

**TALLADH-A-BHEITHE ESTATE**  
**MUIRBURN MANAGEMENT REPORT**  
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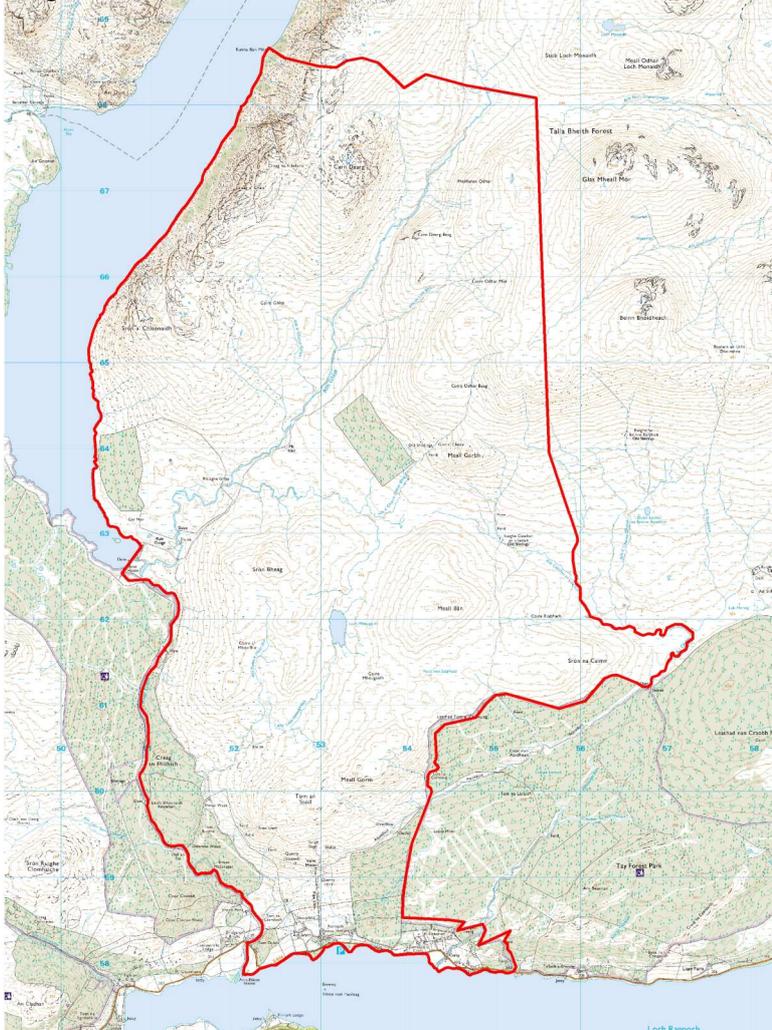
## 1.0 INTRODUCTION

- 1.1 TEP was commissioned by the Talladh-a-Bheithe Estate in February 2011 to prepare a Muirburn Management Report to provide site specific guidance for the Estate Management Team when undertaking muirburn operations.
- 1.2 This Muirburn Management Report has subsequently been prepared to ensure that sensitive habitats and bird and mammal species within the Talladh-a-Bheithe Estate are safe-guarded for the future in a manner that complements the deer management objectives. It is the intention that this Muirburn Management Report provides guidance to fulfil both conservation and stock management objectives, making full use of the habitat and species survey information which is now available.
- 1.3 Much of the muirburn guidance provided in this report is based on existing Scottish Executive publications including the "*Muirburn Code*" (Appendix 1) and the "*Supplement to the Muirburn Code: A Guide to Best Practice*". On-going consultation with Scottish Natural Heritage (SNH) confirms that all muirburn operations at Talladh-a-Bheithe should be undertaken in accordance with the Muirburn Code (Burrow, *pers. comm.*, February 2011).
- 1.4 It is not the intention that this Talladh-a-Bheithe Muirburn Management Report duplicates existing generic guidance concerning muirburn Health and Safety measures. Neither is it the intention that this report explains muirburn techniques to experienced muirburn operators.
- 1.5 Ecological surveys were undertaken between July 2009 and September 2010 which identified features of ecological interest associated with the Talladh-a-Bheithe Estate. These surveys included habitat and vegetation surveys, moorland bird surveys, otter surveys and water vole surveys.

## 2.0 SITE DESCRIPTION

- 2.1 The Talladh-a-Bheithe Estate extends from the far north western end of Loch Rannoch northwards to the Talladh-a-Bheithe forest and the southern end of Loch Ericht. The entrance to the Estate is located at Bridge of Ericht, approximately 30 miles to the west of Pitlochry. The Estate boundary is shown below by the red line in Diagram 1.

*Diagram 1: Talladh-a-Bheithe Estate Site Location Plan.*



- 2.2 The landscape within the estate is characterised by blanket bog and acidic heath vegetation and intermittent coniferous woodland. The site is about 47km<sup>2</sup> and is located partially within the Loch Rannoch and Glen Lyon National Scenic Area (NSA) and the Coire Bhachdaidh Site of Special Scientific Interest (SSSI).

### **Habitat and Vegetation Survey 2010**

- 2.3 The Phase 1 Habitat survey of the Talladh-a-Estate shows that heath and blanket bog communities are prevalent (Appendix 2). On upper slopes, the heath communities are found where the underlying rocks protrude through the blanket of peat, but there are also many small heath patches on hummocks of moraine scattered through the mire vegetation on the lower slopes of the study area. The various heath communities found here fit the Phase 1 Habitat D1 dry dwarf shrub heath found in montane areas, with more than 25% coverage of

- dwarf ericoid shrubs such as: heather (*Calluna vulgaris*) bell heather (*Erica cinerea*), bilberry (*Vaccinium myrtillus*), crowberry (*Empetrum nigrum*) and cowberry, (*Vaccinium vitis-idaea*). The heathland is further distinguished from the mire types by being defined as occurring on peat of less than 0.5m depth.
- 2.4 The very extensive mire habitats represented here are mainly encompassed within the Phase 1 habitat blanket bog category E1.6.1, comprising *Sphagnum*-rich vegetation on deep peat forming a blanket over both concave and convex surfaces on moderately sloping and level areas of upland regions. This category is used for relatively undamaged blanket bog generally with abundant *Sphagna* and a wide range of ericoids, cotton-grasses (*Eriophorum* species) and deergrass (*Trichophorum germanicum*). Whilst human activities have led to a degree of modification over much of the bog habitat at Talladh-a-Bheithe, the majority of it still presents the appearance of semi-natural blanket bog. Only those areas most overtly changed by the combination of drainage, grazing and/or burning have been mapped as either wet modified bog (E1.7) or dry modified bog (E1.8).
- 2.5 Away from the higher areas within the estate, there are some extensive stands of conifer plantation (A.2.2), and smaller areas of mixed plantation (A1.3.2) and birch woodland (A1.1.1). On the lower parts of the estate, in the south and south-west, there are sheep-grazed slopes of acid grassland (B1), and bracken patches (C1).

### 3.0 MUIRBURN GUIDANCE

#### Land Management Objectives

- 3.1 Published guidance identifies four main land management objectives for prescribed burning of moorland, otherwise known as muirburn. These four objectives are:
- To produce a continuous supply of vigorous and nutritious new growth, by removing accumulated dead and woody plant material which makes the vegetation unpalatable and indigestible for grazing animals;
  - To maintain moorland vegetation which is varied in composition and height, allowing greater access by livestock, and which provides increased foraging and nesting opportunities for moorland game and wildlife;
  - To maintain the cover of heather, blaeberry and other characteristic moorland plants, in the long-term, so as to provide year round forage and cover for livestock, moorland game and wildlife, and to maintain internationally renowned moorland landscapes;
  - To reduce the accumulation of potential fuel and so reduce the risk of damaging, high intensity wildfires.
- 3.2 All of these objectives are of importance for the Talladh-a-Bheithe Estate. The majority of the Estate is accessible to a sizeable local red deer population. It is therefore essential to ensure that there is plant regrowth available for the red deer to graze all year around.
- 3.3 Ecology surveys undertaken on the Talladh-a-Bheithe Estate in 2009 and 2010 have confirmed that the estate supports a wide range of moorland nesting bird species. These species include meadow pipit, golden plover and red grouse.
- 3.4 It is important that the moorland vegetation is maintained using muirburn management techniques to ensure that the moorland vegetation has a varied composition and height, providing nesting opportunities for these species. Some of the moorland nesting birds within the estate provide a source of food for important birds of prey including golden eagle and merlin, also known to nest in the locality.
- 3.5 Much of the moorland vegetation within the Talladh-a-Bheithe Estate can be classified as UKBAP priority habitat. Additionally two of the species found within the study area, dwarf birch (*Betula nana*) and interrupted clubmoss (*Lycopodium annotinum*) are nationally scarce in the UK and are UK species of conservation concern, although not UKBAP priorities. These sensitive habitats and species should also be considered when planning muirburn operations.

#### Opportunities and Threats

- 3.6 Burning should be carried out to an approved plan, which includes prior identification of fire-free areas. It is important to have a detailed knowledge of the condition of the vegetation and its distribution across the site prior to identifying fire-free areas. It is also vital to know details of the peat resource over the whole area.

The current condition of the moorland

- 3.7 The bulk of the blanket mire habitat appears to be in a reasonable state with most of the peat resource apparently intact and in a wet and healthy condition. This confirms that past and recent management by muirburn has been carried out at an appropriate scale and frequency; however, it is vital that future muirburn management continues to be carried out safely and appropriately, following the Muirburn Code.
- 3.8 Some evidence of factors associated as causing loss or decline of the sensitive habitats to be found on the Talladh-a-Bheithe Estate were identified during the 2009 and 2010 field surveys. When muirburn is followed by heavy grazing this can result in the loss of heather leading to transition to grassland. It can also cause longterm soil damage, leading to erosion and the formation of bare ground and peat hags. Such features are present in some locations, particularly on the hills in the Northeast of the estate.

Burning heather

- 3.9 During the course of fieldwork very few areas of tall heather were noted, indeed the heathland areas over the exposed tops were often uniformly low with a tight cover of heather. Some taller heather occurs on some wetter areas.
- 3.10 If burning is too frequent this can also result in heather being replaced by mat grass and purple moor grass. Typically heather should be allowed to grow well over 20cm tall before it is ready for muirburn. It can take up to 25 years for regenerating heather to reach a stage where it is ready to be burnt again, depending on the productivity of the moorland and deer grazing intensity.
- 3.11 On wet heaths and blanket bogs, where species like Sphagnum mosses and cross-leaved heather are abundant, the removal of the protective cover of mosses is not desirable and a cool, quick fire is preferable.

The relationship between muirburn and grazing

- 3.12 Muirburn is most beneficial where heather or bell heather is an important or dominant component of the vegetation (unless in fire-free areas). Infrequent burning over large areas is considered most likely to produce moorland vegetation of low value for livestock, game and wildlife.
- 3.13 Poor regeneration of heather following fire encourages the undesirable spread of plants like mat grass and purple moor grass, which have a poor forage quality for deer. These grasses tend to become dominant if grazing is heavy following burning.
- 3.14 Grazing animals concentrate on recently burnt ground, attracted by the new regrowth. It is important to ensure that sufficient total area is burnt to reduce such concentrations since this can lead to loss of heather, low forage productivity and a reduction in plant and animal diversity.
- 3.15 Dwarf birch (*Betula nana*), the nationally scarce small shrub, responds to burning in much the same way as heather although severe burning can destroy the stem base and crown, killing the plant. The main danger to this plant is

excessive deer grazing. Poorly planned muirburn that results in concentration of grazing and burning limited areas may exacerbate these impacts on dwarf birch.

When to burn and risks to breeding birds

3.16 In Scotland, below 450 metres above sea level, muirburn is permitted between 1<sup>st</sup> October and 15<sup>th</sup> April inclusive, which is extendable to 30<sup>th</sup> April subject to authorisation from the proprietor or the Scottish Government. Above 450 metres, muirburn is permitted from 1<sup>st</sup> October to 30<sup>th</sup> April, which is extendable to 15<sup>th</sup> May, although the Scottish Government discourages such extensions.

3.17 It is strongly recommended that no muirburning is undertaken after 15<sup>th</sup> April within areas identified as being of importance for golden plover (Figures 1 and 2). It may also be advisable to consult an ecological specialist or SNH should muirburn be planned to take place after 30<sup>th</sup> April within any part of the estate.

Determining the size of fires

3.18 Many small fires approximately 30 metres or 100 feet wide are better than large fires because they are easier to control, less likely to disrupt deer hefts and they produce a better habitat structure and composition. It is the width of the fire which is key and not the overall area. It is acceptable to increase the width up burnt areas to up to 50 metres wide in the first year of a muirburn programme if muirburn has not been extensively undertaken for some time.

## 4.0 FIRE-FREE ZONES AT TALLADH-A-BHEITHE

### Identifying Fire-free Zones

- 4.1 One of the first steps in planning a muirburn programme should be to identify areas where muirburn would be harmful or an inefficient use of time and resources. These areas are referred to as Fire-free Zones. This section explains the criteria for identifying fire-free zones in the Talladh-a-Bheithe Estate. Fire-free Zones at Talladh-a-Bheithe are illustrated in Figures 1 and 2.
- 4.2 The Muirburn Code (Appendix 1) and other published guidance describe the basic principals for how fire-free zones should be identified.
- 4.3 Identification of Fire-free Zones is also necessary to highlight areas where muirburn could damage the sensitive underlying peat. Muirburn may also be inadvisable in certain locations for Health and Safety reasons, since burns can be very difficult to control in some circumstances.
- 4.4 Fire-free zones will also protect areas of sensitive vegetation, plants, breeding birds, otters and water voles within Talladh-a-Bheithe Estate.
- 4.5 Table 1 (overleaf) identifies the criteria for how fire-free zones have been identified on the Talladh-a-Bheithe Estate. These criteria have been identified and agreed through consultation with the Estate Manager applying the principles of the Muirburn Code (Oliver, *pers. comm.*, January 2011).
- 4.6 It is very important that all criteria are considered holistically when identifying fire-free zones, rather than considering each criteria separately, several criteria may be relevant to a particular area within the estate.
- 4.7 Recent consultation with SNH has confirmed that a management agreement exists for the Coire Bhachdaidh SSSI which is located partially in the west side of the Talladh-a-Bheithe Estate (Figure 1). This management agreement identifies areas within the SSSI where no muirburn operations should be undertaken (Appendix 3).
- 4.8 Figure 1 identifies the fire-free zones at Talladh-a-Bheithe as colour-coded areas to identify the primary reason for that zone's identification. Figure 2 consolidates all Fire-free Zones of Figure 1 to clearly identify the complete extent of the fire-free zones at Talladh-a-Bheithe.

**Table 1: Agreed criteria for identifying fire-free zones at Talladh-a-Bheithe** (based on the Muirburn Code).

Agreed criteria	Type of fire-free zone defined by Muirburn Code	Purpose of fire-free zone
<b>No muirburn to be undertaken within 100 metres of a traditional Schedule 1 bird species nesting site</b> – hen harrier, merlin, peregrine.	1. Sites traditional used by nesting protected birds of prey	Schedule 1 birds are subject to strict protection under the Wildlife and Countryside Act 1981, as amended. The nest sites for these birds are protected whilst they are being used by the adult birds. However it is best practice to protect Schedule 1 bird nest sites at all times of year.
<b>No muirburn to be undertaken within 800 metres of a golden eagle site.</b>	2. Any areas within half a mile of nesting golden eagles.	<p>There is a well established golden eagle nesting site located within the Coire Bhachdaidh SSSI on the west side of the Estate close to Loch Ericht. Golden eagles are usually resident at there breeding sites all year round.</p> <p>Ruddock and Whitfield (2007) concluded that active disturbance occurs typically at an upper limit of 750 to 1000 m from a golden eagle nest site but later implied an upper limit of disturbance at 800 m was more realistic.</p>
<b>No muirburn to be undertaken within 100 metres of any areas of woodland or scrub</b> including regenerating woodland.	3. Woodland, woodland edges and scrub	<p>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. Burning should only be undertaken within forestry plantation sites by appropriately trained and experienced woodland managers.</p> <p>Also many types of native woodland and scrub are scarce and only occur in small, vulnerable stands. The 1992 EC Habitats Directive and the UK Biodiversity Action Plan place obligations on government departments and agencies to promote the conservation of most types of native woodland and scrub. 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.</p>

Agreed criteria	Type of fire-free zone defined by Muirburn Code	Purpose of fire-free zone
<p><b>Inspection required by Estate Manager to determine if Sphagnum mosses and cross-leaved heather <i>Erica tetralix</i> are abundant.</b></p> <p><b>Extreme care should be undertaken when burning within areas of blanket bog or raised bog where Sphagnum mosses or cross-leaved heather <i>Erica tetralix</i> are abundant.</b></p>	<p>4. Blanket bogs and raised bog on deep peat</p>	<p>The presence of Sphagnum mosses and cross-leaved heather are to some extent indicative of deep peat. Surveys undertaken on the Estate in 2009 and 2010 have identified some, but not all, of the locations where these plants are abundant. Therefore areas should be inspected prior to burning to confirm that neither Sphagnum mosses nor cross-leaved heather are abundant.</p> <p>Conditions that permit good control of fires are exacting and infrequent on peat ground: either much material is left unburnt, and heather regeneration is poor, or the effects are too intense and the underlying peat is exposed. In very dry conditions the fire may burn uncontrollably and lead to ignition of the peat. Once the peat ignites it may burn for months and is virtually impossible to put out. A fire that burns into the peat will cause considerable damage, which will be long lasting and could lead to serious peat erosion.</p>
<p><b>No muirburn to be undertaken within 20 metres of areas of severely exposed peat.</b></p>	<p>5. Peat hagsgs and other areas with exposed peat</p>	<p>Burning is likely to exacerbate erosion and there is a much higher risk of ignition of the peat itself.</p>
<p><b>No muirburn to be undertaken within areas where soil erosion is widespread exposing underlying rock.</b></p>	<p>6. Where the soil is eroding, or if there is less than 5cm of soil over underlying rock</p>	<p>Shallow soils are likely to be very dry and burning them may directly consume them, or damage them by removing the protective vegetation cover.</p>

Agreed criteria	Type of fire-free zone defined by Muirburn Code	Purpose of fire-free zone
<p><b>No muirburn to be undertaken within areas where vegetation is noticeably wind-clipped.</b></p> <p>And</p> <p><b>Muirburn in golden plover nesting areas should be undertaken at a reduced scale</b> (66% reduction by area) being careful to avoid wind clipped vegetation.</p>	<p>7. Summits and ridges and other areas that are exposed o the wind</p>	<p>Sometimes the heather is quite upright and up to 20 cm tall (8 inches) but with conspicuously wind-blasted shoot tips. There is nothing to be gained by burning this kind of vegetation, and long-term damage is highly probable, as recovery is extremely slow and there is a high risk of starting soil erosion.</p> <p>These areas are also an important part of the habitat of golden plover, one of the birds listed in Annex 1 of the 1979 EC Wild Birds Directive requiring special measures to protect its habitat. Burning this kind of prostrate heath will reduce habitat suitability for this species.</p>
<p><b>No muirburn to be undertaken within areas with a slope great than 1 in 3 (18 degrees).</b></p>	<p>8. Steep hillsides and gulleys</p>	<p>As a general guide, hillsides with a slope greater than 1 in 3 are best tackled only by experienced and skilled operators, while slopes steeper than 1 in 2 (26 degrees) are best avoided. Especially avoid steep north facing slopes and steep south facing slopes with old dry woody heather. Gullies should be avoided. Since these slopes will often have escaped fire in the past, they are the parts of the landscape that are most likely to provide refuges for species that are sensitive to fire.</p>
<p><b>No muirburn to be undertaken within areas where bracken is abundant.</b></p>	<p>9. Areas where bracken is present</p>	<p>Heather is most likely to be invaded by adjacent bracken where the heather does not regenerate quickly and vigorously after fire.</p>
<p><b>No muirburn to be undertaken within areas where heather has an existing varied age structure</b> (uncommon at Talladh-a-Bheithe)</p>	<p>10. Un-even aged heather where the heather is a mixture of tall and short bushes</p>	<p>The heather cover within the Talladh-a-Bheithe Estate is generally of a uniform, unvaried structure. However, heather can persist in such situations by layering of stems and occasional seedling regeneration. Creating a mixture of tall and short heather is one of the principal reasons for burning so there is little to be gained by burning in this situation.</p>

Agreed criteria	Type of fire-free zone defined by Muirburn Code	Purpose of fire-free zone
<p><b>No muirburn to be undertaken within areas located within 20 metres of large watercourses (River Ericht, Allt Ghlas and the west section of the Allt a Choir Odhar Bhig)</b></p> <p>or</p> <p><b>within 10 metres of smaller watercourses marked on an 1:25,000 ordnance survey map</b></p> <p>And</p> <p><b>No muirburn will be undertaken within 100 metres of a otter maternity holt</b></p>	<p>11. Tall vegetation at the edge of watercourses</p>	<p>Many of the watercourses within the Talladh-a-Bheithe Estate are used by otters and water voles for foraging and shelter in some cases. The water vole (<i>Arvicola terrestris</i>) receives protection under Schedule 5 of the <i>Wildlife and Countryside Act 1981, as amended</i> which protects the burrows and resting places of this species. In Scotland, otters are protected under the <i>Conservation (Natural Habitats &amp;c.) Amendment (Scotland Regulations 2007)</i>. Otters are therefore fully protected and their places of shelter and rest protected from damage, destruction and disturbance.</p> <p>Furthermore there are traditional nesting sites used by merlin located close to the Allt Ghlas.</p>
<p>CRITERIA SPECIFICALLY RELATING TO THE COIRE BHACHDAIDH SSSI</p>		
<p><b>No muirburn will be undertaken within areas identified by SNH as being fire-free areas within the Coire Bhachdaidh SSSI</b></p> <p><b>Includes Area D and all land above 600 metres</b></p>	<p>12. Any areas identified as fire-free in management agreements</p>	<p>There is an existing management agreement in place between SNH and the Talladh-a-Bheithe Estate (Appendix 3) for areas of the estate which are located within the SSSI.</p> <p>Muirburn is not normally permitted on a SSSI if muirburn is identified as an Operation Requiring Consent (ORC) unless consent is obtained from SNH, which is usually subject to a management agreement.</p> <p>The Talladh-a-Bheithe management agreement states that no muirburn will be undertaken in "Area D" or above 600 metres.</p>

## **5.0 THE MUIRBURN PROGRAMME – PLANNING AHEAD**

### **Start Planning Early**

- 5.1 It is important to plan ahead for a muirburning programme on an extensive area of moorland to ensure that the best results are achieved. It is recommended that a burning plan is prepared in April each year for the following winter.

### **Identify Areas to be Included in a Muirburn Season**

- 5.2 One important step is to decide how much potential area should be burnt in a particular year. In years when there are more days suitable for burning, a little more should be burnt to compensate for years when weather conditions were difficult. In an average winter there are between 5 and 15 days suitable for muirburn in western Scotland and slightly more in the east.
- 5.3 Muirburn should never be undertaken alone and an active squad of two or three should aim to burn an average of eight well controlled fires per day, where each fire is about 0.8 ha (2 acres) in size. Therefore it is important to be realistic how much burning can be undertaken during each burning season taking account of favourable burning days and the availability of experienced labour.

### **Prepare Plans to Identify Burning Areas**

- 5.4 A plan will be prepared prior to each burning season identifying the main areas where muirburn operations will be undertaken.
- 5.5 Each plan should then be annotated adding (1) fire-free zones; and (2) areas which have been burnt fairly recently, where burning is not yet appropriate (this may be up to ten years or more depending of heather productivity and grazing pressure).
- 5.6 It is advisable to undertake brief visits to some proposed burning areas prior to the burning season to determine whether those areas are ready for burning again identifying if sufficient heather regrowth has taken place.

### **Keeping of Record of Burnt Areas each Year**

- 5.7 All burnt areas of moorland should be marked on a map so that a record of burnt areas is kept each year. This is important if a long term muirburn programme is to be properly planned.
- 5.8 A summary of what to consider when planning a muirburn season is provided in Table 2.

**Table 2**                      **Points to consider when planning a muirburn season.**

<b>1. Objectives</b>	Clearly state what the fire are to achieve e.g. better forage for deer, dispersion of grazing pressure, improved wildlife habitat etc.
<b>2. Location map</b>	Prepare a map showing the location of the area where burning will be carried out in relation to the whole estate.
<b>3. Previous burns</b>	Review maps of existing burning patterns from previous years.
<b>4. Fire-free zones</b>	Review the fire-free zones plan in this Muirburn Management Report.
<b>5. Fire prescription</b>	Define what the fires should be like in terms of flame length, intensity and rate of spread.
<b>6. Equipment</b>	Check all burning and safety equipment is present and in good working order.
<b>7. Weather</b>	Check weather forecasts regularly during the burning season. Predetermine what weather conditions are suitable for muirburn e.g. wind speed, precipitation, dryness etc.
<b>8. Personnel</b>	Ensure that all personnel are aware of the Muirburn Management Report. Emergency procedures should also be agreed.
<b>9. Detailed map</b>	Map the desired boundaries of new fires. Indicate their priority within the plan, when they will be burnt, and the existence of hazard. Highlight topographical features which will influence fire behaviour.
<b>10. Record</b>	Keep a detailed record of all areas burnt during a burning season making notes on fire behaviour as necessary.

## 6.0 REFERENCES & FURTHER READING

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**APPENDIX 1**  
**Muirburn Code**

**APPENDIX 2**  
**Phase 1 Habitat survey plan 2010**

**APPENDIX 3**  
**Coire Bhachdaidh SSSI Management Agreement with SNH**

**DRAWINGS**