



*The Burning Issue: a briefing paper on  
fire and the natural heritage*



*Peter Cosgrove  
Countryside Officer, Natural Resources Group*

*July 2004*

# **The Burning Issue: a briefing paper on fire and the natural heritage**

## **Summary**

Fire has played, and continues to play an important role in the ecology of the Cairngorms National Park. Along with grazing, geology and climate, fire is a dominant force shaping the vegetation and landscape of the Cairngorms today.

Fire in the countryside is usually considered from two perspectives: wildfire and controlled burning. Many local stakeholders believe that the danger posed by wildfire to a variety of interests in the Cairngorms has increased recently and is set to rise in the future. There has also been an increase in interest in the role of, and best practice research into, controlled burning as a management tool within the Park.

Coincidentally, these issues have arisen at the same time as significant changes to the organisation and role of local Fire Services, leading to uncertainty surrounding the future of fire control across the Park.

This briefing paper draws together information on fire, its control and management and the natural heritage in the Cairngorms in 2004.

**Peter Cosgrove**

**Countryside Officer, Natural Resources Group**

**July 2004**

# The Burning Issue: a briefing paper on fire and the natural heritage

## Introduction

1. Fire is a chemical reaction that requires fuel, oxygen and heat (an ignition source). It plays an important role in the ecology of the Cairngorms and whilst it can be damaging to natural heritage interests, it can also be beneficial, creating new environments for a wide range of species that require open habitats or habitats in the early stages of succession. Charcoal records in peat and loch sediments show that fire has been part of the Scottish upland landscape for thousands of years<sup>1</sup>. Along with grazing, geology and climate, fire continues to be a dominant force shaping vegetation and landscapes in the Cairngorms.
2. This briefing paper draws together information on fire, its control and management and the natural heritage in the Park in 2004.

## Background

3. Land managers and stakeholders in the Park usually consider fire in the countryside from two perspectives:
  - (i) **Wildfire.** This is an unplanned or/and dangerous fire. Wildfires occur frequently and can damage important natural heritage features if not quickly brought under control. During 2003, many damaging wildfires occurred in and around the Cairngorms National Park<sup>2</sup>. Large areas of grassland, moorland, forest and nature conservation land were destroyed, along with property and other assets (e.g. Appendix 1).
  - (ii) **Controlled burning.** This is the planned use of fire within a defined area for a particular management purpose. This management tool is used widely throughout the Park, predominantly in moorland areas for sporting purposes, but also for upland farming, forestry/woodland management and nature conservation. Wildfire can quickly develop from controlled burning if circumstances allow.
4. There is widespread acceptance from stakeholders within the Park that the danger of wildfire has increased recently and that this is likely to increase in the future. At the same time, concern has been expressed about the use of fire as a management tool because of its impact on some habitats/species. Coincidentally, significant changes to the organisation of Fire Services are proposed and this has led to uncertainty surrounding the future of fire control across the Park.

## The threat from wildfires

5. The threat from wildfire comes in a variety of forms. There is a direct threat to human lives, livelihoods and assets for those who become caught in a wildfire. Natural and cultural heritage features such as designated sites,

---

<sup>1</sup> JNCC (2004). Looking to the Hills: new thinking on fire ecology.

<sup>2</sup> North Grampian, South Grampian, Badenoch and Strathspey Rural Fire Protection Group Minutes.

species, habitats, archaeological remains and valued landscapes can also be threatened by wildfire.

6. Due to the variety of uses and causes, there are complex legal aspects to fire that stakeholders must consider and adhere to, with at least 11 separate pieces of relevant legislation (Appendix 2). Examples of bad practice and illegal burning within the Park, e.g. burning up to public roads, suggest that the legal aspects to fire are often not fully understood and serious financial (and legal) consequences can occur for those who ignore or do not understand the legal issues surrounding fire.
7. Fire protection methods seek to prevent dangerous fires by reducing the threat and limiting the size of a fire when one starts. The danger from a fire is a combination of *fire risk* (the likelihood of a fire starting and its consequences) with *fire hazard* (the susceptibility of vegetation to burn). Fire danger may increase with<sup>3</sup>:
  - Visitors, especially children, day trippers and other holiday makers who may not be familiar with the risk of starting a fire in the countryside;
  - Land management practices e.g. moorland or grassland burning;
  - Vegetation condition, its flammability and fuel load;
  - Climate and weather, especially wind force and relative humidity.
8. Many leading authorities on wildfire and controlled burning live and work in the Park, providing a valuable local source of advice and experience.

### **What causes wildfires in the Park?**

9. Formal monitoring of wildfires across the Cairngorms is patchy, with only large fires and 'call-outs' usually recorded. The attending Fire Service tries to determine the cause of each fire with the evidence available, but this is not always possible. Consequently, the reason for a fire starting is known as the '*supposed cause*'. There has been no formal analysis of the supposed cause of wildfires in the Cairngorms, but recently the causes of wildfires have been recorded on an annual basis across areas in the Park by local Rural Fire Protection Groups.
10. For example, the supposed cause of 13 out of 14 (93%) wildfires tackled in Badenoch and Strathspey in 2003 was human action. 29% were started by muirburn activities that got out of control, destroying c1135ha of habitat. The supposed cause of an additional 29% of fires was by discarded cigarettes and camp/bonfires destroying c433ha of habitat (Appendix 1).
11. Malicious or wilful fire raising has not been a big a problem in the Cairngorms as it has in other areas<sup>4</sup>. If such incidences occur in the future, lessons can be learned from other Fire Services, where preventative work with particular elements in the community has achieved a large reduction in malicious fires.

### **Current arrangements for wildfire control**

12. Fire Service personnel in attendance at a fire are the Statutory Authority and are in charge of the incident. The Fire Service is currently under Government

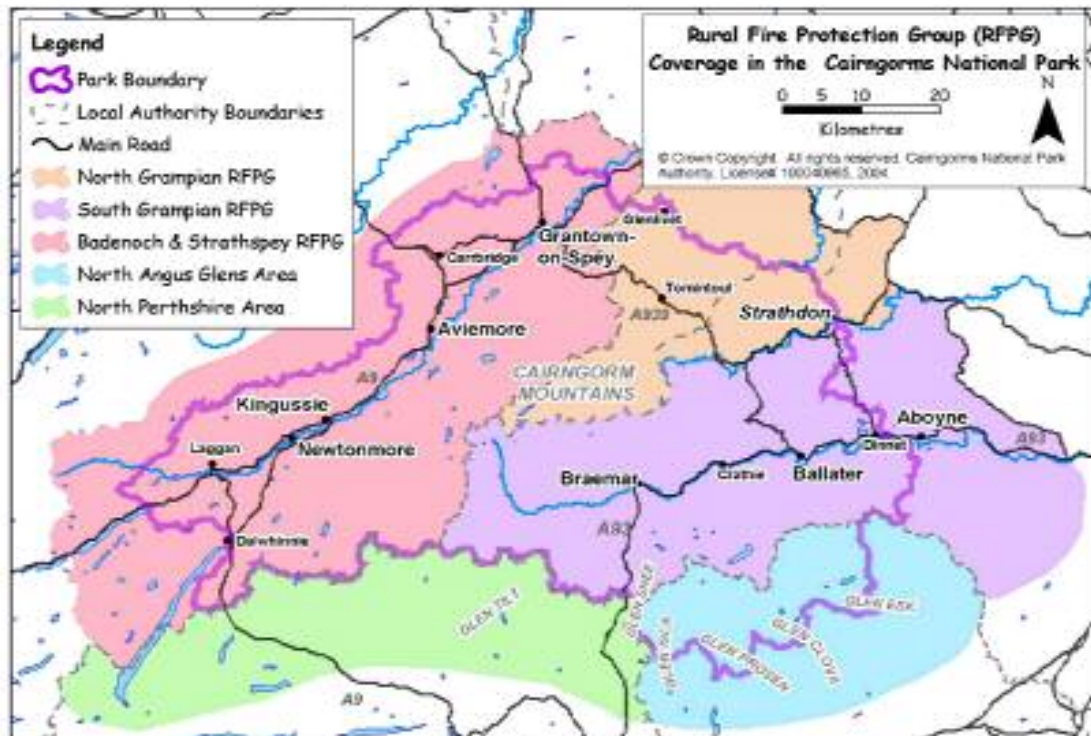
---

<sup>3</sup> Michael Bruce (2003), A Wildfire Strategy for Scotland: do we need one?

<sup>4</sup> North Grampian, South Grampian, Badenoch and Strathspey Rural Fire Protection Group Minutes.

review as part of reform and modernisation of the terms under which they operate. The review aims to make the Fire Service more responsive to locally identified needs and better able to deliver community safety through a process called Integrated Risk Management Planning (IRMP).

13. Currently, the aims of the Park are not a priority for the Fire Service, but '*safeguarding the environment and heritage (both built and natural)*' is one of the aims of IRMP<sup>5</sup>. A shift in the power and resources from national to local fire authorities is taking place as a result of the national review and IRMP, potentially allowing locally identified priorities, such as natural and cultural heritage interests, to be considered for the first time.
14. In March 2004, Audit Scotland reviewed progress on modernising the Scottish Fire Service<sup>6</sup>. Whilst it found some progress had been made towards modernisation, little or none had been made in developing IRMP by most fire authorities including Grampian and Highlands and Islands. Further review is taking place and Audit Scotland will report again after summer 2004.
15. The local Fire Services have maintained close links with land managers in an attempt to reduce the number of wildfires, and more effectively conduct fire-fighting operations. To progress this, the Fire Brigade set up a voluntary initiative at which persons involved with land management could discuss and become involved in all issues relating to fire in their area. This initiative has resulted in the formation of three Rural Fire Protection Groups (RFPGs) who cover most of the Park and adjacent areas, but not the Angus glens and highland Perthshire (where there is no RFPG coverage).



<sup>5</sup> Sir Graham Meldrum (2003), HM Chief Inspector of Fire Services. Fire Service Circular 7/2003.

<sup>6</sup> Audit Scotland (2004), The Scottish Fire Services: verification of the progress of modernisation.

16. Rural Fire Protection Groups identify and co-ordinate local activity on a range of mutually important issues (Appendix 3). Each group is composed of interested locals including landowners, independent factors, Forestry Commission and estate staff and Fire Service personnel. The group maintains an up to date list of equipment, members' contact details and circulates information on a variety of topics including, when available, best practice guidance and training events. In the event of a call-out, members and equipment systematically respond to a fire on the group's behalf.

### **Preventing wildfires in the Park**

17. The role of local RFBGs is seen as pivotal in helping the Fire Service tackle wildfires and preventing them from spreading in the Park. However, there is little co-ordination from any organisation on awareness raising with land managers, the general public and visitors in particular. The Fire Service review has identified that much more needs to be done at the local level on fire prevention<sup>7</sup>.
18. Recent management of many woodland and moorland areas in the Cairngorms has reduced controlled burning activities resulting in a build up of high fuel loads. Furthermore, the on-going expansion in native woodlands has also built up combustible materials across the Park in areas often popular as visitor destinations.
19. The Cairngorms Marketing Strategy<sup>8</sup> aims to increase the number of people visiting the Cairngorms National Park. This deliberate promotion of more visitors coupled with the new access legislation is likely to result in a rise in the number of people visiting countryside areas within the Park in the future.
20. The likely rise in visitors and increases in combustible materials has coincided with a detectable change in climate, with drier winter/spring/summer seasons becoming more common along with less snow cover, which often provides the source of water in the burns during the drier months and a bulwark against wildfire spreading from muirburn<sup>9</sup>.
21. Effective fire prevention is more complicated than simply putting up dramatic fire warning signs. Research from the University of Layden (Netherlands) has shown that fire prevention is about dealing with people's psychology as well as interpretation and the provision of information<sup>10</sup>. Seasonal information targeted at different stakeholders in different areas is necessary.

### **The use of controlled burning in the Park**

22. Fire has been used for improving pasture in the Cairngorms for centuries, and the systematic burning of heather for grouse shooting, known as 'muirburn', has been an important part of moorland management for at least 150 years. The greatest use of controlled burning for management practices in the Cairngorms is through muirburn. 41% of the Park is upland heath and private landowners actively manage much of this with muirburn for sporting interests.

---

<sup>7</sup> Sir Graham Meldrum (2003), HM Chief Inspector of Fire Services. Fire Service Circular 7/2003.

<sup>8</sup> Cairngorms Marketing Strategy, CNPA Board Paper, 04/06/04.

<sup>9</sup> Matt Davies (2004) Research and tools for managing changes in fire regimes, GCT.

<sup>10</sup> Eric Baird (2004) *pers. comm.*

23. In recent years there has been an upsurge in interest in controlled burning within Cairngorms woodlands and practical research into it.

### **Best practice and guidance in controlled burning**

24. During discussions on this briefing paper, several local stakeholders highlighted problems with the uptake of what little best practice guidance is available, the nature and scope of the advice currently available, who is responsible for promoting it and the need for appropriate co-ordinated training and support mechanisms. Such best practice guidance or training in controlled burning should not just target land managers and local RFPGs members, but also Fire Service personnel who often have little or no training in tackling rural countryside fires.
25. Despite centuries of controlled burning (and incidents of wildfire), little research has been carried out in this country into understanding the environmental and fuel properties that determine the characteristics of fire, the impacts of different types of fire on different ecosystems or the dynamics of fire itself. As a consequence, there is often a lack of understanding to inform the development of best practice guidance.
26. In particular, very little research has focussed on controlled burning in non-moorland habitats and so best practice guidance is presently lacking for many habitats. To combat this lack of guidance, some fire related research has been recently undertaken by partners in different habitats in the Cairngorms (Appendix 4). Although, due to the nature of fire and its varying uses, no one organisation has taken the lead in developing best practice and guidance for controlled burning and natural heritage.
27. *The Muirburn code* and its supplement *Prescribed Burning on Moorland* published by Scottish Executive Environment and Rural Affairs Department in 2000 give advice and guidance on voluntary best practice for muirburn practitioners. The National Moorland Forum is currently undertaking a periodic review of muirburn guidance and legislation in Scotland (due out in 2004), and has commissioned the British Trust for Ornithology to report on nesting seasons of upland birds over the past 30 years, to see if any species might be adversely affected by the current muirburn season.
28. The National Moorland Forum has developed a Moorland Scenario model, to help land managers predict the changes in vegetation dynamics and land use patterns under different Common Agriculture Policy (CAP) and climate change scenarios<sup>11</sup>. Although CAP reform is not fully decided, changes that may occur include decreased stock in the uplands, with consequent changes to vegetation communities and an increase in combustible materials over large areas. This tool may provide Cairngorms land managers with useful guidance on where and when controlled burning activities should be undertaken in the future.

### **Controlled burning – does it have a future?**

29. Whilst not at the forefront of local discussions, at a national level the logic behind controlled burning for sporting purposes is beginning to be questioned by various interest groups with regard to a range of issues including

---

<sup>11</sup> JNCC (2004). Looking to the Hills: Scotland's Moorland Forum - progress

biodiversity, the impact on soil, hydrology, CO<sub>2</sub> emissions and climate change<sup>12</sup>. In the early 1980s stubble burning was banned across the UK (largely for Health and Safety reasons), so there is a precedent for landscape scale changes to controlled burning practices.

### **Our role**

30. The CNPA plays little direct role in fire management in the Park at present. However, there are four areas where our current work indirectly relates to fire management: (1) provide secretariat for the Badenoch and Strathspey Rural Fire Protection Group, who provide essential co-ordination on fire-fighting; (2) support and run the Land-based Business Training Programme, who provide training to estates e.g. fire safety and helicopter training; (3) the Cairngorms Moorland Project, which provides best practice demonstrations of controlled muirburn; and (4) as the access authority, the CNPA have a statutory duty to promote the Access Code, and we will be working closely with SNH and other partners to promote responsible access and use of the countryside in the Cairngorms.
31. In the future, the CNPA could work together with our partners to enable them to:
- Reduce and, where possible, prevent damaging wildfires from occurring in the first place;
  - At a strategic level, help partners effectively tackle wildfire;
  - Promote best practice controlled burning.

### **What next?**

32. In the future, the CNPA will need to consider how it should work together with our partners on fire, its control and management and the natural heritage. However, this is not considered here and it will be addressed in a paper to the Board at a later date.

**Peter Cosgrove**  
**July 2004**

[petercosgrove@cairngorms.co.uk](mailto:petercosgrove@cairngorms.co.uk)

---

<sup>12</sup> Eric Baird (2004), *pers. comm.*



## Appendix 1. Wildfire incidents reported in Badenoch and Strathspey in 2003.

Source: Badenoch and Strathspey Fire Protection Group

Note, where possible, the Fire Service tries to determine the cause of each fire, but this is not always possible. Consequently, the reason for the fire starting is called the '*supposed cause*'.

<b>Date</b>	<b>Location</b>	<b>Details</b>
17/02/03	Lochindorb Estate, Muchrack Estate	Out of control muirburn. <b>1,052ha of heathland destroyed</b> 40 fire-fighters in attendance
19/02/03	Model aircraft strip, Pityoulish, Rothiemurchus Estate	Discarded cigarette <b>c21 ha of scrub &amp; woodland destroyed</b> 49 fire-fighters + estate staff in attendance
19/02/03	Pityoulish, Rothiemurchus	Flare up due to heat & winds <b>c1.6ha of heathland damaged</b> 15 fire-fighters + estate staff in attendance
14/02/03	Skye of Curr, Dulnain Bridge	Out of control muirburn <b>c0.5ha of grassland destroyed</b> 9 fire-fighters in attendance
24/03/03	Dalnavert, Kinraig Forest	Out of control bonfire <b>c8ha of woodland destroyed</b> 10 fire-fighters in attendance
30/03/03	Broomhill, Strathspey Railway	Sparks from train <b>c15ha of grassland destroyed</b> 15 fire-fighters in attendance
30/03/03	Catha Mor, Dalwhinnie	Ignited by emergency flares <b>c240ha of heathland destroyed</b> 25 fire-fighters + estate staff in attendance
30/03/03	Railway yard, Strathspey Railway	Sparks from train <b>Small area of grassland destroyed</b> 10 fire-fighters in attendance
08/04/03	Loch Laggan area, Ardverikie Estate	Camp fire <b>c324ha of heathland destroyed</b> 30 fire-fighters + estate staff in attendance
10/04/03	Tomachrochar Road, Nethy Bridge	Out of control muirburn <b>c80ha of grassland destroyed</b> 12 fire-fighters in attendance
13/04/03	Strathspey Railway, Aviemore	Sparks from train <b>c100ha of heathland destroyed</b> 10 fire-fighters in attendance
15/04/03	Old A9, Ralia Estate, Newtonmore/Dalwhinnie	Discarded cigarette <b>c80ha of heathland destroyed</b> 48 fire-fighters + 30 estate staff in attendance
15/04/03	Tullochroam, Ardverikie Estate	Started deliberately, persons unknown <b>Two large woodland areas threatened</b> 6 fire-fighters + estate staff in attendance
17/04/03	Street of Kincardine, Boat of Garten	Out of control muirburn <b>c3ha of grass, scrub &amp; woodland destroyed</b> 22 fire-fighters + estate staff in attendance

## Appendix 2. Wildfire/controlled burning relevant legislation

- Hill Farming Act 1946
- The Wildlife and Countryside Act 1981
- The EC Habitats Directive 1992
- The EC Wild Birds Directive 1979
- The Forestry Act 1967
- The Roads (Scotland) Act 1984
- The Clean Air Act 1993
- The Health & Safety at Work Act 1974
- The Fire Services Act 1947
- Ancient Monuments and Archaeological Areas Act 1997
- Management of Health and Safety at Work Regulations 1999

## Appendix 3. Rural Fire Protection Group tasks and responsibilities

<b>Land managers/ Group members</b>	<b>Fire Service (Brigade)</b>
Common Standard Operating Procedures	Common Standard Operating Procedures
Fire Map	Liaison/communication
Fire Plan	Command and control structure
Up to date specialist labour (contacts) and equipment lists	Labour and equipment
Access routes and 4WD transport	Health and Safety
Insurance: helicopters and private sector fire fighting costs	Training
Logistical support, food and water	
Health and Safety	
Training	

**Appendix 4. Examples of local partner research and practical management on fire and the natural heritage in the Cairngorms.**

<b>Local partner</b>	<b>Fire research and practical management</b>
<b>Michael Bruce and Glen Tanar Estate</b>	<ul style="list-style-type: none"> <li>• Large scale, 2 year controlled burning project with understory vegetation in the NATURA Pine woodland has just been completed as part of the Capercaillie LIFE Project.</li> <li>• The project included innovative interpretation work, explaining why fire was being used for management purposes within the NATURA woodland, as visitors heavily used the site<sup>13</sup>.</li> </ul>
<b>The Macaulay Institute</b>	<ul style="list-style-type: none"> <li>• Research project '<i>Investigating anthropogenic impacts on montane heathlands</i>'. This work studied the '<i>Interactive effects of nitrogen deposition, fire and grazing on species composition and on water chemistry</i>'. Work began in 1999 and will continue through to 2007<sup>14</sup>.</li> </ul>
<b>RSPB</b>	<ul style="list-style-type: none"> <li>• Research investigating fire as a conservation management tool on its Cairngorms reserves. At Abernethy, they have experimentally burned c40 patches of vegetation in woodland and heathland in the last 2 years and more research on fire and the natural heritage is planned. In particular, the RSPB is interested in patch size/scale effects for biodiversity and is monitoring many different variables such as fire temperatures, fuel loads etc. The RSPB uses controlled burning on their Cairngorms reserves for 3 main purposes<sup>15</sup>:             <ol style="list-style-type: none"> <li>i. Grouse moor management. The RSPB uses controlled burning on a much smaller scale than traditional muirburn because what little evidence there is suggests that smaller sized burn patches are much better for biodiversity than larger ones. The research work aims to test and quantify any biodiversity benefits from small patch burning.</li> <li>ii. Promoting blaeberry understory within woodlands for Capercaillie.</li> <li>iii. Reducing vegetation cover for regenerating trees at the woodland edge. The purpose of this management is to provide an open rich seed bed for natural regeneration to take off from. Currently, rank heather understory dominates significant areas of woodland and this out competes tree seedlings and other species. A secondary consideration is the reduction of high fuel loads in some habitats.</li> </ol> </li> </ul>
<b>The Game Conservancy Trust, SNH and University of Edinburgh</b>	<ul style="list-style-type: none"> <li>• Collaborative project investigating fire behaviour and factors controlling its impact on ecosystem function. This work looks at predictive systems and fire models to help land managers consider fire risk management as part of integrated and responsible management.<sup>16</sup></li> <li>• Game Conservancy Limited has also developed a training package, including controlled burning demonstration, aimed at moorland gamekeepers. This new training event is being hosted by Dalhousie Estates in the Angus Glens<sup>17</sup>.</li> </ul>
<b>The Cairngorms Moorland Project</b>	<ul style="list-style-type: none"> <li>• The Cairngorms Moorland Project has two demonstration moors that are being managed experimentally to look at burning/grazing interactions and the consequences for grouse and wider biodiversity considerations. This project is underway and the results are not expected for some time.</li> </ul>
<b>SNH</b>	<ul style="list-style-type: none"> <li>• On-going research work into the effects of fire on <i>Arctostaphylos</i> heath and other upland heath habitats.</li> </ul>

<sup>13</sup> Eric Baird, Glen Tanar Estate (2004) *pers. comm.*

<sup>14</sup> The Macaulay Institute (no date). Investigating anthropogenic impacts on Montane heathlands. Andrea Britton, Julia Fisher, Rachael Halliwell and Shelia Gibbs.

<sup>15</sup> Desmond Dugan, (2003) Field layer management trials at Abernethy Forest Reserve: an update; Mark Hancock (in press) Experimental burning, cutting and cattle grazing in a Scottish native pinewood important for Western Capercaillie (*Tetrao urogallus*).

<sup>16</sup> Matt Davies, Angus MacDonald, Colin Legg and Adam Smith (2004) Research and tools for managing changes in fire regimes.

<sup>17</sup> SLF (2004). Landowning in Scotland.