

Site Condition Monitoring of invertebrates at Beinn Eighe SSSI





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COMMISSIONED REPORT

Commissioned Report No. 636

Site Condition Monitoring of invertebrates at Beinn Eighe SSSI

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COMMISSIONED REPORT

Summary

Site Condition Monitoring of invertebrates at Beinn Eighe SSSI

Commissioned Report No.: 636

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 Beinn Eighe SSSI during 2013. The species identified for monitoring were several RDB species, among them *Callicera rufa*, *Mycetophila lapponica* (Diptera), *Bolitophagus reticulatus* (Coleoptera), *Aethes rutilana* and *Rheumaptera hastata* (Lepidoptera).

Main findings

- None of the target species were detected, although three nationally scarce beetles associated with dead pine and bracket fungi on dead birch stems were found, suggesting that site quality remains moderately high for decaying wood assemblages.
- The most notable find is the minute fungus beetle *Ropalodontus perforatus* which develops in *Fomes fomentarius* brackets on dead birch stems.
- The site appears to be adequate for all of the key species, and condition assessment is therefore 'favourable-maintained'.
- The area requires controlled, low intensity grazing to encourage the development of diverse age structures of pines, and space to enable open-grown trees to develop.
- Grazing by red deer appears not to be feasible and it may be advisable to restore some grazing by a hardy type of beef cattle while at the same time excluding red deer.

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1. SITE DESCRIPTION

Beinn Eighe is an extensive mountain massif located to the south of Loch Maree and southwest of Kinlochewe in Wester Ross. The SSSI has been designated for its Cambrian stratigraphy, structural and metamorphic geology, native pinewood, and its upland, vascular plant, bryophyte and invertebrate assemblages. The invertebrate assemblage is species-rich, with large numbers of British Red Data Book and nationally scarce species.

The lower north-facing slopes support the most extensive native pinewood in Wester Ross and are dominated by Scots pine, birch, rowan and holly. The woodland has a variable canopy and shows a range of age classes. The ground flora is dominated by dwarf shrub heath with a large diversity of mosses, liverworts and lichens.

The slopes of Beinn Eighe support some of the best examples of western upland plant communities associated with a range of rock types. These habitats include alpine and subalpine heaths, dry heaths, montane grassland, tall herb ledges and scree communities. The crags of the upper areas have a herb rich flora while the summit supports a species-rich moss heath and bare ground.

Woodland restoration and deer management are important management aspects.

The citation states that diverse habitats spread over a broad altitudinal range and support diverse invertebrate communities, including the nationally scarce argent and sable moth (*Rheumaptera hastata*) and the nationally scarce pearl-bordered fritillary butterfly (*Boloria euphrosyne*) and at least another 14 threatened species. The 13 species of dragonfly and damselfly comprise a nationally important assemblage that includes the nationally rare northern emerald (*Somatochlora arctica*). Also of note are the nationally rare moth species *Plusia haasi*, *Aethes rutilana* and *Udea uliginosalis* and several saproxylic beetles and flies, including species restricted to Caledonian pinewood such as the hoverfly *Callicera rufa*.

Target species for Site Condition Monitoring have been identified as several RDB Diptera (*C. rufa*, *Mycetophila lapponica*), Coleoptera (*Bolitophagus reticulatus*), Lepidoptera (*A. rutilana*, *R. hastata*).

2. SUMMARY OF KNOWN INVERTEBRATE INTERESTS

Beinn Eighe SSSI is known to be rich in invertebrates, with a long list of British Red Data Book and Nationally Scarce species reported. Only the named target species are summarised here.

Callicera rufa is a hoverfly (Syrphidae) which has larvae developing in rot-holes between bifurcating branches and in wet holes at the surface of stumps of Scots pine and larch. Adults are very elusive, but females may be seen searching for oviposition sites on pine trunks and stumps. Trials have shown that the rot-holes created artificially by cutting into pine trunks with a chain-saw are utilised readily. The species has been the subject of detailed studies by the Malloch Society that have shown it to occur in the majority of locations in northern Scotland where ancient Scots pine occurs. The rotting material needs to be wet. The period of adult activity is from June into August, although larvae may be found all year round. The species has extended its range in recent years in response to new habitat created by felling of conifer plantations, and English records are beginning to be reported (Ball *et al.*, 2011). Although afforded British Red Data Book 'endangered' status in Shirt (1987), this was downgraded to 'rare' in Falk (1991), and is due for further downgrading to 'nationally scarce' (R.K.A. Morris, pers. comm.).

Mycetophila lapponica is a fungus gnat (Mycetophilidae) of unknown biology but is believed to develop in lignicolous fungi in its Caledonian forest habitats associated with both broadleaves and conifers. Only recently recognised to occur in Britain, the spread of records suggests that it is likely to be found more widely within its range in the Scottish Highlands. Dates of adult records are from mid-June to late October. It was listed as RDB 'vulnerable' in Falk (1991) but revised to 'nationally scarce' in Falk & Chandler (2005).

Bolitophagus reticulatus is a darkling beetle (Tenebrionidae). The larvae feed in the cap of dead brackets of *Fomes fomentarius* fruiting from standing dead birch stems growing in full sunshine; the pupa is formed below the upper dermis and the newly formed beetle bites its way out of the cap leaving a characteristically shaped emergence hole (pers. obs.). Larval development usually takes one year, but they may live for more than one season as adults. Increasing habitat size and decreasing degree of isolation increases the probability of its presence, while increasing insolation and thereby higher ambient temperatures also improves the probability of its presence (Rukke & Midtgaard, 1998). The adult is a powerful flier and may be able to fly for several kilometres, enabling it to exploit thin tree cover (Jonsson, 2003). Although included in the British Red Data Book (Hyman, 1992) as 'rare', the beetle is now recognised as being more widespread in the Caledonian forest area and has been reassessed as nationally scarce (Alexander *et al.*, in press).

Aethes rutilana is a micromoth of the family Cochylidae. The larvae feed on juniper leaves producing silken strands between neighbouring leaves to which the frass adheres. They feed from September to June, overwintering in a silken tube spun against the twig. The adult moth flies in bright sunshine in July and August (Bradley *et al.*, 1973).

Rheumaptera hastata is the argent and sable moth (Geometridae), a specialist of open birch woodlands on boggy moorland hillsides. The larvae feed in spun terminal leaves of bog myrtle from July to early September (Skinner, 1984). The adult moths are day-flying in May and June, preferring warm and sunny weather conditions. The larvae are illustrated in Porter (1997). This species has been identified as a Priority Species under the national Biodiversity Action Plan.

3. DESCRIPTION OF METHODOLOGY

Many invertebrates are highly seasonal in their availability for survey, having largely annual life cycles. Identification generally requires the adult stage, which can be available for periods as short as weeks during a field season, and on varying times depending on weather patterns. The date selected for the survey visit was 3 July 2013 – four of the five target species would be expected to be in the adult stage at this time of year while the fifth, argent and sable, would be present as larvae.

The day of monitoring was largely cloudy but bright nonetheless. Although originally planned for the previous day, the visit had been postponed due to a forecast for rain and strong winds. The vegetation, however, was still very wet at first. Conditions improved during the visit, with the vegetation drying out and enabling sweep-netting. The car thermometer reached a peak of 14°C by the afternoon.

The strategy adopted was to start using the way-marked Woodland Trail in Coille na Glas-Leitire to provide easy access across part of the area, and to make forays out into the surrounding habitats as opportunity arose and as suitable habitats for sampling were observed. The lower sections of the way-marked Mountain Trail were also explored in the same way. The shoreline woodlands along Loch Maree were also specifically targeted, in both directions from the visitor car park, with a separate foray to the more northerly car park south of the Bridge of Grudie. The final area explored was along the north side of Allt a'Chuirn, where a path gave access to extensive areas of mire with fringing woodland.

The target features sought were:

- large old pines with rot-holes, for ovipositing female *C. rufa* or its larvae;
- bracket fungi in general for fungus gnats;
- *Fomes fomentarius* brackets for the darkling beetle;
- Juniper bushes for the distinctive frass-filled silken webs and flying adults;
- *Myrica gale* stands amongst birches, for larvae of argent and sable moth.

4. EVALUATION OF SITE CONDITION

The exploration of Coille na Glas-Leitire revealed scattered mature and young pine trees, showing a diverse age structure but lacking ancient pines. Stands of overcrowded dense young pines are a strong feature. Standing dead pines were relatively frequent, although mostly small girth trees, long dead, and with dry loose bark showing old galleries of bark beetles (Scolytinae) and longhorn beetles (Cerambycidae). One standing live pine had a damaged area of bark with damp sappy areas but investigation did not reveal any Diptera larvae. An elytron of the nationally scarce click beetle *Ampedus nigrinus* (Elateridae) was the main interest located. No suitable breeding habitat for *C. rufa* was encountered but it would seem unlikely that the habitat was not represented somewhere across the site. The predominance of young overcrowded pines is not encouraging however as rot-holes tend to be most frequent where derived from trees with lateral branching, with the rot forming in old branch scars where the laterals have snapped off.

No bracket fungi could be found on the pines although one standing dead young pine had encrustations of a violet *Stereum*-type fungus. Bracket fungi were rare on the broad-leaved trees also. *Inonotus radiatus* was found in abundance on one standing dead alder in a damp hollow and knocking this over a net revealed the nationally scarce false darkling beetle *Abdera flexuosa* (Melandryidae). Dead birches in streamside areas to the west of the Woodland Walk had brackets of *Piptoporus betulinus* and *F. fomentarius* – fresh larval trails of a fungus gnat were observed on one very fresh *Fomes* bracket. No emergence holes of *B. reticulatus* could be found despite a wide variety of structures, from shaded to very open canopy woodland. This species is normally readily detectable, and it may be that it has a very localised population here. Minute fungus beetles (Ciidae) were scarce but the widespread *Cis castaneus* and the much rarer Highland specialist *Ropalodontus perforatus* were present. The latter may be new to the site list. Although currently with 'rare' status in the British RDB, this species is overdue for downgrading to nationally scarce (G. Orledge, pers. comm.).

Myrica and juniper were very sparse in the areas explored and no signs of the two rare moths could be found. It was very noticeable that much of the area now has very deep heather growth – shoulder height in places – and this appears to be a recent feature as such conditions were not noted on a previous exploration of the site by the author in 1989.

The banks to Loch Maree have a good scatter of large old pines as well as birches of exceptional girth and plentiful alders. One birch measured had a girth of 2 m. A good range of bracket fungi were encountered, including *P. betulinus* and *F. fomentarius* on dead birch stems, together with sterile conks of *I. obliquus* on living birches. *Inonotus radiatus* was more plentiful here on the dead alder stems and stumps. These banks therefore provide very valuable habitat for invertebrates. *Abdera flexuosa* was plentiful on the brackets of *I. radiatus*. Only the widespread minute fungus beetle *C. bidentatus* was found on the birch brackets here. A large growth of the bracket fungus *P. scheinitzii* was found on a large pine by the northern car park; this was found to contain a crane fly larva and a section was retained for rearing.

The lower slopes by Allt a'Chuirn were found to have an extensive area of mire with *Myrica gale* in abundance. This was searched for larvae of argent and sable moth and sweep-netting was also carried out across the mire. The only moths detected were two young larvae of emperor moth *Pavonia pavonia* which is a locally common species of heaths and moors. The larvae of this species feed on the foliage of a wide variety of shrubs, dwarf shrubs and herbs. The uncommon soldier beetle *Podabrus alpinus* was also found amongst *Myrica gale* higher up the burn. The ravine of the mid-section of the burn has extensive development of old pine forest but most trees are on the far southern side and would need a

different route to gain access. Prostrate juniper is scattered through the area but no larval feeding signs of the rare moth could be found, nor were any adult moths in evidence.

In conclusion, none of the target species could be found, although suitable habitat is undoubtedly present. Three nationally scarce beetles were detected – two associated with bracket fungi and one with pine deadwood, which suggests that site quality appears to be high. It is recommended that site condition is favourable-maintained.

5. SITE MANAGEMENT RECOMMENDATIONS

The deep heather growth and the stands of dense young pine both indicate that grazing levels by red deer are now at a very low level within the areas of the SSSI that were explored on this occasion. It needs to be explicitly recognised by the site managers that large herbivores are an essential component of the ecosystem and that site condition deteriorates without them just as it does when grazing intensity is too high. Ideally the area requires controlled, low intensity grazing, to encourage the development of diverse age structures of pines, and space to enable open-grown trees to develop as well as denser stands. Controlled grazing using red deer appears not to be feasible and it may be advisable to restore some grazing by a hardy type of beef cattle while at the same time excluding red deer.

There is also a clear need to provide SCM surveyors with information on the locations of key areas for target species. This is a large site and the exploration reported here did not encounter areas with frequent juniper, nor areas of open birch with *M. gale*, and probably not even the best areas with old pines.

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ANNEX A: LIST OF INVERTEBRATES & FUNGI

Group	Family	Species
Coleoptera	Cantharidae	<i>Malthodes flavoguttatus</i>
		<i>Malthodes fuscus</i>
		<i>Podabrus alpinus</i>
	Carabidae	<i>Ocys harpaloides</i>
	Chrysomelidae	<i>Luperus longicornis</i>
	Ciidae	<i>Cis bidentatus</i>
		<i>Cis castaneus (nitidus)</i>
		<i>Ropalodontus perforatus</i>
	Cryptophagidae	<i>Cryptophagus sp</i>
	Curculionidae	<i>Anoplus plantaris</i>
		<i>Rhamphus pulicarius</i>
	Elateridae	<i>Ampedus nigrinus</i>
		<i>Aplotarsus incanus</i>
		<i>Athous haemorrhoidalis</i>
		<i>Melanotus castanipes</i>
Melandryidae	<i>Abdera flexuosa</i>	
Scraptiidae	<i>Anaspis rufilabris</i>	
Staphylinidae	<i>Atrecus affinis</i>	
Lepidoptera	Hepialidae	<i>Hepialus lupulinus</i>
	Saturniidae	<i>Pavonia pavonia</i>
Psocoptera	Mesopsocidae	<i>Mesopsocus unipunctatus</i>
Mollusca		<i>Arion subfuscus</i>
		<i>Lehmannia marginata</i>
		<i>Zonitoides nitidus</i>
Diplopoda		<i>Cylindroiulus punctatus</i>
		<i>Proteroiulus fuscus</i>
Oniscidea		<i>Oniscus asellus</i>
Fungi		<i>Fomes fomentarius</i>
		<i>Inonotus radiatus</i>
		<i>Phaeolus schweinitzii</i>
		<i>Piptoporus betulinus</i>
		<i>Stereum rugosum</i>

ANNEX B: IMAGES

Even-aged stand of young pine, poor quality habitat for pine fauna



Inonotus radiatus brackets on alder stone along loch shore; habitat for nationally scarce false darkling beetle *Abdera flexuosa*



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