Cairngorms
NATIONAL PARK
Pàirc Nàiseanta a' Mhonaidh Ruaidh

PLANNING

Cairngorms National Park Local Development Plan 2020

Strategic Environmental Assessment Scoping Report September 2016

Appendix 2: Environmental Baseline
Topic 3: Water

Topic 3: Water

> "*Water is a heritage which must be protected and defended.*"
>
> The European Union Water Framework Directive (2000/60/EC).

The Cairngorms National Park encompasses the headwaters of three of Scotland's major rivers as well as many smaller ones (**Figure 18**). Many of the rivers and their tributaries as well as lochs and wetlands are designated as Natura sites and Sites of Special Scientific Interest (SSSIs). The rivers in particular provide water for society in the National Park, and for people outside the Park as they flow downstream towards the sea.

Three of the National Park's rivers are subject to catchment management plans, the Dee, the Esk and the Spey. These plans aim to protect water quality, direct the use of the rivers as resources, protect against flooding, enhance biodiversity, and promote access and economic development.

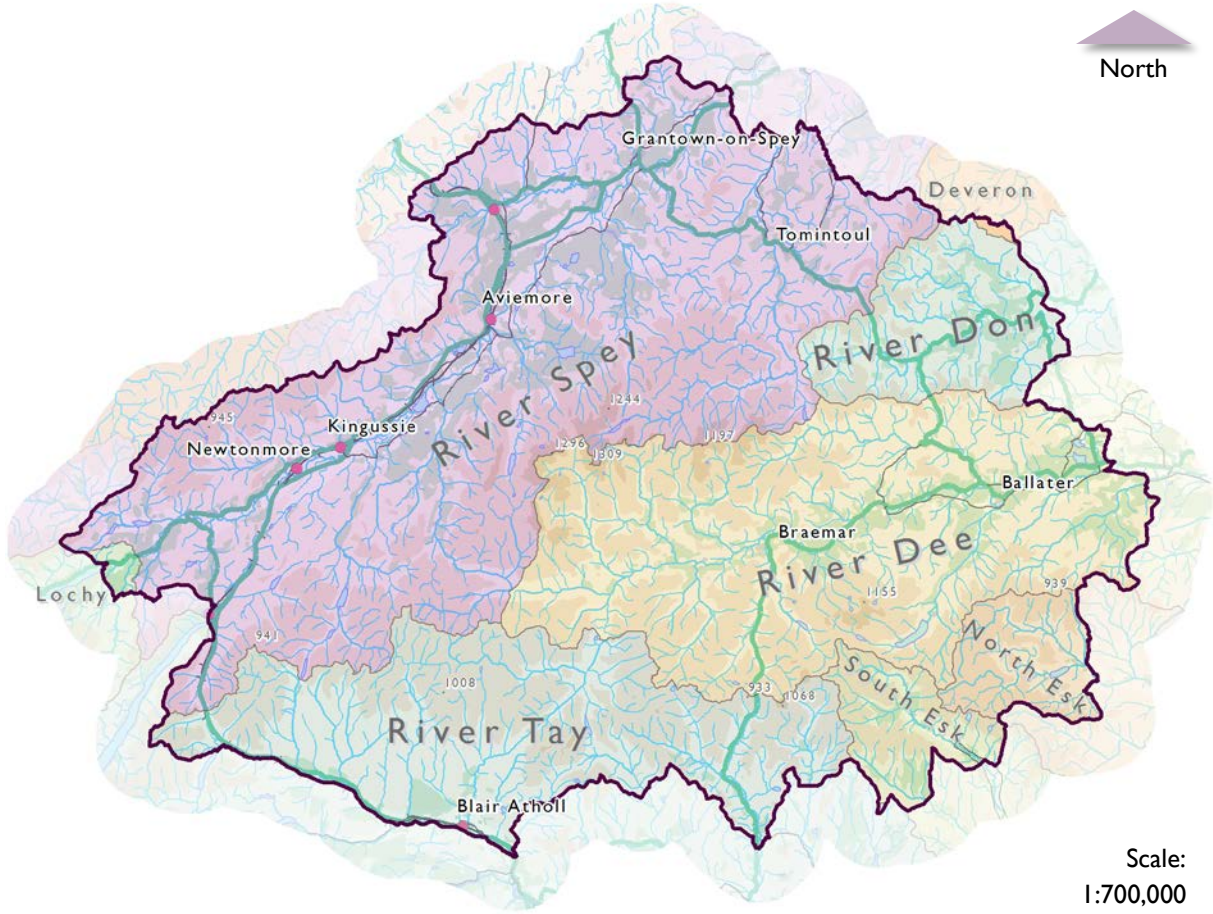

Figure 18 River catchment areas within the Cairngorms National Park.

Water Quality

Pollution leading to the deterioration of water quality can originate from one of two sources, point and diffuse.

Point source discharge means a release of effluent or other matter to the water environment or land, via a pipe or outlet. For example, this includes sewage and trade effluent; surface water discharges from urban areas; and abandoned mine discharges.

Diffuse pollution is the release of potential pollutants from a range of activities that, individually, may have no effect on the water environment, but, at the scale of a catchment, can have a significant effect. Activities associated with diffuse pollution are varied and include run-off from roads, houses, commercial areas, farmland, forestry activities and community and amenity green spaces; seepage into groundwater from developed landscapes of all kinds; and yard run-off from industrial activities.

Government regulation has been extremely successful in reducing instances of point source pollution and therefore diffuse pollution is now of greatest concern. Diffuse sources of water pollution can have a significant effect of biodiversity and human health. The effects include:

- Groundwater and surface water contamination and the subsequent loss, or need for treatment of drinking water resources;
- Nutrient enrichment and eutrophication of water bodies;
- Oxygen depletion of water bodies;
- Toxicity to plant and animal life, including endocrine disruption in fish; and
- Smothering of freshwater pearl mussel beds and fish spawning gravels (Dee Catchment Partnership, 2007).

Of particular significance is the effect of water pollution on freshwater pearl mussel populations, as good water quality is essential for the completion of their life cycle (Young, 2005). Freshwater pearl mussel is one of the species on the Nature Action Plan List (Cairngorms National Park Authority, 2013) and is one of the qualifying features for a number of the National Park's SACs, including the River Spey and River Dee SACs. Further information may be found under **Topic 6: Biodiversity, Fauna and Flora** (p. 121).

The European Union Water Framework Directive (2000/60/EC) (WFD), adopted in 2000, is the operational tool that sets out the objectives for water protection in Scotland. The WFD sets out a number of objectives in respect of which the quality of water is protected. The key ones at European level are:

- General protection of the aquatic ecology;
- Specific protection of unique and valuable habitats;
- Protection of drinking water resources; and
- Protection of bathing water.

All these objectives must be integrated for each river basin. It is clear that the last three - special habitats, drinking water areas and bathing water - apply only to specific bodies of water (those supporting special

wetlands; those identified for drinking water abstraction; those generally used as bathing areas). In contrast, ecological protection should apply to all waters: the central requirement of the WFD is that the environment be protected to a high level in its entirety (European Commission, 2014).

SEPA are the responsible authority for monitoring water quality in Scotland to the requirements set out by the WFD. The Directive requires all water features in a category (i.e. rivers, lochs, transitional waters, coastal waters and groundwater) above a certain size threshold to be defined as water bodies.

Surface water bodies are classified using a system of five quality classes – high, good, moderate, poor and bad, with groundwater classified as good or poor. In general, the classification of water bodies describes by how much their condition or status differs from near natural conditions. Water bodies in a near natural condition are at high status, while those whose quality has been severely damaged are at bad status

The ultimate overall aim of the WFD is therefore to ensure that these water bodies don't deteriorate in status and that all water bodies achieve at least 'good' status by 2015, unless it is demonstrated that less stringent objectives should apply (Scottish Environment Protection Agency, 2007).

The overall status and water quality classification of waterbodies within the Cairngorms National Park for years 2010-2014 is presented in **Figure 19**, **Figure 20**, **Figure 21** and **Figure 22**. The main reasons for waterbodies not achieving overall good status is the presence of a large number of barriers to fish and poor morphology (this covers catchment/landuse matters such inputs of fine sediments or impacts to hydrology and direct impacts such as through engineering or condition of riparian corridor).

The status of waterbodies for 2015 was not available at the time of writing. The definition of what constitutes a waterbody in the National Park is set out in **Appendix 3**.

As can be seen, the current situation is mixed, and only a minority of waterbodies are in bad or poor condition, there has been an increase in the number of waterbodies changing to a worse status or classification.

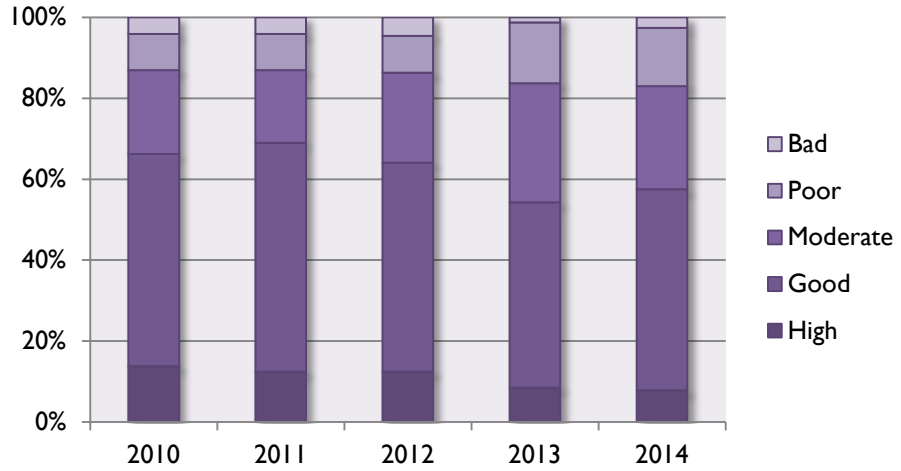

Figure 19 Overall status of waterbodies within and overlapping the Cairngorms National Park.

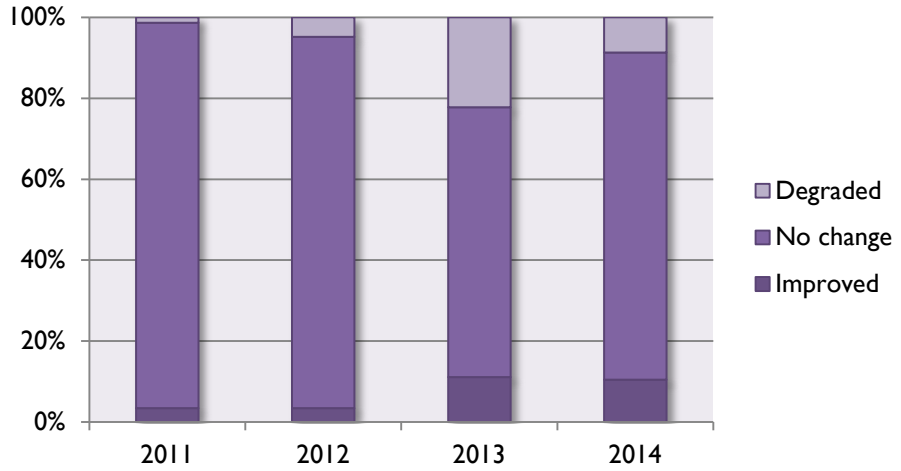

Figure 20 Change from previous year in the overall status of waterbodies within or overlapping the Cairngorms National Park

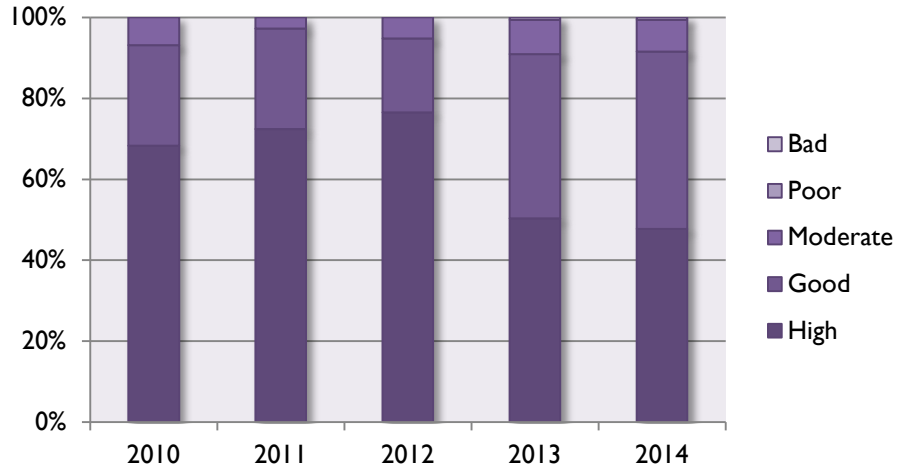

Figure 21 Water quality classification of waterbodies within and overlapping the Cairngorms National Park.

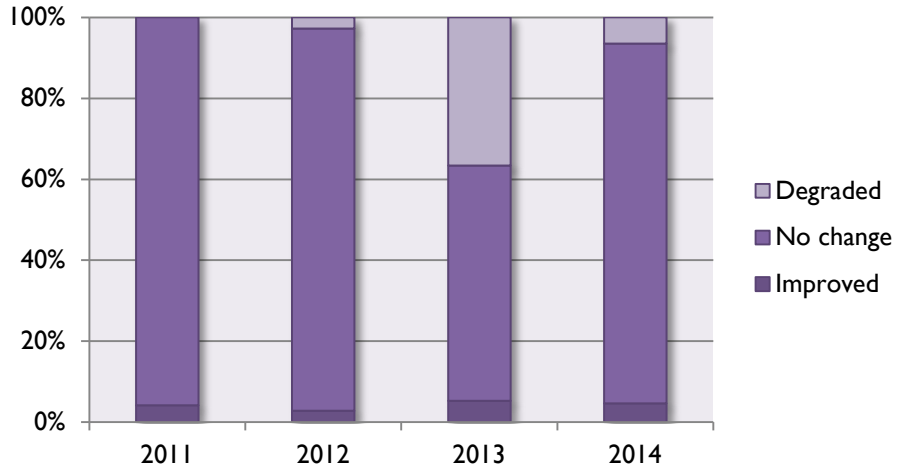

Figure 22 Change from previous year in the water quality of waterbodies within or overlapping the Cairngorms National Park

Source: www.environment.scotland.gov.uk/get-interactive/data/water-body-classification/

Water Quantity

In order to provide information for the management of water resources, SEPA monitor water levels at 20 sites within the Cairngorms National Park, as well as at a number of locations just outside the Park's boundary. Water levels are converted to flow at most river gauging stations. The information gathered may inform the SEA, since trends may be used as an indicator of climate change or as an identifier of potential risks, such as flooding.

Figure 23 and **Figure 24** represent the series of maximum instantaneous peak flows within a given water year (October to September) for monitoring stations on the River Spey and River Dee. The data from both stations shows a general trend for higher annual maximums over the time they were monitored. The causes of this are uncertain; however, it highlights the importance of taking into account the potential for an increase in the number and severity of flood events over the lifetime of the LDP and beyond.

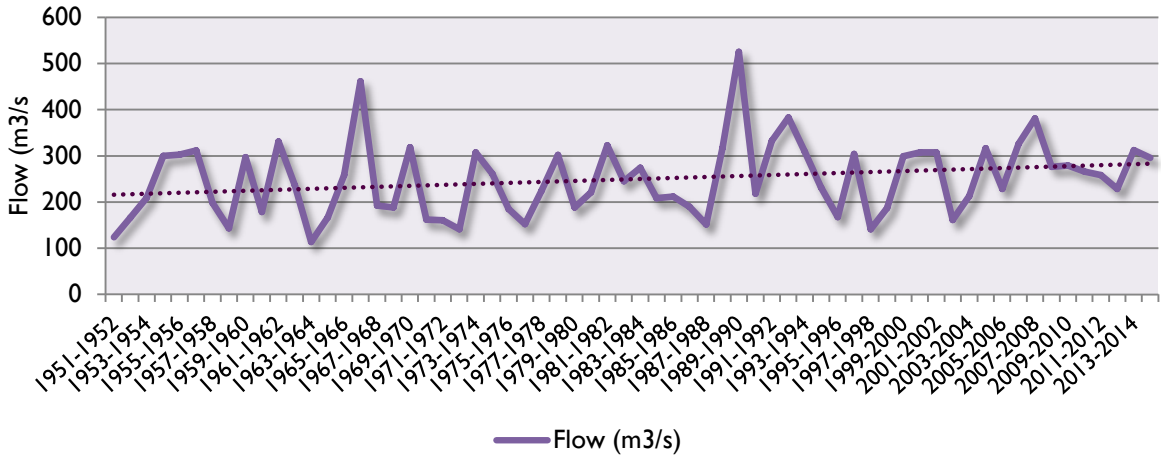

Figure 23 Annual maximum (AMAX) data for the River Spey at Grantown-on Spey (Station 8010). Contains SEPA data © Scottish Environment Protection Agency and database right 2016. All rights reserved.

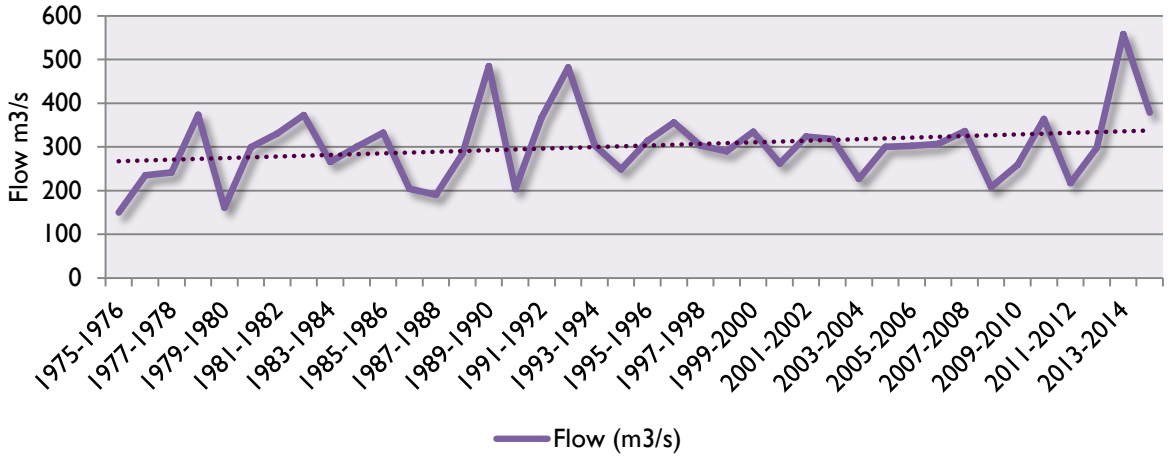

Figure 24 Annual maximum (AMAX) data for the River Dee at Polhollick, near Ballater (Station 12003). Contains SEPA data © Scottish Environment Protection Agency and database right 2016. All rights reserved.

Water Infrastructure

Whilst Scottish Water (SW) is funded to provide any strategic capacity that may be required for water supply / waste water treatment ('part 4' assets) to facilitate development, it is necessary to consider the timescale to deliver new strategic capacity to ensure that the provision of it is timed to enable development in the right place at the right time. The implications of this on any programme of development must therefore be considered. The current capacity status of the water and waste treatment works that serve the National Park's settlements is shown in **Table 8**.

Including all planned and committed development proposals, capacity exists at most of the SW water treatment works serving settlements in the National Park. There are however constraints in certain locations. For example, there is currently not enough capacity to supply the 1,500 units permitted at An Camas Mòr.

Table 8 Capacity of water and waste treatment works serving the Cairngorms National Park, July 2015 (Source: Scottish Water).

Local Authority	Settlement	Water Treatment Works	Capacity (housing units)	Waste treatment Works	Capacity (housing units)
Aberdeen-shire	Ballater	Ballater	93	Ballater	93
	Braemar	Braemar	315	Braemar	63
	Dinnet	Ballater	93	Dinnet	<10
	Strathdon	Lumsden	<10	Private	N/A
Angus	Angus Glens	Private	N/A	Private	N/A
Highland	An Camas Mòr	Aviemore	966	Aviemore	60
	Aviemore	Aviemore	966	Aviemore	60
	Boat of Garten	Aviemore	966	Boat of Garten	96
	Carr Bridge	Aviemore	966	Carr Bridge	87
	Cromdale & Advie	Aviemore	966	Cromdale	105
	Dalwhinnie	Dalwhinnie	20	Dalwhinnie	<10
	Dulnain Bridge	Aviemore	966	Dulnain Bridge	24
	Glenmore	Private	N/A	Glenmore	<10
	Grantown of Spey	Aviemore	966	Grantown	197
	Insh	Aviemore	966	Insh	<10
	Inverdruie & Coylum Bridge	Aviemore	966	Aviemore	60

More significantly, the current capacity of many waste treatment works serving the National Park is a constraint to development. For example, the Aviemore treatment works, which serves the eponymous town and much of the surrounding area, including An Camas Mòr, only has capacity for a further 60 units.

Therefore, investment in both water and waste treatment works will be necessary for the National Park's permitted and projected growth to be met sustainably.

Where there is no public water supply network within the vicinity there would be a need either for a private water treatment system or to lay a new water infrastructure to the existing public network, and early discussion with SW would be required. Where there is no public sewer network a private wastewater treatment system may be required. Early engagement with SEPA to discuss the specific requirements and approval of any private systems is essential.

Local Authority	Settlement	Water Treatment Works	Capacity (housing units)	Waste treatment Works	Capacity (housing units)
Highland	Kincraig	Aviemore	966	Kincraig	52
	Kingussie	Aviemore	966	Kingussie	327
	Laggan	Laggan Bridge	<10	Laggan Bridge ST	<10
	Nethy Bridge	Aviemore	966	Nethy Bridge	70
	Newtonmore	Aviemore	966	Newtonmore	208
Moray	Glenlivet	Tomnavoulin	<10	Private	N/A
	Tomintoul	Blairnamarrow	65	Tomintoul	46
Perth & Kinross	Blair Atholl	Killiecrankie	2000+	Blair Atholl	16
	Bruar & Pittagowan	Killiecrankie	2000+	Private	N/A
	Calvine	Killiecrankie	2000+	Private	N/A
	Glenshee	Private	N/A	Private	N/A
	Killiecrankie	Killiecrankie	2000+	Killiecrankie	<10

Flooding

All of the National Park's rivers and watercourses have the potential to flood to some degree (**Figure 25**). Most concern is generated along the National Park's main straths and glens, as when the rivers and tributaries that flow along these, namely the Spey, Dee and Don, break their banks, they often result in economic, and occasionally human, cost. Small watercourses also represent a risk but are often poorly understood with respect to the severity of the flood hazard that can be generated on a catchment scale. Furthermore, in some areas surface water flooding, which can arise for a number of reasons, is a significant risk.

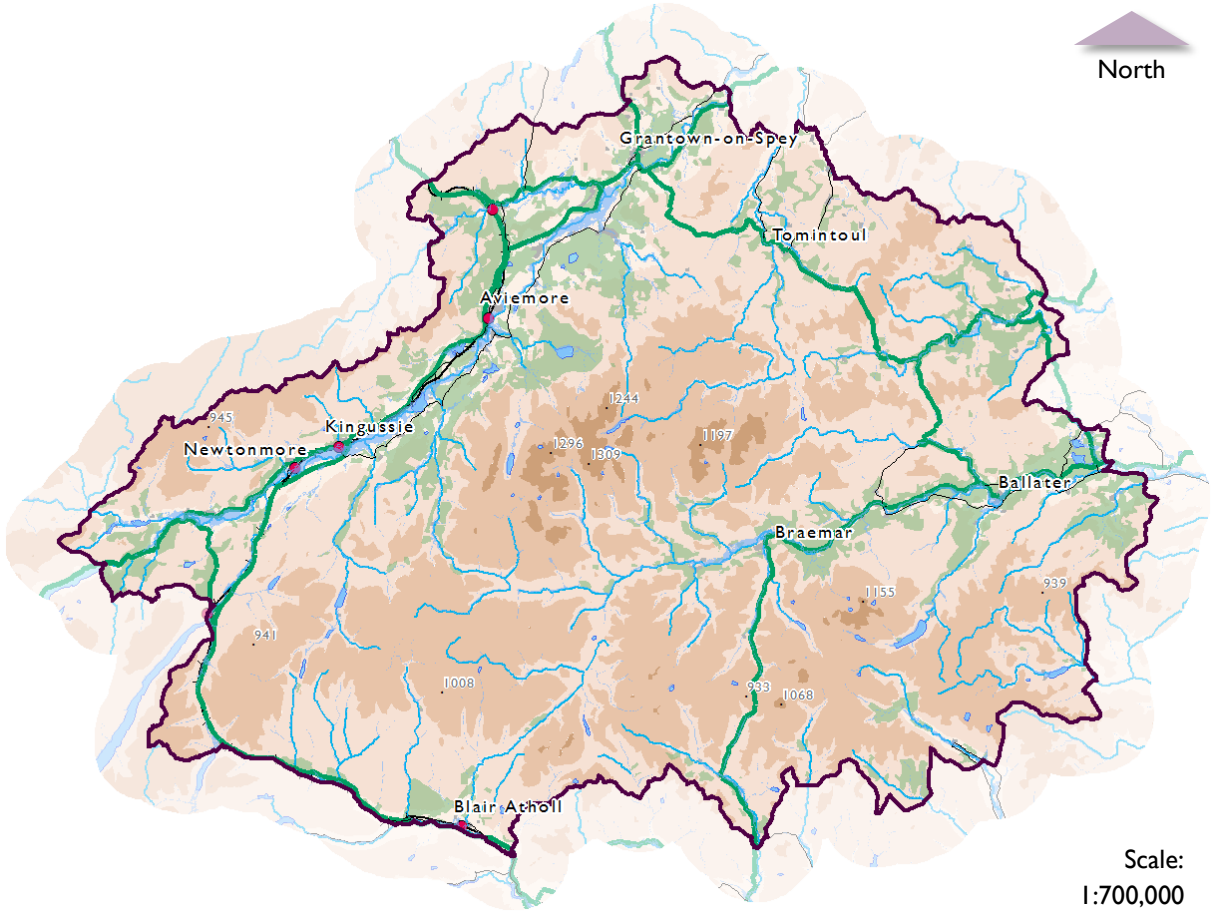

Figure 25 Indicative river flooding extent (medium probability 1 in 200 years) in Cairngorms National Park.

River Spey

The River Spey (**Figure 26**) rises in the high ground of the Monadhliath and Cairngorm Mountain ranges and flows in a northeasterly direction through narrow straths and scenic river valleys before discharging into the Moray Firth beyond the fertile farmlands of Morayshire. The upper part of the catchment is characterised by its mountainous areas, the highest point being the summit of Ben Macdui at 1,309 metres above sea level.

The River Spey is the seventh largest river in Britain, with a catchment area of over 3,000 km^2, and a stream network length of about 36,500 km, of which the main river comprises 157 km (Spey Catchment Steering Group, 2003).

There is a long history of flooding within the Spey catchment area, with a notable event, known as the Great Muckle Spate, destroying several bridges in 1829. The River Spey and its tributaries continue to flood regularly, with heavy rains and melting snows increasing the volumes of water in

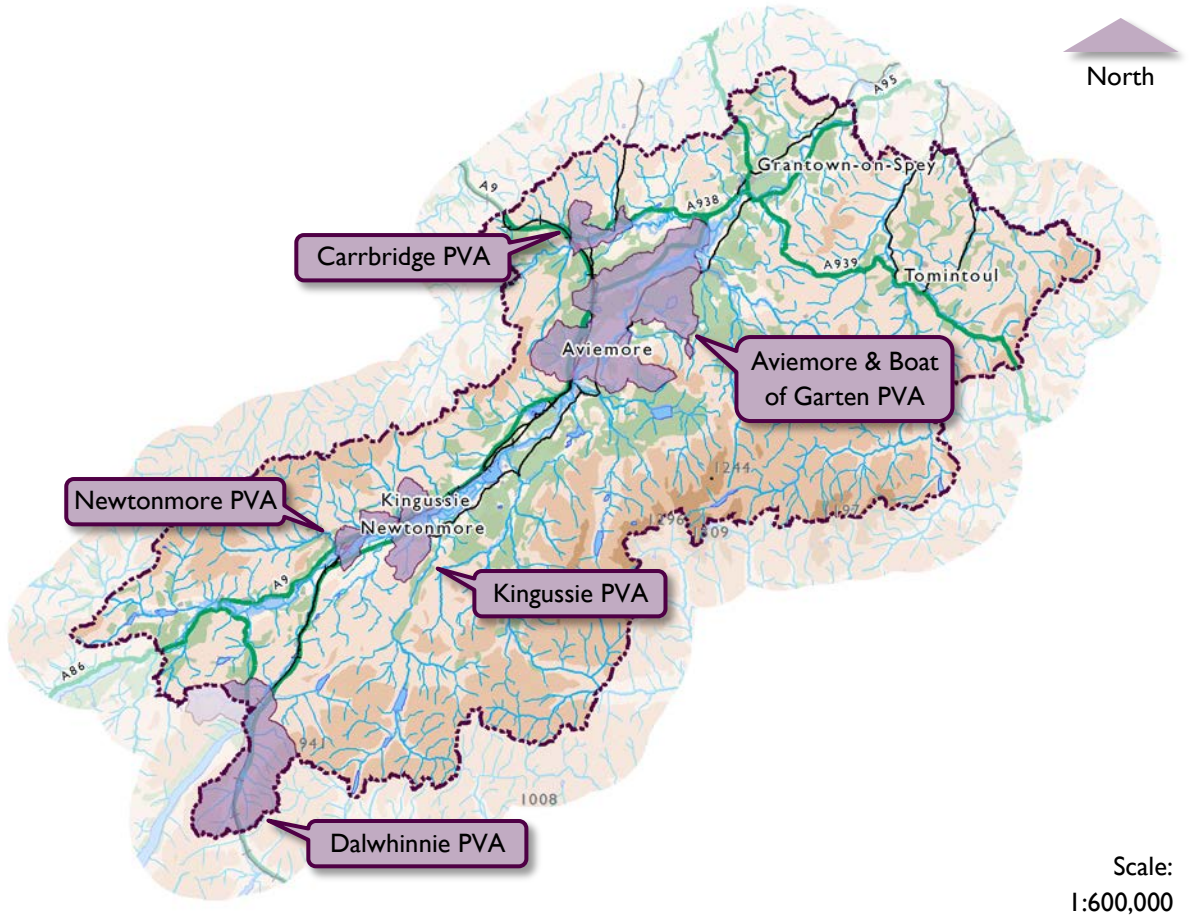

Figure 26 River Spey PVAs in the River Spey catchment area within the Cairngorms National Park and indicative river flooding extent (medium probability 1 in 200 years).

the catchment. These floods have damaged properties in Newtonmore, Aviemore and Carrbridge on a number of occasions. Most recently in 2014, Gynack Burn broke its banks in Kingussie, damaging local buildings and infrastructure (Scottish Environment Protection Agency, 2015).

Flood management practices are being undertaken at a number of locations. The Spey Catchment Initiative has carried out natural flood management / river restoration works on a tributary upstream of the River Dulnain (Spey Catchment Initiative, 2013). There are also agricultural embankments along the River Spey between Aviemore and Boat of Garten and further embankments at Dalwhinnie. The standard of protection (and condition) provided by these embankments is however unknown (Scottish Environment Protection Agency, 2015).

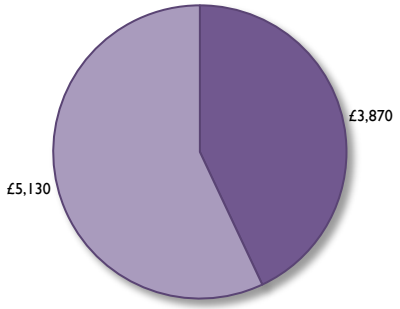

Figure 27 Annual average damages in Carrbridge PVA (PVA 05/10).

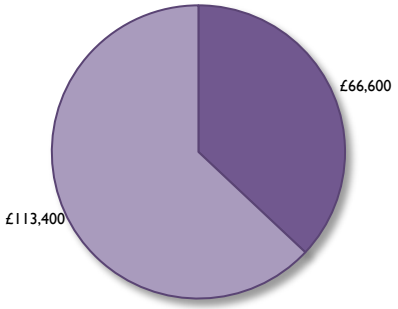

Figure 28 Annual average damages in Aviemore and Boat of Garten PVA (PVA 05/11).

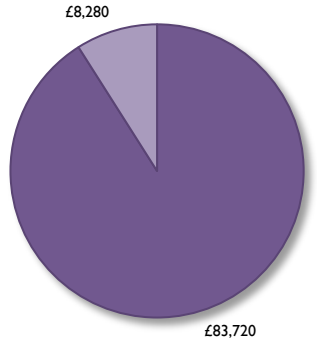

Figure 29 Annual average damages in Kingussie PVA (PVA 05/12).

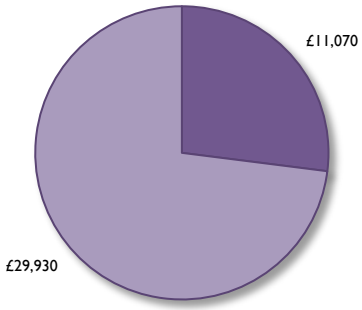

Figure 30 Annual average damages in Newtonmore PVA (PVA 05/13).

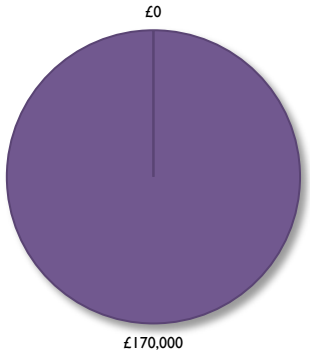

Figure 31 Annual average damages in Dalwhinnie PVA (PVA 05/14).

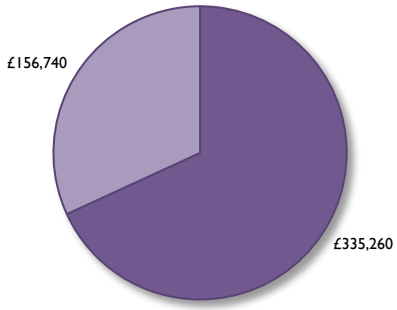

Figure 32 Annual average damages of all National Park PVAs in Spey Catchment area.

River flooding Surface water flooding

(Source: Scottish Environment Protection Agency, 2015).

Due to the potential risk caused by flooding within the catchment area, five Potentially Vulnerable Areas (PVAs) have been identified within the National Park (**Figure 26**), at:

- Carrbridge (PVA 05/10);
- Aviemore and Boat of Garten (PVA 05/11);
- Kingussie (PVA 05/12);
- Newtonmore (PVA 05/13); and
- Dalwhinnie (PVA 05/14).

The estimated total average annual cost of damage in these areas is £492,000 (**Figures 27** to **34**). Around £335,000 (68%) of this damage is caused by river flooding (Scottish Environment Protection Agency, 2015).

SEPA have identified a number of actions for managing flood risk in these areas, which were consulted on in 2015.

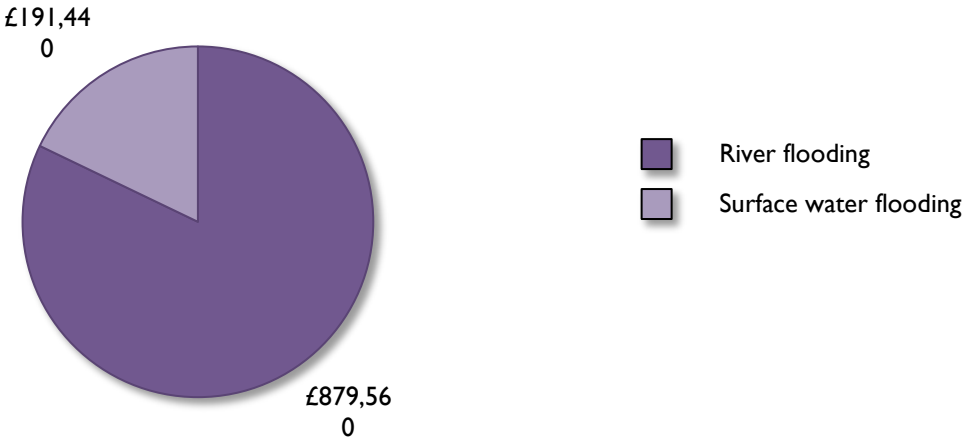

Figure 33 Annual average damages of all PVAs within or overlapping the Cairngorms National Park (Scottish Environment Protection Agency, 2015).

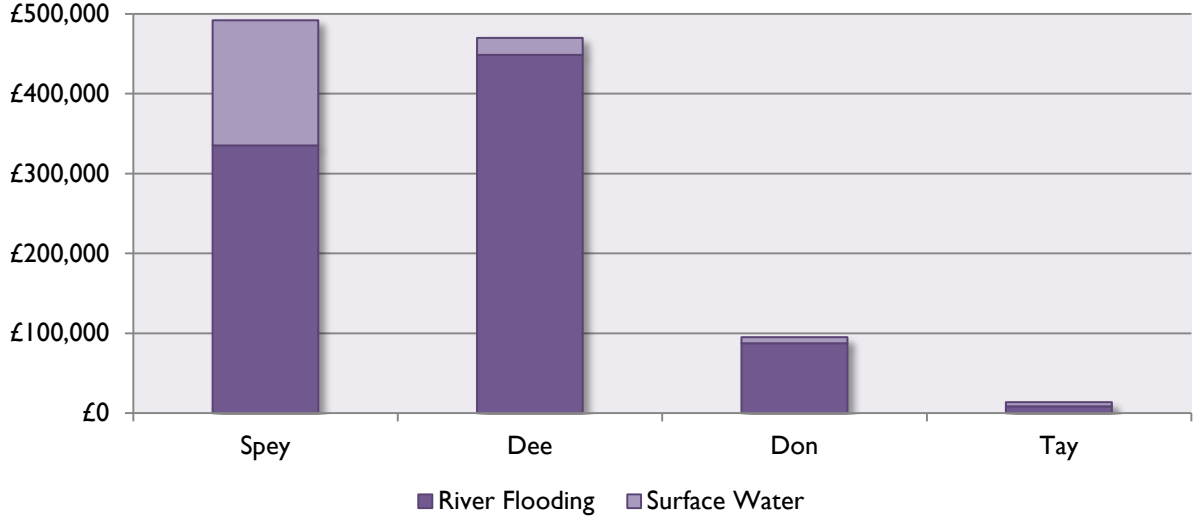

Figure 34 Annual average damages of all PVAs within or overlapping the Cairngorms National Park by catchment area (Scottish Environment Protection Agency, 2015).

River Dee

The River Dee (**Figure 35**) rises in the Cairngorm Mountains east of Braemar on the semi-arctic Braeriach-Cairn Toul plateau. For the majority of its course, the river flows eastwards through a broadening valley, which becomes much gentler in relief as it leaves the National Park. Within the National Park, the river is fed by a number of important tributaries, namely the Lui, Clunie, Gairn, Muick and Tanar, the latter's confluence located just outwith the National Park Boundary (Dee Catchment Partnership, 2007).

The river is considered to be the best example of a natural highland river in Scotland (Maitland, 1985). The notable characteristics of the river include its great altitudinal range, its unique succession of plant communities, and its seep profile compared to other large British rivers (Dee Catchment Partnership, 2007).

Like the Spey, the Dee suffers from flooding related to heavy rain and melting snows. Major floods have been recorded in 1769,

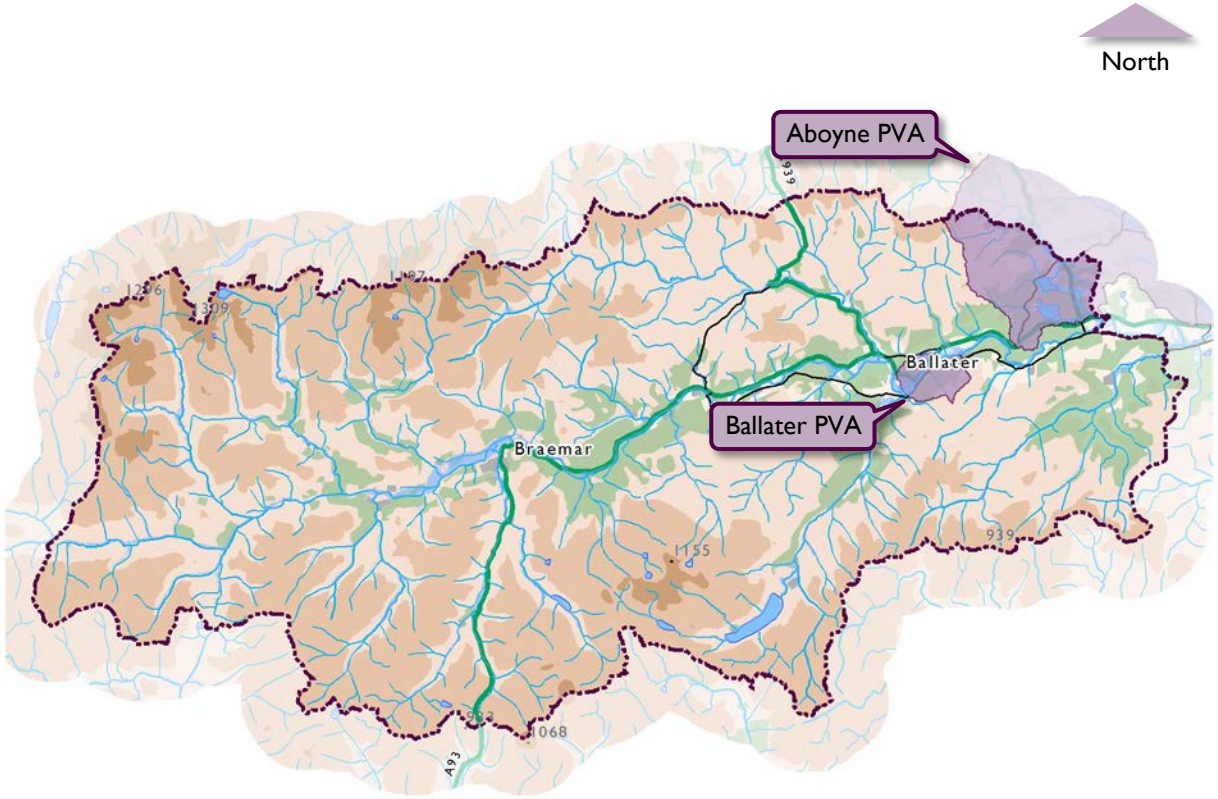

Figure 35 River Dee PVAs in the River Dee catchment area within the Cairngorms National Park and indicative river flooding extent (medium probability 1 in 200 years).

1829 (the Great Muckle Spate), 1920 and 1956 (the Cairngorm Flood) (Dee Catchment Partnership, 2007). In 2008 surface run-off entered the Netherly Guesthouse in Ballater and in 2014 the town's caravan park and a number of roads were closed due to flooding (Scottish Environment Protection Agency, 2015). More recently, in December 2015 / January 2016, the Dee experienced widespread flooding, which caused significant damage to property and transport infrastructure.

The Dee catchment contains two PVAs that fall within or across the National Park boundary **Figures 36** to **38**), namely:

- Aboyne (PVA 06/20); and
- Ballater (PVA 06/22).

The former is only partly within the boundary, with the majority of the population and the associated risk located outwith. As one of the National Park's main settlements, the PVA around Ballater therefore offers most concern. The estimated average annual cost of damage here is £230,000, 99% of which is associated with river flooding. The majority of estimated damages are due to flooding to non-residential properties (80%), although more significantly, the fire station is located in an area which has a medium likelihood of flooding (Scottish Environment Protection Agency, 2015).

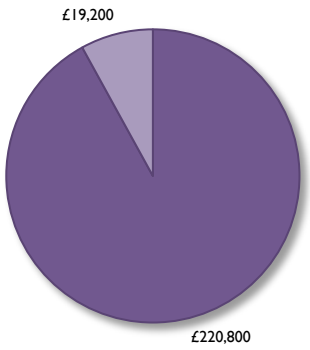

Figure 36 Annual average damages in Aboyne PVA (PVA 06/20).

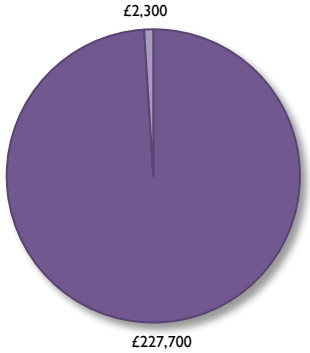

Figure 37 Annual average damages in Ballater PVA (PVA 06/22).

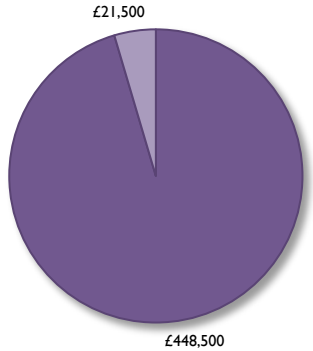

Figure 38 Annual average damages of all National Park PVAs in Dee Catchment area.

River flooding Surface water flooding

(Source: Scottish Environment Protection Agency, 2015).

River Don

Rising in the in the peat flat beneath Druim na Feithe, and in the shadow of Glen Avon, the River Don flows 135km east to the sea in Aberdeen. It's Scotland's 6th largest river, draining a catchment of around 1,300km^2.

The Don catchment contains one PVA that falls across the National Park boundary, namely Heugh-Head (PVA 06/14) (**Figure 40**). There was a surface water flood in August 2006 affecting Strathdon, Waterside and Bellabeg when water ponded in low points of the road, with heavy rainfall and steep sloping fields to the south resulting in significant amounts of flood water. Most of the PVA's estimated annual average damages, which equate to £95,000, are associated with river flooding (92%) (**Figure 39**). These damages mostly affect residential properties (60%) (Scottish Environment Protection Agency, 2015).

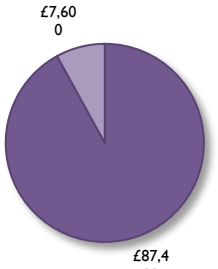

Figure 39 Annual average damages in Heugh-head PVA (PVA 06/14).

Figure 40 Heugh-Head PVA (PVA 06/14) and indicative river flooding extent (medium probability 1 in 200 years) in the River Don catchment area within the Cairngorms National Park.

The River Tay has the largest catchment area and is the longest river in Scotland, with many of its headwaters lying within the Cairngorms National Park (**Figure 42**). It covers an area of 5,088km^2 and is around 190km in length. More water flows through the River Tay than any other river in the United Kingdom. The main tributaries include the River Garry, River Tummel, River Lyon, River Braan, River Isla and River Almond. The largest lochs in the River Tay catchment include Loch Ericht, Loch Rannoch and Loch Tay (Scottish Environmental Protection Agency, 2015).

The Tay catchment contains one PVA that falls across the National Park boundary, namely Blair Atholl (PVA 08/01). A number of river floods have been recorded in this area. These include:

- 13 June 1931: Evacuation was required as River Garry flooded near Blair Atholl, the railway was also affected.
- July 1916: Evacuation was required as River Garry flooded near Blair Atholl, the railway was also flooded.

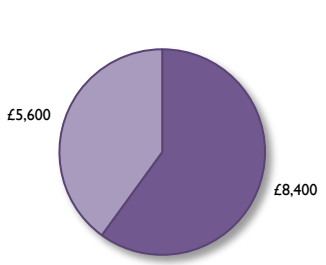

Figure 41 Annual average damages in Blair Atholl PVA (PVA 08/01).

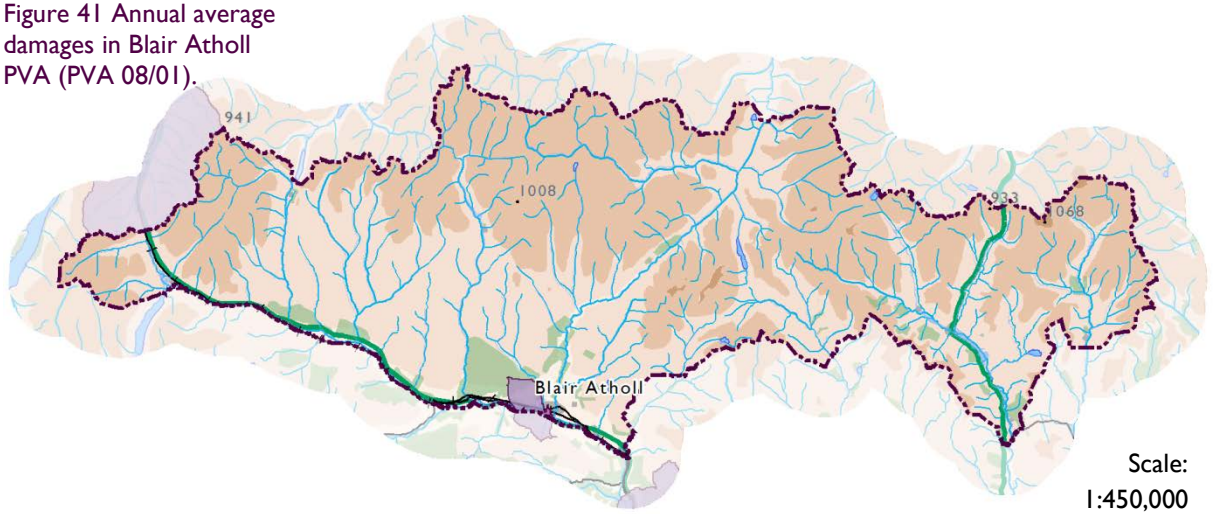

Figure 42 River Tay PVAs in the River Tay catchment area within the Cairngorms National Park and indicative river flooding extent (medium probability 1 in 200 years).

Blair Atholl continues to be at risk of flooding from the Garry Burn and from surface water. The risk of flooding to people, property, as well as to community facilities, utilities, the transport network, designated sites and agricultural land is presented in **Figure 41**.

Currently there is relatively low confidence in SEPA's river flood hazard maps due to limitations arising from the data used and techniques applied in the national modelling. The number of properties at risk of flooding in the Blair Atholl area is likely to be underestimated (Scottish Environmental Protection Agency, 2015).

Key Messages

Water quality within the National Park is relatively high, however, monitoring indicates that recent years have seen an increase in the proportion of water bodies falling out of the high classification for overall status and water quality. The situation was particularly poor in 2013, which saw a large increase in the number of waterbodies falling into lower classifications.

AMAX data from the Spey and Dee indicates a general trend for higher annual maximum instantaneous peak flows over the time they were monitored, indicating an increase in floodrisk in these catchments.

There is not enough capacity in the water and sewage treatment works that serve the National Park to meet the projected level of housing growth for the Plan period.

There are nine Potentially Vulnerable Areas (PVAs) within the National Park. The estimated total average annual cost of damage in these areas is £1,071,000.

Inter-relationships with other topics

- Topic 1: Climatic Factors 61
- Topic 2: Air 70
- Topic 4: Soil 102
- Topic 6: Biodiversity, Fauna and Flora 121
- Topic 7: Landscape and Cultural Heritage 193
- Topic 8: Population and Human Health 222