

THE MUIRBURN CODE



SCOTTISH EXECUTIVE

Making it work together

THE MUIRBURN CODE

Fire - a powerful but potentially dangerous tool

Fire has been part of upland environments for many thousands of years. It occurs naturally as a result of lightning strikes and it is probably also one of the most useful, and oldest, land management tools. However, it is a powerful tool, which needs to be used with skill and understanding if it is not to do more harm than good.

The first step towards the wise use of fire is to identify the constraints that apply. This is the primary purpose of this code. The law provides statutory restrictions that *must* be followed, and these are described. In some circumstances, burning also may be unsafe, damaging, or a waste of time and resources. Following the additional recommendations of the code will greatly reduce risks to those carrying out the burning and to the general public, and will decrease the risk of damage to agricultural, forestry, game, wildlife diversity (biodiversity), landscape, and archaeological assets.



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This code does *not* provide all the information you need in order to carry out burning safely and effectively. If you require more detailed guidance please refer to the Supplement to the Muirburn Code: A Guide to Best Practice. Training in understanding fire behaviour, modern safety requirements, and new techniques for the control of fire is strongly recommended even for those with some experience. Sources of further information, and of training, are listed at the end.

The Law - statutory restrictions

The principal legislation governing muirburn is the Hill Farming Act 1946. The legislation covers the burning of all vegetation on moorland, including plants such as gorse. It does not refer just to the burning of heather. Parts of the Wildlife & Countryside Act 1981, the Roads (Scotland) Act 1984, the Clean Air Act 1993, the Health & Safety at Work Act 1974, and the Fire Services Act 1947, among others, may also apply. Negligence in carrying out muirburn could result in liability to civil damages.

In Scotland, below 450 m (1500 feet) above sea level, muirburn is **permitted only between the 1st October and 15th April inclusive**. This may be extended to 30th April on the authority of the proprietor or of the Scottish Executive Environment and Rural Affairs Department (SEERAD). Above 450 m (1500 feet), the muirburn season is 1st October to 30th April, extendable as above to 15th May. Generally, SEERAD does not encourage burning after the 15th April (or 30th April above 450 m). The proprietor does not require the permission of SEERAD for the extension periods. Unlike in England and Wales, there are no provisions for extensions before or after these dates by either the proprietor or the Scottish Executive.

All of the following actions are **offences**, which could result in prosecution.

- **Burning outwith the statutory burning season** [Hill Farming Act 1946, s23].
- **Burning at night, between 1 hour after sunset and 1 hour before sunrise** [Hill Farming Act 1946, s25].
- **Leaving a fire unattended** [Hill Farming Act 1946, s25].
- **Being unable to control a fire or having not made provision for its proper control** [Hill Farming Act 1946, s25].
- **Causing damage to *any* woodland** [Hill Farming Act 1946, s25].
- **Causing damage to neighbours' property** [Hill Farming Act 1946, s25].
- **Causing damage to a scheduled ancient monument** [Ancient Monuments and Archaeological Areas Act 1979, s2(2)a].

- **Carrying out burning on a Site of Special Scientific Interest, without consent from Scottish Natural Heritage, if burning has been notified as a ‘potentially damaging operation’** [Wildlife and Countryside Act 1981, Part II, s28].
- **Omitting to give the landlord and adjoining proprietors at least 24 hours written notice of the date, place and extent of intended muirburn** [Hill Farming Act 1946, s24 and s25].
- **Lighting a fire, or allowing a fire to spread, within 30 m of a road so as to damage the road or endanger traffic on it, without lawful authority or reasonable excuse** [Roads (Scotland) Act 1984, s100(c)].
- **Creating smoke that is a nuisance to inhabitants of the neighbourhood** [Clean Air Act 1993, s17, refers to an offence under the Public Health (Scotland) Act 1897].
- **Endangering anyone’s health or safety, including members of the public** [Health and Safety at Work etc. Act 1974, s2 and s3, Management of Health and Safety At Work Regulations 1999 S.I. 3242].

A tenant has the right to carry out muirburn “for the purpose of conserving or improving” the land, but if the lease includes provisions relating to muirburn the tenant must give the landlord at least 28 days written notice. If the landlord is dissatisfied with the proposed muirburn the landlord, or factor, must (a) give notice to the tenant of the grounds for dissatisfaction within 7 days and (b) refer the matter to SEERAD H.Q. for a decision. Representations may be made to SEERAD by either party.

The use of cutting or swiping machinery as a substitute for burning is not subject to the same statutory seasonal limits as muirburn. However, an offence would be committed under Part 1 of the Wildlife & Countryside Act 1981 if cutting or swiping intentionally resulted in the death or injury of wild birds. It should not be used after the 15th April, and throughout the summer months, when ground-nesting birds will be present. The use of cutting machinery on a Site of Special Scientific Interest may also be an offence if the use of vehicles has been identified as a ‘potentially damaging operation’ and a consent for their use has not been given. Other legal obligations relating to the safe use of machinery will apply.

Recommendations

1. Identify situations where burning should not be carried out (“fire-free” areas).

- Sites traditionally used for nesting by legally protected birds of prey.
- Any areas within a ½ mile of nesting golden eagles, after the end of February.
- Woodland, woodland edges and scrub, except where burning is used by trained and experienced staff as part of *woodland* management, to encourage native woodland expansion, or to benefit *woodland* game or wildlife. Moorland fires should not be allowed to spread into established stands of mature trees, even when sparsely stocked, or into recently replanted or naturally regenerating areas of native trees and shrubs (Figs. 1 - 3). You should seek advice from Scottish Natural Heritage before carrying out muirburn near to any area of native oak, tree birches, aspen, Scots pine, willow or juniper.



Fig. 1. An upland birch woodland expanding by natural regeneration. Moorland fires should not be allowed to spread into this sort of situation.

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Fig. 2. Muirburn should not be allowed to spread into regenerating Scots pine on moorland adjacent to Caledonian pinewood.

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Fig. 3. An example of moorland juniper, including regenerating juniper, accompanied here by some Scots pine trees. Moorland fires should be strictly limited in this sort of situation.



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- Blanket bogs and raised bogs on deep peat (more than 0.5 m - about 20 inches - deep), unless heather constitutes more than 75% of the vegetation cover (Figs. 4 - 7).



Fig. 4. Blanket bog should be avoided. Do not burn areas with bog pools and where bog mosses are abundant. In this illustration the bog mosses are the yellow green, ochre and red patches at the edge of the pool.

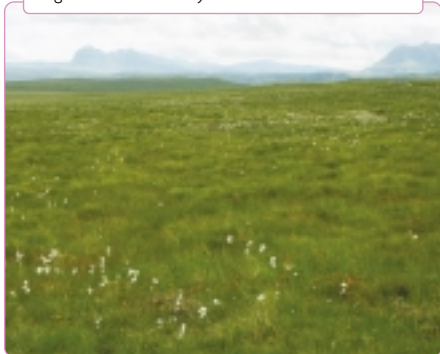
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Fig. 5. Some types of blanket bog are a mixture of heather and cottongrass, particularly at higher altitudes and in the east. Bog pools are not always present and bog mosses are not always very obvious.

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Fig. 6. Blanket bog often has much less heather and appears more "grassy" but cottongrass and bog mosses are usually abundant.



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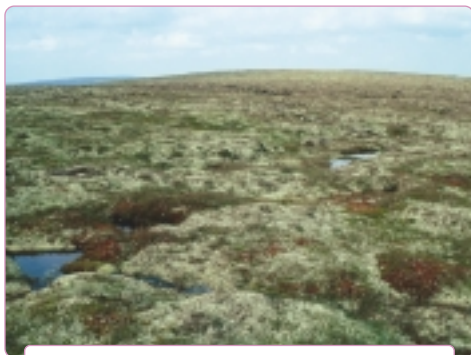
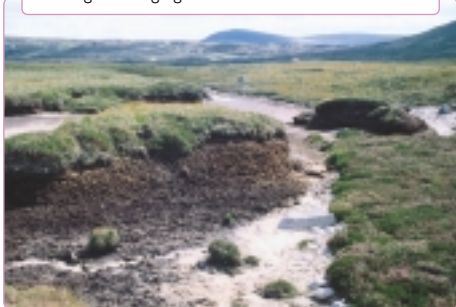


Fig. 7. In some parts of the north-east, blanket bogs can look very different due to the abundance of lichens, but bog mosses are still abundant.

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- Peat hags and other areas with exposed peat (Fig. 8).
- Where the soil is eroding, or if there is less than 5 cm (2 inches) of soil over the underlying rock (Figs. 9 - 10).
- Summits, ridges and other areas which are very exposed to the wind, where the vegetation grows as a more or less prostrate, and sometimes sparse, mat in which the heather perpetuates itself by rooting from creeping stems (Fig. 11). Most likely to occur above 300 m (1000 feet) in the north-west to above 600 m (2000 feet) in the south-east, and in very exposed areas at lower altitudes near to the coast or where the wind is funnelled through a pass.

Fig. 8. Avoid areas of exposed peat. Erosion can be exacerbated. Also, the peat is more likely to ignite, creating a damaging and difficult to control fire.



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Fig. 10. Avoid burning where past erosion has produced thin soils with much exposed bedrock. Burning will exacerbate the loss of soil.

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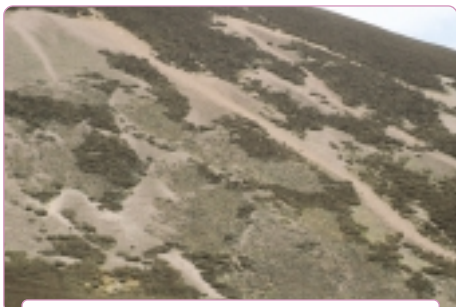


Fig. 9. Avoid burning where the soil is very thin. The soil itself may be consumed by the fire and, even if not, regeneration of the vegetation is often poor in such dry, freely draining, situations.

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Fig. 11. Where the vegetation grows as a short mat, due to wind-exposure, do not burn or allow fires to spread into such areas. The heather often has a paler, slightly greyer, colour compared to heather growing in more sheltered situations.



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- **Steep hillsides and gullies (Fig. 12).** Hillsides with a slope greater than 1 in 3 (18°) are best tackled only by experienced and skilled staff, while slopes steeper than 1 in 2 (26°) are best avoided.
- **Areas where bracken is present, except where there is a commitment to control any bracken spread** into the burnt area should it occur (Fig. 13).
- **Uneven-aged heather where there is already a self-perpetuating, intimate mixture of short and tall heather bushes (Fig. 14).**
- **Tall vegetation at the edge of watercourses, other than where a watercourse is the only practical type of firebreak (Fig. 15).**
- **Any other areas identified as fire-free in management agreements, for example, with Scottish Natural Heritage, or Historic Scotland, or as part of an agri-environment scheme agreement.**



Fig. 12. Fires should not be allowed to spread onto steep slopes or into gullies.

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Fig. 13. Bracken can spread into burnt patches if regeneration of other vegetation is slow or weak.



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Fig. 14. Burning will provide little benefit where there is already an intimate mixture of short and tall heather.

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Fig. 15. Where possible, avoid burning taller vegetation at the edge of watercourses.



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2. Plan where and how to carry our burning well in advance

- Only burn outside fire-free situations and where heather or bell heather is an important or dominant component in the vegetation. Agricultural businesses may be able to claim grant aid for muirburn costs under agri-environment schemes, administered by SEERAD. You can obtain further details from your local SEERAD office.
- Burn only where heather is greater than 20 cm (8 inches) tall, but avoid allowing the heather to become much taller than 30 cm (12 inches) if outside fire-free areas.
- Determine the total amount to be burnt each year according to the rate of growth of the heather.
- Ensure there are sufficient firebreaks (Fig. 16 - 19). Firebreak width should be at least 2½ times the expected flame length.



Fig. 16. An example of a hill track and a green grass strip used as firebreaks. Snow banks, wet flushes, previously burnt patches with little regrowth of vegetation, can also be used.

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Fig. 17. Previously burnt strips can be used as partial or complete firebreaks, depending on the regrowth of vegetation.



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Fig. 18. Cutting or swiping can be used to create firebreaks, though these should not be relied on completely. They should be cut immediately before the fire is lit so that the cut material does not have time to dry out.

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Fig. 19. A swiped firebreak used in conjunction with other methods increases the efficiency of a fire control squad.



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- Consider cutting or swiping as an alternative to burning (Fig. 20 - 21), but only where the ground is not too rocky, wet or inaccessible for safe use, and where the vegetation and soil will not be damaged by the machinery. It is much less hampered by the weather and there is no fire risk to neighbours' property.
- If using swiping to create firebreaks, or as a substitute for burning, **avoid creating squares**. These do not maximise the amount of "edge" between short and tall heather, which is one of the main reasons for burning, and they can be visually offensive and detract from landscape value.
- **Limit the area within your muirburn plan to suit resources** of time, labour, equipment and funds.



Fig. 20. Heather which has been cut rather than burned.

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Fig. 21. The same area as in Fig. 19, showing good regeneration after five years.



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3. Prepare thoroughly, before any burning is undertaken

- **Join your local Rural Fire Protection Group.** These exist in many areas, and provide a formal arrangement for landowners, managers and the fire brigade to co-ordinate their resources and provide mutual assistance if fires escape control.
- **Seek further information or training** if you cannot predict **flame length, fire intensity, rate of spread**, and other aspects of fire behaviour, or are unsure about **fire control techniques**.
- On Sites of Special Scientific Interest, **Scottish Natural Heritage** should be informed. If muirburn is listed as a ‘potentially damaging operation’, you will need to obtain a consent.
- If **archaeological features** are present, you should seek advice from **Historic Scotland**. On scheduled sites, a consent will be required.
- **Produce a written fire plan and copy this to your local fire brigade.**
- Make sure you have an **emergency plan** and will have **back-up help** available, contactable by radio or mobile phone, on the day when burning is to be carried out.
- The Provision and Use of Work Equipment Regulations 1998 (S.I. 2306, Reg. 4 and 5) stipulates that **all equipment should be fit for purpose**. Ensure fire lighting and fire control equipment is the **safest and most effective available**.
- Make sure that there is both **sufficient variety of fire control equipment** (e.g. beaters of various types, high pressure “fogging” sprays, etc.), and **spares**, to cope with changing conditions, breakage or equipment failure (Figs. 22 -26).



Fig. 22. Make sure fire control equipment is ready and in good working order before commencing burning.

Fig. 23. Swiping a firebreak, and laying a temporary foam barrier, immediately before fire lighting, can assist fire control.



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Fig. 24. Make sure there is a sufficient number and variety of beaters, scrapers and other fire control equipment to keep control of the fire even if conditions change.



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Fig. 25. A fire being extinguished as it reaches a swiped firebreak reinforced by a foam barrier.



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Fig. 26. A high pressure water jet can be useful for wetting down vegetation to reinforce a firebreak, and for extinguishing hot spots during fire control.



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- Those carrying out the burning should be trained in the use of the equipment.
- All staff should be trained in safe procedures and should use personal safety equipment (e.g. face visors to BS2092/BSEN166, leather gloves, fire-retardant overalls - Fig. 27).
- Teams carrying out burning should have a first aid kit and at least one of the team should have first aid training.
- Ensure that additional fire suppression assistance will be available when burning vegetation where there is much purple moor-grass (“blow grass” or “flying bent”, Fig. 28). Burning scraps of straw and dead leaves from this grass can be lifted in the updraught from the fire and can start new fires.

Fig. 27. Heat-resistant face visors, leather gloves, and fire-retardant, high visibility, overalls make fire control safer and more comfortable.



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Fig. 28. Burning where there is much purple moor-grass (“blow grass” or “flying bent”) requires particular care, and additional assistance should be on stand-by.

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4. Undertake burning in a safe and professional manner

- **On the morning** of the day of burning, or the previous evening, **inform adjoining proprietors** by telephone of your muirburn plans for the day.
- **On the morning** of the day of burning, **telephone your local fire brigade** and provide details of the location (including Ordnance Survey map grid reference) and extent of intended burning. At the end of the day let them know when all fires have been extinguished.
- **Do not burn if the weather is unsuitable** for safe and controlled burning. Obtain weather forecasts as close to the time of burning as possible.
- **Do not burn when it is too dry**, that is, when the moss and plant litter on the ground surface has completely dried out.
- **Do not burn if the wind is too strong**, that is, wind speeds greater than about 15 miles per hour or 6.7 m/22 feet per second at eye level (a forecast wind speed of Force 4 or greater). When the wind is too strong, taller heather stems thrash about continuously and even the shorter, more sheltered heather stems are in continuous motion.
- **Do not burn if the flames are likely to be longer than 3 m, or about 10 feet (Fig. 29)**. Whether this occurs or not will depend on the combination of fuel load and weather conditions.

Fig. 29. The flames here are about 1.5 -2 m long. Fires with flames longer than about 3 m are dangerous and difficult to control.



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- Do not allow the *width* of individual fires to exceed 50 m, or about 165 feet (Figs. 30 - 31).
- Do not burn uphill on steep slopes (Figs. 31 - 33).
- Do not burn unless you know how, and where, the fire will be extinguished.
- Avoid back-fires, or only use with extreme caution, where there is peat, to reduce the risk of irreversible damage to the vegetation and underlying peat.
- Ensure that workers are supervised so that they do not suffer from heat exhaustion.

Fig. 30. An example of good practice where burnt strips and patches do not exceed 50 m in width.



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Fig. 31. An example of bad practice where burnt patches are much wider than 50 m. Also, fires have been burnt without proper planning or control, without firebreaks, uphill on steep slopes and where there are thin soils.



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Fig. 32. Good practice in steeper ground is to burn across and down the slope. Note how sensitive gullies, and areas of thin soil, have been avoided.

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Fig. 33. A fire burning uphill widens as it progresses. A large, and out of control, uphill fire produces a characteristic burn pattern.



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Further information and training

Formal training.

- Borders College (Thorniedean House, Melrose Road, Galashiels TD1 2AF, Tel 01361 883 738, <http://www.scet.org.uk/educ/online/borders.asp>) which includes moorland management modules in its Gamekeeping and Rural Development residential course.
- Forestry & Arboriculture Safety Training Council (Room 323, 231 Corstorphine Road, Edinburgh EH12 7AT, Tel 0131 314 6193, <http://www.treecare.co.uk/22fores.htm>) for information about forestry vocational qualifications relating to the use and control of fire. These are also relevant to moorland fires.
- Lantra, The Rural Centre, West Mains, Ingliston, Midlothian EH28 8NZ (Tel 0131 472 4131, <http://www.lantra.co.uk>), the national training organisation for land based sectors.
- North Highland College (Ormlie Road, Thurso, Caithness K14 7EE, Tel 01847 896 161, <http://www.uhi.ac.uk/thurso>) which runs a residential Highland Gamekeeping course.
- Scottish Qualifications Authority (Helpdesk 0141 242 2214, Hanover House, 24 Douglas Street, Glasgow G2 7NQ and Ironmills Road, Dalkeith, Midlothian EH22 1LE, <http://www.sqa.org.uk>) for information on Scottish Vocational Qualifications.

Advice, and periodic demonstration days and short courses related to the use of fire.

- Farming & Wildlife Advisory Group, FWAG Scotland, Rural Centre, West Mains, Ingliston, Newbridge, Midlothian EH28 8NZ (Tel 0131 472 4080).
- The Game Conservancy Ltd Advisory Services, Couston, Newtyle, Perthshire PH12 8UT (Tel 01828 650 543).
- The Heather Trust, The Cross, Kippen, Stirlingshire FK8 3DS (Tel 01786 870 808).
- RSPB Scotland, Dunedin House, 25 Ravelston Terrace, Edinburgh EH4 3TP (Tel 0131 311 6500).

- Scottish Agricultural College, SAC Central Office, West Mains Road, Edinburgh (Tel 0131 535 4000, <http://www.sac.ac.uk>).

Rural Fire Protection Groups

Your local fire brigade is the best source for details about your local Rural Fire Protection Group. By late 2000, such groups had been established in North Grampian, South Grampian, Strathspey, Inverness, Lochaber, Skye and Lochalsh, Ross and Cromarty, Caithness and Sutherland, and the Western Isles. As well as being a source of mutual assistance such groups provide for exchange of information and experience and may also provide some training for members.

Publications

- *Prescribed Burning on Moorland. Supplement to The Muirburn Code: A Guide to Best Practice, SEERAD* (2001). Available from SEERAD Publications, Pentland House, 47 Robb's Loan, Edinburgh EH14 1TY (Tel 0131 556 8400)
- *A Manual of Red Grouse and Moorland Management*. P.J. Hudson and D. Newborn (1995). Game Conservancy Trust. Available from Game Conservancy Trust, Fordingbridge, Hampshire SP6 1EF (Tel 01425 652 381).
- *Good Practice for Grouse Moor Management*. The Moorland Working Group. Copies available from Scottish Natural Heritage Publications, Battleby, Redgorton, Perth PE1 3EW (Tel 01738 627921)
- *The Lowland Heath Management Handbook*. C.H. Gimingham (1992). English Nature. Copies available from English Nature Publications, Northminster House, Peterborough PE1 1UA (Tel 01733 455 000).
- *Introduction to Wildland Fire*. S.J. Pyne, P.L. Andrews and R.D. Laven (1996). 2nd edition. John Wiley & Sons Inc., New York. Very comprehensively describes fire behaviour, the use of prescribed fire, fire planning, and fire control techniques in North America.
- *A Guide for Prescribed Fire in Southern Forests*. D.D. Wade and J.D. Lunsford (1989). Technical Publication R8-TP11, Forest Service Southern Region, United States Department of Agriculture. USDA Forest Service, Southern Region, 1720 Peachtree Road, NW Atlanta, Georgia 30367-9102. Although dealing with prescribed burning of the understorey vegetation in the pine forests of the south-east USA, this provides a very relevant and concise account of fire

behaviour, and the practicalities of prescribed burning, in a short booklet well illustrated with colour photographs.

- *Australasian Fire Authorities Council Learning Manuals*. These excellent manuals cover a wide of range fire-related issues in a concise and clear way, well illustrated with colour diagrams. There are manuals on *Wildfire Behaviour* (manuals 1.12A, 2.28, 3.23), *Wildfire Suppression* (manuals 1.12B, 2.29, 3.18) and *Prescribed Fire* (manuals 3.17, 4.25). Tasmania TAFE, Learning Media Services, P.O. Box 949, Rosny Park, Tasmania 7018 (Tel 0061 3 62 33 7397). Details about these other manuals can be found at <http://ausfire.com/index.htm>.
- *Prescribed Burning Guidelines in the Northern Great Plains*. K.F. Higgins, A.D. Kruse and J.L. Piehl (1989). U.S. Fish and Wildlife Service, Cooperative Extension Service, South Dakota State University, U.S. Department of Agriculture EC760, Jamestown, North Dakota, USA. This document can be found and downloaded free at <http://www.npwrc.usgs.gov/resources/tools/burning>.
- A six page illustrated guide to the safe use of a drip torch can be found at <http://www.bouldermountainfire.org/training/drip>.
- The Forestry Commission will publish a Technical Note on forest and moorland fire suppression in 2001. Available from Forestry Commission publications, P.O. Box 100, Fareham, Hampshire PO14 2SX (Tel 01329 331345)

The following *SNH Information and Advisory Notes* are relevant to aspects of muirburn and are available, free of charge, from Scottish Natural Heritage Publications, Battleby, Redgorton, Perth PE1 3EW (Tel 01738 627921)

- *Heather layering and its management implications*. No. 35. A.J. MacDonald.
- *Cutting heather as an alternative to muirburn*. No. 56. A.J. MacDonald.
- *Grazing behaviour of large herbivores in the uplands*. No. 47. H. Armstrong.
- *Heather moorland management for Lepidoptera*. No. 78. A.J. MacDonald and K. Haysom.
- The FireBeaters website (<http://www.ed.ac.uk/~ebfr89/firebeat/home.htm>) provides information about fire ecology in the UK. It has links to other

relevant websites, providing access to a large amount of useful information on prescribed burning, wildfire control, techniques and tools, from other parts of the world.

