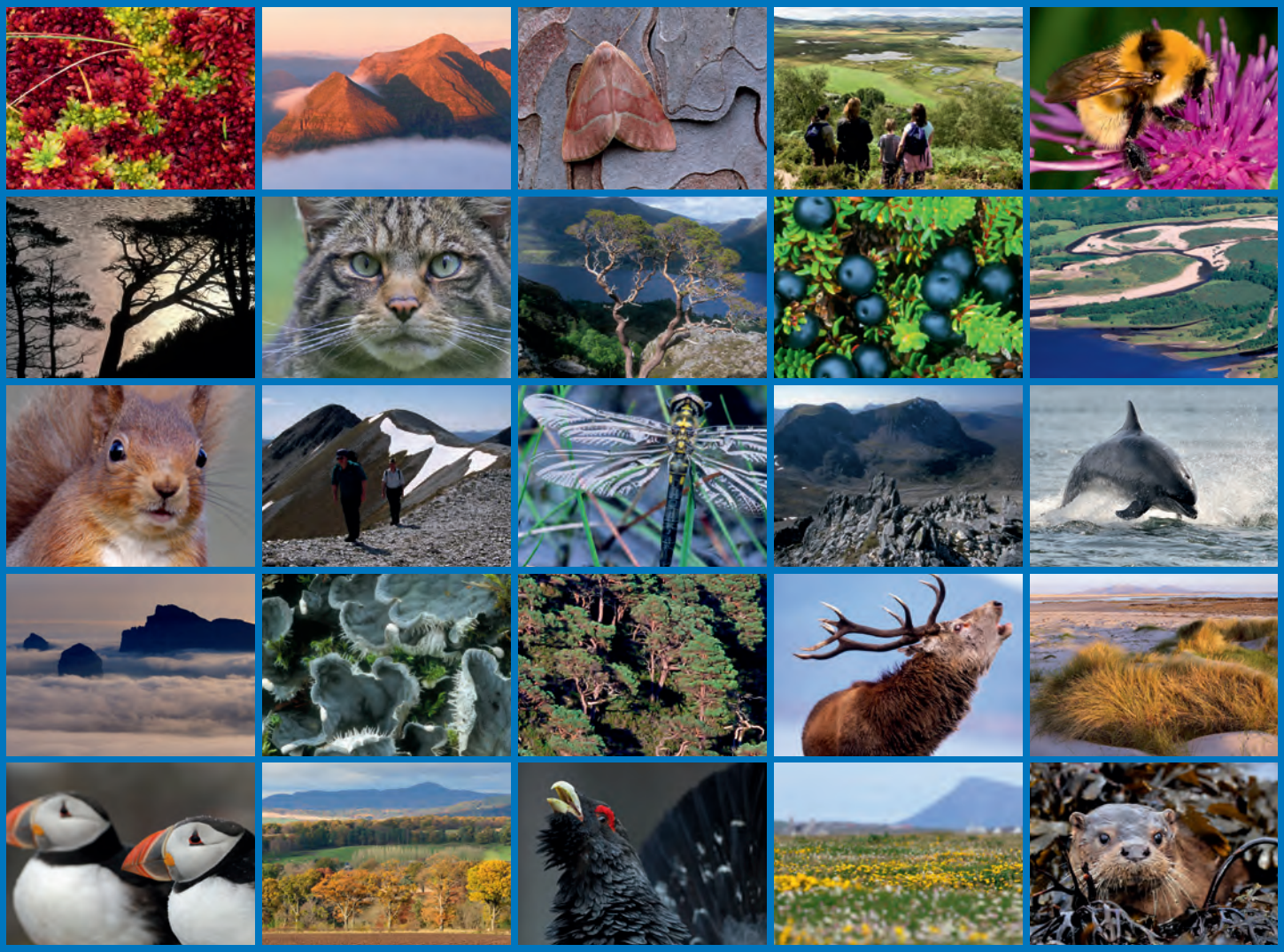
Scottish Natural Heritage
Commissioned Report No. 639

Site Condition Monitoring of invertebrates at Morrone Birkwood SSSI



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COMMISSIONED REPORT

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Site Condition Monitoring of invertebrates at Morrone Birkwood SSSI

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COMMISSIONED REPORT

Summary

Site Condition Monitoring of invertebrates at Morrone Birkwood SSSI

Commissioned Report No. 639
Contractor: K.N.A. Alexander
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Background

Site Condition Monitoring (SCM) is a six year rolling programme of assessment, against quality standards, of the state of the notified features. This document reports on SCM at Morrone SSSI during 2013. The species identified for monitoring were the pot beetle (*Cryptocephalus decemmaculatus*), the cousin German moth (*Paradiarsia sobrina*) and the netted mountain moth (*Semiothisa carbonaria*). They all are Priority Species under the Biodiversity Action Plan.

Main findings

- None of the species were found in a survey in late June 2013.
- Site quality, however, appears to be at least superficially adequate for the key species.
- The survey date may have been too late for the flight period of the netted mountain moth and too early for the cousin German moth, although larvae and feeding signs were not detected either; the Nationally Scarce black mountain moth (*Psodos coracina*) was, however, found on the summit of Morrone.
- The birch fauna suggested a secondary woodland habitat rather than old growth, and this is consistent with the historic records of fauna of early successional development of birch in the open.
- The condition assessment is 'favourable-maintained' for the montane heath fauna but 'unfavourable-recovering' for the young growth birch fauna.

Management actions identified are the need to:

- Target controlled grazing of the open areas of the lower part of the SSSI, such that invasive birch is encouraged but not allowed to develop into woodland; this would best be achieved by a series of grazing enclosures to exclude red deer but permit rotational grazing by a suitable hardy breed of cattle.
- Areas of older birch may be retained to provide local shelter and a seed source for the young growth, and also to develop into old growth as part of a developing network to re-connect old growth birch through Deeside.
- Continue to retain the montane hillsides as unenclosed land open to red deer grazing.
- Investigate volunteer moth recording by light-trapping.

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Acknowledgements

Athayde Tonhasca set up the contract and provided a summary compilation of invertebrate data for the site. Fiona Cruickshank (SNH) arranged access permission with the land-owner and the estate's stalker Ian Campbell confirmed that no stalking activity was proposed during the day of the visit. Martin Willing (Conchological Society) drew attention to the concurrent work by Ian Killeen for SNH concerning the whorl snail; Sandra Penman (Operations Area Officer, Tayside & Grampian Area) provided a copy of the interim report on the whorl snail and a copy of the Cycle 1 Morrone Birkwood Invertebrate assemblage SCM form. Ian Killeen provided edited highlights from his draft report to SNH. Mark Parsons (Butterfly Conservation) kindly identified moths from images supplied.

1. SITE DESCRIPTION

Morrone is a foothill (859 m) of the Cairngorms, overlooking Braemar, on south Deeside. The hill is dominated by acid rocks but a band of lime-rich rock on the mid slopes gives rise to small crags and a series of calcareous springs and flushes. The slopes below these outcrops support a mixture of juniper scrub and birch woodland, reputedly forming the finest example of a sub-montane birch-juniper wood on calcareous soils in Britain. The calcareous springs and flushes within the woodland form natural glades.

Parts of the site have been fenced to exclude deer and allow the natural regeneration of birch. The unenclosed areas of the site are grazed by red deer. Part of the SSSI is designated as Morrone Birkwood SAC for various European vegetation types and Geyer's whorl snail (*Vertigo geyeri*).

The SSSI has been notified for the following natural features:

- Quaternary geology and geomorphology.
- Vegetation types (upland birch woodland, juniper scrub, alpine heath, rocky slopes, subalpine calcareous grassland, spring-head, rill and flush, subalpine flush, basin fen).
- Vascular plant assemblage.
- Bryophyte assemblage.
- Fungi assemblage.
- Invertebrate assemblage.

The citation states that the invertebrate fauna is an important one, with a high proportion of northern and montane species, and a number of national rarities. It names the flies *Dorylomorpha beckeri* and *Spilogona griseola,* the moths *Kessleria saxifragae* and *Dichomeris juniperella,* the beetle *Scolytus ratzeburgi,* pearl-bordered fritillary butterfly (*Boloria euphrosyne*) and Geyer's whorl snail.

Target species for Site Condition Monitoring have been identified as:

- The pot beetle *Cryptocephalus decemmaculatus.*
- The moth cousin German moth (*Paradiarsia sobrina*) and netted mountain moth (*Semiothisa carbonaria*).
- Geyer's whorl snail (*Vertigo geyeri*).

As *V. geyeri* was assessed independently during the previous autumn (Killeen, 2013), this species was not sought– the habitat is fragile and a second series of sampling so soon after the last was considered potentially damaging.

2. SUMMARY OF KNOWN INVERTEBRATE INTERESTS

Morrone Birkwood SSSI is known to be rich in invertebrates, with a long list of British Red Data Book and Nationally Scarce species reported. The most extensively studied groups appear to be moths and Diptera, but there are also important species of Coleoptera, Hemiptera and Mollusca (A. Tonhasca, pers. comm.). Only the three target species are summarised here: these have been identified as Priority Species under the national Biodiversity Action Plan.

Cryptocephalus decemmaculatus, a British Red Data Book 'vulnerable' species, has been subject to much research and is unusually well-known for an invertebrate (Piper, 2002a, 2002b, 2002c; Piper & Compton, 2002; Owen, 2004; Cox, 2007). In Britain, it is known from just a few sites in the English Midlands (Cheshire and Staffordshire) and the Scottish Highlands, notably Camghouran, Perthshire. There is a single specimen reported from 'the Braemar area' in 1959 (Allen, 1960), but there are no records from subsequent searches there. In Scotland it has been found on eared willow (*Salix aurita*), dwarf sallows (*Salix* spp.) and downy birch (*Betula pubescens*); elsewhere is known also from grey willow (*S. cinerea*) and alder (*Alnus* spp.). Adults feed on live foliage from May to August (peak numbers in June and July), while larvae mostly feed on the fallen old leaves and petioles on the ground surface below; larvae are also known to climb up onto the bushes. Dispersal ability is poor, and gene flow can be impeded by relatively trivial barriers. Sites tend to be open, sunny glades in broad-leaved woodland, exclusively on wet hillsides or in areas of quaking bog; host bushes have south-facing aspects surrounded by windbreaks of taller vegetation and tend to be young growth. Grazing may be important in maintaining short ground vegetation beneath host plants as well as keeping the habitat open-structured. Scrub clearance, scrub maturation and land drainage have been identified as threats.

Protolampra sobrina (formerly known as *Paradiarsia sobrina*) (Noctuidae) in Britain is confined to the Scottish Highlands and adjacent areas, living in upland birch woodland where there is a bilberry (*Vaccinium* spp.) understorey (Skinner, 1984). Larvae feed from September through to May on the foliage of bilberry and leaves from the lower branches of young birches growing amongst the bilberry. Adults are on the wing in July and August, visiting heather blossom. It was discovered at the site in 1960, and features in species lists dated 1970-1983 and 1971-1980.

Macaria carbonaria (formerly known as *Semiothisa carbonaria*) (Geometridae) in Britain is confined to the Scottish Highlands, inhabiting moorland and mountain hillsides (Skinner, 1984). Larvae feed on the foliage of bearberry (*Arctostaphylos uva-ursi*) in June and July. Adults are active in sunshine from April to early June, their time of appearance varying according to season and altitude; they are attracted to flowers of various plants. The moth was identified on a species list for this site dated 1971-80.

3. DESCRIPTION OF METHODOLOGY

Many invertebrates have largely annual life cycles and are highly seasonal; identification generally requires the adult stage, which can be available for periods as short as weeks during a field season and at varying times depending on weather patterns. Amongst the target species, the pot beetle has a peak in the adult stage in June and July, the cousin German moth flies during July and August, and the netted mountain moth from April to June. The date selected was 25 June 2013, when the pot beetle should be readily detectable, late individuals of netted mountain moth might be feasible in a year with such a late spring, and late caterpillars of cousin German moth might be found.

Spring 2013 proved to be unusually cold, with temperatures reaching the seasonal average late in the season. Much of June was particularly warm and dry in Scotland, but afterwards there was a period of relatively low temperatures and unsettled conditions. The day of monitoring was largely cloudy, with a cold northerly wind; – the car thermometer reading was 10°C at the start of the survey and had only risen to 14°C by the afternoon.

The strategy adopted was to start on the heaths of the open hillsides, systematically search for day-flying moths and then work downwards into the open areas of the birch woodland.

Initially the path from the village to the summit was used as a transect, and off-route forays were made periodically for stops to examine all moths disturbed underfoot. Each species seen was photographed so that the images may act as vouchers for the records. From the summit, the route went down along the spur above the west side of Coire nam Muc, including a series of sideways forays. In addition to noting day-flying moths, the larval food plant of netted mountain moth (bearberry) was sought and examined for eggs and young larvae and feeding signs. The mature larvae are described and illustrated in Porter (1997).

Once in the birchwood area, a circuitous route was followed around woodland edges and glades for searches of young birches. These were either sampled by sweep-netting or inspected closely for caterpillars and feeding signs.

4. EVALUATION OF SITE CONDITION

4.1 Day-flying moths of the open heaths

Only two day-flying moth species were found on the mountain slopes: the black mountain moth (*Psodos coracina*) and a tortricid, probably *Phiaris* (*Olethreutes*) *schulziana.* The black mountain moth was a notable find as this is a Nationally Scarce species confined on higher plateau and summits, rarely found below 600 m (Skinner, 1984). It flies in July and so the presence of small numbers of moderately worn individuals in late June was surprising. The only recorded larval food-plant of this moth is crowberry (*Empetrum nigrum*). Black mountain moth features in the 1971-1980 site list, so the new record is a useful confirmation that this species still occurs in the SSSI. *Phiaris schulziana* is a more widespread heathland specialist occurring in both lowlands and uplands (Bradley *et al.,* 1979).

Very little bearberry was found, and the plants examined showed no signs of caterpillars or feeding. Although the target species was not found, this is likely to be because the flight period was missed rather than its absence from the site. The presence of the black mountain moth does suggest that the area is in favourable condition for mountain heath species.

4.2 Young growth birch fauna

Young birch growth was found widely across the large grazing exclosure, around the fringes of glades and track-sides, at woodland fringes and even out into open areas of heath. In contrast it was scarce in the areas open to deer grazing. No moth caterpillars or *Cryptocephalus* beetles could be found on the foliage.

A basic birch invertebrate fauna was present, with species such as the fly *Jassidophaga fasciata*, which is a parasitoid of *Oncopsis* leafhoppers, the typical weevils *Anoplus plantaris, Polydrusus cervinus* and *P. tereticollis* and the soldier beetles *Malthodes fuscus* and the Nationally Scarce *M. guttifer*. Species characteristic of old growth birch were clearly absent, which is consistent with the essentially secondary nature of the area.

The failure to find any specialist young-growth birch associates suggests that the site should be assessed as unfavourable for this fauna.

4.3 General considerations

The failure to locate any of the target species plus the failure of Killeen (2013) to find Geyer's whorl snail in 2012 is in marked contrast with the overall impression of the site gained from this visit. The grazing exclosure has plentiful young birch established across the area as well as well-developed spring-fed calcareous seepage vegetation. This may be a relatively new situation as deer numbers are reported to have increased dramatically in recent decades so the target species may have been eliminated by deer grazing prior to the establishment of the large exclosure. The pot beetle has only been reported from the Braemar area in 1959, when a single beetle was found; it is entirely possible that this colony has been lost during the intervening period. The cousin German moth has, in contrast, been reported on a number of occasions, most recently in the early 1980s.

The mountain heath also appears to be in good condition and the failure to detect netted mountain moth could easily be the result of the timing of the survey rather than its true absence. Access to some botanical data on the best places for bearberry would have helped the survey and might have increased the chances of success. The presence of black mountain moth indicates that site condition for the moths of montane heath is favourable.

The conclusion from this SCM is therefore that the area of montane heath is in favourable condition but that the young growth birch is in unfavourable condition, with no evidence for the survival of the two target species.

This conclusion is in contrast to the assessment made in August 2003 that the entire site was 'favourable-maintained'. However the 2003 assessment was based solely on the condition of the vegetation; the same approach in 2013 is likely to have also resulted in a similar conclusion. But favourable condition of vegetation does not necessarily equate to favourable condition of the associated invertebrate fauna, even where the structural features of the site are now much better and more suitable than in the recent past. The target invertebrates are relatively immobile and, if lost, may not have other populations in the surrounding landscape for re-colonisation.

It does need to be taken into consideration also that a single day on site may not be sufficient to detect the target species. Searches for the pot beetle may require the taking of litter samples from beneath young birch across the site to search for larvae (Piper, 2002a, 2002b, 2002c) as well as more extensive searching for the adult on a series of visits across the activity period. This more detailed approach would be much more time demanding but may be required to confirm this species' extinction here. The cousin German may be better surveyed by light-trapping on a series of evenings across the flight period. Surveys of black mountain moth require visits earlier in the season, to coincide with peak adult activity.

The conclusion is therefore that the assessments made in 2013 need to be regarded as provisional as the target species may just have been overlooked as a result of the single day survey approach.

5. SITE MANAGEMENT RECOMMENDATIONS

5.1 Current Management

The SSSI is currently split into two grazing units: the large exclosure centred on the eastern half of the birch woodland, and the rest of the site which is open to grazing by wild red deer.

The current Site Management Statement (June 2011) deserves some discussion. Key recmmendations from this were:

- The location of fencing should be reviewed and further fencing may be required to allow regeneration outside the current area and prevent damage to the juniper scrub.
- Ideally the woodland should be allowed to expand to natural altitudinal limits, whilst retaining open glades of flushes and grassland within the woodland.
- Fencing for the benefit of woodland may lead to loss of calcareous grassland and increased shading and nutrient enrichment to the detriment of the bryophyte and fungi assemblage.

5.2 Discussion and recommendations arising from 2013 visit

5.2.1 Woodland component

It is striking that the 2011 Site Management Statement (SMS) continually refers to 'woodland' and the need for 'regeneration' and assumes that expansion of woody growth is desirable for conservation purposes. The invertebrate special interests are very clearly associated with the open habitats and young birch trees in open habitats, with areas of older birch nearby to provide shelter. It is essentially a young-growth fauna, associated with the early successional stages of woody invasion of the open habitats. Older birches are not needed throughout the site - 'woodland' is not desirable at all for the invertebrates of this site, only a few birch trees to act as seed sources.

5.2.2 Grazing aspects

Maintenance of early successional birch invasion of open habitats is problematic and requires periodic controlled grazing. The present options of 'red deer' or 'no red deer' does not equate to controlled grazing. The SMS is largely correct that 'Some grazing within any fenced enclosures will need to be maintained at levels low enough to prevent erosion and compaction, and to allow further regeneration within the woodland and into heathland areas whilst preventing tree and shrub expansion onto the important open-ground habitats'. The problem is what to do with the older birches and the dense birch stands that have developed in recent decades. Ideally these should be gradually felled and the areas restored to open heath, to enable new growth. The lower areas of the SSSI with birch should be made into a series of enclosures, with grazing animals available to be moved from enclosure to enclosure and progress with felling and removal of the unwanted older birch trees. A hardy cattle breed would be most suitable for this purpose as cattle tear the vegetation and create breaks in the grassland, which encourage seed-set and establishment. Sheep and deer create dense lawns which are poor for woody growth.

5.2.3 Tree management

While extensive birch woodland would seem inimical to the young growth interests, some older birch are needed for shelter and as a seed source. The Highlands are known to be important for old growth birch and the special fauna which it supports, and yet stands of old growth are very fragmented and isolated. It does make sense to work towards old growth conditions to provide a stepping stone for the movement of birch associates across the

landscape. The SSSI also includes some old aspen – and the rare aspen bracket fungus *Phellinus tremulae* - and there is good regeneration of aspen within the exclosure. The woodland aspect of the SSSI does have good potential for nature conservation but this should not be at the expense of the young growth birch invertebrates, which are rarer in the landscape today than old growth birch invertebrates largely due to changing land management practices.

5.2.4 Moth trapping

The cousin German is probably best surveyed by standard light-trapping equipment. Morrone Birkwood SSSI is well situated, on the edge of Braemar, for regular moth-trap recording by volunteers. The local moth-recording group of Butterfly Conservation may be encouraged to develop a programme of visits, or else a request for visits may be posted in the national moth column in *British Wildlife* magazine. This would be a very cost-effective approach to monitoring the local population of the cousin German moth, and hence progress with young-growth birch conservation management.

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ANNEX A – LIST OF INVERTEBRATES

Species identification	GB status	Assemblage
Coleoptera		
Cantharidae		
Malthodes fuscus		saproxylic
Malthodes guttifer	Nationally Scarce	saproxylic
Rhagonycha lignosa		canopy
Carabidae		
Carabus glabratus		ground layer
Cychrus caraboides		ground layer
Nebria brevicollis		ground layer
Pterostichus madidus		ground layer
Ciidae		
Cis bidentatus		saproxylic
Coccinellidae		
Adalia 10-punctata		canopy
Cryptophagidae		
Cryptophagus dentatus group		saproxylic
Curculionidae		
Anoplus plantaris		canopy
Micrelus ericae		field layer
Phyllobius argentatus		canopy
Polydrosus tereticollis		canopy
Polydrusus cervinus		canopy
Sciaphilus asperatus		field layer
Strophosoma melanogramma		canopy
Elateridae		
Aplotarsus incanus		field layer
Dalopius marginatus		field layer
Melanotus castanipes		saproxylic
Lymexylidae		
Hylecoetus dermestoides		saproxylic
Scraptiidae		
Anaspis rufilabris		saproxylic
Diptera		
Pipunculidae		
Jassidophaga fasciata [= setosa]		canopy
Empididae		
Empis (Platyptera) borealis		
Hymenoptera		
Formicidae		
Formica lugubris		ground layer
Leptothorax acervorum		ground layer
Lepidoptera		
Tortricidae		
Phiaris (Olethreutes)		field layer

schulziana		
Psodos coracina	Nationally scarce	field layer
Mollusca		
Arion ater agg		ground layer
Columella aspera		field layer
Lehmannia marginata		canopy
Oxychilus alliarius		ground layer
Oniscidea		
Trichoniscus pusillus sensu lato		ground layer
Diplopoda		
Proteroiulus fuscus		saproxylic
Fungi		
Fomes fomentarius		saproxylic
Phellinus tremulae	Rare	saproxylic
Piptoporus betulinus		saproxylic

ANNEX B - IMAGES

Black mountain moth photographed on the summit of Morrone, June 2013

Grazing by red deer or no grazing – neither suitable for conservation of the specialist fauna of young growth birch

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