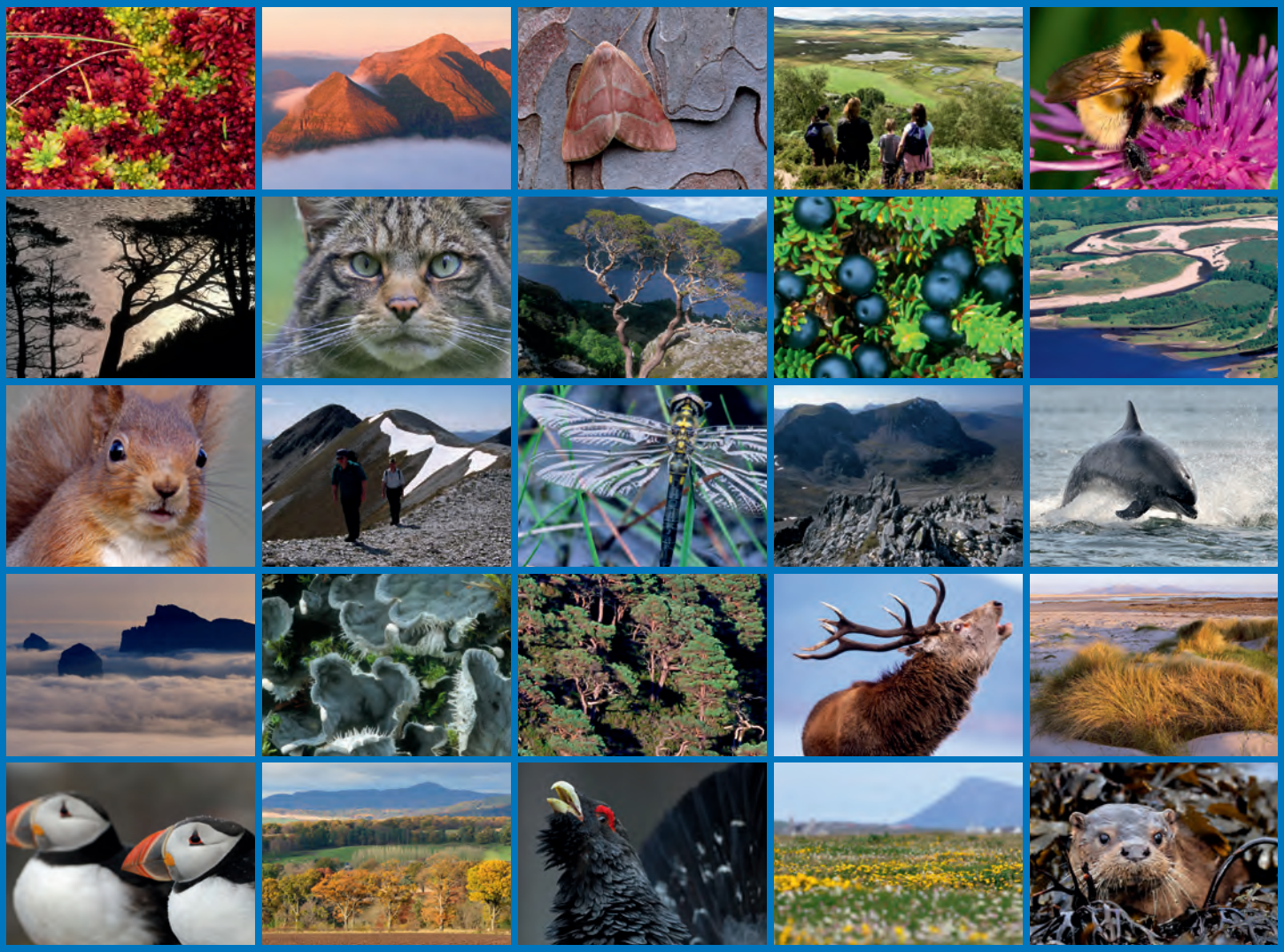
Scottish Natural Heritage
Commissioned Report No. 642

Site Condition Monitoring of invertebrates at Struan Wood SSSI



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COMMISSIONED REPORT

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Site Condition Monitoring of invertebrates at Struan Wood SSSI

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COMMISSIONED REPORT

Summary

Site Condition Monitoring of invertebrates at Struan Wood SSSI

Commissioned Report No.: 642
Contractor: K.N.A. Alexander
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Background

Struan Wood SSSI has been designated for its ancient birch wood and for the insects it supports, especially rare saproxylic beetles and a species of moth, *Ancylis tineana*. This document reports on a contract established to carry out SCM during 2013.

Main findings

- A total of 18 species of saproxylic beetle were identified from one day of sampling, including three species of British Red Data Book status and two of Nationally Scarce status.
- Two of the RDB species, *Ropalodontus perforatus* and *Bolitophagus reticulatus*, are characteristic of old Caledonian forest and previously known here. The third species, *Agathidium confusum*, is more widespread, but this is the first record for the site.
- The visit was too early in the year to sample *A. tineana*, but a Butterfly Conservation survey in 2012 detected a strong thriving population in the site's eastern half.
- Standing dead stems with bracket fungi are plentiful at the site, but there is a large age-gap between stands.
- The current condition assessment is 'favourable-maintained'.

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Acknowledgements

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1. SITE DESCRIPTION

Struan Wood is an important ancient birch wood that supports rare saproxylic beetles and a rare species of moth, *Ancylis tineana*. The wood is a small remnant of the once extensive highland birch woodland within Perth and Kinross, and a good example of the outstanding insect fauna found in the Tummel-Garry valley system. The long history of woodland cover has meant that invertebrates with very specific habitat requirements have persisted. Of particular importance are six rare beetle species, including the endangered *Abdera affinis.* The key habitat type for the saproxylic beetles is bracket fungi on old dead birch stems, especially *Fomes fomentarius* and *Inonotus radiatus.*

2. SUMMARY OF KNOWN INVERTEBRATE INTERESTS

The beetle interest of Struan Wood was described relatively recently by R. Lyzkowski and I. White during two visits in June 1982. They found four species with British Red Data Book status, five that are Nationally Scarce, and five more that are localised nationally. All of these species are saproxylic (wood-decay) specialists (Table 1).

*Table 1 – Struan Wood saproxylic species. * = Caledonian forest only*

Beetle species	British status	Substrate
*Abdera affinis**	RDB1	*Inonotus radiatus & I. obliquus*
*Bolitophagus reticulatus**	RDB3	*Fomes fomentarius*
*Ropalodontus perforatus**	RDB3	*F. fomentarius*
*Atheta boletophila**	RDBK	Bracket fungi generally
Abdera flexuosa	NS	*I. radiatus*
Enicmus rugosus	NS	Slime moulds
Hallomenus binotatus	NS	Bracket fungi generally
Orchesia micans	NS	*I. radiatus*
*Scolytus ratzeburgi**	NS	Freshly dead birch stems
Cerylon histeroides	Local	Deadwood generally
Dacne bipustulata	Local	Softer bracket fungi
Quedius plagiatus	Local	Deadwood generally
Triplax russica	Local	*F. fomentarius*
Xylocleptes bispinus	Local	*Clematis* dead stems

Epuraea silacea (pRDB at that time) also featured on their list but has subsequently been synonymised with the common *E. deleta*. *Xylocleptes bispinus* is associated with *Clematis* and may be assumed to be a transcription error as the host plant was not seen and is an unlikely species for the site.

Ancylis tineana is a tortricid moth only known in Britain from the Scottish Highlands and one site in the English Midlands (Sterling & Parsons, 2012). The larvae of *A. tineana* feed on small birches growing in damp areas and stunted by grazing so that they are only slightly higher than the surrounding vegetation (Heckford & Beavan, 2012). Larvae make rough, frass-covered tubes, up to 3 to 4 cm long, by spinning together the leaves of the stunted birches. The adult moth was discovered at Struan in 1974 (Bradley *et al.*, 1979) although the larvae were found until 1994 (Heckford, pers. comm.). Despite statements in the literature that the larvae may be found in June and July, larvae are not present in the Scottish Highlands until August (Heckford, pers. comm.).

3. DESCRIPTION OF METHODOLOGY

3.1 Recommended methodology for saproxylic invertebrates

Drake *et al.* (2007) provided a detailed review of the survey requirements for condition assessment of saproxylic invertebrate assemblages. The recommended standard approach is to make a series of visits across the field season. During each visit a variety of niches as wide as possible should be investigated by standard techniques of beating, sweeping and panning, supplemented by direct observation, to disclose an adequate range of species in the assemblage. Repeat visits will allow the operation of specialist trapping devices that may be needed for the more elusive species.

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. Ideally, therefore, invertebrates should be sampled across the season to enable detection of a wide variety of the resident species and to generate a reliable assessment of site conservation value. The standard for site assessment is a minimum of three visits, covering the late spring, high summer and autumnal activity peaks (Drake *et al.*, 2007).

The basic features to be investigated in a Caledonian birch wood are:

1. Large old trunks of living trees, especially those in well-lit sunny areas, investigated for: active insects that may be captured by netting, panning or sieving of wood mould accumulations in the base of cavities; sap-runs or other wet fluxes for visible insects and collecting larvae for rearing; exit holes that may provide clues to the identity of the inhabitants, such as shape and size; rot-holes, searching for adult insects and larvae in the wet debris; white-rotten or red-rotten wood in the trunk.

2. Aerial dead branches on living trees sampled by tapping them over a net. High summer and autumn are important times of the year for the specialist beetles. Sections of decayed branch can be taken away for rearing purposes.

3. Aerial live branches sampled by beating them over a net to capture resting/sheltering adult stages.

4. Standing dead trunks sampled as for live trunks, but generally with better access to decay and cavities; dead trunks will attract more warmth-loving species than live trunks.

5. Fallen trunks and boughs sampled by general investigation, breaking them into loose and soft material and turning them over - where feasible - to inspect the moister undersides.

6. Fruiting fungi inspected directly, tapping them over a net, inspecting insect exit holes, breaking open a representative sample to check for larvae that may be taken and reared to adult stages.

7. Blossoms by beating a representative sample of flowering trees and shrubs in late spring and early summer, in search for nectaring adult insects.

8. Surrounding habitat by sweep-netting low over the field layer and beneath the foliage.

In England, for common standards monitoring purposes, three whole day visits are the recommended approach: during late spring (May-June), optimum for adult abundance, high summer (July-August) and autumn (September-October).

Ideally the site to be assessed should be divided into four units and an hour and a half spent surveying each.

The surveyor must have expertise in the saproxylic insects known from the site. An inexperienced surveyor may well find very little in a rich site.

3.2 Methodology applied in 2013

The visit was carried out on 28 June 2013. It was a dry but overcast day, following overnight rain. The thermometer read 12°C. A June date was selected as being optimal for a wide range of the species of interest.

The site is divided in two by a fence line across the contours and there is a small enclosure in the lower part of the western half. The older stands of birch are more or less confined to the western half. The approach adopted for surveying was very much of a general exploration, using a variety of techniques, as outlined in the preceding section. The lower slopes were first traversed, including the lower small enclosure, and all bracket fungi visible targeted for investigation. The route varied according to the visibility of bracket fungi. On reaching the far western fence line, the surveying route went uphill to close to the upper limit of mature birches and then downhill at an angle, crossing the mature birch woodland back to the central fence line.

After working the area for saproxylic beetles, the survey was directed to the upper section of the eastern enclosure, where there was a large amount of low, stunted birches associated with a boulder field. These birches were inspected for micro-moth activity – flying adults and signs of leaf-mines.

A separate stand of birches lies on the lower slopes at the eastern end of this enclosure. The birches here proved to be much younger and very few dead stems with bracket fungi could be found.

4. EVALUATION OF SITE CONDITION

A total of 18 species of saproxylic beetle were identified, including three species of British Red Data Book status and two of Nationally Scarce status. The RDB species are *Ropalodontus perforatus* and *Bolitophagus reticulatus,* which are characteristic of old Caledonian forest and previously known here, and the more widespread *Agathidium confusum*, which is a new site record. The first two species are specific to *Fomes fomentarius* brackets on dead birch stems; *A. confusum* is associated with various fungi on decaying wood and probably develops in slime moulds (Myxomycetes). The two Nationally Scarce species are the birch bark beetle *Scolytus ratzeburgi* and the decaying wood generalist *Quedius xanthopus*, a rove beetle (Staphylinidae). The former has been noted here previously but the latter is an addition to the site list. The non-graded shining fungus beetle *Triplax russica* (Erotylidae) was also found. This is also a specialist of *Fomes fomentarius* in Scotland, but uses different bracket fungi in southern England. It is known from fewer than 100 hectads and so merits up-grading to Nationally Scarce at the next species status review. The discovery of two additional significant species in 2013 may suggest that other interesting species remain to be discovered.

The stunted birches on the boulder field showed extensive signs of leaf-mining activity, with at least two types of leaf-mines. One appeared to be from an *Eriocrania* species but the other proved impossible to identify. The mines all appeared spent and so rearing was not possible. It was very clear, however, that the stunted birch habitat was in good condition. Heckfield & Beavan (2012) noted that "it is evident that the species thrives on the small stunted *Betula* plants which are in damp situations but exposed to sunlight". They noted larval feeding of *A. tineana* right across the eastern half of the site and in good numbers on 3 August 2012. They also found a range of other rare micro-moths:

- *Atemelia torquatella* (Yponomeutidae): a few larvae mining seedling *Betula* sp. Nationally Scarce.
- *Pseudotelphusa paripunctella* (Gelechiidae): one larva in spun leaves of *Myrica gale*. Nationally Scarce.
- *Acleris rufana* (Tortricidae) several larvae in spun leaves of *M. gale*, moths reared on September 2012. Nationally Scarce.
- *Pammene luedersiana* (Tortricidae): a few larvae in spun leaves of *M. gale*. The moth was reared on January 2013 and confirmed by dissection. The species is a pRDB1. This species is much rarer than *A. tineana*, or possibly under-recorded and is only known from four vice-counties, all in Scotland. Struan Wood appears to be a new locality. The moth has only been reared a few times in Britain and the larva appears to be undescribed.

Several Scotch argus butterflies (*Erebia aethiops*) were also seen.

One further invertebrate species of note was found in the younger birch stand of the eastern enclosure: the ash-black slug *Limax cinereoniger,* characteristic of ancient wood pasture.

The results from the 2012 and 2013 surveys clearly demonstrate that the condition of this SSSI is 'favourable-maintained'.

5. SITE MANAGEMENT RECOMMENDATIONS

5.1 Background

According to the Site Management Statement (14 September 2007), the beetles are currently in favourable condition but the upland birch woodland and the moth are in unfavourable condition. The problem with the birches was the lack of young replacement trees and saplings due to the grazing pressure. The extent of bracken was also identified as a problem.

The land is grazed by sheep as part of an agricultural tenancy, and herds of red deer have in the past wintered in the wood thereby increasing the grazing pressure. A 2-ha exclosure was erected in 1998 under the ESA scheme to allow controlled grazing to provide habitat suitable for the very specific requirements of *A. tineana*. However, surveys in 2003 and 2004 found few regenerating young birch trees.

5.2 Situation in late June 2013

The whole site appeared under-grazed in late June 2013. The ground vegetation had become dense and rank over much of the site, although the lack of grazing and browsing was encouraging good growth of young birches. No sheep were present but some fresh wool and dung provided evidence that some have been present relatively recently. The internal gates were all open and the site appeared to be managed as a single unit. Birch regeneration was evident locally throughout much of the open areas, including the enclosure, but poor within the older birch stand of the western half. There appears to be a significant age gap but some of the older trees may survive long enough for transfer of the beetle fauna to the developing next generation of trees.

The key concern here appears to be whether the new regeneration of birches will develop fast enough to provide future replacement trees for the old birch fauna.

Heckford & Beavan (2012) expressed some concern for the amount of bracken stating “In our view there is a need to control bracken encroachment on the site since this grows to a greater height than the *Betula* and shades it out. The areas of bracken broadly did not contain *Betula* plants and there were no larvae on the few plants that were growing amongst the bracken. For the same reason rank vegetation also needs to be avoided. In our view the area has been insufficiently grazed.”

5.3 Recommendations

While overgrazing has been a serious problem in the past, it appears that grazing levels need to be increased again. The combination of sheep and deer is not a good one for promoting the development and maintenance of upland birch stands or for controlling bracken, but may be suitable for producing the low stunted areas of birches required by *A. tineana*. It is therefore recommended that sheep grazing is restricted to the eastern half and that - if at all possible - grazing by cattle is explored for the western half. Appropriate hardy beef cattle have the potential to favour birch development: light poaching of the ground opens up patchy seed beds, while their heavier trampling may reduce the prevalence of bracken that is evident over much of the open slopes. Also, cattle are less likely than sheep to browse young birches. This new regime should be initiated as soon as possible, on a trial basis. Stocking levels would need to be kept low, perhaps too low to be economic for a farm tenant. If beef cattle cannot be found then the western area would probably be best left without grazing temporarily. It may also be sensible to fence out deer on this half of the site as they do browse young birches heavily.

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ANNEX A: FULL LIST OF INVERTEBRATES & FUNGI

Species identification	GB status	Assemblage
Coleoptera		
Cantharidae		
Cantharis pellucida		field layer, shaded
Malthodes marginatus		saproxylic
Rhagonycha lignosa		canopy
Ciidae		
Cis bidentatus		saproxylic
Cis castaneus (nitidus)		saproxylic
Ropalodontus perforatus	RDB3	saproxylic
Elateridae		
Athous haemorrhoidalis		field layer
Melanotus castanipes		saproxylic
Erotylidae		
Triplax russica	[NS]	saproxylic
Leiodidae		
Agathidium confusum	RDBI	saproxylic
Monotomidae		
Rhizophagus bipustulatus		saproxylic
Rhizophagus dispar		saproxylic
Rhizophagus ferrugineus	Local	saproxylic
Nitidulidae		
Epuraea biguttata		saproxylic
Epuraea pusilla		saproxylic
Epuraea rufomarginata	Local	saproxylic
Epuraea silacea		saproxylic
Scolytinae		
Scolytus ratzeburgi	Nationally scarce	saproxylic
Scraptiidae		
Anaspis regimbarti		saproxylic
Staphylinidae		
Quedius xanthopus	Nationally scarce	saproxylic
Tenebrionidae		
Bolitophagus reticulatus	RDB3	saproxylic
Hymenoptera		
Formicidae		
Formica lemani		ground layer
Oniscidea		
Oniscus asellus		general
Diplopoda		
Proteroiulus fuscus		saproxylic
Cylindroiulus punctatus		saproxylic
Ommatoiulus sabulosum		field layer
Mollusca		
Arion ater agg		ground layer

Arion subfuscus		ground layer
Discus rotundatus		ground layer
Lehmannia marginata		canopy
Limax cinereoniger	Local	epiphyte
Fungi		
Fomes fomentarius		saproxylic
Inonotus radiatus		saproxylic
Piptoporus betulinus		saproxylic

ANNEX B: IMAGES

High quality habitat for the saproxylic beetles of Caledonian birch

Stunted birch amongst boulder field

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