Plantations,
- Birch & Aspen Woodland,
- Wet & Riparian woodland, and
- Upland Oak.

The native pine woodlands of predominantly self-sown Scots pine are the western-most link to the extensive boreal forest which formerly covered a much

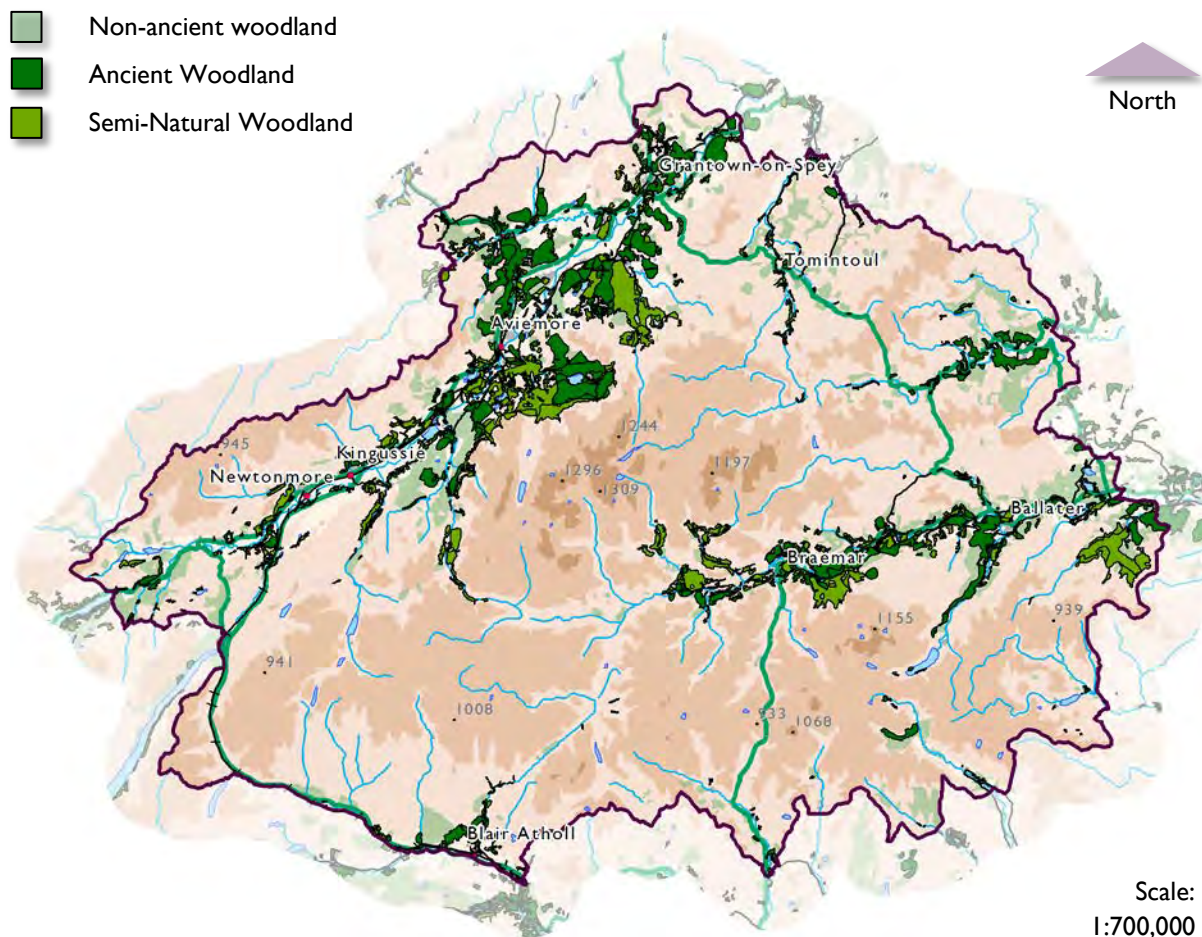


Figure 101 Areas of ancient woodland in the Cairngorms National Park.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Forestry Commission Scotland.

larger area of northern Europe. Aspen can tolerate a wide range of soil types and climatic conditions and it is likely that its present distribution is due to the effects of deforestation.

Around 340 km² of the National Park’s woodlands are also identified as being ancient according to SNH’s Ancient Woodland Inventory (**Figure 101**). Around 160 km² of this has also been identified as being semi-natural. Ancient woodland is defined as land that is currently wooded and has been continually wooded, at least since 1750. This type of woodland has important biodiversity and cultural values by virtue of its antiquity.

Over the last 25 years there has been an increased awareness of the multiple benefits that native woodland can deliver and an upsurge in action to restore and expand native woods. Between 2013 and 2017 approximately 1,120ha of new native woodland has been created in the National Park, while work is underway to identify areas of with future potential (**Figure 100** and **Figure 102**). Of

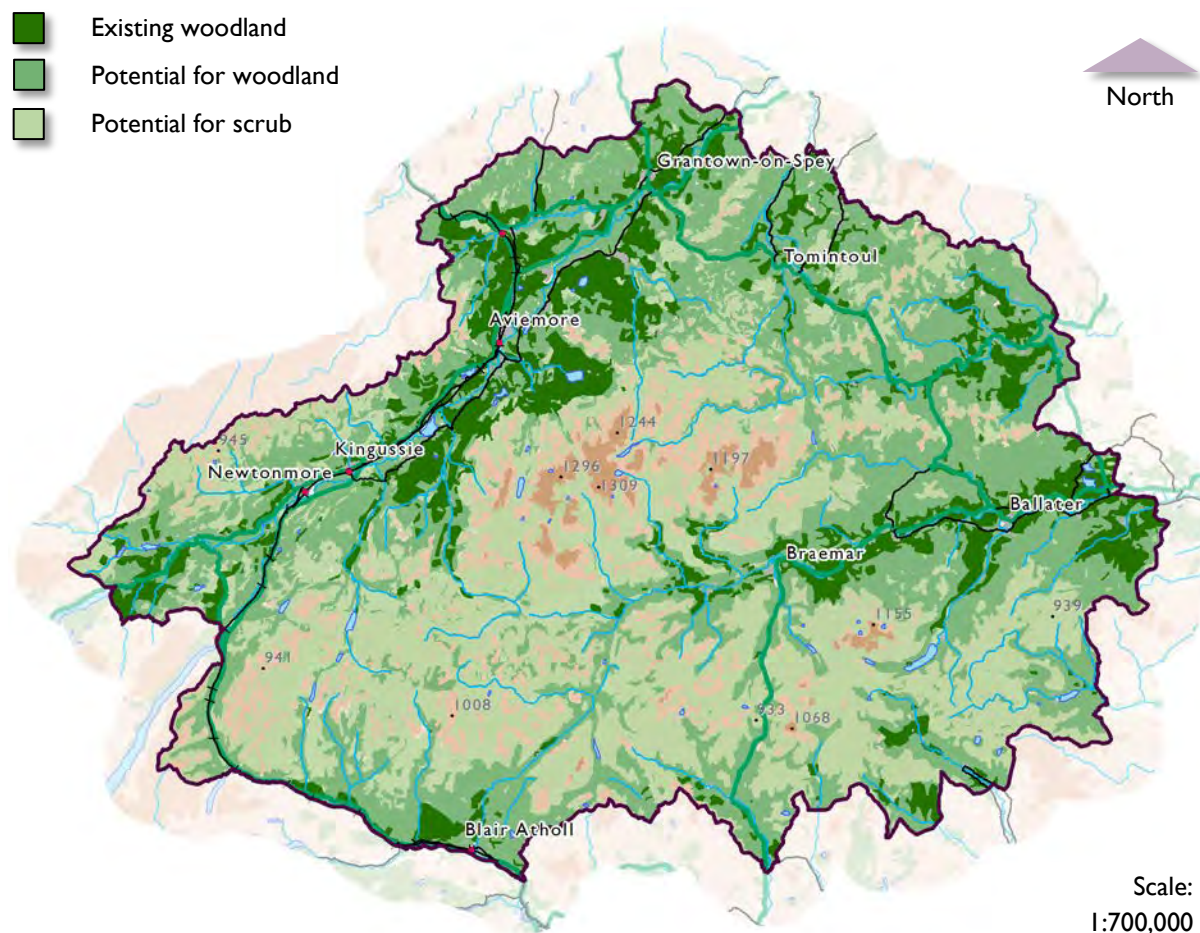


Figure 102 Existing woodland and land with potential for woodland and scrub in the Cairngorms National Park (Based on Soil Survey of Scotland Staff, 1981).

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © James Hutton Institute.

the newly created woodland, around 704ha is adjacent to the existing resource.

However, Lack of regeneration, poor structural diversity and grazing pressure has resulted in some woodlands suffering from reduced biodiversity value.

Improved connectivity through woodland expansion combined with good management is crucial to enhance habitat that supports species of high conservation value. The CNPA Woodlands Expansion programme (Cairngorms National Park Authority, 2008) actively promotes this and in combination with the Cairngorms Deer Management Framework (Cairngorms National Park Authority, 2011) aims to ensure greater connectivity and management.

Table 21 provides the main issues affecting woodlands within the National Park together with actions required to address them.

Table 21 Issues affecting woodlands in the Cairngorms National Park.

Habitat	Issue	Action Required
Caledonian Pinewood	At threat from habitat loss, lack of regeneration, limited deadwood and poor structural diversity. Past management has reduced species diversity in many of the remaining woods.	<ul style="list-style-type: none"> ➤ Improving the existing resource and encouraging expansion into areas for habitat connectivity and resilience which will mitigate against further loss and also enhance the habitat to halt the decline and encourage growth.
Conifer Plantations	Mixture of Scots Pine, Sitka and Norwegian Spruce, Lodgepole pine and Douglas fir and Larch. Many are of single species and single age and are of limited value for biodiversity. Conifer plantations make up 50% of the woodland resource and a third of these are on Ancient Woodland Sites.	<ul style="list-style-type: none"> ➤ Promote the restoration of Plantations on Ancient Woodland Sites. ➤ Encourage and provide advice and guidance on continuous forest cover via workshops, demonstration projects and events. ➤ Promote stand restructuring and thinning to create a mosaic of different densities and structures.
Birch & Aspen Woodland	Aspen dominated woodland is unique to the Cairngorms National Park, the stands are small and total less than 350ha concentrated in Strathspey and Deeside.	<ul style="list-style-type: none"> ➤ Encourage and advise land managers to manage birch woodlands for aspen enhancement. ➤ Review grazing management in high nature value areas to encourage vigorous birch and aspen regeneration and a diverse field layer.
Wet & riparian woodland	Fragments of ancient floodplain woodlands are rare in the UK, the Cairngorms National Park has some of the best, especially in Strathspey and Deeside.	<ul style="list-style-type: none"> ➤ Identify sites for creating and expanding bog and wet woodland. ➤ Block drains, re-wet areas and remove non-native conifers.
Upland oak	Lack of regeneration, poor structural diversity and grazing pressure has reduced their biodiversity value. Most of the oak woodlands are found in Deeside	<ul style="list-style-type: none"> ➤ Encourage better land management and reduce grazing pressures.

Key Woodland Species

The CNAP species which have been selected for targeted action and are dependent on woodland habitat are listed in **Table 22**.

Working in partnership, the CNPA is involved in projects aimed directly at improving the status of woodland habitats and associated species, some of which were listed in **Table 22**, within the Cairngorms National Park, these include:

Capercaillie Framework

Capercaillie (*Tetrao urogallus*) populations in Scotland have declined significantly from an estimated 20,000 birds in 1970 to around 1,285 at the most recent national winter survey in 2009/10 (Ewing *et al.* 2012).

The Cairngorms National Park holds a significant proportion of the national population – at least 75% of the national number of lekking males, with the majority in Strathspey (Eaton *et al.* 2007; Poole, 2010) (**Figure 103**, p. 203).

Table 22 Woodland species selected for targeted action in CNAP (Cairngorms National Park Authority, 2013).

Species	Status in the CNP
Capercaillie <i>Tetrao urogallus</i>	Capercaillie are found almost exclusively in Caledonian Pine Forest. Including Anagach, Rothiemurchas and Abernethy woods. Capercaillie chicks feed on moth caterpillars feeding on blueberry plants, adults and older chicks feed on leaves and berries, during winter they feed on pine needles.
Scottish Wildcat <i>Felix sylvestris</i>	The Scottish wildcat is a rare, elusive and largely nocturnal species confined to the most thinly populated parts of the UK. Main threats to the survival of the species in Scotland were: hybridisation with feral or domestic cats, being inadvertently killed during feral cat control operation and disease.
One-flowered Wintergreen <i>Moneses uniflora</i>	This plant used to be called St Olaf's Candlestick. It has a single nodding white flower at the top of a stem, and a rosette of leaves at the base. Key threats are the loss of the old Caledonian Forest and the harvesting of commercial forests.
Twinflower <i>Linnaea borealis</i>	Twinflower is an Arctic-alpine flower which is a relic of the ice age it has a stronghold in Strathspey. It is dependent on the open canopy of Caledonian Pinewoods.
Green Shield-moss <i>Buxbaumia viridis</i>	The Green Shield-moss is a rare and endangered species which grows on decaying wood. The loss of woodland cover over the centuries and, more recently, the intense management of woodland areas has led to a significant loss of habitat for this bryophyte species.
Pine Hoverfly <i>Blera fallax</i>	The Pine Hoverfly is found in only two locations in the UK in Strathspey. It needs rotten tree stumps that are more than 40 cm in diameter to breed. The lack of these large stumps in pinewoods – especially stumps with the necessary rot conditions – has been the cause of the decline.

Although capercaillie numbers have held up in Strathspey in recent years, the population is now extremely vulnerable elsewhere. Capercaillie persist in other areas (Deeside, Donside, Easter Ross, Moray and Perthshire) but these populations are smaller and more fragmented.

The Strathspey capercaillie population is crucial to the long-term survival of the species in the UK. The Capercaillie Framework (Cairngorms National Park Authority, 2015) aims to improve conservation for Capercaillie by the introduction of landscape scale measures to target the main threats of disturbance, predation, collision with deer fences, unsympathetic woodland management, habitat loss and fragmentation.

Increased disturbance resulting from development and recreation can have a significant effect on Capercaillie usage of habitat for example Capercaillie have been shown to avoid habitat close to tracks,

Species	Status in the CNP
Pearl-bordered fritillary <i>Boloria euphrosyne</i>	Changes in woodland management over recent years have led to the decline of the species. Woodland practices such as coppicing and thinning are in decline, and many areas have been planted with conifers. Woodland rides and clearings have become increasingly shady and overgrown. Bracken habitats are no longer managed through grazing.
Dark bordered beauty <i>Epione vespertaria</i>	A small yellow- orange moth with brown bordered wings. The caterpillar feeds on young suckering aspen, which requires particular levels of grazing. Only found in a handful of locations in the CNP.
Scarlet splash fungus <i>Cytidia salicina</i>	This fungus appears as a bright red splash on the underside of dead willow branches, especially those lying close to the ground. It has only been recorded 14 times in Scotland most of these records are in the CNP.
Kentish Glory <i>Endronis versicolora</i>	Kentish Glory, a large day flying moth is found in open birch woodlands. Both sexes are brown with white markings on the forewings.
Wood Ants	There are four species considered for action: <i>Formica aquilonia</i> , <i>F. lugubis</i> , <i>F. exsecta</i> and <i>Formicoxenus nitidulus</i> . They perform a number of important roles in the forest ecosystem, earning them the status of “keystone” species; these are species which play critical roles in the structure of their ecological community. Changes in woodland management, deforestation, inappropriate afforestation, urban expansion, human disturbance and agriculture are all linked to the loss of suitable habitat for woodland ant species.

which may reduce overall carrying capacity in forests with a high density of tracks (Rosner *et al.* 2013). A study at Abernethy forest estimated that 21-41% of suitable woodland habitat could be lost due to avoidance of tracks (Summers *et al.* 2007). To ensure these factors are considered the framework integrates habitat management, recreation and development plans as outlined in the Cairngorms Nature Strategy (2012-2018), Active Cairngorms (2015) and the Local Development Plan (2015) and suggests mitigation packages be developed to ensure no impact on Capercaillie.

Red Squirrel of the Highlands

The Cairngorms National Park is one of the last strongholds for Red Squirrel (*Sciurus vulgaris*) in the UK. Grey Squirrels (*Sciurus carolinensis*) are larger than the native reds and were introduced to the UK from America and Canada in the early 1900's. They pose a serious threat to the survival of the red squirrel population through transmission of the deadly squirrel pox

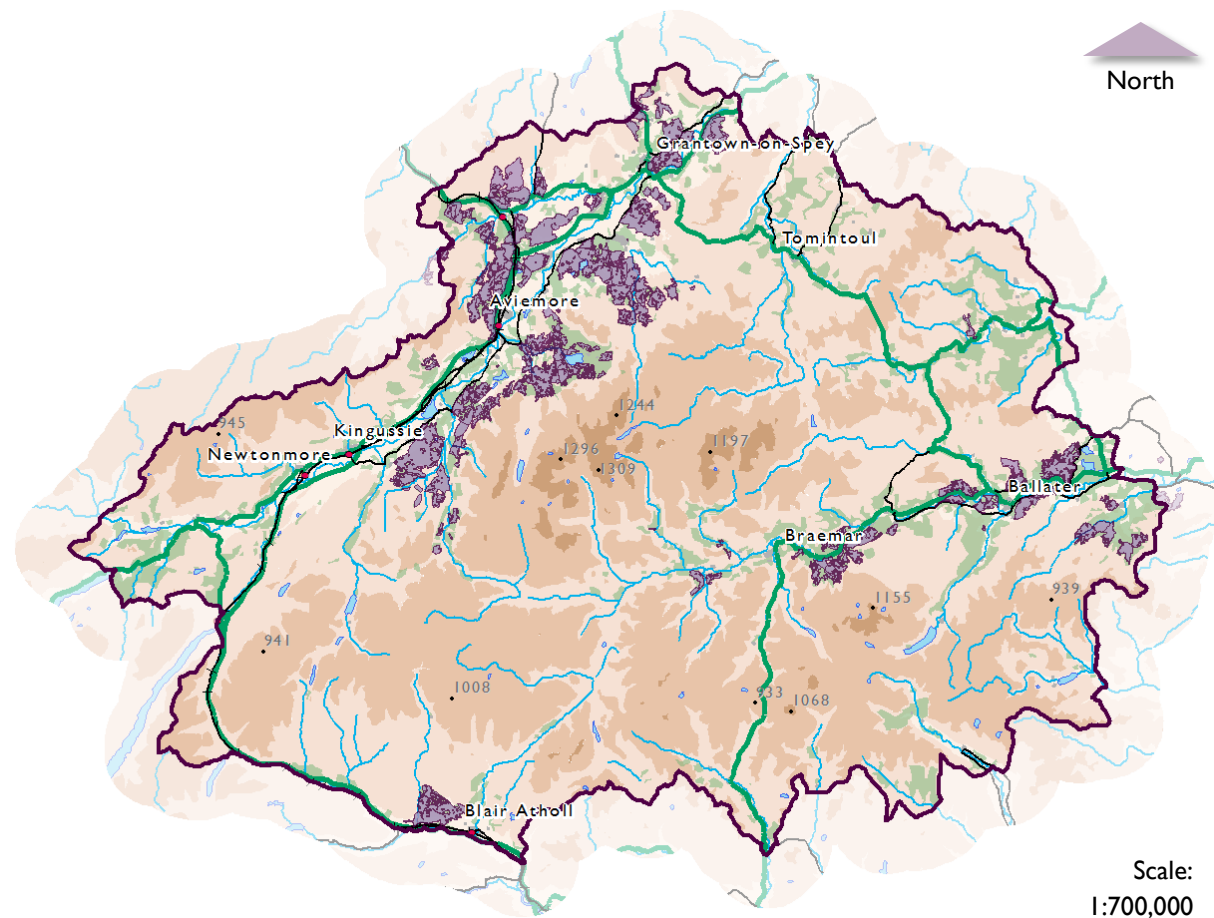


Figure 103 Areas where Capercaillie have been sighted in the Cairngorms National Park since 2007.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority.

virus that the grey squirrel carries. Grey squirrels are occasionally seen moving up the River Dee from Aboyne or moving up the River Garry from Pitlochry. The Red Squirrels of the Highlands Project is working to monitor and conserve Red Squirrels in the National Park.

Wildcat - Tiger of the Highlands

The project raised awareness of the wildcat's (*Felis silvestris*) plight using a campaign branded 'Highland Tiger'. It worked with a range of partners and interest groups to safeguard surviving Scottish wildcat populations and create favourable conditions for the species to thrive in the future. Part of the project was aimed at assisting gamekeepers to confidently identify wildcats to ensure they are not inadvertently culled through otherwise legal predator control activities. The project also worked with vets and cat welfare charities to encourage responsible cat ownership and the expansion of feral cat trapping and neutering. SNH have produced the Scottish Wildcat Conservation Action Plan 2013-2018, which

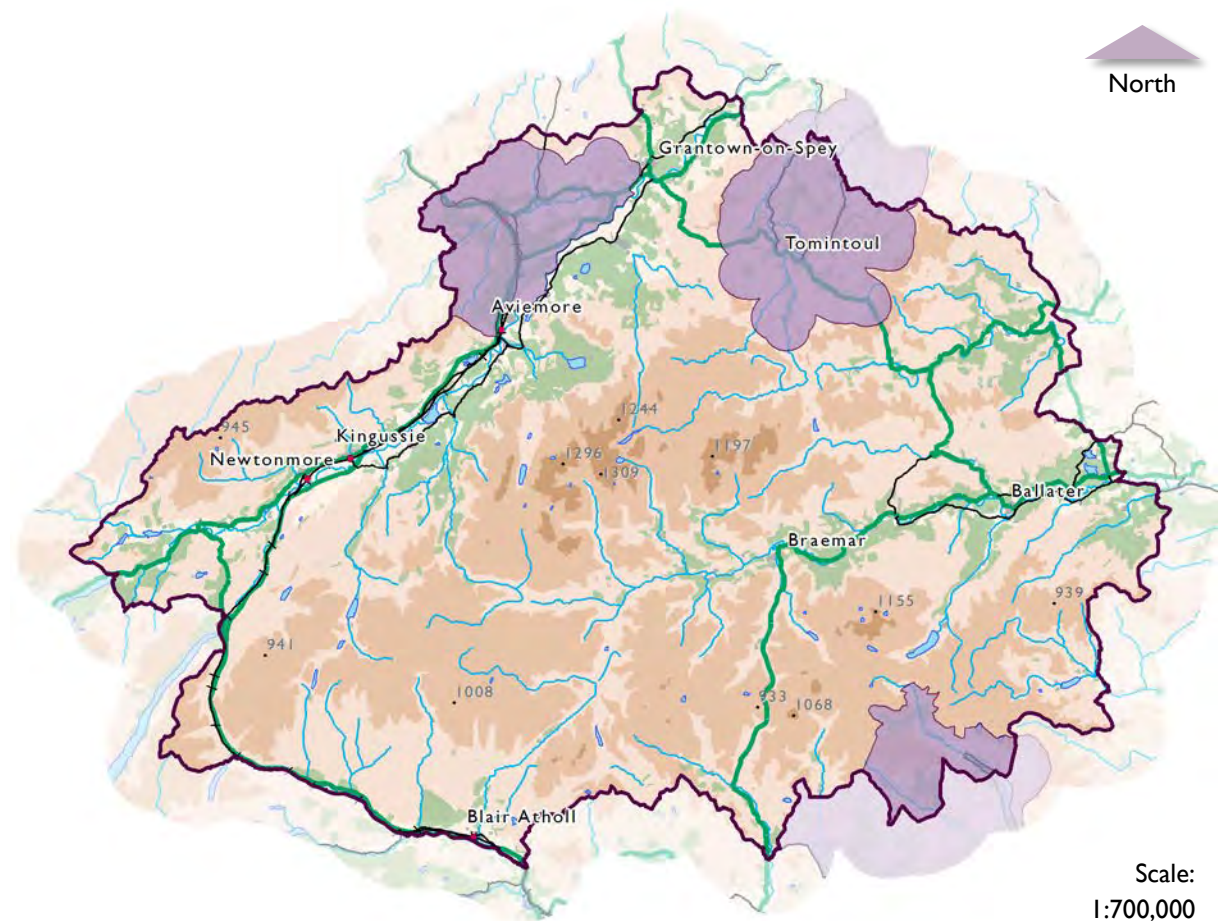


Figure 104 Wildcat Priority Areas within the Cairngorms National Park.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Natural Heritage.

details three Wildcat Priority Areas within the National Park (**Figure 104**).

Deer

There are four species of deer found within the Cairngorms National Park, all contributing to different extents to the biodiversity and economy of the area. The UK's largest wild land mammal, Red Deer (*Cervus elaphus*) are common in most areas of the National Park and have long been central to the cultural and natural heritage of the Highlands (**Figure 105**). Their economic importance and significant positive and negative impacts on the land means that their careful management is critical, and at times causes controversy.

Roe Deer (*Capreolus capreolus*) are also numerous in the National Park and are a common sight on lower ground in and around woodlands. Although less high profile, they are popular with wildlife spotters and are valued for venison, but can cause damage to young trees and crops.

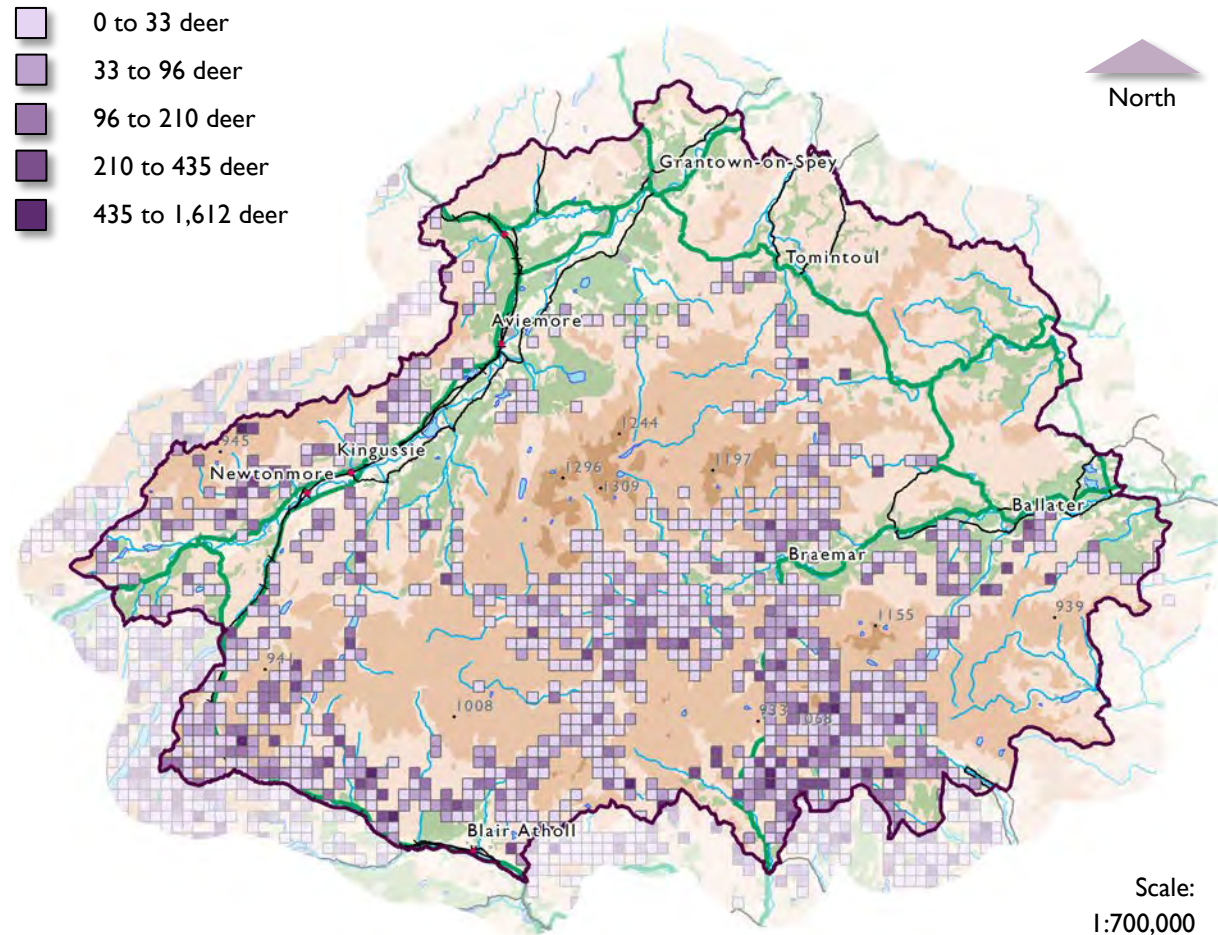


Figure 105 Deer density polygons of 1km² based on results from deer counts, 2000 - 2015.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © Scottish Natural Heritage.

Non-native Sika Deer (*Cervus nippon*) are present in much smaller numbers and are of concern because of their potential to interbreed with Red Deer.

The unique herd of semi-domestic Reindeer (*Rangifer tarandus*) in the National Park are important mainly as a tourist attraction.

Deer can have a negative impact on the environment, both in terms of existing woodlands (**Figure 106**) and areas identified for woodland expansion (**Figure 100**) and on our ability to restore peatlands and maintain and achieve the favourable of designated sites.

Reducing deer density can therefore have an environmental benefit while recent research on red deer (Pemberton & Kruuk, 2015) suggests that reducing deer density, especially hind density, will also:

- increase calving rates,
- increase the proportion of stag calves born,
- increase calf and yearling survival (especially in stags) and antler size, and
- reduce stag emigration.

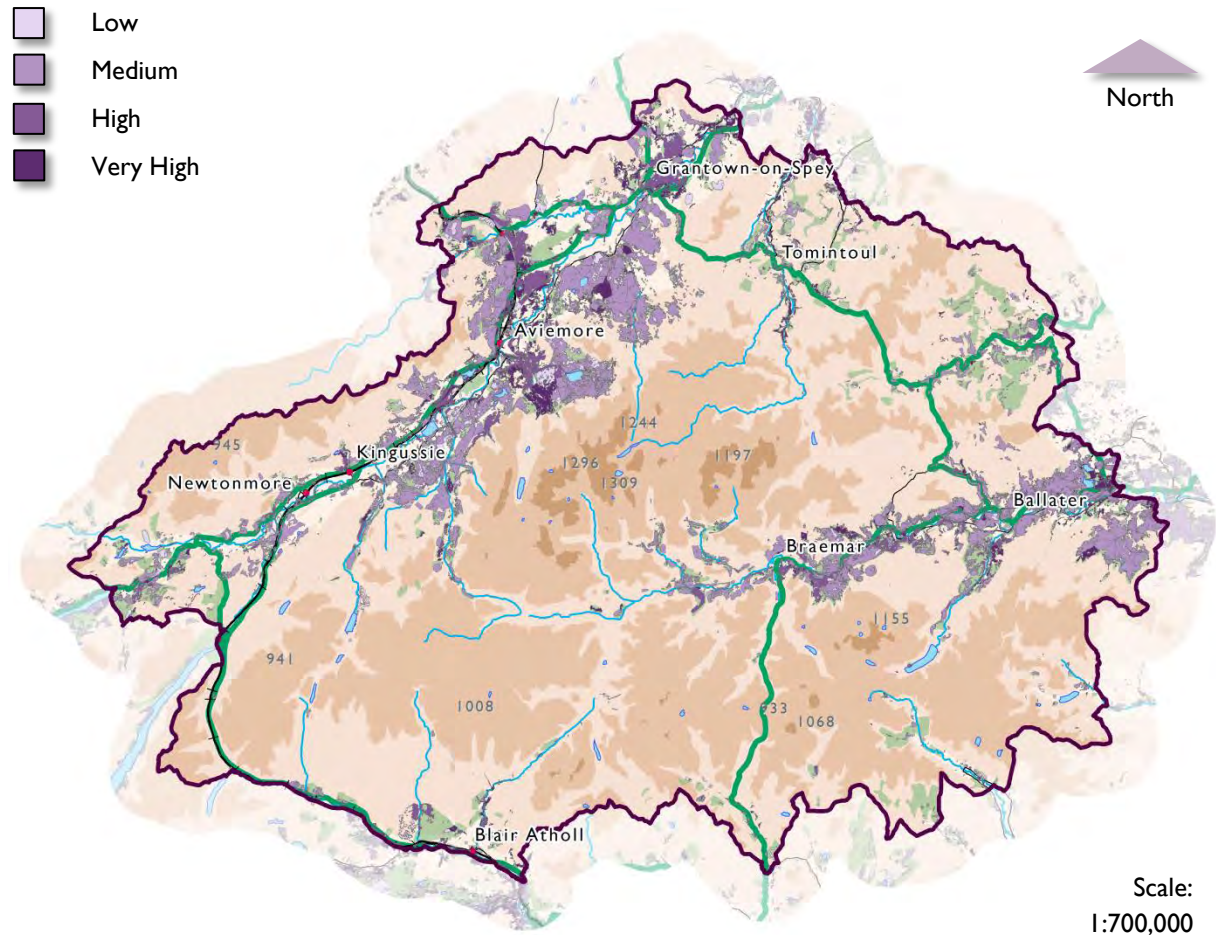


Figure 106 Overall impact of herbivories on native woodlands in the Cairngorms National Park.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority © Forestry Commission Scotland.

The Cairngorms Deer Advisory Group is a forum to promote and advise on best practice deer management within the Cairngorms and is formed from local deer group members. In partnership with the CNPA they have produced The Cairngorms Deer Management Framework (Cairngorms National Park Authority, 2011). One of the Framework's aims is to create patchwork of deer densities allowing different deer management objectives to be achieved in different parts of the Park (**Figure 107**).

Key Woodland Sites in the Cairngorms National Park

Key woodlands within the Cairngorms National Park are Abernethy, Glenmore, Rothiemurchas and Inshriach, all of which are located in Strathspey. Together these

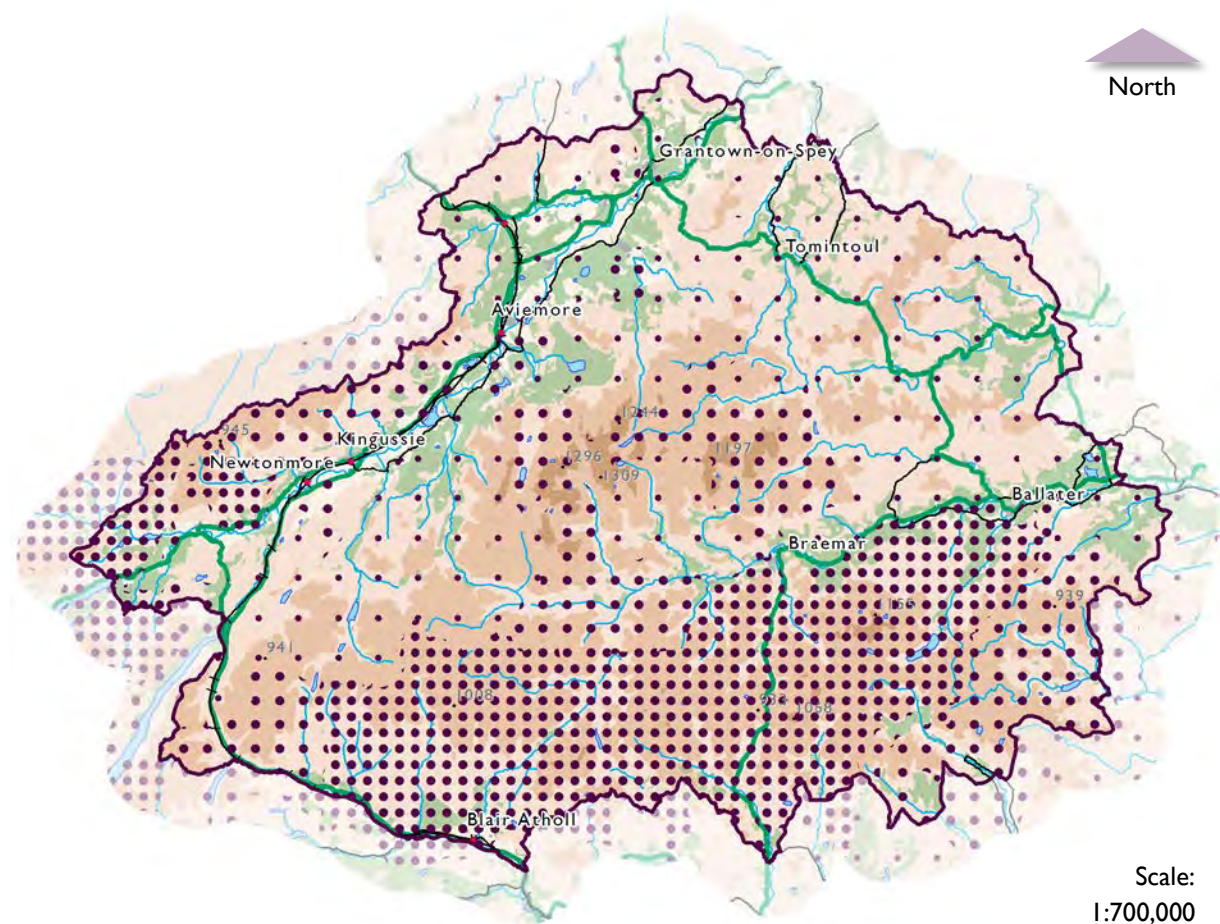


Figure 107 Aspirational Red Deer Densities in the Cairngorms National Park, November 2015.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority.

reserves form the largest continuous tract of native woodland in the UK. In Deeside the two NNRs Glen Tanar and Dinnet Oakwood are examples of Caledonian woodland and old Sessile Oak (*Quercus petraea*) woodland, a habitat which is very fragmented in north-east Scotland. They are managed by various organisations, which include the Forestry Commission, SNH, RSPB and the Estates. They are home to Osprey (*Pandion haliaetus*), Capercaillie, Red Squirrel and Crossbill (*Loxia curvirostra*). The forests have a rich understorey and plant species include Twinflower and One flowered wintergreen (*Moneses uniflora*).

Freshwater, Wetlands & Wet Grassland

A mosaic of wetland habitats with fens, bogs, woods, wet grassland and open water provides a home to a rich array of wildlife (**Figure 108**). The National Park is one of the most important sites for breeding waders due to the combination of wetlands, wet grassland and low-intensity mixed farming. Even so, birds such as Lapwing and Redshank have seen dramatic declines in

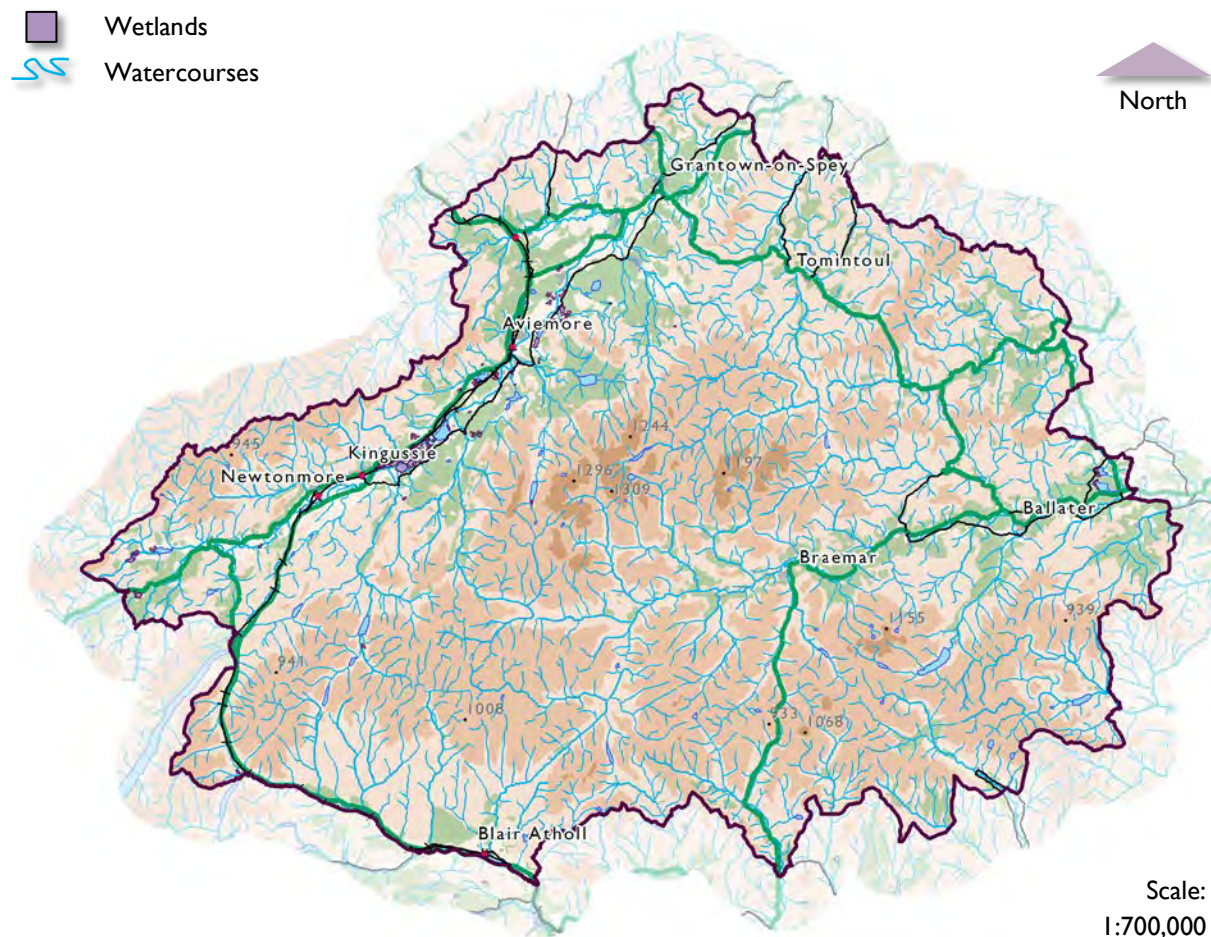


Figure 108 Wetlands within the Cairngorms National Park (Soil Survey of Scotland Staff, 1981).

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © James Hutton Institute.

numbers in recent years. Wet grasslands are the products of agricultural management, they are not extensive within the National Park and are often in low-lying areas of fields where crop yield and productivity is low. Wetlands would have once been an extensive habitat within the Cairngorms National Park but have suffered dramatic declines here as in the rest of the UK.

The Cairngorms are the source of the internationally designated rivers Spey, Dee, Tay and South Esk, which support Atlantic Salmon (*Salmo salar*), Freshwater Pearl Mussel (*Margaritifera margaritifera*), Otter (*Lutra lutra*) and Lamprey (*Petromyzontiformes*). The lochs support fish including Arctic Charr (*Salvelinus alpinus*).

The WFD Classification places a requirement on SEPA to monitor the ecological status of waterbodies and its ability to continue to function as such. Within the National Park around 50% of waterbodies are classified as being at good or better ecological status (**Figure 109**), however, recently the ecological status of

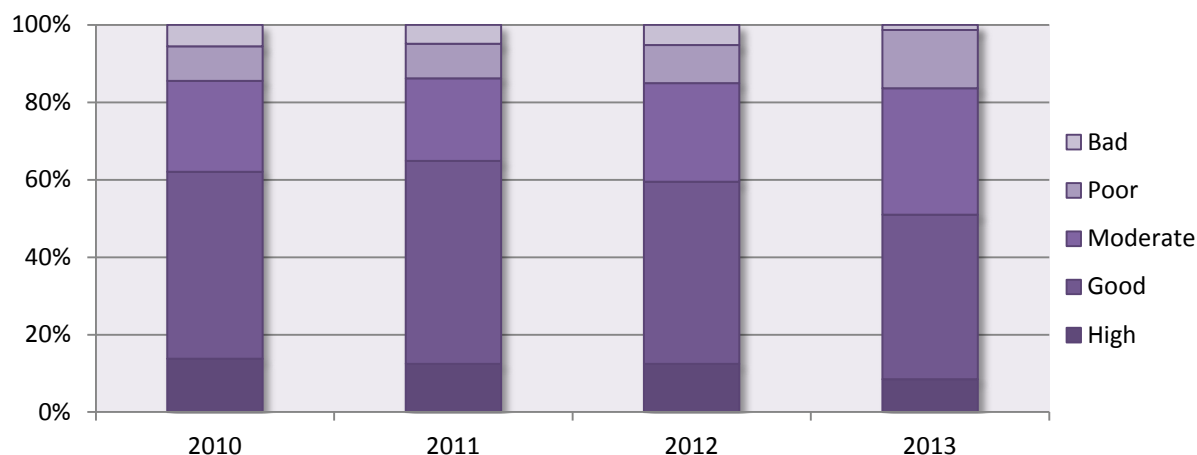


Figure 109 Ecological status of waterbodies within and overlapping the Cairngorms National Park.

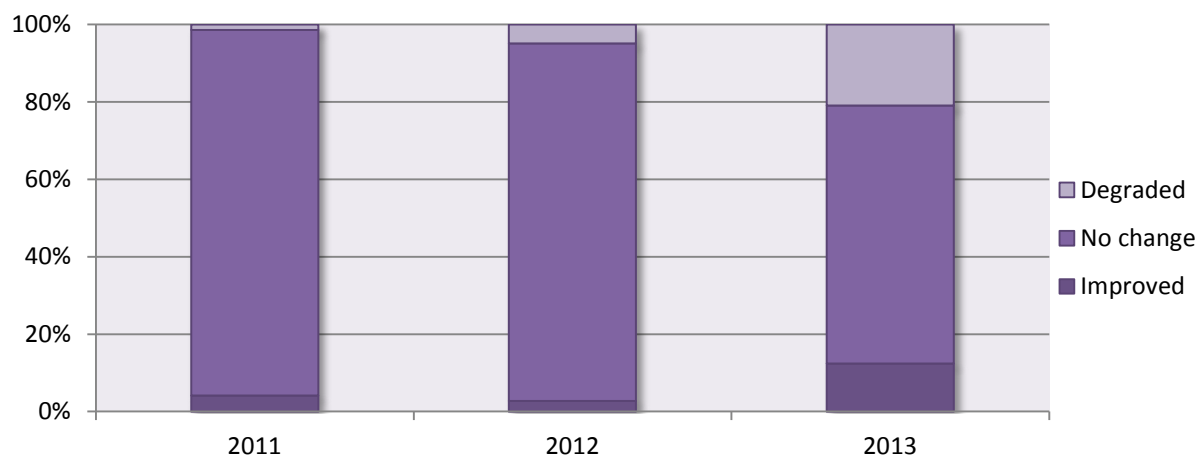


Figure 110 Change from previous year in the ecological status of waterbodies within or overlapping the Cairngorms National Park

Source: <http://www.sepa.org.uk/data-visualisation/rbmp-interim-planning-tool/>

many waterbodies within the National Park has been on the wane (**Figure 110**). See **Topic 3: Water** (p. 101) for further information on the quality of waterbodies in the National Park. **Table 23** provides the main issues affecting wetlands within the National Park together with actions required to address them.

Table 23 Issues affecting Freshwater, Wetlands and Wet Grassland in the Cairngorms National Park.

Habitat	Issue	Action Required
Wet Grassland	Over-grazing and poaching by livestock, cutting for hay at critical wader breeding times and drainage to produce productive agricultural land.	➤ Support land managers and farmers to conserve populations of breeding waders. Improve and restore wet grassland.
Wetlands	Wetlands have historically been drained for agriculture, suffered water shortages as a result of over abstraction and impoundment and been subject to pollution pressure from diffuse and point sources. The remaining wetlands are now often small and fragmented.	➤ Create new wetland habitats.
Freshwater	Rivers and lochs and the species they support have been affected by large scale impoundments which have a hydrological impact but also affect sediment dynamics, barriers to fish passage, diffuse and point source pollution and invasive species such as <i>Ranunculus</i> .	➤ Continue to support river management to improve and maintain good ecological status of waterbodies, create new freshwater targets.

Key species for focused action

The CNAP species which have been selected for targeted action and are dependent on Freshwater, Wetlands & Wet Grassland habitat are listed in **Table 24**.

Working in partnership, the CNPA is involved in projects aimed directly at improving the status of wetland habitats and their associated species within the Cairngorms National Park, these include:

River Catchment Initiatives

Several of the rivers within the National Park have associated initiatives who co-ordinate partnerships to deliver integrated catchment management they are (**Figure III**):

- Spey Catchment Initiative,
- Dee Catchment Partnership,
- River South Esk Catchment Partnership, and
- River Don Catchment Partnership.

The main objectives to meet WFD good status within these catchments are to

Table 24 Freshwater, Wetlands & Wet Grassland species selected for targeted action in CNAP (Cairngorms National Park Authority, 2013).

Species	Status in the CNP
Lapwing <i>Vanellus vanellus</i>	Breeding lapwings are in decline in Strathspey, the Waders and Wetlands Project aims to research reasons for the decline and work with landowners to encourage sympathetic land management.
Northern damselfly <i>Coenagrion hastulatum</i>	This is a very rare and localised species with almost all known lochan locations within the CNP. It is very similar to Common blue damselfly but has a distinctive ‘ace of spades’ marking.
Northern silver-stiletto fly <i>Spiriverpa lunulata</i>	Stiletto larvae are long, thin, white and worm-like. They are ferocious predators with a glossy hard skin that lets them slither through dry sand as they chase their insect prey. Habitat needs – exposed sand and shingle on river banks
Freshwater pearl mussel <i>Margaritifera margaritifera</i>	The freshwater pearl mussel <i>Margaritifera margaritifera</i> grows to 140 mm in length, and burrows into sandy substrates, often between boulders and pebbles, in fast-flowing rivers and streams. It is sensitive to heavy siltation and requires high water quality.
Northern February red stonefly <i>Brachyptera putata</i>	The Northern February red is a freshwater species endemic to Britain, found mainly in Scottish upland streams. Due to its rarity and decline in numbers this insect has been made a Priority Species on the UK Biodiversity Action Plan (BAP).

address barriers to fish, tackle diffuse pollution and improve river morphology.

Strathspey Wetland and Waders Initiative

The Strathspey Wetlands and Waders Initiative (SWWI) was set up to work with farmers and other landowners to safeguard wetland habitats and the future of the nationally important wader population in Badenoch and Strathspey - the largest of its kind in mainland Britain.

Pearls in Peril

'Pearls in Peril' (PIP) is a UK wide LIFE funded nature project with 22 partners working together to restore river habitats benefiting freshwater pearl mussel and salmonids. A total of 48 actions will be delivered across 21 rivers designated as SACs for freshwater pearl mussel. The freshwater pearl mussel (*Margaritifera margaritifera*) is declining dramatically throughout its range. Mussel populations have been affected by multiple issues, including wildlife crime – pearl fishing was

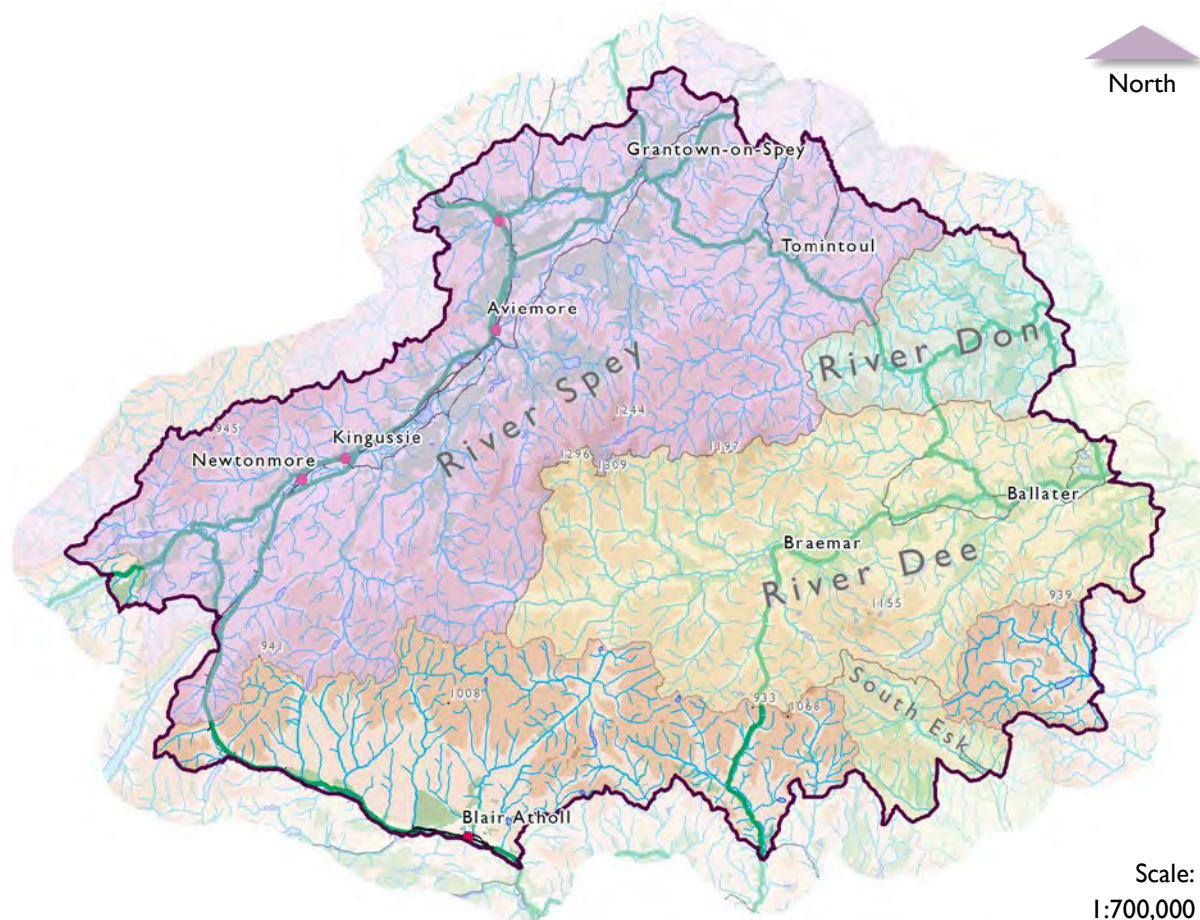


Figure 111 Areas covered by River Catchment Initiatives.

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. Contains SEPA data © Scottish Environment Protection Agency and database right 2015. All rights reserved.

legal until 1992, habitat degradation and declining water quality. This project will help to safeguard the future of the most important pearl mussel populations in the UK by tackling these threats and implementing best practice conservation methods.

A recent survey of FWPM sites in the River Spey highlighted a 50% decline in the population (Sime, 2014), meaning the status of FWPM in the River Spey SAC is currently classified as unfavourable and declining. The reasons for this are still under investigation but are attributed to water quality, especially nutrient levels; an increase in the abundance of water crowfoot (*Ranunculus* spp.) in the middle and lower Spey; low river levels in the middle and lower reaches which have killed established mussel beds; illegal fishing and no recruitment of juveniles in the middle to upper reaches which means the distribution will gradually contract as older mussels die.

Key Wetland Sites

Muir of Dinnet NNR

At the heart of the Reserve are Lochs Davan and Kinord, with their near pure water and associated bogs and fens providing ideal habitat for a wide mix of species; from rare water beetles to mammals like otter, feeding and breeding on the Reserve. During winter, the lochs are an important roost site, attracting migrating geese and other wildfowl. Their international importance is recognised by their designation as a SAC, SPA and Ramsar site.

Muir of Dinnet has two areas of raised bog, one at Parkin's Moss to the south-west of Loch Kinord and the other at Black Moss to the north-east of the Reserve. Together they cover approximately 32ha. Sphagnum mosses, the most important plants of a raised bog, are found at both locations, growing in the wet, acid and nutrient poor conditions. Both bogs support other specialist bog plants including bog cotton, cranberry and the carnivorous plants,

butterwort and sundew. The bogs are also home to a wide variety of insects, including at least eight species of dragonfly or damselfly.

Insh Marshes NNR

One of the most designated wetlands sites in Scotland, the Insh Marshes is owned and managed by the RSPB and is renowned for its birdlife throughout the year. The marshes are also home to rare invertebrates such as the newly discovered in Scotland caddisfly (*Molanna angustata*) and hoverfly (*Cheilosia psilophthalma*) and a population of Dark Bordered Beauty moth (*Epione vespertaria*). Mammals include water vole and otter. Wetland vegetation includes String Sedge (*Carex chordorrhiza*), which is only found at one other location in Scotland. Its international importance is recognised by its designation as a SAC, SPA and Ramsar site.

Uplands

The Cairngorms are considered to be one of the most spectacular mountain areas in Britain and support a rich arctic montane flora (**Figure 112**). Upland heath is the most extensive habitat due mainly to human activities such as felling, burning and grazing which prevents natural tree regeneration and drainage to allow grouse and red deer hunting. Blanket bog (**Figure 51 to 52**) is the second most extensive habitat and is mainly *Calluna-Eriophorum* dominated blanket mire.

Montane scrub is where dwarf trees and shrubs grow above the natural tree line. Dwarf willows, birches and juniper grow in a low twisted, wind-pruned form together with a variety of flowering plants, fungi, lichen and insects. The best example of a continuous treeline in Britain is at Creag Fhialach above Inshriach where a complex of Juniper and birch scrub grows at 550-650m.

In recent years one of the key drivers for improving the management of the uplands

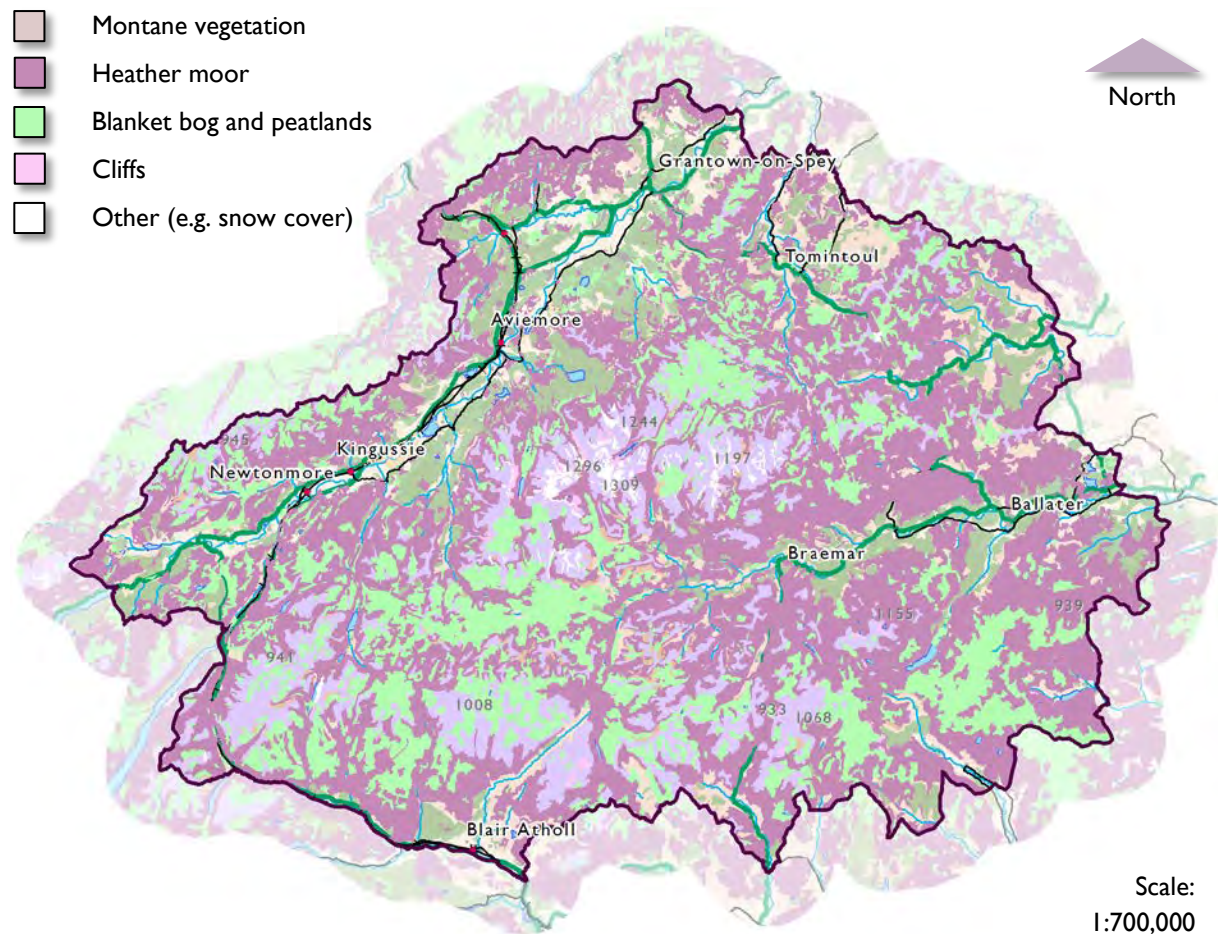


Figure 112 Upland land cover types within the Cairngorms National Park (Soil Survey of Scotland Staff, 1981).
 Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017.
 All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © James Hutton Institute.

has been the establishment of collaborative working groups whose membership consists of some of the National Park's largest landowners. Combined Cairngorms Connect and the East Cairngorms Moorland Group cover around 43% of the National Park.

Table 25 provides the main issues affecting uplands within the National Park together with actions required to address them.

Table 25 Issues affecting uplands in the Cairngorms National Park.

Habitat	Issue	Action Required
Montane & moorland	Climate change, trampling, erosion and disturbance.	➤ Reduced grazing pressure and sympathetic disturbance.
Upland heathland	Drainage.	➤ Restoration and blockage of drainage channels.
Blanket bog	Erosion, which is likely to be a significant cause of carbon emissions.	➤ Sustainable deer management and following the Muirburn Code.
Montane scrub	Overgrazing and burning.	➤ Deer Management to prevent overgrazing.

Key species for focused action

Those Cairngorms Nature Action Plan species dependent upon upland habitat are listed in **Table 26**.

Working in partnership, the CNPA is involved in projects aimed directly at improving the status of upland habitats and their associated species within the Cairngorms National Park, these include:

Golden Eagle

North East Scotland Raptor Watch began in 2006. It’s a partnership project that aims to address the problem of declining populations of rare or endangered species of birds of prey that breed in the uplands of North East Scotland. The Raptortrack project is into its fifth year of satellite tracking specific raptors in the Cairngorms National Park. Three golden eagles (*Aquila chrysaetos*) are presently being followed.

Montane Scrub Expansion

High altitude birches, willows and junipers would have been much more prevalent in

Table 26 Upland species selected for targeted action in CNAP (Cairngorms National Park Authority, 2013).

Species	Status in the CNP
Golden eagle <i>Aquila chrysaetos</i>	Breeds in high altitude areas of the CNP. At threat from persecution and disturbance.
Alpine blue sow thistle <i>Cicerbita alpina</i>	Alpine blue-sow-thistle is a very rare plant in the UK; it grows on only four rocky ledges sites on the Cairngorm Massif. It was once part of a more widely distributed mountain flora that is today restricted by changing land management practices and increased levels of grazing.
Tufted saxifrage <i>Saxifraga cespitosa</i>	A cushion-forming, perennial herb of well-drained base-rich rocks. It is found on mossy ledges, in crevices and on boulder-scrub slopes, it is in decline in the Cairngorms.
Powdered sunshine lichen <i>Vulpicida pinastri</i>	Records exist for the Eastern and Southern Cairngorms.

the Cairngorms in the past. Centuries of burning and heavy grazing by livestock and deer have taken their toll on trees and shrubs which grow only slowly amid the poor soils and exposed conditions found high in the Cairngorms. Cairngorms Nature is bringing landowners in the core of the national park together to help identify where all the remnants are and the condition they’re in, and explore ways of enhancing and expanding them.

The Cairngorms SAC/SPA is a key site in the effort to expand mountain scrub. Some of the best cliff and scree flora in the Cairngorms is found high up in the cliff buttresses, ridges and deeply indented gullies of the Northern Corries. A number of rare species grow here including alpine saxifrage (*Micranthes nivalis*), Highland saxifrage (*Saxifraga rivularis*), hare’s-foot sedge (*Carex lachenalii*), curved wood-rush (*Luzula arcuata*) and green shield-moss (*Buxbaumia viridis*) above the treeline in

Creag Fhiaclach is one of the best areas for montane scrub in Britain.

Lowlands

The lowland farmland and grassland within the National Park (Figure 113) has been traditionally managed less intensively than the rest of the UK. There are small fragmented areas of lowland and upland hay meadows which are locally important for biodiversity and include many species of orchid and waxcap fungi.

Those Cairngorms Nature Action Plan species dependent on lowland habitat are listed in Table 27.

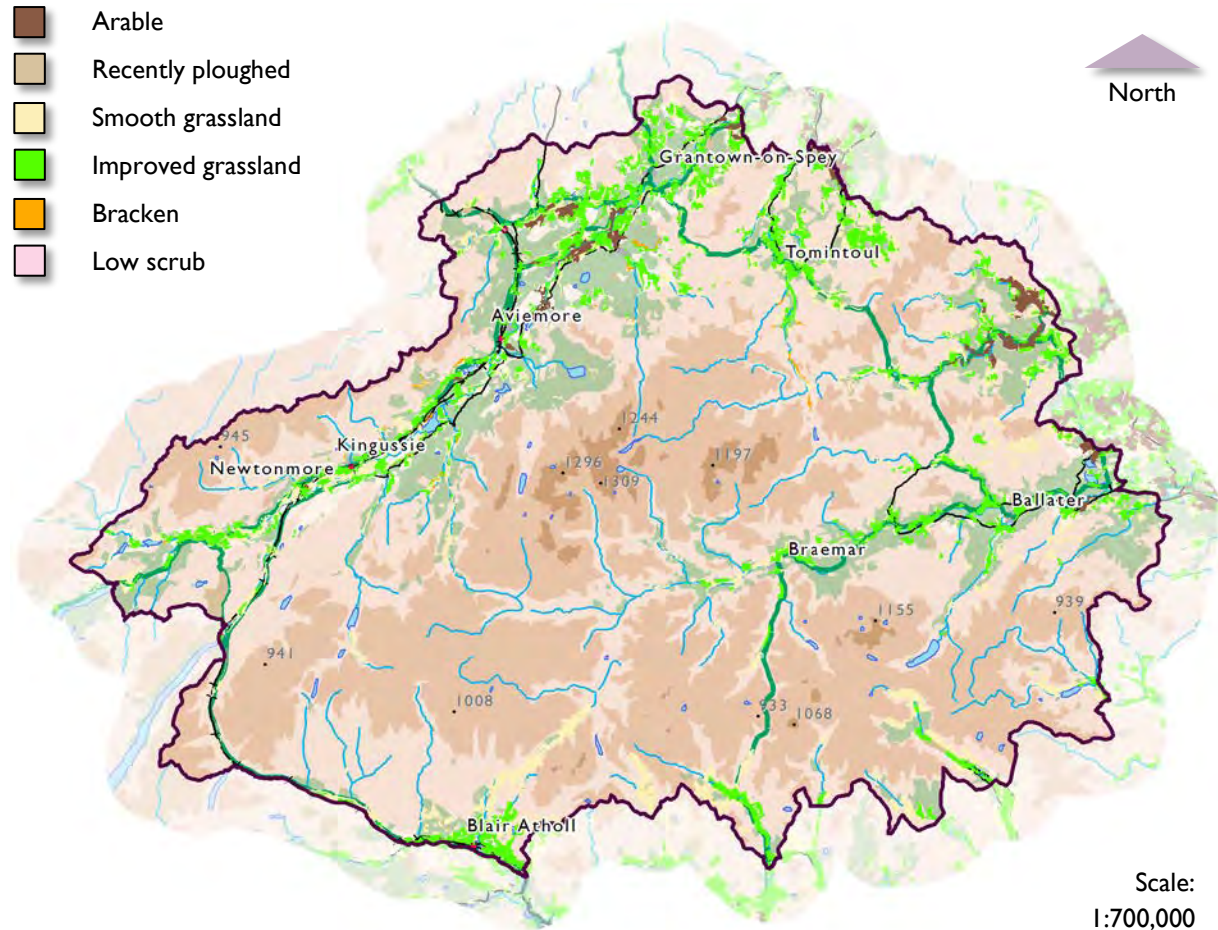


Figure 113 Lowland land cover types (excluding woodlands and moorland) within the Cairngorms National Park (Soil Survey of Scotland Staff, 1981).

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2017. All rights reserved. Ordnance Survey Licence number 100040965 Cairngorms National Park Authority. © James Hutton Institute.

Working in partnership, the CNPA is involved in projects aimed directly at improving the status of lowland habitats and their associated species within the Cairngorms National Park, these include:

Farm Advisory

Most of the farms in the Cairngorms National Park are livestock farms. Farmers and crofters keep beef cows, sheep and grow small areas of crops. Most of the crops are for feeding to livestock - grass for hay and silage, turnips for sheep in winter - however some crops such as barley are grown for whisky distilleries. Many of the farmers and crofters in the park are in 'agri-environment' schemes, which means that they take extra care of the environment by careful grazing, growing special crops for birds, and growing wildflower meadows. The CNPA provides advice, support, various projects and special learning events such as the Land Management Training Series which recently included a deer stalking course for women working within the Cairngorms National Park.

Table 27 Lowland species selected for targeted action in CNAP (Cairngorms National Park Authority, 2013).

Species	Status in the CNP
Small dark yellow underwing <i>Anarta cordigera</i>	Depends on bearberry-rich moorland, mainly at altitudes of between 200-650m. Flies rapidly in sunshine, but in dull weather can be found at rest on rocks and posts.
Mining bee <i>Andrena marginata</i>	Requires bare ground for nesting and grassland rich in devils-but scabious as a nectar source. Only a handful of known sites in the National Park.
Violet oil beetle <i>Meloe violaceus</i>	Occurs in woodland, heathland and grassland habitats where solitary bees are abundant which it requires for part of its lifecycle.
Crimson waxcap <i>Hygrocybe punicea</i>	One of the largest of the waxcaps, <i>Hygrocybe punicea</i> is an infrequent find on cropped grassland. It occurs in late summer and autumn and is only found in grassland along Strathspey and Deeside.

Bio-security

Non-native species, pathogens and disease can have an impact on the nature of the Cairngorms National Park and a range of environment-based economic activities including fishing, farming and forestry.

Non-native species can kill, harbour disease, or compete with native species. A number have been recorded in the National Park, including the plants, Japanese knotweed (*Fallopia japonica*), giant hogweed (*Heracleum mantegazzanum*), Himalayan balsam (*Impatiens glandulifera*), American

Skunk Cabbage (*Lysichiton americanus*); the mammals American Mink (*Mustela vison*) and Grey Squirrel (*Sciurus carolinensis*); and the fish, rudd (*Scardinius erythrophthalmus*), roach (*Rutilus rutilus*), tench (*Tinca tinca*), golden orfe (*Leuciscus idus*) and bream (*Abramis brama*).

The CNPA is a partner in the Scottish Mink Initiative which aims to have river catchments within the Cairngorms (and throughout Scotland) free from mink to enhance water vole and ground nesting bird populations. The CNPA also supports the

Cairngorms non-native fish project to stop the deliberate or accidental release of non-native fish into the Dee or Spey catchments.

Pathogens can cause death or reduce viability of populations which has great implications for habitat connectivity.

Red band needle blight (also known as Dothistroma Needle Blight) is a fungus which causes the premature loss of pine needles. In the Cairngorms National Park planting of Scots Pine next to existing stands is currently discouraged, which could have long term impacts on woodland structure and species composition.

Ash dieback or Chalara (*Hymenocyphus fraxineus*) is a fungus causing dieback and mortality in Ash trees. In 2015, records show it on the southern edges of the Cairngorms National Park.

Ramorum Phytophthora ramorum is a fungal disease of Larch, the highest incidence is in the south west of Scotland but it was recorded on the southern and eastern

fringes of the Cairngorms National Park in 2015.

Phytophthora austrocedraeon is a fungus which causes dieback and mortality in Juniper when it attacks the roots and stems, it has been found within the Cairngorms National Park and is thought to be transmitted to new areas through movement of sheep.

Key Messages

The Cairngorms National Park is considered to be one of the richest and biodiverse places in the UK, being home to 25% of the UK's rare animal, insect, lichen, fungi and insect species.

Consequently, large areas have are protected by various types of national and international nature designation, including NNRs, SSSIs, SACs and SPAs. A number of these designations are however in unfavourable condition.

Increasingly the National Park's valued species and habitats are under threat from habitat loss, fragmentation, disturbance and unsustainable land management practices. Some important species, such as Capercaillie and Freshwater Pearl Mussel have been under particular pressure and have seen significant drops in their population. To counter this progress is being made in the creation of new habitat, including the creation of 1,120ha of new native woodland between 2013 and 2017. Furthermore, the collaborative partnerships Cairngorms Connect and East Cairngorms Moorland Group cover 43% of the National Park.

The Cairngorms National Park Authority already has a number of PPS in place to help prevent, mitigate and compensate the loss of biodiversity, including the Cairngorms Nature Action Plan (2013). The implementation NPPP may therefore result a number of cumulative, synergistic and in-combination with these. Together they should work towards a cohesive approach addressing issues, linking the needs of people with the natural environment.

Inter-relationships with other topics

➤ Topic 1: Climatic Factors	88
➤ Topic 2: Air	97
➤ Topic 3: Water	101
➤ Topic 4: Soil	118
➤ Topic 5: Material Assets	129
➤ Topic 7: Landscape and Cultural Heritage	221
➤ Topic 8: Population and Human Health	250