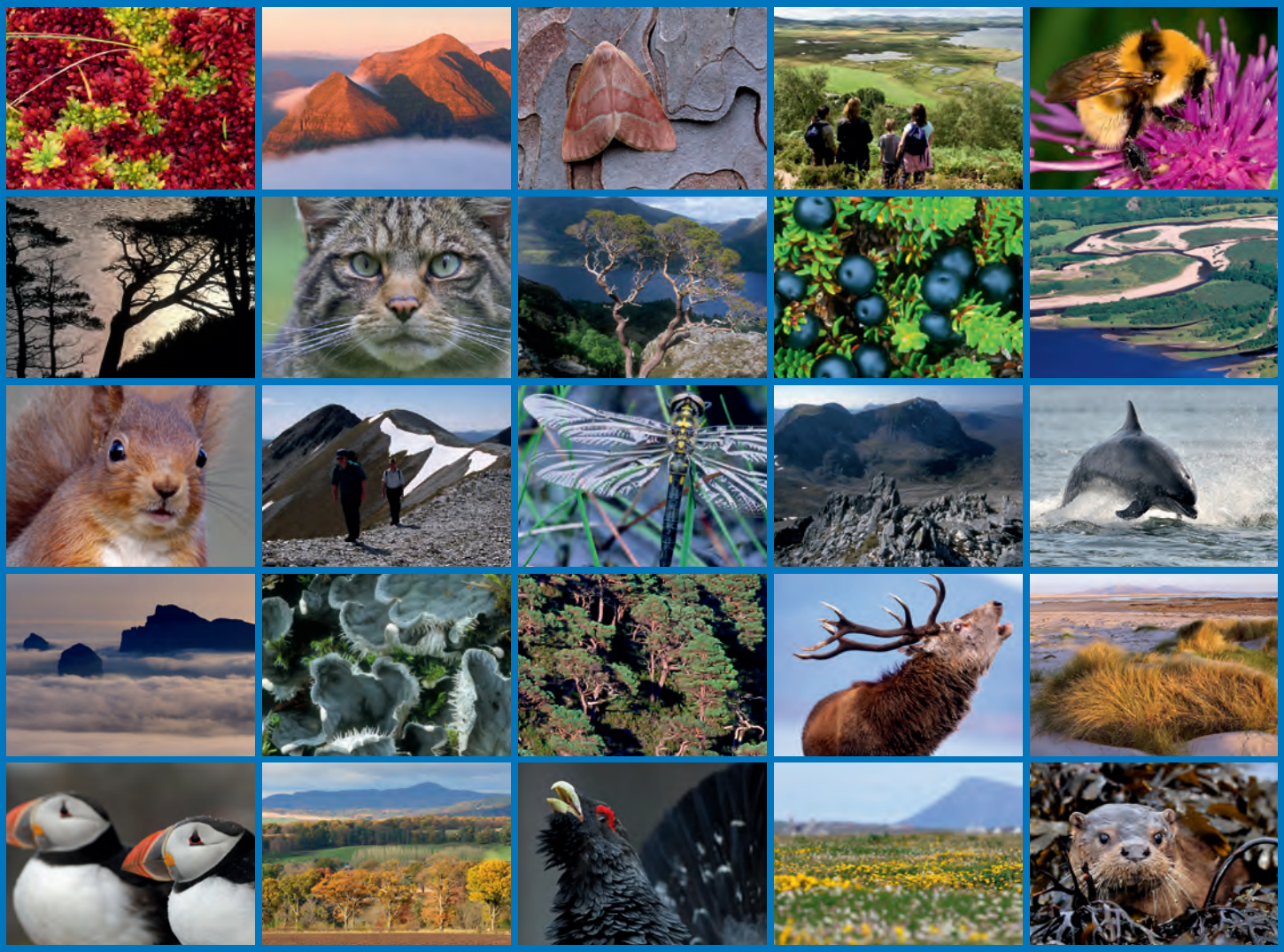
Scottish Natural Heritage
Commissioned Report No. 637

Site Condition Monitoring of invertebrates at Glen Tanar SSSI



Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

COMMISSIONED REPORT

Commissioned Report No. 637

Site Condition Monitoring of invertebrates at Glen Tanar SSSI

For further information on this report please contact:

Athayde Tonhasca
Scottish Natural Heritage
Battleby
PERTH
PH1 3EW
Telephone: 01738 458671
E-mail: athayde.tonhasca@snh.gov.uk

This report should be quoted as:

Alexander, K.N.A. 2014. Site Condition Monitoring of invertebrates at Glen Tanar SSSI. *Scottish Natural Heritage Commissioned Report No. 637.*

SCM Reports

This report was commissioned by NatureScot as part of the Site Condition Monitoring (SCM) programme to assess the condition of special features (habitats, species populations or earth science interests) on protected areas in Scotland (Sites of Special Scientific Interest, Special Areas of Conservation, Special Protection Areas and Ramsar). SCM is our rolling programme to monitor the condition of special features on protected areas, their management and wider environmental factors which contribute to their condition.

The views expressed in the report are those of the contractor concerned and have been used by NatureScot staff to inform the condition assessment for the individual special features. Where the report recommends a particular condition for an individual feature, this is taken into account in the assessment process, but may not be the final condition assessment of the feature. Wider factors, which would not necessarily be known to the contractor at the time of the monitoring, are taken into consideration by our staff in making final condition assessments.

This survey was based on a limited number of sample points. Previous and ongoing management at the site is expected to benefit the interests and is broadly similar to that outlined in the management recommendations.

COMMISSIONED REPORT

Summary

Site Condition Monitoring of invertebrates at Glen Tanar SSSI

Commissioned Report No.: 637
Contractor: K.N.A. Alexander
Year of publication: 2014

Background

Site Condition Monitoring (SCM) is a six year rolling programme of assessment of the state of notified features. This document reports on invertebrate SCM at Glen Tanar SSSI during July 2013. The features were the assemblages of Coleoptera and Diptera.

Main findings

- Seven nationally scarce beetles were found: *Abdera flexuosa*, *Coeliodinus nigritarsis*, *Quedius xanthopus*, *Rhagium inquisitor*, *Dendrophagus crenatus*, *Pytho depressus* and *Pityogenes quadridens*. The last four species are characteristic of Caledonian pine forest.
- Also of note was the old forest species ash-black slug *Limax cinereoniger*.
- The site appears to be in adequate condition for all key species, but not in optimal condition. The assessment is 'favourable-maintained'.
- The older pines are surrounded by dense young pine; these will not generate good quality pine habitat in the long term if a policy of localised thinning is not introduced soon.

Management recommendations are:

- Identify and map the areas with older pines in the open and initiate haloing work to ensure that the older trees have sufficient space to grow without crown competition from younger pines.
- Identify areas of young pines for thinning and promoting grown of old pine trees.
- Recognise 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.
- Controlled, low intensity grazing to encourage the development of diverse age structures of pines, and to enable open-grown trees to develop.

For further information on this project contact:
Athayde Tonhasca, Scottish Natural Heritage, Battleby, Perth, PH1 3EW.
Tel: 01738 458671 or athayde.tonhasca@snh.gov.uk
For further information on the SNH Research & Technical Support Programme contact:
Knowledge & Information Unit, Scottish Natural Heritage, Great Glen House, Inverness, IV3 8NW.
Tel: 01463 725000 or research@snh.gov.uk

Table of Contents **Page**

Acknowledgements

Athayde Tonhasca set up the contract and provided a summary compilation of invertebrate data for the site. Sandra Penman arranged access permission, Colin McClean (Wildlife Manager) and Eric Baird (Head Ranger), provided advice on areas with sensitive nesting birds and where access was restricted; the author is very grateful for permission to take a vehicle into the centre of the SSSI.

1. SITE DESCRIPTION

Glen Tanar SSSI comprises the Forest of Glen Tanar and adjacent moorland. The Forest occupies the slopes of the Tanar valley together with the confluent valleys of the Gairney and the Allachy, and it is one of the largest native woodlands in Britain.

The Forest canopy is entirely dominated by Caledonian pine *Pinus sylvestris* var. *scotica*, with a patchy juniper shrub-layer, particularly near the upper edges, which extend to 450 m above sea level. Broad-leaved trees occur locally and include birch, alder, holly, aspen and oak. An unusual range of age classes of Caledonian pine is present and young trees have colonised the rounded summits of the Strone and Tom Giubhais.

The field layer is mostly free-draining podsolised soils derived from granite and is dominated by combinations of blueberry, heather and feather-mosses. In places the drainage is impeded and a small forest bog is present near the Water of Allachy, but there are no extensive wetlands.

Glen Tanar has an interesting fungus flora with a number of species of boreal distribution and associated in Britain with native pine forests.

The SSSI has been designated for its native pinewood, subalpine dry heath, fungi assemblage, birds and invertebrates. Glen Tanar is best known entomologically for a unique population of the beetle *Chrysanthia nigricornis* (Oedemeridae) which develops in fallen pine branch wood. The citation states that the forest supports a wide range of invertebrates including a number of species associated with old pine such as the false blister beetle *Chrysanthia nigricornis* and the hoverfly *Callicera rufa*. The robber-fly *Laphria flava* and the green hairstreak butterfly *Callophrys rubi* are also found. The list of species with conservation status – British Red Data Book or nationally scarce – is outstanding and dominated by Coleoptera and Diptera. These two insect orders form the targets for Site Condition Monitoring (SCM).

In 1937 a shield fence was erected to exclude deer from the majority of the forest. A section was dismantled in 1996, and the owner promotes tree regeneration through deer culling alone. Traditionally Glen Tanar has been managed for a combination of timber production, sport-shooting of deer and grouse, and the seasonal grazing of cattle in summer. The summer grazing of cattle ceased in the 1990s, although provision for it remains in the current NNR Management Agreement. Little management is carried out in the 182 ha strict reserve zone, which is owned by SNH. Within the shield fence, there is a 1253 ha fenced forest zone that has been subject to sustainable timber extraction by small coup fellings and natural regeneration.

2. SUMMARY OF KNOWN INVERTEBRATE INTERESTS

Glen Tanar SSSI is known to be outstandingly rich in invertebrates, with a long list of British Red Data Book and Nationally Scarce species. Only species named in the SSSI citation are summarised here.

Chrysanthia nigricornis (Coleoptera, Oedemeridae) is only known in Britain from Glen Tanar, where it was first recorded in 1971 and most recently in 2000. It is unclear precisely where the species was found but the Millfield area appears to be the main focus of records, and this lies outside the SSSI boundary. The species appears to develop in substantial well-rotted fallen pine branches while the adults are attracted to blossoms in open sun. This suggests that site management should provide open forest conditions and encourage the development of large open-grown pines with good lateral branching. Dense stands of young pine are unlikely to provide suitable habitat. Its current conservation status - using the IUCN Red List Guidelines - is 'vulnerable' (Alexander *et al.,* in press).

Callicera rufa (Diptera, Syrphidae) larvae develop in rot-holes between bifurcating branches and in wet holes at the surface of stumps of Scots pine and larch. Adults are elusive, but females may be seen searching for oviposition sites on pine trunks and stumps. Trials have shown that rot-holes created 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 and has shown to occur in the majority of locations in northern Scotland with ancient Scots pine. 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 assigned Red Data Book 'endangered' status in Shirt (1987), it was downgraded to 'rare' in Falk (1991), and is due for further downgrading to 'nationally scarce' (R.K.A. Morris, pers. comm.).

Laphria flava (Diptera, Asilidae) is a large and powerfully built bee mimic. The larvae develop in large items of Scots pine dead wood, where they prey on longhorn beetle larvae feeding in the white-rotten fibrous sapwood. It favours open forest conditions where the pine trees have space to grow and to develop large lateral branches. It is characteristic of the ancient Caledonian pine forests of the drier eastern Highlands, principally in the Spey and Dee valleys, but also Culbin Forest. The peak in adult activity is in June and July. Its conservation status is 'rare' (Falk, 1991).

Dictyoptera aurora (Coleoptera, Lycidae) has recently been assessed as ‘vulnerable’ under the IUCN Red List guidelines (Alexander, in press). A specialist of the Scottish Highlands, it is best known from East Inverness-shire, but has also been reported from West Inverness-shire (Glenfinnan), Aberdeenshire (Glen Tanar SSSI), Moray, Mid-Perthshire and east Sutherland. It is a montane conifer species in Europe, where it is associated with *Abies*, *Picea* and *Pinus*. The larvae develop in decaying white-rotten pine trunks, but with no record of girth classes required or the bracket fungi species causing the decay. It is either carnivorous or omnivorous, with food digested externally by enzymes secreted on the mouthparts. Adults are short-lived and fly in the evening sunshine in May and June. There is a need to clarify its habitat requirements in relation to forest structure and extent, and to establish monitoring protocols. In the meantime it is important that open structured forest is maintained, generally by suitable grazing regimes which keep new woody growth patchy and enable a high proportion of individual trees to develop without canopy competition.

3. DESCRIPTION OF METHODOLOGY

Many invertebrates are highly seasonal and have annual life cycles. Identification generally requires the adult stage, which can be available for periods as short as weeks and on varying times depending on weather. The date selected for the survey was 26 June 2013 – this was judged to be within the optimal time of year to find adults of some of the key species. The day of monitoring was largely cloudy but bright nonetheless, and sunny spells developed as the day progressed. There was little wind so conditions were good for insect flight. The car thermometer was reading 13°C at the start of sampling and rose to 16°C by the end of the visit.

Monitoring was focused on the first bridge across the Water of Tanar (NO461941). The forest ride network provided easy access through the valleys, and forays were made to sample around older pines and to investigate larger items of dead wood. The morning was spent exploring westwards up the valley and out to to the open moorland edge. The afternoon was focused on the main valley downstream, by the tracks either side of Water of Tanar down as far as Glen Tanar House.

The basic monitoring methods are:

1. Large old trunks of living trees, especially those in well-lit sunny areas, investigated for the following: 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 sampled 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 sampled by sweep-netting low over the field layer and beneath the foliage.

4. EVALUATION OF SITE CONDITION

The pine forest along the Water of Tanar branch of the main valley was found to contain a good scatter of older pines in open ground along the valley bottom and up onto the lower slopes, but these are predominantly within a matrix of dense and even-aged young pine. Open forest is very little in evidence. Alder and occasional birch are locally frequent along the riverbanks and rowan was the main source of blossoms for flying insects. Fallen large pine branches were present in low numbers, although more may exist amongst the dense young pine growth. The nationally scarce beetle *Dendrophagus crenatus* was found beneath bark on two relatively recently fallen pine branches where the bark was still firmly attached. The weevil *Rhyncolus ater* and larvae of the nationally scarce longhorn beetle *Rhagium inquisitor* were also found here. These are all characteristic species of Caledonian pine forest. One well-rotted larger pine branch held larvae of the more widespread longhorn beetle *Rhagium bifasciatum*. The nationally scarce rove beetle *Quedius xanthopus* was found in a rotten pine stump. Overall, deadwood habitats were relatively poorly represented but the fauna is clearly one of moderate habitat quality.

The pines along the track from the Tanar bridge across to the Water of Allachy are evenly aged and uniformly thinned to forestry standards. Very little deadwood habitat was present. However, a recently fallen pine trunk had been left close to the lower bridge along the Water of Allachy and this proved to be a local hot-spot for pine fauna. The notable discovery here were larvae of the nationally scarce beetle *Pytho depressus* together with larvae of *R. inquisitor*. Also present were the rove beetle *Quedius plagiatus* and a larva of a snake-fly, presumably *Atlantoraphidia maculicollis* as this is the only species known from the Highlands. The uncommon beetle *Anisotoma castanea* was present amongst slime mould on the trunk.

The western side of the river, from Knockie Bridge back to the bridge in the Tanar side valley, also proved to be relatively rich in pine dead wood habitat. Recently fallen pine trunks of girths around 1 m were comparatively frequent along the river flats, and this was where the greatest variety of pine dead wood insects was found. Larvae of *P. depressus, D. crenatus* and *R. inquisitor* were plentiful beneath the sappy bark closely attached to the trunks, together with a few larvae of the widespread awl-fly *Xylophagus ater* – these were carefully checked for the old pine forest species *X. cinctus* but only *X. ater* could be found. The nationally scarce pine bark beetle *Pityogenes quadridens* was found by sweep-netting. A few dead stems with *Inonotus radiatus* brackets from riverside alders immediately above Knockie Bridge were inhabited by the nationally scarce false darkling beetle *Abdera flexuosa*. The old forest species ash-black slug *Limax cinereoniger* was also found under older loose pine bark on a fallen trunk. Overall this was the richest area found but still lacked large old pines.

In conclusion, none of the rarer species known from the SSSI could be found, although a good range of characteristic Caledonian pine forest species were detected, including many with nationally scarce status. However forest structure appears poor, dominated by dense young growth pine which is surrounding the few older pines. Site management for conservation does need attention, but the range of species does indicate that the overall site condition is favourable-maintained.

5. SITE MANAGEMENT RECOMMENDATIONS

Two main concerns arose from the visit:

- Older pines in the open are encroached by dense young pine.
- Young pine will not generate good pine habitat unless a policy of uneven thinning is introduced as soon as possible.

Old growth pine appears to be of limited extent, although it is difficult to be sure of this as much may be hidden amongst the dense young growth. The areas of old growth pine need to be assessed and action taken to clear them from the young growth. Haloing of individual veteran pine is required in order to favour the open forest invertebrate interests of the SSSI. Crown competition from younger and more vigorous pines threaten to kill the lower branches of the older trees and will eventually threaten entire trees with premature decline and death. Many of the special insects have sun-loving adult stages and open conditions are required around the host trees.

The forest appears to be under active forestry management. While conservation of the special interest of Glen Tanar SSSI is compatible with a certain level of forestry activity, there do need to be areas zoned for priority conservation management. This means protection of old growth stands and identification of areas of young growth to be managed sympathetically for invertebrate conservation. This requires thinning areas to develop open growth in parts of the stands. Dense pine forest does have its specialist invertebrates but, at present, these are being favoured at the cost of the rare and threatened old growth fauna.

The strict reserve zone is managed under a low-intervention regime and contains a long-term woodland structure monitoring transect established in 1989. This type of conservation management is primarily of academic interest and is an unproven regime for the conservation of old growth pine invertebrates. The most useful definition of minimum intervention for nature conservation is the minimum needed to protect, maintain and enhance the intrinsic values (Alexander & Green, 2013).

Site managers need to recognise 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. The area requires controlled, low intensity grazing to encourage the development of pine of diverse age structures, and to enable trees to develop in the open. Controlled 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. There is provision in the current NRA Management Agreement for summer grazing of cattle, and it is strongly recommended that this is restored as soon as possible and the impacts on forest structure closely monitored.

6. REFERENCES

Alexander, K. & Green, T. 2013. The sanctuary and special delight of kings: the nature conservation work of The Crown Estate in Windsor Forest and Great Park. *British Wildlife*, **24**, 305--315.

Alexander, K.N.A. In press. A review of the scarce and threatened Coleoptera of Great Britain: Elateroidea. *Natural England Research Reports*.

Alexander, K.N.A., Dodd, S. & Denton, J.D. In press. A review of the scarce and threatened Coleoptera of Great Britain: Tenebrionoidea. *Natural England Research Reports*.

Ball, S.G., Morris, R.K.A., Rotheray, G.E. & Watt, K.R. 2011. *Atlas of the hoverflies of Great Britain (Diptera, Syrphidae).* Wallingford, Biological Records Centre.

Falk, S. 1991. A review of the scarce and threatened flies of Great Britain (part 1). JNCC *Research & survey in nature conservation No. 39.*

Shirt, D.B. (ed.). 1987. *British Red Data Books 2: insects*. Peterborough, Nature Conservancy Council.

ANNEX A: LIST OF INVERTEBRATES

Group	Family	Species
Coleoptera	Cantharidae	*Malthodes fuscus*
	Carabidae	*Carabus problematicus*
	Cerambycidae	*Rhagium bifasciatum*
		*Rhagium inquisitor**
	Chrysomelidae	*Oulema melanopus*
		Phratora laticollis
	Cucujidae	*Dendrophagus crenatus**
	Curculionidae	*Coeliodinus nigritarsis**
		Hylobius abietis
		Polydrusus cervinus
		Rhyncolus ater
		Strophosoma melanogramma
	Elateridae	*Aplotarsus incanus*
		Dalopius marginatus
		Melanotus castanipes
	Leiodidae	*Anisotoma castanea*
	Melandryidae	*Abdera flexuosa**
	Monotomidae	*Rhizophagus dispar*
	Nitidulidae	*Epuraea biguttata*
	Pythidae	*Pytho depressus**
	Scolytinae	*Pityogenes quadridens**
	Scraptiidae	*Anaspis frontalis*
		Anaspis rufilabris
	Staphylinidae	*Atrecus affinis*
		Leptusa fumida
		Quedius plagiatus
		*Quedius xanthopus**
Diptera	Keroplatidae	*Orfelia nigricornis*
	Tipulidae	*Tipula irrorata*
	Xylophagidae	*Xylophagus ater*
Heteroptera	Miridae	*Pachytomella parallela*
Hymenoptera	Formicidae	*Formica aquilonia*
		Leptothorax acervorum
Lepidoptera	Nymphalidae	*Boloria selene*
	Geometridae	*Bupalus piniarius*
Psocoptera	Caeciliusidae	*Valenzuela burmeisteri*
	Psocidae	*Loensia fasciata*
	Stenopsocidae	*Graphopsocus cruciatus*
		'Raphidia' sp.
Oniscidea		*Oniscus asellus*
		Porcellio scaber
Diplopoda		*Cylindroiulus punctatus*
		Ommatoiulus sabulosum
		Proteroiulus fuscus

Group	Family	Species
Mollusca		*Arion subfuscus*
		Lehmannia marginata
		Limax cinereoniger
		Oxychilus alliarius
		Inonotus radiatus

*GB Nationally scarce

ANNEX B: IMAGES

A few older pines of open-grown form within dense even-aged young pine

Dense young growth pine which will not eventually form old growth forest

www.snh.gov.uk

ISBN: 978-1-78391-031-1

Policy and Advice Directorate, Great Glen House,
Leachkin Road, Inverness IV3 8NW
T: 01463 725000

You can download a copy of this publication from the SNH website.

recycle

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad