



Ledmore & Migdale

Management Plan 2015-2020

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THE WOODLAND TRUST

INTRODUCTION

The Trust's corporate aims and management approach guide the management of all the Trust's properties, and are described on Page 4. These determine basic management policies and methods, which apply to all sites unless specifically stated otherwise. Such policies include free public access; keeping local people informed of major proposed work; the retention of old trees and dead wood; and a desire for management to be as unobtrusive as possible. The Trust also has available Policy Statements covering a variety of woodland management issues.

The Trust's management plans are based on the identification of Key Features for the site and setting objectives for their management. A monitoring programme (not included in this plan) ensures that these objectives are met and any necessary management works are carried out.

Any legally confidential or sensitive species information about this site is not included in this version of the plan.

PLAN REVIEW AND UPDATING

The information presented in this Management plan is held in a database which is continuously being amended and updated on our website. Consequently this printed version may quickly become out of date, particularly in relation to the planned work programme and on-going monitoring observations. Please either consult The Woodland Trust website www.woodlandtrust.org.uk or contact the Woodland Trust (wopsmail@woodlandtrust.org.uk) to confirm details of the current management programme.

There is a formal review of this plan every 5 years and a summary of monitoring results can be obtained on request.

WOODLAND MANAGEMENT APPROACH

The management of our woods is based on our charitable purposes, and is therefore focused on improving woodland biodiversity and increasing peoples' understanding and enjoyment of woodland. Our strategic aims are to:

- Protect native woods, trees and their wildlife for the future
- Work with others to create more native woodlands and places rich in trees
- Inspire everyone to enjoy and value woods and trees

All our sites have a management plan which is freely accessible via our website

www.woodlandtrust.org.uk. Our woods are managed to the UK Woodland Assurance Standard (UKWAS) and are certified with the Forest Stewardship Council® (FSC®) under licence FSC-C009406 and through independent audit.

In addition to the guidelines below we have specific guidance and policies on issues of woodland management which we review and update from time to time.

We recognise that all woods are different and that the management of our sites should also reflect their local landscape and where appropriate support local projects and initiatives. Guidelines like these provide a necessary overarching framework to guide the management of our sites but such management also requires decisions based on local circumstances and our Site Manager's intimate knowledge of each site.

The following guidelines help to direct our woodland management:

1. Our woods are managed to maintain their intrinsic key features of value and to reflect those of the surrounding landscape. We intervene when there is evidence that it is necessary to maintain or improve biodiversity and to further the development of more resilient woods and landscapes.
2. We establish new native woodland using both natural regeneration and tree planting, but largely the latter, particularly when there are opportunities for involving people.
3. We provide free public access to woods for quiet, informal recreation and our woods are managed to make them accessible, welcoming and safe.
4. The long term vision for our non-native plantations on ancient woodland sites is to restore them to predominantly native species composition and semi-natural structure, a vision that equally applies to our secondary woods.
5. Existing semi-natural open-ground and freshwater habitats are restored and maintained wherever their management can be sustained and new open ground habitats created where appropriate.
6. The heritage and cultural value of sites is taken into account in our management and, in particular, our ancient trees are retained for as long as possible.
7. Woods can offer the potential to generate income both from the sustainable harvesting of wood products and the delivery of other services. We will therefore consider the potential to generate income from our estate to help support our aims.
8. We work with neighbours, local people, organisations and other stakeholders in developing the management of our woods. We recognise the benefits of local community woodland ownership and management. Where appropriate we allow our woods to be used to support local woodland, conservation, education and access initiatives.
9. We use and offer the estate where appropriate, for the purpose of demonstration, evidence gathering and research associated with the conservation, recreational and sustainable management of woodlands. In particular we will develop and maintain a network of long-term monitoring sites across the estate.
- 10 Any activities we undertake will conform to sustainable forest management principles, be appropriate for the site and will be balanced with our primary objectives of enhancing the biodiversity and recreational value of our woods and the wider landscapes.

SUMMARY

This public management plan briefly describes the site, specifically mentions information on public access, sets out the long term policy and lists the Key Features which drive management actions. The Key Features are specific to this site - their significance is outlined together with their long (50 year+) and short (5 year) term objectives. The short term objectives are complemented by a detailed Work Programme for the period of this management plan. Detailed compartment descriptions are listed in the appendices which include any major management constraints and designations. A short glossary of technical terms is at the end. The Key Features and general woodland condition of this site are subject to a formal monitoring programme which is maintained in a central database. A summary of monitoring results is available on request.

1.0 SITE DETAILS

Site name:	Ledmore & Migdale
Location:	Spinningdale, Bonar Bridge
Grid reference:	NH661904, OS 1:50,000 Sheet No. 21
Area:	690.98 hectares (1707.45 acres)
Designations:	Ancient Semi Natural Woodland, National Conservation Review site, National Scenic Area, Scheduled Ancient Monument, Site of Special Scientific Interest, Special Area of Conservation

2.0 SITE DESCRIPTION

2.1 Summary Description

This wild and rugged landscape comprises rich and diverse habitats including dense broadleaved deciduous woodland, conifer plantations, heather moorland, marsh and rocky crags. Not only beautiful with commanding views, it is also of immense national importance for nature conservation.

2.2 Extended Description

Introduction

Ledmore and Migdale Woods lie around the small village of Spinningdale, within the Dornoch Firth National Scenic Area. A network of more than 12km of paths allows visitors to explore the woods, which stretch across three distinct and craggy hills, commanding outstanding views of the surrounding landscape. The site is the most northerly of the Trust's woodlands, and also one of its largest, extending to nearly 700 ha.

Ledmore and Migdale is of national interest for nature conservation, encompassing three Sites of Special Scientific Interest (SSSIs): Ledmore Oakwood (95 ha) Migdale pinewood (144 ha) and Spinningdale Bog (29 ha). Ledmore Oakwood is also designated as a Special Area of Conservation (SAC). The site is a mosaic of woodland with open ground, which provides a highly diverse range of habitats.

Migdale Pinewood is one of the most northerly pinewoods in Scotland. It supports a remarkable range of 'ancient pinewood indicator' invertebrates, lichens and plant species, which suggest continuity with the post glacial Caledonian Pine Forest. Historical records, however, indicate that much of the site was planted with larch and Scots pine in the 18th and 19th centuries.

Ledmore oakwood is an Ancient Semi Natural Woodland (ASNW) and is recorded in historic documents as far back as 1628. As a resource of valuable timber close to a navigable waterway, it has been much exploited over the centuries.

Out-with the two woodland Sites of Special Scientific Interest, the forest is dominated by birch, with a lesser proportion of pine, much of which has regenerated since WWII when the Canadian Forestry Corp felled large swathes for the war effort.

The underlying bedrock is granite, and the soils are largely acid in nature. In some areas, notably Migdale Rock, the granite contains veins of alkaline minerals (epidote and calcite) which have created conditions suitable for some rare and specialised lime loving plants.

The woods are rich in biodiversity with a vast array of plant, insect, bird and animal life including deer, otters, pine marten osprey, peregrine and black grouse. Wildcat are known to be in the area, but sightings are rare. The woodland understory provides a habitat for a number of rare flowers, such as the creeping ladies tresses orchid. On an even smaller scale there is a rich insect life, including the fascinating Slavemaker Ant, and a variety of lichens, many of which are rare outside ancient woodland habitats.

Ledmore and Migdale Woods are important for the contribution they make to the network of woodland habitats which stretches across the south eastern corner of Sutherland. This network is diverse in character and includes key ancient semi natural woodlands - such as Gearrhoille oak wood at Ardgay, Amat Pinewood at the head of Strathcarron, the Mound Alderwoods near Golspie and the birch woods of Easter Fearn as well as numerous scattered fragments. The area also supports large areas of commercial conifer woodland, including a number of former ancient woodland sites, which have been replanted with commercial conifer crops, mostly in the last century.

3.0 PUBLIC ACCESS INFORMATION

3.1 Getting there

Two bridges cross the Firth - an elegant steel arch over the Kyle of Sutherland at Bonar Bridge, and downstream, at the old ferry crossing, the Dornoch Firth Bridge built in 1991. Between these crossings Ledmore Oakwood skirts the northern shore, with Migdale Pinewoods marching across the hills beyond.

Either approach makes an inspiring start to an exploration of the woods and the 7500 ha Dornoch Firth National Scenic Area in which they lie. The road to Bonar Bridge passes through pretty settlements, and affords spectacular views to the woods from Strule Hill to the south; while the main A9 route over the Dornoch Bridge gives a long view upstream to Spinningdale, and, nearer at hand, Skibo Castle estate.

Maps: OS Explorer 441, Landranger/Discoverer 21
Grid Reference NH66 1904

Public transport

There is no regular public transport to the woodland, but trains on the Inverness-Wick line stop at Ardgay, 9.7km (six miles) east; and buses run to Bonar Bridge and Spinningdale. For information on trains and also bus services, contact Traveline on 0871 200 2233, or at travelinescotland.com

Coaches travel to Dornoch. For details of coach services contact National Express on 0870 580 8080, or at nationalexpress.com

By car

The wood is about an hour's drive north of Inverness on the A9 Inverness to Wick/Thurso road. To reach the wood from the A9, turn off at Clashmore and travel 8km (five miles) west on the A949 to Spinningdale. From the village, take a right turn onto a minor road sign-posted 'Migdale' and travel 0.8km (half a mile) up the Fairy Glen road to reach a Torroy car park on the right.

Alternatively, if approaching from the west through Bonar Bridge, take the A949 for 8km (5 miles) to reach Spinningdale. From the village take the left turn sign-posted 'Migdale' onto the Fairy Glen road, and proceed as above.

Further parking is available in a lay-by adjacent to the northern shore of Loch Migdale (reached from Bonar Bridge) with informal road-side parking also possible at entrance points around the site. Please take care not to obstruct gates or passing places.

3.2 Access / Walks

There are several entry points around the site, giving access to a network of more than 12km of paths and tracks, allowing visitors to explore the woods which stretch across three distinct and craggy hills.

The track running from the main entrance (off Fairy Glen road) to the east end of Loch Migdale is wide and grassy, with gentle to moderate inclines. The majority of the other tracks provide moderate to strenuous walking, with some significant slopes and uneven surfaces. Please note that the paths can become wet and very slippery in winter.

A free leaflet about Ledmore and Migdale Wood is available locally, and from the Woodland Trust Scotland, including information on the woods and suggested walking routes. There are information boards with maps at the main entrances.

You can also find walking routes at walkhighlands.co.uk

4.0 LONG TERM POLICY

The long term vision for Ledmore & Migdale is that it will be a mosaic of ancient and semi-natural woodland and open ground habitats, valued regionally and nationally for its outstanding landscape, rich biodiversity and engaging history. It will be used regularly as a learning and recreational resource for local communities and schools, and visitors will understand and appreciate the site in its historic and landscape context.

Dynamic processes of natural succession will be taking their course across the site, resulting in evolving compositions, locations and densities of woodland cover and open spaces. Up to 20% of the site may be open ground habitats at any one time, however a minimum of 5% of the site will be permanently retained as open ground, including valley mire habitat and historic features. Ancient woodland components will be secure, and the populations of key rare or threatened species, including the rock cinquefoil, *Potentilla rupestris*, will remain viable.

A limited range of management interventions will focus on significant opportunities or threats relating to the biodiversity of the site. Thinning of planted ancient woodland areas will have created a varied stand structure, thus supporting the survival of and colonisation by specialist woodland flora and fauna, and promoting long-term stand stability. Invasive non-native species will have, as far as possible eliminated. Spinningdale Bog will be managed to retain a succession of habitats from open water to wet woodland. Deer impact will be monitored, and management will be undertaken to maintain browsing levels within acceptable limits.

The three year 'People and Trees' project, will be completed in 2016, including improvements to the access infrastructure, provision of on-site and on-line interpretation, and delivery of a programme of engagement events, activities and resources for local communities, schools and visitors. The impact of the People & Trees project will be evaluated and a plan for ongoing, sustainable public engagement will be developed in line with the Trust's objectives, and the needs and preferences of local stakeholders & communities.

5.0 KEY FEATURES

The Key Features of the site are identified and described below. They encapsulate what is important about the site. The short and long-term objectives are stated and any management necessary to maintain and improve the Key Feature.

5.1 Mixed Habitat Mosaic

Description

The habitat mosaic of Ledmore and Migdale Woods is made up of several distinct components arranged in an irregular pattern of small and large patches. There are at least 23 distinct NVC communities and sub-communities (Hughes & Entwistle 1997)

The main habitat types are broad-leaved deciduous woodland mainly of oak and birch, semi-natural coniferous woodland, coniferous plantation and mixed woodland. Minor tree species are important for their contribution to biodiversity and their cultural significance. These include ash (boundary walls) aspen (Rare longhorn beetle *Saperda carcharias*, and the aspen hover fly *Hammerschmidtia ferruginea*), bird cherry (*Hammerschmidtia*) rowan (*Osmia uncinata*), hazel (lichen spp.), gean, crab apple, blackthorn, hawthorn, holly, willows, alder and juniper. In particular, the site is notable for its abundant juniper.

Currently, approximately 18 % of the site is open ground habitat, including wet and dry acidic heath, dwarf shrub heath, blanket mire, screes and cliffs, acidic grassland, marshy grassland and wet flushes (this excludes Spinningdale Bog which is described as a separate Key Feature below). The varied geology and topography provide many small niches for locally rare plants; for example rock cinquefoil *Potentilla rupestris* on base-rich areas of Migdale rock, and rock whitebeam *Sorbus rupicola* by the shore of the Dornoch Firth

Among the bird species recorded across the site are wood warbler, redstart, tree pipit, crossbill, lesser redpoll, great spotted woodpecker, peregrine, black grouse and osprey. The woods are located in an area identified by the RSPB as key for the maintenance and expansion of black grouse and capercallie, both in a regional & national context.

Over 500 species of arthropod (mainly insects) have been recorded at Ledmore & Migdale. The woods are within one of Butterfly Conservation Scotland's ten 'Butterfly Survival Zones' for Pearl-bordered Fritillary.

The major components of the semi-natural habitat mosaic of Ledmore and Migdale woods are described below:

a) Migdale pinewood (cpt 3) is one of the most northerly pinewoods in Britain. Parts of the wood have been planted circa 1870, but some areas - in particular on and around the steep rocky slopes of Migdale Rock - may have developed naturally. On the southern slope of the rock, all age classes of pine are represented and extensive areas of Juniper form an understorey, principally in the scree belt. The woods here are of NVC type W18 *Pinus sylvestris* - *Hylocomium splendens*. The groundflora is mainly blaeberry and bracken, but is locally rich with primrose, bugle and creeping ladies tresses *Goodyeria repens*. The south facing crags of Migdale Rock support a calcareous cliff

sub-montane flora including rock rose (*Helianthus numularium*) wild strawberry (*Fragaria vesca*), pyramidal bugle *Ajuga pyramidalis* and rock cinquefoil *Potentilla rupestris*. Rock cinquefoil is only known to exist at two locations in Scotland, the other being at nearby Loch Fleet. On the south facing cliffs there is a peregrine falcon nesting site.

b) Ledmore oakwood (cpt 3) is almost entirely dominated by even aged oaks which appear to be a *Quercus robur* x *petraea* hybrid ranging from 100 to 200 years old. Small groups of mature penduculate oak are also present. It is the largest oak-dominated woodland in Sutherland and one of the most northerly, large oakwoods in Britain. A smaller area of oak woodland is present on the SW slope of Migdale Rock.

The main NVC type is W17d *Quercus petraea* - *Betula pubescens* - *Dicranum majus* woodland - (*Rhytidiadelphus triquetrus* sub-community) but patches of W17a *Quercus petraea* - *Betula pubescens* - *Dicranum majus* woodland - (*Isoetecium myosuroides* - *Diplophyllum albicans* sub-community) appear on boulder screes, and W17c *Quercus petraea* - *Betula pubescens* - *Dicranum majus* woodland - (*Anthoxanthum odoratum* - *Agrostis capillaris* sub-community) is present where dense canopy cover shades out the ericaceous undershrubs.

There are a few specimens of the rare Rock Whitebeam, *Sorbus rupicola* in Ledmore Oakwood (cpt 7) - this is one of only two sites recorded in eastern Scotland, the other being a few miles north at Loch Fleet. It grows on the edge of the Dornoch Firth within a 200 m stretch where there are locally lime-rich conditions.

So far 78 species of insect have been recorded in Ledmore oakwood including 37 species of Lepidoptera and other species previously unrecorded at these latitudes, notably *Neuroterus albipes*, and *Dasyneura malpighi* (gall-forming insects) and *Heliozella sericella*, *Tischeria ekbladella*, *Profenusa pygmaea* and *Ectoedemia albifasciella* (leaf miners). (Entwhistle 1998)

Among the bird species recorded in the oak woodland are: Sparrowhawk, Buzzard, Redstart, Mistle Thrush, Willow Warbler, Wood Warbler, Goldcrest, Spotted Flycatcher, Treecreeper, Siskin, Redpoll, White's Thrush (rare visitor) and Jay. The woodland edge along the Dornoch Firth has been identified as an otter activity cluster site.

c) Large tracts of the site, totalling approx. 200ha are in the process of succession from open ground to semi-natural woodland via regeneration. Most of this is occurring in areas where there was formerly woodland cover, and the trees have either been felled, burnt or windblown. A significant amount of felling - approximately 2/3 of the entire site - took place in the 1940's when two Canadian Forestry Corps logging camps were operating on the site. A significant regeneration pulse derives from the 1980s-90s, probably related to the withdrawal of stock grazing and, anecdotally, several years of high deer culling by a sporting tenant. New seeding recruitment has slowed in the past decade as coarse vegetation has developed and deer pressure has increased. The density and age of regeneration varies widely, and is patchy in some areas, and very dense and robust in others. Approx 130ha has reached pole stage or semi mature, while approx. 70 ha is established regeneration. Approx. 20ha of this regenerating woodland is on former Ancient Woodland sites. Pine and birch are the dominant species.

Tree disease has not been an issue to date: There are very few ash trees, and so far chalara is absent from the area.

Significance

The mosaic of woodland with open ground habitats in an intimate mix has created a very diverse habitat. The biodiversity of the site has been recognised with the SSSI and SAC designations within its boundaries

The development of native woodland through natural regeneration will extend and buffer existing semi-natural woodland across site, forming a significantly larger core habitat area.

This large, contiguous area of semi-natural woodland is important in the context of climate change, as it likely to be more stable and resilient than the more fragmented woodland typical of the Highlands. The woods also have a significant cultural value, having once been extensively occupied with associated farming, forestry and industrial activity.

There is a significant Common Juniper population on the site, mainly around Migdale Rock and on the lower slopes to the north of Spinningdale bog. Juniper is a vulnerable and declining species in Scotland, and the population at Ledmore & Migdale has been described as the most significant in the north of Scotland outside Speyside (Entwhistle 1998).

The mixed habitat mosaic supports a range of spp. regarded as wholly reliant on the habitat provided by the site

Management of the mixed habitat mosaic contributes to the Woodland Trust objectives to protect, restore and create native woodland.

Opportunities & Constraints

An area of c. 0.5 ha of larch at the base of the rocky S. face of Migdale (cpt 3c) offers the opportunity to restructure and create suitable habitat for juniper regeneration by thinning/felling and extraction to increase light levels and create ground disturbance.

Deer browsing is a constraint on successful tree regeneration and on the survival of veteran hazel stools (NB to preserve lichen interest, these stools must not be coppiced). Deer present a serious threat to new recruitment of seedling regeneration, with Juniper being especially vulnerable to browsing.

Locally dominant bracken is a constraint on successful tree regeneration and may reduce the habitat value of open glades, especially for Pearl Bordered Fritillary, which, while it requires bracken to complete its lifecycle, is not favoured by dense cover. Bracken control in selected areas may provide the opportunity to diversify the habitat mosaic.

The site has a long history of fire events, and represents a high fire risk. As well as the potential hazard to human life and infrastructure, fire can have a significant impact on biodiversity, with both negative and positive outcomes.

The native pinewood feature on Migdale Rock SSSI (cpt 3) is currently categorised by SNH as being in 'unfavourable - declining' condition on account of the presence of non-native species, principally larch.

Cotoneaster has been identified as a potential threat to *Potentilla rupestris* on Migdale rock

Forestry operations such as thinning and felling may disturb rare breeding birds and should be restricted to the period 1 Sept-15th April.

Threats from tree disease may affect the site in future (Ash dieback, *Dothistroma*, *P. ramorum*) although none currently none to be present (2016). *Dothistroma* would have the greatest impact due to the extent and importance of the Scots pine component of the woods.

Factors Causing Change

Natural succession, Invasion by non-native species, Wind damage, Grazing & browsing by deer.

Long term Objective (50 years+)

There will be a diversity of semi-natural woodland and non-woodland habitats across the site, providing a high biodiversity potential, and retaining the interest of the cultural landscape.

The proportion of woodland cover to open ground will be gradually increasing, however it is anticipated that a minimum of 5% and maximum of 20% open ground habitat (currently 19%) will persist within the mosaic. Note: this excludes Spinningdale Bog which is described as a separate key feature below.

Native habitats and species (where they are wholly dependent on the habitat) will be secure from threat of ongoing change or decline due to the spread of invasive native or non-native species.

A permanently irregular age structure and tree density will be developing at whole site level, creating opportunities for the recruitment of future veteran trees, the ongoing retention & colonisation of associated woodland species including flora, fungi and bryophytes, and the development of stable, windfirm stand structures

Designated sites will be in 'favourable condition' as assessed by SNH

Short term management Objectives for the plan period (5 years)

- a) Approx. 1.7 ha of new native woodland (planted 2013) including a significant component of hazel, will be established in cpt 1b (known as Torroy Woodland Creation area) by 2020 at min. 1600 trees/ha, healthy, and in a condition capable of continued growth given no further weeding and subject to normal ongoing maintenance operations. If growth is adequate, hazel will be cut to stimulate coppice growth.
- b) A Deer Management Plan (DMP) will be put in place by 2016. This will use baseline impact monitoring data (beginning 2015 and carried out annually) to assess the impact of deer on the site. The DMP will be used to set cull targets and define other measures needed to ensure that deer numbers move towards an equilibrium level such that the various habitats are not adversely impacted by deer and in the medium term can be managed without fencing. To help deliver the plan there will be engagement with neighbouring land managers through active participation in the local informal Deer Management Group.
- c) Aspen will be present in age classes ranging from established regeneration to pole stage at a minimum of Occasional on the DAFOR scale across a 2.5 ha core area in cpt 2b by 2020.
- d) By 2017 control of cotoneaster will have begun (with the medium term goal of eradication) in the areas of Migdale Rock (cpt 3) that are accessible without ropes. The colonies of *Potentilla rupestris* & other calcareous cliff sub-montane flora will be monitored to assess the threat from cotoneaster, and if a significant threat is present, then control will be carried out.
- e) An area of c. 5 ha of European Larch at the base of Migdale Rock (cpt 3c) will have been thinned/felled and extracted by 2020 to create suitable conditions for regeneration and spread of the adjacent Juniper population. This action will be subject to the prior achievement of deer management objectives to reduce damage to a level compatible with successful Juniper regeneration. Non-native spruce within the SSSI will have been eliminated or reduced to rare occurrences.
- f) By 2020, a strategy for the on-going management of larch in Migdale Rock SSSI will have been developed, in relation to threats it may pose to integrity of the pinewood habitat. This will have been informed by a comparative survey of regeneration in general and larch and pine regeneration in particular carried out in 2016, and repeated in 2020.

5.2 Ancient Semi Natural Woodland

Description

The site incorporates a total of 94ha ancient semi-natural woodland, as recorded on the Ancient Woodland Inventory.

By far the most significant part of the ancient woodland component is Ledmore oakwood (cpt 7, AWI classification 1a). This area of 68ha is dominated by hybrid oak *Q. petraea* x *robur* = *Q. rosacea*. The first known direct reference to Ledmore Wood is in a charter of 1628 of the lands of Creich which refers to the 'wood and pasture of Leadmore'. The oakwood also appears on General Roy's military survey of Scotland of 1747-55. By the 18th Century the oakwoods were being systematically coppiced to produce bark to make tannin, which was used to cure leather. Another small area of ASNW oakwood lies on the north shore of Migdale Loch, and is also known to have been coppiced in the 18th century.

There is a possibility that the present day Ledmore oakwood may have been planted in the mid 19th century after felling of a previous coppice oak stand, however it may have originated as singled coppice from trees of semi-natural origin or earlier planting. Old woodland lichens found in the oakwood indicate long term continuity of woodland. The oaks in the small stand by loch Migdale, by contrast, have been left to grow as multi-stemmed trees after the last coppicing, and the stand exhibits greater species variety with frequent scots pine, aspen and juniper.

The remainder of the ASNW at Ledmore & Migdale is in smaller pockets dominated by birch and/ or scots pine in cpts 1,2 and 5 totalling 26ha (AWI classification 2a). in cmt 1 & 2 the remnants are associate with archaeological evidence of former farmsteads and field patterns - although they may also be a legacy of a 'small deer park' These are associated with former farmsteads and field patterns, along the south facing or with the riparian zone along A significant number of ancient pinewood indicators are present amongst the vascular plant, lichen and invertebrate populations throughout Migdale pinewoods - not just in the ASNW areas. This suggests that either a the ancient pinewoods relict may be of greater extent than recorded, or that site conditions and past management have allowed these species to survive and re-colonise more successfully than would be expected elsewhere.

Significance

The large areas of ASNW within Ledmore & Migdale woods, and the extensive buffering by other woodlands of semi natural origin means that there is a robust core area and high potential for future continuity of habitats on this site.

Management and maintenance of the ASNW component on the site contributes to meeting the Woodland Trust objective of 'No further loss of ancient woodland'

Opportunities & Constraints

The oakwood is even-aged and is showing few signs of recruitment from seedling regeneration, which may result in gaps in the recruitment of future veteran trees, and a potential associated decline in ancient woodland species. There is an opportunity to diversify the age structure by adapting existing regeneration exclosures and by expanding the oakwood at its eastern end into cpt 8b.

The pinewood component across the whole site has a varied structure and has been expanding through natural regeneration . This is providing an opportunity for ancient woodland species to expand their range from the core ASNW areas.

Significant populations of red and sika deer, and to a lesser extent roe present a serious threat to recruitment of seedling regeneration, particularly in Ledmore oakwood.

Factors Causing Change

Natural succession, grazing & browsing by deer, invasive exotic shrubs, wind damage

Long term Objective (50 years+)

The total area of ancient woodland will not diminish. The processes of natural succession will remain dynamic within the ancient woodland, resulting in evolving structures and densities of cover, and expansion of woodland into new areas.

A permanently irregular age structure will be developing within the ancient woodland component at a whole site level, creating opportunities for the recruitment of future veteran trees, and the on-going retention of associated ancient woodland species and assemblages. Frequent standing and fallen deadwood will be present and there will be no significant threats from invasive exotic species.

Short term management Objectives for the plan period (5 years)

- a) A Deer Management Plan (DMP) will be put in place by 2016. This will use baseline impact monitoring data (beginning 2015 and carried out annually) to assess the impact of deer on the site. The DMP will be used to set cull targets and define other measures needed to ensure that deer numbers move towards an equilibrium level such that the various habitats are not adversely impacted by deer and in the medium term can be managed without fencing. To help deliver the plan there will be engagement with neighbouring land managers through active participation in the local informal Deer Management Group.
- b) By 2020 in the deer fenced 1998 regeneration plots A, D, E & G (cpt 7g) (as identified in Oakwood Regen survey Beck 2103) average overall stocking will be min 1600/ha, of which min 400/ha will be oak at greater than vegetation height. Existing deer fenced will be maintained. In plot G (cpt 7gG) regeneration will be supported with annual bracken control. A review of the management of the Ledmore Wood plots in the context of the wider management of the oak wood will be undertaken, in consultation with SNH, and in the light of changes in deer impacts following implementation of the DMP and fencing of cpt 8b.
- c) By 2020 browsing impacts in cpt 7f (the parts of Ledmore Wood outwith the fenced plots) will be significantly reduced, as measured by annual browsing impact monitoring. Unbrowsed tree seeding regeneration and understory vegetation will be at least Rare on the DAFOR scale.
- d) By 2020, approx. 8ha new Upland Oakwood habitat will be created to buffer and extend the Ledmore Wood ASNW. A minimum 1600 native trees/ha, including min 500 oak/ha, will have been established in a fenced enclosure in cpt 8b (PAWS zone 15) via planting of oak and natural regeneration of other species. Should natural regeneration of other species not be forthcoming, they will be planted to achieve the required stocking density throughout the compartment.
- e) Rhododendron and Gaultheria will have been reduced to rare occurrences by 2020. Key locations are cpt 7f (Ledmore Wood), cpt 8a,b,c (PAWS zones 15 & 16, Craeg na Sroine). Investigations will be made into potential off-site sources, and discussions undertaken to explore options to prevent reinfection.

5.3 Planted Ancient Woodland Site

Description

Approximately 178 ha within Ledmore & Migdale is identified in the Scottish Ancient Woodland Inventory (AWI) as Planted Ancient Woodland Site (PAWS). Of this total approximately 40% is of semi-natural origin (overwhelmingly AWI classification 2a, with a single area of 6ha classified as 1a). The remaining 40% is of plantation origin (AWI classification 2b).

Ledmore & Migdale was extensively planted with larch and Scots pine, starting in the late 18th century and reaching a peak in the mid-19th century (Historical Records, Bangor-Jones 2014). Local memory is of a landscape dominated by huge pines when the Canadian loggers arrived during WW2 to fell timber for the war effort (Matheson 2014), which suggests that at least some of it was still on its first rotation. Much of the plantation-origin PAWS was included in the major harvesting operation during WWII.

The earliest available map evidence is the Roy map c 1760, on which only Ledmore oakwoods are identifiable. The Burnett and Scott map, surveyed 1831-31, shows what appears to be mixed plantation forest extending from Ledmore oakwood (cpt 7) over the top of À Chraisg and down to Spinningdale Bog (cpts 6, 8, 9, 10). Other woodland appears as small patches of broadleaved trees, likely to be of semi-natural origin; this is marked on the lower south west slope of Migdale Rock, wrapping round the eastern end of the rock, and on the lower slopes of Creag a Bhealich to the north of the rock. The OS 1st edition map c. 1860 shows woodland extending over the whole of the present day site, only excepting Spinningdale bog, the summit of Migdale Rock, and a few farmstead fields.

The area of PAWS identified by the Scottish Ancient Woodland inventory does not, however, take in the whole of the woodland as marked on the OS 1st Edition, or even that on the earlier Burnet & Scott map. For the current management plan, the PAWS resource has been assessed as those areas which appear on the Scottish AWI, plus contiguous ground which appears as woodland on one of the 19th C maps, and which has remnant ancient woodland features e.g. ground flora. Two additional areas, cpt 6a and cpt 1c-g, which are shown as wooded on the OS 1st edition, but not recoded on the AWI, will be surveyed during the course of the management plan period.

Today, the PAWS resource at Ledmore & Migdale is Scots pine dominated, although it seems likely that at least the south facing slopes of Migdale Rock and Creag a Bhealich would formerly have been more diverse with a significant, or indeed dominant broadleaf component. Only occasional non-native conifer species survive from former plantations, principally larch, which casts a relatively light shade, and is therefore less problematic than other exotic conifer species. Ground flora is dominated by blaeberry and heather, with greater or lesser diversity of ancient woodland indicator flora including pinewoods specialists Creeping Ladies Tresses, lesser Twayblade, and Coralroot Orchid. The ground flora is notably more diverse in the PAWS areas of semi-natural origin, and where there are base rich influences.

Where the Scots pine is well-spaced with a secure woodland specialist ground flora, it can be described as Restored Ancient Woodland Site (RAWS), although it remains somewhat of a pine monoculture. In other areas there are dense, un-thinned stands of Scots pine with birch, which have developed from planting or natural regeneration. Finally there are some areas where limited regeneration has occurred after windblow, fire or felling in the past 30-70 years, and where bracken has become well-established.

Significance

Restoration of PAWS represents the only opportunity to increase the area of ancient woodland with semi-natural characteristics.

A healthy restored PAWS resource at Ledmore & Migdale will connect the fragmented ancient woodland components, and ensure that the whole site operates as a functional ecosystem.

The Woodland Trust is committed to restoring all non-native conifer PAWS type woodland to Restored AWS (RAWS) in its ownership and to ensure the continuing survival and where possible enhancement of the ancient woodland components.

Opportunities & Constraints

Much of the PAWS resource has strong semi-natural characteristics and supports a range of ancient woodland species and assemblages. There is potential to expand the ancient woodland species found in the RAWS, ASNW and other hotspots on the site into those PAWS areas which are still categorised as threatened.

The 'ideal' conditions to support the fullest range of pinewood specialist flora and fauna is a diverse structure, density and age range, including some open areas. There is an opportunity to manage the woodlands through continuous cover forestry to create a permanently irregular structure across the site.

Tree species on the site as a whole are artificially segregated due to past management. The relatively treeless PAWS zone 11 (parts of cpt 2c&d) with its diverse remnant flora has the potential to be restored to a more 'natural' and diverse W17-W18 habitat. Other relatively open areas in PAWS zones 4 (cpt 3b) and 13 (cpts 3g-i) also offer opportunities for enrichment with broadleaved species.

Constraints

There have been several historical and recent windblow events of some significance. Opening up too much of the canopy at any one time is likely to result in extensive windblow.

Vigorous bracken has become well established in canopy gaps, limiting successful tree regeneration and colonisation by woodland flora. Opening up too much of the canopy at any one time is likely to result in bracken colonisation.

There is a lack of oak seed trees out-with the confines of Ledmore oakwood (cpt 7).

Deer pressure is very high across the site, and browsing is a major constraint on successful regeneration of trees and ground flora. The success of any enrichment planting will depend on either fencing or a significant reduction in deer numbers.

Rhododendron and Gaultheria regrowth/spread represents a threat to natural regeneration of both native ground flora and tree species. Gaultheria is a particularly persistent invader and is difficult to control effectively.

Forestry operations carry the risk of disturbance to sensitive species including birds, bats, otters and potentially wildcat. Surveys in advance of carrying out work will be required, as well as careful planning & timing of the operations.

Archaeological remains can be damaged by forest operations. Any management interventions to favour PAWS restoration on the site of the Canadian Forestry Corps sawmill are likely to be detrimental to the features.

The presence of larch in the area around Migdale Rock has been identified as a constraint by SNH as part of the SSSI site condition monitoring, based on the possibility that it may regenerate preferentially over the Scots pine.

Factors Causing Change

Natural succession, deer damage, invasive exotic species, competing coarse vegetation, wind damage

Long term Objective (50 years+)

Ancient Woodland components in PAWS areas will be secure within a woodland habitat which (through long term continuous cover management) is developing, or has developed strong semi natural characteristics, including a predominance of native tree species, a varied structure, a diverse ground flora, frequent standing and fallen deadwood and the absence of any significant threats from invasive exotic species. Non-native tree species will be accepted as an occasional feature of the canopy. In suitable areas, oak will have been re-established as a component of the W17/W18 habitat.

Short term management Objectives for the plan period (5 years)

- a) By 2017 a PAWS assessment of cpt 6a and cpt 1c-g, which are shown as wooded on the on the OS 1st edition, but not recorded on the AWI, will have been completed, and the PAWS Key Feature of this management plan updated accordingly.
- b) By 2020, in areas currently assessed as 'threatened' due to the presence of invasive non-native species will be in a recovering condition (PAWS zones 15 & 16, cpts 8abc). Rhododendron, gaultheria and exotic conifers will be, at most, Rare on the DAFOR scale. This will include treatment of infestations in neighbouring compartments (e.g. Ledmore Wood, cpt 7f). Investigations will be made into potential off-site sources, and discussions undertaken to explore options to prevent reinfection.
- c) By 2020 areas currently assessed as 'critical' due to loss of canopy cover (PAWS zones 11 & 15) will be in a recovering condition. Conditions favouring natural regeneration will be developing through a series of on-going interventions including fencing, scarification/vegetation control and planting as required. In PAWS zone 11 (cpts 2c,d) seedling regeneration will be at least occasional throughout, and min 500 oak per ha will have been planted on the most suitable ground. In PAWS zone 15 (cpt 8b, Craeg na Sroine) a minimum 1600 native trees/ha, including min 500 oak/ha will have been established via a combination of planting and natural regeneration in a fenced enclosure.
- d) By 2020 areas currently identified as 'threatened' by high levels of shade (PAWS zones 6,8, 14 = cpts 8a, 9a, 9b, 10a & 5c(part)) will have been opened up by variable density intermediate and crown thinning to diversify stand structure, recruit future veterans, promote long term stability and favour woodland specialist flora, without encouraging colonisation by coarse vegetation. Ancient woodland flora hotspots including margins of tracks and watercourses will be targeted during thinning operations to allow woodland specialist ground flora to spread and become more robust.
- e) By 2020, a strategy for the on-going management of larch (Zones 3, 4, 5, cpt 3a-d) will have been developed, in relation to threats it may pose to ancient woodland features within Migdale Rock SSSI. This will be informed by a comparative survey of larch and pine regeneration carried out by 2016, and repeated by 2020.
- f) A Deer Management Plan (DMP) will be put in place by 2016. This will use baseline impact monitoring data (beginning 2015 and carried out annually) to assess the impact of deer on the site. The DMP will be used to set cull targets and define other measures needed to ensure that deer numbers move towards an equilibrium level such that the various habitats are not adversely impacted by deer and in the medium term can be managed without fencing. To help deliver the plan there will be engagement with neighbouring land managers through active participation in the local informal Deer Management Group.
- g) In 2020 the PAWS assessment process will be repeated to ensure the retention of ancient woodland specialist species, deadwood, and other remnant AW features remain intact during the restoration process.

5.4 Archaeological Feature

Description

A total of 28 features or groups of features of archaeological interest have been recorded in Ledmore & Migdale woods, including a concentration of chambered cairns, two of which are Scheduled Ancient Monuments (SAM).

There are extensive post medieval sites- including relatively complex townships such as at Kyloag (cpt 1a), Torroy (cpt 1b) and Creag na Sroine (cpts 8a & 8b), and some small isolated farmsteads and some individual buildings, such as the cornmill on Spinningdale burn (cpt 5b).

Several plantation banks are evident in the woods, notably in cmpt 1 and along the northern edge of Ledmore oakwood (cmpt 7)

Significance

The association of woodland with archaeological remains is of significant historical interest, and has a cultural value as a record of land use patterns.

The concentration of chambered cairns at Ledmore and Migdale woods is notable for the area.

Opportunities & Constraints

Operations affecting SAMs require consultation with Historic Scotland and may require the issue of Scheduled Monument Consent.

Management operations, including felling, path/road construction and tree planting may disturb archaeological sites.

There is an opportunity to interpret the archaeological interest of the site to contribute to public interest and enjoyment.

Factors Causing Change

Vegetation encroachment, physical disturbance

Long term Objective (50 years+)

Evidence of previous human settlement and occupation will be protected and will contribute to the attractiveness and interest of the site.

Short term management Objectives for the plan period (5 years)

a) The Scheduled Ancient Monuments at Rivra (cpt 1d, by the Achue track) [Index no. 1803], Creich Mains (cpt 7a) [Index no. 1805] and Kyloag (cpt 1a) [Index no. 1799] will be free from trees and woody growth.

b) Sites of archaeological interest will be protected from disturbance caused by management operations in their vicinity.

5.5 Informal Public Access

Description

Ledmore and Migdale woodland is situated within a 20 mile radius of a population of over 10,000 including the small towns of Tain and Dornoch, and numerous coastal villages. It is 4 miles from the main A9 trunk road, a popular tourist route and 1 hours 'drive from Inverness. Limited data on visitor numbers supported by data from comparable local sites suggests visitor numbers in the region of 5000-6000 per annum. An annual events programme since 2010 has concentrated on engaging local families and children. In 2014 over 1000 people participated in events

The site is within the 7500 ha Dornoch Firth National Scenic Area and is highly visible in the landscape, especially from the south shore of the Dornoch Firth (Struie hill) and the Dornoch Bridge.

The Torroy shelter (cpt 1a), built in 2012, with associated car parking and access paths, provides a central activity hub, viewpoint and picnic area.

The woodlands contain a network of approx 12km of pedestrian footpaths and forestry tracks offering a range of walks throughout most of the site. Five routes are way-marked.

There are orientation boards at four entrances with information about the way-marked walking routes.

The paths are 3m wide or less, are surfaced with locally borrowed material and most are at least partially covered by encroaching turf and heather. The forestry roads are over 5m wide, surfaced with locally borrowed material or imported graded scalplings.

The paths and tracks are generally in moderate condition with areas of impeded drainage and erosion, Some low lying areas are muddy in wet weather, and in a few areas gorse requires regular management to prevent it encroaching.

Some forestry tracks in the plantation area marked on 1960's Ordnance Survey maps are now either impassable due to encroaching gorse and birch vegetation or have disappeared completely.

There 2 wooden and one concrete bridges over streams, which are suitable for vehicles; and one wooden, pedestrian bridge..

There is a link to a path which continues along the north shore of Loch Migdale beyond the Woodland Trust property boundary towards the settlements of Badbae and Migdale.

There are several commanding viewpoints along the path network, giving good views both out of and within the site

A total of 29 features of archaeological interest have been recorded on or immediately adjoining the site, including prehistoric chambered cairns, post medieval townships, farmsteads, field systems and isolated features such as a watermill. One of the prehistoric cairns is easily accessible from the path network.

Significance

Public access is of high local significance and tourism is important in the region.

The provision of access supports the Trust's vision of 'a UK rich in native trees which are valued by everyone'

Opportunities & Constraints

There is an opportunity to build on the successful public engagement programme which is currently being delivered by the 'People and Trees' project to engage more people, more fully in learning about, understanding and valuing the woodland.

There is a risk that the current level of local engagement with the woods will decline after the end of the 'People and Trees Project'

There are opportunities to work with local schools and voluntary groups to involve people in management activities in the woods.

Factors Causing Change

Encroaching vegetation, deterioration of access features, wind damage, litter, dog fouling.

Long term Objective (50 years+)

The site will provide an extensive area of quiet informal recreation to a wide range of users both from the local community and from further afield.

There will be a network of paths providing a range of linear and loop routes suitable for walkers, horse riders and cyclists, and where possible linking to the surrounding path network.

Informative interpretation will provide visitors with information on routes and on the woodland's history and ecology.

Short term management Objectives for the plan period (5 years)

Access provision will be in keeping with WT access guidelines. Achieved by:

- a) Ensuring that the site is welcoming to visitors by implementing actions under the Trusts 'Welcoming Sites Programme' including the installation of brown tourist signs in 2015 and additional way-marking in 2016
- b) Ensuring that all managed paths are kept well-drained and free from encroaching vegetation, and that access features (e.g. bridges, steps, entrances, boundary features, etc. are kept in good order (annually).
- c) Ensuring that all viewpoints are maintained free of encroaching vegetation, where it is obscuring the view.
- d) Ensuring that the site is kept safe and welcoming by: repair of vandalism (when needed); clearing of fallen trees where access is obstructed (as needed); and regular site safety surveys (as per risk assessment).
- e) Completing the delivery of the 2013-2016 'People and Trees Project' including a programme of events and activities for families, visitors and local schools
- f) Reviewing the impact of the People and Trees project and developing a plan for retaining local and visitor engagement in the future.

5.6 Semi Natural Open Ground Habitat

Description

Spinningdale bog supports dense stands of *Phalarus arundinacea* and *Phragmites australis* plus a variety of other species including *Menyanthes trifoliata*, *Carex rostrata*, *Senecio aquaticus*, *Potentilla palustris* and *Potamogeton polygonifolius*. Numerous *Sphagnum* species also abound, including *S. recurvum* - which is dominant - together with *S. palustre*, *S. papillosum* and *S. capillifolium*.

There are areas of NVC type W4c *Betula pubescens* - *Molinia caerulea* woodland - (*Sphagnum* spp. sub community) along the southern edge and groups of alder and grey willow are also present on the margins.

The valley mire also supports the Bog Orchid (*Hammarbya paludosa*) and Coralroot Orchid (*Corallorhiza trifida*).

The bog supports an important insect fauna, including Northern Emerald Dragonfly *Somatochlora arctica*, a very local moth *Adelea cuprela*, the hoverfly *Tropidia scita*, the horsefly *Hymbomitra lurida*, the jumping spider *Salticus cingulatis*. (Entwhistle 2008)

Significance

Spinningdale bog is a complex 'Valley Mire', the sole example in east Sutherland. It shows a complete succession from open water to woodland and provides an extensive area of valuable habitat that is now nationally rare. The bog is designated as a Site of Special Scientific Interest (SSSI)

The bog supports a range of species which are wholly reliant on the habitat it provides, for example the proximity of the bog to ancient woodland provides an important niche for the northern emerald dragonfly.

Opportunities & Constraints

The Valley Mire feature of Spinningdale Bog SSSI is currently assessed by SNH as being in 'unfavourable - declining' condition because of tree encroachment on the bog surface, which may lead to drying out and deterioration or loss of specialised species that are reliant on the fen habitat, including; the nationally scarce bog orchid, the scarce northern emerald dragonfly, an uncommon hoverfly (*Tropidia scita*) and rare horsefly (*Hymbomitra lurida*).

A five year plan (2012-16) for scrub control has been agreed with SNH and is currently being implemented.

Factors Causing Change

Natural succession, hydrological changes.

Long term Objective (50 years+)

The valley mire feature will continue to support viable populations of the specialised plants and insects which depend on the habitat it provides. The SSSI will be in 'favourable condition'.

Short term management Objectives for the plan period (5 years)

a) A 5 year management plan to achieve zoned removal of tree regeneration from Spinningdale Bog SSSI (cpt 4a) will have been completed by 2016, and an on-going strategy for managing tree regeneration on the SSSI will have been agreed with SNH by 2017.

6.0 WORK PROGRAMME

Year	Type of Work	Description	Due By
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APPENDIX 1: COMPARTMENT DESCRIPTIONS

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Key Features Present	Designations
1a	18.44	Birch (downy/silver)	1940	Min-intervention	Archaeological features	Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area
<p>South facing slope between Migdale road and the west end of the Achue track. Contains a chambered cairn and the township of Kyloag, with the remains of several buildings and extensive field patterns. A second chambered cairn is largely on adjoining property and is a Scheduled Ancient Monument (Kyloag Index no. 1799).</p> <p>Predominantly well-spaced, mature Birch woodland, with open areas on former field sites. Groups and scattered individual mature Scots Pine are frequent throughout. Aspen and Rowan are occasional throughout. Occasional Juniper and Ash are found in the W of the sub-cmpt, the latter associated with former field boundaries. Areas of abundant to dominant Birch seedling regeneration (regen.) are frequent. There are occasional areas of Scots Pine regen, becoming more frequent to the north by the Achue track.</p> <p>Bracken is frequent throughout and dominant in some areas, particularly on former field sites. Melancholy Thistle <i>Cirsium heterophyllum</i> is found in this cmpt but not elsewhere on the site. (Entwhistle 2008). A number of notable Lichen species, some associated with old woodland sites, are present, particularly on Birch and Pine. Key specimens have been tagged. (Coppins & Coppins 2001)</p> <p>Aspen supports the rare longhorn beetle <i>Saperda carcharias</i>.(Entwhistle 2008)</p> <p>The eastern end of this sub-cmpt, to the boundary with Kyloag, is recorded as Ancient Semi Natural Woodland (ASNW) on the Ancient Woodland Inventory (AWI), with small pockets of Planted Ancient Woodland Site (PAWS). The whole area appears as unenclosed woodland on the Ordnance Survey (OS) 1st Edition map, and on previous maps including Burnett & Scott 1855 and, arguably, on Roy 1755. The name Kyloag appears as Coille oag on earlier maps (Gaelic: 'coille' -wood; 'oag' - young. Norse 'oag' - burial mound)</p> <p>3 veteran Scots pine have been recorded for the Ancient Tree Hunt in this sub-cmpt.</p>							
1b	3.25	Mixed native broadleaves	2013	Wood establishment	Archaeological features, Housing/infrastructure, structures & water features on or adjacent to site	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area

Young native woodland planted 2013 in a previously bracken-dominated field on a moderate south-facing slope.

Torroy farmstead is in the NW corner of the sub-cmpt (also known as the 'Croft') including remains of buildings, enclosures and fields. The ruined dwelling was converted into an open, roofed shelter in 2013 to provide a base for group activities and picnics. A car park and access track were constructed at the same time. Attractive viewpoint across WT site and to Dornoch Firth from Torroy

1c	24.54	Birch (downy/silver)	1940	Min-intervention	Housing/infrastructure, structures & water features on or adjacent to site	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area
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Very large swathe of even aged birch regen, across south facing hillside, probably derived from natural regen in the post WWII era.

Predominantly *B. pubescens* with some *B. pendula* above Rhivra. Density varies & includes some large scattered glades, especially in the northwest corner.

Birch becomes progressively more stunted towards east of sub-cmpt. Scots pine is Regenerating into the area from the north side. Thinning to waste was carried out over 19ha Birch in 2002.

A former Scottish Water tank is situated at the west end of the sub-compartment, this is now privately owned.

This area appears as woodland on the OS 1st Edition map and is remembered locally as being Scots Pine, which was felled during WWII by the Canadian Forestry Corps.

1d	27.12	Birch (downy/silver)	1940	Min-intervention	Archaeological features	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Scheduled Ancient Monument
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Exposed south-facing moderate slope levelling out to the Achue track. Supports a large area of open heather moorland with large irregular patches of birch regen. and frequent Scots pine. The Rivra or Achaidh chambered cairn by the Achue track is a Scheduled Ancient Monument [Index no. 1803]. This area appears as woodland on the OS 1st Edition map and is remembered locally as being Scots Pine, which was felled during WWII by the Canadian Forestry Corps.

1e	23.25	Birch (downy/silver)	1940	Min-intervention	Archaeological features, Gullies/Deep Valleys/Uneven/Rocky ground	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area
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Moderate to steep south facing hillside bisected by a deep steep sided valley with an attractive permanent burn, the Allt nan Eun - known locally as the Fairy Glen. Steep banks have well-spaced Birch and Scots Pine at all stages.

Part of the area is enclosed by 19th C. plantation banks. The area within the plantation banks appears as woodland on the 1855 Burnett & Scott map.

The whole of the sub-cmpt is shown as woodland on the OS 1st edition map c.1860. It was probably felled during WWII by the Canadian Forestry Corp, but steep sided sections along the Allt nan Eun may support remnant ASNW.

In the early 1900's a walk crossing the burn on 9 wooden bridges was built by Andrew Carnegie.

The walk led to a log picnic cabin in the upper part of the glen at NH 677 908. The bridges and the cabin are gone, but traces remain. A modern bridge crosses the burn just below the site of the cabin.

1f	9.03	Open ground		Min-intervention	Services & wayleaves	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area
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Flat, open heather moorland above south facing slope supporting a large area of raised blanket bog with very stunted, sickly Scots pine and some downy birch widely scattered in wet ground. This area appears as woodland on the OS 1st Edition map, but not on previous maps. It was probably felled during WWII by the Canadian Forestry Corps.

1g	30.44	Birch (downy/silver)	1940	Min-intervention	Archaeological features, Services & wayleaves	Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area
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South facing slope supporting open heather moorland with a wooded margin. The moorland supports occasional groups of small pole stage Silver Birch regen and individual Scots Pine. Large patches of gorse are present on previously disturbed ground. Remains of 1850's plantation banks are visible.

The wooded areas bordering the moor are composed of dense, scrubby silver birch regen. to the N, semi mature silver birch to the SW, pine and birch to the S, a wet area with dense birch and goat willow at the SE corner, and a strip of open mature silver birch along the roadside to the E. Gorse is frequent in glades and as an understory throughout.

The gully of the Allt Ruadh marks the southern boundary of the property. The SE and SW corners of the sub-cmpt are shown as woodland bordered by plantation banks (one follows the line of the path) on the Burnett & Scott 1855 map. The area bordering the Achue road was used for a large timber stacking area by the Canadian Forestry Corp s during WWII.

The whole of the sub-cmpt is shown as woodland on the OS 1st edition map c.1860. Part of the SW corner is recorded as ASNW.

2a	12.82	Scots pine	1975	Min-intervention		Informal Public Access, Mixed Habitat Mosaic	National Scenic Area
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South facing slope above the Spinningdale-Migdale public road, supporting Birch and Scots Pine regen at all stages, with a small area of mature Scots Pine woodland on the W bank of the Allt Coire nan Caorach. Much of the regen is more than 30 years old and has reached thicket/pole stage. Birch are present throughout, becoming frequent along the road side. Juniper is frequent under the mature pines.

The sub-cmpt. suffered fire damage in the 1980's, which may have been less severe here than in the remainder of Cmpt 2, allowing regeneration to become established earlier.

Pearl Bordered Fritillary has been recorded in this sub-cmpt (Butterfly Conservation Scotland).

An overgrown forest track leads from the road on the E side of the burn towards a ruined farmstead in cmpt 2B. This sub-cmpt. appears as unenclosed woodland on the OS 1st Edition map, and on previous maps including Burnett & Scott 1855.

2b	10.94	Scots pine	1975	Min-intervention	Archaeological features	Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area
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Gentle to moderate undulating south facing slope, between the Spinningdale-Migdale public road and a (partially overgrown) forest track on its northern edge.

The sub-cmpt. suffered fire damage in the 1980's. The area is predominantly open, but supports scattered senescent birch woodland with many dead and fallen trunks, probably related to the fire. There are large open areas of both bracken and Calluna. Groups and scattered individual mature Scots Pine survive, with one large fallen larch in the centre of the sub-cmpt. Occasional Birch and Scots Pine regen (7-10yrs old) is present, except in areas dominated by bracken. Pine regen becomes frequent at lower levels.

There are occasional groups of mature Aspen in the centre and towards the E of the sub-cmpt with regen concentrated in 2 x 0.25 ha stock/rabbit exclosures, which were constructed Nov 2002. The very rare Hoverfly *Hammerschmidtia ferruginea* which develops in the bark of recently dead Aspen has been recorded at Ledmore & Migdale (Entwhistle 1998)

Several veteran Hazel stools survive adjacent to the Achue track, with some seedling regeneration. Oak, Rowan and Juniper are occasional throughout.

A number of notable Lichen spp, some associated with old woodland sites, are present particularly on Hazel and Aspen. Key specimens have been tagged. (Migdale Lichen Survey Coppins & Coppins 2001)

The wood ant *Formosa aquilonia* has been recorded on this area (Entwhistle 1998).

There is a ruined farmstead in the NW corner, largely destroyed by a later forest track. This sub-cmpt. appears as unenclosed woodland on the OS 1st Edition map, and on previous maps including Burnett & Scott 1855. Most of it is recorded as ASNW, except for an area in the NW corner around the former farmstead. It is probable that some felling took place here during WWII. An area at the northern edge is recorded as PAWS, but the surviving tree cover appears to be of semi-natural origin. 7 veteran Scots pine have been recorded for the Ancient Tree Hunt in this sub-cmpt.

2c	22.02	Scots pine	1975	PAWS restoration	Very steep slope/cliff/quarry/mine shafts/sink holes etc	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area
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South facing, moderate to steep slope, becoming open heather moorland at the northern edge. This sub-cmpt suffered fire damage in the 1980's. Occasional mature Scots Pine survive in upper part of the sub-cmpt. Large patches of dense Silver Birch and scattered Scots pine regen at various stages are frequent in the S. of the sub-cmpt, becoming occasional at higher levels. There are large open areas of both bracken and Calluna. Larch regen is frequent at the upper edges of the sub-cmpt. This sub-cmpt. appears as unenclosed woodland on the Burnett & Scott map of 1855 and on the OS 1st Edition map c.1860. Part of the western portion is recorded as PAWS, but any previous plantation appears to have been felled, possibly during WWII.

2d	28.33	Open ground		PAWS restoration	Very steep slope/cliff/quarry/mine shafts/sink holes etc	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area
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High, open, exposed, south facing heather moorland adjoining an area of Skibo estate. Part of the western portion is designated PAWS, but any previous plantation appears to have been felled, possibly during WWII.

3a	4.91	Scots pine	1880	PAWS restoration	Archaeological features, Services & wayleaves	Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest
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Stand of mature Scots Pine mixed with mature Silver Birch and Aspen, near the main woodland entrance. Aspen and Rowan are frequent along the edge of the Allt Leacach burn. There is locally frequent regen of all species, with abundant Scots Pine and Birch in a wayleave. Bracken patches are frequent in open areas, but there is diverse ground flora beneath. There is a cairn in the NE corner, below the Spinningdale-Migdale Road, and part of a farmstead site to the W of the Allt Leacach (which extends into sub-cmpt 3J) A number of ancient pinewood indicators are present in this sub-cmpt including lichen and invertebrate species assemblages (Coppins & Coppins 2001; Entwistle 1998) The area to the E of the Allt Leacach is recorded as ASNW (although shown without trees on the Burnett & Scott 1855 map). The area to the W of the Allt Leacach is recorded as PAWS and is shown on maps as wooded from 1855 - it seems likely that it is in fact ASNW.

3b	12.37	Scots pine	1950	PAWS restoration		Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest
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Lower south east slope of Migdale Rock. An area of frequent to abundant thicket and pole stage birch and pine bisected by a band of open ground supporting occasional pine and birch regen. Occasional to frequent larch regenerating throughout. Bracken patches are frequent, becoming dominant in the open central area.

A number of ancient pinewood indicators are present in this sub-cmpt including invertebrate and lichen species assemblages (Migdale Lichen Survey Coppins & Coppins 2001; Invertebrate Assessment, Entwistle 1998).

Approximately 2/3 of the compartment is recorded as PAWS.

This area is shown on both the Burnett & Scott 1855 map and the OS 1st edition map c. 1860 as wooded. Local information is that there was extensive windblow in this area in a 1950's storm (Entwistle 1997)) A path (now overgrown) is shown on earlier maps (1855, 1860, 1966) running from a former farmstead site at the end of Loch Migdale to Kyloag, roughly along the NE edge of this sub-cmpt.

This sub-cmpt is within Migdale Rock SSSI, which is currently assessed by SNH as 'unfavourable - declining' due to the presence of non-native species: principally larch, with rare rhododendron.

3c	22.90	Scots pine	1880	PAWS restoration	Very steep slope/cliff/quarry/mine shafts/sink holes etc	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest
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Moderate to very steep south facing slope with mature, well-spaced, retained plantation Scots pine of good form becoming progressively stunted and more sparse towards higher ground. Towards the W. end mature Juniper is frequent and there are open areas supporting good Scots Pine regen. There are occasional groups of Aspen along the Migdale Loch shore (some on neighbouring property) There are several groups and one larger area (approx 0.5 ha) of mature Larch above the loch shore. Near the E. end of the Loch there are a few mature Norway Spruce.

There are some flat strips of land with patches of pole stage Scots pine and birch regen. along the access track as it approaches Loch Migdale from the E. These relate to the Canadian Forestry Corp camp which was at the head of Loch Migdale. Cross bars seen on some trees are said to have supported telegraph wires to the camp (Hughes & Entwistle 1997).

A number of ancient pinewood indicators are present in this sub-cmpt including invertebrate and lichen species assemblages (Coppins & Coppins 2001; Entwistle 1998)

The Slave Making Ant *Formica sanguinea* is present at the E end of the subcmpt.

Most of this area is recorded as PAWS. It is shown on the Burnett & Scott 1855 map as sparsely wooded, becoming treeless along the loch shore. The wooded area is more extensive on the OS 1st edition map c. 1860.

A fire swept over Migdale Rock and through this compartment in 1880, destroying what was then describes as a young plantation.

This sub-cmpt is within Migdale Rock SSSI, which is currently assessed by SNH as 'unfavourable - declining' due to the presence of non-native species: principally larch, with occasional spruce, sycamore and cotoneaster.

3d	10.17	Open ground		Min-intervention	Very steep slope/cliff/quarry/mine shafts/sink holes etc	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest
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Crags and steep slopes with frequent large and small groups of old stunted Scots pine, becoming more open spaced towards the E. There are groups of mature birch along the cliff base, frequent mature juniper and occasional mature holly.

A number of ancient pinewood indicators are present in this sub-cmpt including lichen and invertebrate species assemblages (Coppins & Coppins 2001; Entwistle 1998). The cliffs rise in an irregular series of steeply sloping granite faces. The rocks support a diverse lichen flora. There are some base rich seepage areas giving rise to a calcicole flora which includes the nationally rare Rock Cinquefoil, *Potentilla rupestris*. RBGE carries out regular monitoring of Rock Cinquefoil.

Non-native cotoneaster is present.

Although this area does not appear as wooded on early maps, it is possible that its inaccessibility made it a refuge for the stunted remnants of a much earlier forest. The greatest diversity in ancient pinewood lichen flora was found in this sub-cmpt.

3e	2.65	other oak spp	1880	Min-intervention	Very steep slope/cliff/quarry/mine shafts/sink holes etc	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest
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Moderate south facing slope above Loch side supporting dominant mature oak with frequent mature 'granny' Scots pine and occasional holly, and juniper. Diverse understory with blueberry, heather and patches of bracken. Some of the oak shows signs of having been pollarded or coppiced in the past. This is thought to be the 'Migdale oakwood' referred to in historical documents. The area is shown as wooded on maps from 1855 onwards, and is recorded as PAWS, but has strong semi-natural characteristics. 1 veteran Scots pine has been recorded for the Ancient Tree Hunt in this sub-cmpt.

3f	4.73	Birch (downy/silver)	1900	Min-intervention		Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest
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Rectangular sub-compartment of birch - with two small groups of mature Scots pine in centre. Several large 'granny' birch present - remainder at pole or high forest stage. Part of the sub-cmpt is recorded as ASNW

3g	39.66	Scots pine	1930	PAWS restoration		Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest
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<p>Moderate to steep south facing hillside rising to rounded and flat crest. Almost pure Scots Pine ranging from large 'granny' specimens at low levels gradually decreasing in size towards high ground on crest of hill. Open gullies support scattered mature silver birch. The broad summit of Migdale Rock has shallow soils and rocky outcrops supporting Calluna and abundant Scots Pine regen. There are commanding views in almost all directions. The lower slopes to the W of the sub-cmpt are recorded as PAWS, corresponding approximately to the extent of tree cover shown on early maps - this area has strong semi-natural characteristics. A fire swept over Migdale rock and through this compartment in 1880, destroying what was then described as a young plantation.</p>							
3h	31.67	Open ground	1920	PAWS restoration		Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest
<p>Gentle northeast facing undulating slope supporting open moorland mainly of heather and rough grasses with large swathes of bracken covering 50% of the area. Much of this area was windblown and the timber subsequently cleared after a major storm in the 1950's. Numerous dead, standing, tree trunks on higher ground. Scattered large thickets of downy birch and frequent scattered groups of silver birch and Scots pine regen. at various stages. Approximately 2/3 of the area is recorded as LEPO (long established of plantation origin) , although current tree cover is limited to patchy regeneration. Tree cover on the OS 1st Edition map indicates that the whole area was under woodland c. 1860. No tree cover is shown on the Burnett & Scott 1855 map (surveyed 1831-32). An underground tunnel was uncovered in this vicinity during the logging operations after the 1950's storm, but subsequently lost.</p>							
3i	13.95	Scots pine	1880	Min-intervention	Very steep slope/cliff/quarry/mine shafts/sink holes etc	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest
<p>Mid slope occupying broad eastern ridge of Migdale Rock. Frequent Scots Pine regen at all stages with frequent groups of mature Scots Pine, including occasional large 'granny' trees. Glades of heather and blaeberry with small patches of bracken. The majority of this area is recorded as of Long Established Plantation Origin (LEPO) on the Ancient Woodland Inventory. Tree cover on the OS 1st Edition map indicates that the whole area was under woodland c. 1860. No tree cover is shown on the Burnett & Scott 1855 map (surveyed 1831-32). This areas has been assessed as potential Capercallie habitat (Dennis 1999). 1 veteran Scots pine has been recorded for the Ancient Tree Hunt in this sub-cmpt.</p>							
3j	10.95	Birch (downy/silver)	1900	Min-intervention	Mostly wet ground/exposed site	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest

This sub-cmpt. stretches along S side of the minor Migdale-Spinningdale road, following the stream valley of the Allt Leacach. It is predominantly open wet flush to the W. with frequent Gorse and Broom, becoming progressively more wooded to the E. There is frequent scattered Scots Pine and Birch regen at all stages, largely checked on the wetter areas. Pole stage and mature Scots Pine and Birch are frequent along the road side, with occasional mature 'granny' Scots Pine. Pale Butterwort *Pinguicula lusitanica* has been recorded in this sub-cmpt (Entwhistle 2008). In the centre of the sub-cmpt. there is a level alluvial area under the north facing slope of Migdale Rock supporting a well spaced stand of even-aged birch. Towards the E end of the sub-cmpt there is an area composed of well grown granny Pine and senescent Birch, with abundant Juniper in the understory, and frequent Alder along the streamside. There are the remains of a former farmstead on level ground at the W. end of the sub-cmpt, while the boundaries of the township of Kyloag extend into the sub-cmpt at the E end, where there is a rectangular stone wall footing. A small portion of the sub-cmpt. is recorded as PAWS, however most of this area appears to be recent secondary woodland of semi natural origin, and the associated lichen flora is indicative of recent disturbance (Coppins & Coppins 2001). The whole area is shown as woodland on the OS 1st Edition c. 1860, but only the extreme E. end, opposite Kyloag, is shown as tree covered on the Scott & Burnett map of 1855). The area of granny pine opposite Kyloag supports a reasonable pinewood lichen flora. 3 veteran Scots pine have been recorded for the Ancient Tree hunt in this sub-cmpt.

4a	28.83	Other		Non-wood habitat	Mostly wet ground/exposed site, No/poor vehicular access to the site	Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest
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Spinningdale Bog SSSI: a nationally rare habitat supporting a rich flora and insect fauna. Large expanse of valley mire with scattered, stunted willow and birch present, and some pine regen encroaching from the margins. Frequent groups of alder line the banks of Spinningdale burn, which runs through the mire. The edges of the mire are wooded. At the NW end this is composed of birch, Scots pine (including some mature specimens) and occasional alder on wet, seasonally flooded ground. Tree cover thins progressively towards the edge of the mire. The NE side of the cmpt rises up to the Migdale road and is better drained, supporting large, well-spaced senescent birch with mature Scots pine and occasional other broadleaves including aspen. Areas of regenerating Scots pine and willow species extend out into mire below. The SE end of the cmpt. supports dense mixed birch and willow on flat ground, as well as a small area of open field with single specimens of very large, mature alder and scattered small groups of mature birch. There is a single large, crab apple tree close to the road side of unknown spp/cultivar but considerable age. The SW edge of the sub-cmpt follows the line of the Spinningdale burn. It supports a narrow strip of mixed alder silver birch and grey willow, widest at the western end, gradually thinning out towards the E. The trees are mature but appear to have been stunted by the soil conditions. Small portions of the NW corner of this subcompt are recorded as ASNW. Historic maps show a long history of management of water-flow through the bog, including a 19thC canalisation scheme to feed into a hydro plant at Spinningdale house. This compartment is designated as Spinningdale Bog SSSI, it is currently assessed as unfavourable-declining by SNH due to the progressive colonisation by scrub, and possible drying out of the bog habitat. A five year programme of scrub management commenced in 2012.

5a	1.71	Alder species	1960	Min-intervention		Informal Public Access, Mixed Habitat Mosaic	National Scenic Area
<p>Flat area of ground at E end of Loch Migdale with large pole stage alder below the dam giving way to mature birch on the N side of the stream on the site of a former farmstead. There are occasional mature ash and Scots pine. The shingle beach at the dam is a popular picnic site. Pearl Bordered Fritillary has been recorded in this sub-cmpt (Butterfly Conservation Scotland)</p>							
5b	7.06	Birch (downy/silver)	1920	Min-intervention	Archaeological features, Gullies/Deep Valleys/Uneven/Rocky ground	Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area
<p>Large, complex, streamside, sub-compartment incorporating both sides of a deep gorge and associated riparian zones. Supports large alternating groups of mature 'granny' birch and large Scots pine with groups of alder on streamside banks. Some mature ash and groups of pole stage birch and pine are also present. Some small groups of aspen present in a rich, diverse, understorey. Opposite Leaved Saxifrage <i>Chrysosplenium oppositifolia</i> occurs at the E end of the sub-cmpt. There is a ruined cornmill on the N bank of the burn, said to have burned down in 1809 (Hughes & Entwistle 1997) This sub-cmpt is recorded as ASNW</p>							
5c	5.50	Scots pine	1900	PAWS restoration	Archaeological features	Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area
<p>Flat streamside area of diverse character with two small areas of Scots Pine plantation and an area of birch with occasional willow, alder and Scots pine. This sub-cmpt is recorded as PAWS, with an area of ASNW in the centre. Some remains of a farmstead and enclosures can be seen, although they have been largely destroyed. This may have occurred during WWII when a sawmill was established here by the Canadian Forestry Corp. (Carter & Wordsworth 1997).</p>							
6a	112.47	Open ground		Min-intervention		Informal Public Access, Mixed Habitat Mosaic	National Scenic Area

Large area on the hill between Ledmore Oakwood and Spinningdale burn. The crest of the hill is a moorland plateau, dropping into N facing slopes towards the burn. This cmpt supports a mosaic of large and small groups of Scots pine and silver birch regen at all stages. Trees become progressively more stunted towards the brow of hill. On the N facing slopes there are large groups of pole stage birch and pine. There are two groups of very stunted but mature Scots pine growing in isolation in centre of the exposed moorland plateau. There are wet flushes at the N edge and SE corner of the cmpt. There is a commanding view point on the summit of A'Chraigs. This area is first shown as woodland on the Burnett & Scott map of 1855. It remains on subsequent maps until 1935, and was probably felled during WWII. Black grouse are present in this sub-cmpt, and an artificial raptor nesting platform was constructed the late 1990's. The areas to the S, above Ledmore oakwood, has been assessed as potential Capercallie habitat (Dennis 1999).

7a	4.45	Open ground		Min-intervention	Archaeological features	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Scheduled Ancient Monument, Site of Special Scientific Interest, Special Area of Conservation
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Area of exposed heather moorland on moderate south facing slope near crest of hill. Occasional scattered, stunted Scots pine and birch regen. There is a chambered cairn (SAM, Creich Mains Index no. 1805) on the western boundary, and the upper edge of the sub-cmpt is enclosed by a bank or dyke, which continues E along the top of sub-cmpt 7D to the Allt an Fhuarain. It seems likely that the plantation bank was constructed in the mid 19th century to protect new plantations on the high ground in cmpt 6A.

7b	6.18	Mixed broadleaves	2003	Min-intervention	Archaeological features	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
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Moderate to steep south facing slope. Dense gorse was cleared from a large part of this area, and approx 5000 mixed broadleaf trees were planted in 2003-04. Recolonisation by gorse and deer browsing have hampered successful establishment. The NE corner supports large areas of dense, mature gorse with large groups of thicket stage downy and silver birch growing through. There are the remains of two buildings on the far side of the property boundary to the SW.

7c	6.72	Birch (downy/silver)	1900	Min-intervention	Archaeological features	Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
Moderate south facing slope supporting well spaced, mature 'granny' birch around series of large glades of dense bracken. Heavy deer browsing evident. There is a dense, isolated thicket of blackthorn, occasional browsed holly and rare mature Scots pine. The open glades in this area are associated with an area of former fields, defined by stone banks and clearance heaps.							
7d	9.64	Birch (downy/silver)	1980	Min-intervention	Archaeological features	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
Linear sub-cmpt on moderate south facing slope supporting mature, senescent silver birch and open glades of bracken. Woodland opens out into heather moorland at the upper edge, with large swathes of thicket stage downy and silver birch woodland in more sheltered undulations. The upper edge of the sub-cmpt is enclosed by a bank or dyke, which continues W along the top of sub-cmpt 7A, and E to the Allt an Fhuarain burn. This bank was probably constructed in the mid 19th century to protect newly planted woodlands in cmpt 6a.							
7e	2.36	Birch (downy/silver)	1980	Min-intervention		Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
Area of very dense thicket stage silver birch regen on flat moist land near crest of hill and adjoining the plantation area in cmpt 9. Some open glades to north of subcompartment.							

7f	50.85	other oak spp	1850	High forest	Housing/infrastructure, structures & water features on or adjacent to site, Sensitive habitats/species on or adjacent to site, Site structure, location, natural features & vegetation	Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
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Steep, south facing slope supporting a very large area of pure, even aged, mature, oak woodland. Regen rare, due to a combination of low light levels under mature canopy and deer browsing. Occasional gaultheria and rhododendron present in the eastern end. The A949 road cuts through the sub-cmpt running parallel to the sea shore. There is a small strip of Scots pine and silver birch along N side of the road to the E of the Allt an Fhuarain. There are numerous groups of large pole stage silver birch along the south side of the road and a group of mature sycamore at the western end. Some small groups of semi-mature aspen are present on the S side of the road at the western end, and on the seashore at the eastern end. Rock Whitebeam is present in small calcareous flushes along the shore). The wood ants *Formica aquilonia* and *F. lugubris* have been recorded in this sub-cmpt. The shoreline has been identified as an activity cluster site for otter (Wells & Paterson 2008). 12 nest boxes were erected in this sub-cmpt in 2003, with the aim of attracting Redstart and Pied Flycatcher. This sub-cmpt is recorded as ASNW, and map evidence shows that an oak wood has been present on the site since at least the mid 18th C. Historic evidence suggests that it was managed for coppice in the 19th century. It is not clear whether the present woodland cover (approx 100-150 years old) is derived from singled coppice after the last 19thC cutting, or from a subsequent planting. There are areas of clearance cairns and an extensive former farmstead site at the upper (N) edge of the cmpt, with occasional larger oaks and open areas of bracken on the former fields. The bank which runs E-W above the oakwood changes direction to enter this subcompt and join head of the Allt an Fhurain. Just above this point there is the first of a series of four boundary marker stones (only two have been found on the ground) which continue the line of the burn NNE across the hill above the oakwood. These marked the march between Pulrossie Estate to the east and Creich Estate to the west, prior to their amalgamation in to Skibo Estate in the late 19th C. In 1998 a series of 10 0.5 ha regeneration plots were established in the oakwood with varying treatments (felling, thinning, fencing) and baseline monitoring of regeneration was carried out in the following year. In 2013 a repeat survey revealed adequate levels of regeneration in plots which had been deer fenced and were free of completion from bracken. In other plots and elsewhere throughout the oakwood seedling recruitment is poor.

7g	4.98	Open ground	1998	Wood establishment		Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
<p>Series of eight plots and two control areas within the boundary of sub-cmpt 7F, which were set up in 1998 to assess the effect of different management regimes on regeneration. The plots are 100m X 50m rectangles of 0.5ha each. The central 0.25 ha of each plot was felled, retaining 4 seed trees in half of the treatments. The remaining 0.25 ha of each plot was thinned, with the intensity tapering out towards the plot edges. A) Deer & rabbit fencing, 4 seed trees retained B) No fencing, 4 seed trees retained C) Rabbit fencing, 4 seed trees retained D) Deer fencing, no seed trees retained E) Deer fencing, 4 seed trees retained f) No fencing, no seed trees retained G) Deer & rabbit fencing, no seed trees retained H) Rabbit fencing, no seed trees retained i) Deer and rabbit fencing, control no felling J) No fencing, control no felling. Base line monitoring of the plots was carried out (James 1999). A follow up survey was carried out of plots A, B, D G in 2014, which recorded an average stocking rate of 2247/ha (excl mature trees) in the deer fenced plots, with oak (including coppice regrowth) making up 11% of the total. Recruitment in the unfenced plot B was only 25% of the level in fenced plots. (Beck 2014)</p>							
8a	22.50	Scots pine	1960	PAWS restoration	Archaeological features	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
<p>Moderate north facing slope rising to crest of hill supporting plantation Scots pine (p1960) which was thinned in 1998 and 2004. Stature decreases towards upper elevations. Stream sides were cleared to 30m & open ground created on site of clearfelled sitka spruce in 1998. Limited regeneration of birch has occurred in open areas. A substantial amount of windblow occurred in this area c. 2005, particularly towards the crest of the hill. A small stand of 0.6 ha sitka spruce at NH668895 was felled in 2010. The NW side of the sub-cmpt is bounded by broad ride or firebreak, which first appears on the Burnett and Scott map of 1855, and follows the march between the former Pulrossie and Creich estates. There are remains of a deserted township with several buildings and dykes stretching into the adjacent sub-cmpt 8B. Most of This sub-cmpt is PAWS of LEPO origin, and was probably 19th C plantation, felled during WWII and subsequently restocked. There is a small area at the S edge of the sub-cmpt which is recorded as PAWS of ASNW origin and falls within the SSSI & SAC. This area has, however, been almost completely windblown. Occasional rhododendron & gaultheria are present.</p>							

8b	11.94	Open ground		PAWS restoration	Archaeological features, Very steep slope/cliff/quarry/mine shafts/sink holes etc	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
<p>Gentle to moderate north and east facing slope becoming steep at higher elevation. 10.74 ha of P1960, previously thinned Douglas fir and lodgepole pine were felled in 2010. This sub-cmpt is recorded as PAWS of LEPO origin, and was probably 19th C plantation, felled during WWII and subsequently restocked. There is a small area of approximately 2.8 ha at the S edge of the sub-cmpt which is designated PAWS of ASNW origin, and falls within the SSSI & SAC. Part of this is under an isolated stand of 0.91ha Scots Pine, the remainder is under heavily windblown lodgepole pine and Douglas Fir, which has been undergoing gradual removal by chemical thinning and felling to waste since 2010. There are remains of a deserted township with several buildings and dykes stretching into the adjacent sub-cmpt 8A.</p>							
8c	2.91	Birch (downy/silver)	1960	PAWS restoration		Informal Public Access, Mixed Habitat Mosaic	Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
<p>Very steep east facing cliff and boulder scree. Supports well-spaced mature and pole stage silver birch with occasional rowan. Also occasional lodgepole pine and Scots pine on lower boulder scree. Very thick moss on boulders. Most of the sub-cmpt falls within the SSSI & SAC. The S half is recorded as ASNW, and the N portion PAWS of ASNW origin. A potential wildcat den was identified in a pre-harvesting survey in 2009.</p>							
9a	7.36	Scots pine	1960	PAWS restoration		Informal Public Access, Mixed Habitat Mosaic	National Scenic Area
<p>Moderately steep north facing rectangular sub-cmpt of Scots pine thinned in 1998 and 2004 rising to near the crest of the hill. A broad ride to the SE separates it from cmpt 9 and supports frequent groups of birch. Occasional pole stage silver birch is present throughout the sub-cmpt. There are some wet areas within the woodland resulting in patches of stunted trees. The trees become progressively less vigorous towards the southwestern edge at higher elevations. There is an area of windblow in the W corner. This sub-cmpt is PAWS of Long Established of Plantation Origin (LEPO). It was probably 19thC plantation, felled during WWII.</p>							
9b	30.82	Scots pine	1975	PAWS restoration	Mostly wet ground/exposed site	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area

Moderate north facing slope above Spinningdale Bog supporting very large area of exceptionally vigorous Scots pine and silver birch regen of all stages and of varying density. Diverse mix of other individual native broadleaves scattered throughout. Occasional regen of sitka spruce and Douglas fir. Very irregularly shaped, large groups of plantation Scots pine remain after forest fire in southeast of compartment. These are difficult to distinguish from the natural regen when close up. Includes large open areas in the SE partially attributable to clearfelling of sitka, and possibly to a past fire. These areas support occasional to frequent groups of Scots pine and birch regen. This sub-cmpt can be described as PAWs of LEPO origin. Respacing of scots pine regeneration to diversify structure and release native broadleaf regen took place over approx. 7 ha within this sub-cmpt in 2010.

10a	7.95	Scots pine	1950	PAWS restoration	Mostly wet ground/exposed site	Informal Public Access, Mixed Habitat Mosaic	National Scenic Area
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Gentle to moderate north facing slope supporting thinned semi-mature Scots pine plantation woodland on both sides of a track, with occasional suppressed individual silver birch, ash and gear.

Appendix 2: Harvesting operations (20 years)

Forecast Year	Cpt	Operation Type	Work Area (ha)	Estimated vol/ha	Estimated total vol.
2018	9a	Thin	8.07	10	80
2018	9b	Thin	15.00	2	35
2018	10a	Thin	7.56	3	25
2020	3c	Thin	0.50	60	30

GLOSSARY

Ancient Woodland

Ancient woods are defined as those where there has been continuous woodland cover since at least 1600 AD. In Scotland ancient woods are defined strictly as sites shown as semi-natural woodland on the 'Roy' maps (a military survey carried out in 1750 AD, which is the best source of historical map evidence) and as woodland all subsequent maps. However, they have been combined with long-established woods of semi-natural origin (originating from between 1750 and 1860) into a single category of Ancient Semi-Natural Woodland to take account of uncertainties in their identification. Ancient woods include Ancient Semi-Natural Woodland and plantations on Ancient Woodland Sites (see below). May support many species that are only found in ancient woodland.

Ancient Semi - Natural Woodland

Stands in ancient woods defined as those consisting predominantly of native trees and shrubs that have not obviously been planted, which have arisen from natural regeneration or coppice regrowth.

Ancient Woodland Site

Stands in ancient woods that have been converted to plantations, of coniferous, broadleaved or mixed species, usually for timber production, including plantations of native species planted so closely together that any semi-natural elements of the understorey have been suppressed.

Beating Up

Replacing any newly planted trees that have died in the first few years after planting.

Broadleaf

A tree having broad leaves (such as oak) rather than needles found on conifers (such as Scots pine).

Canopy

The uppermost layer of vegetation in a woodland, or the upper foliage and branches of an individual tree.

Clearfell

Felling of all trees within a defined area.

Compartment

Permanent management division of a woodland, usually defined on site by permanent features such as roads. See Sub-compartments.

Conifer

A tree having needles, rather than broadleaves, and typically bearing cones.

Continuous Cover forestry

A term used for managing woods to ensure that there are groups or individual trees of different ages scattered over the whole wood and that some mature tree cover is always maintained. Management is by repeated thinning and no large areas are ever completely felled all at once.

Coppice

Trees which are cut back to ground levels at regular intervals (3-25 years).

Exotic (non-native) Species

Species originating from other countries (or other parts of the UK) that have been introduced by humans, deliberately or accidentally.

Field Layer

Layer of small, non-woody herbaceous plants such as bluebells.

Group Fell

The felling of a small group of trees, often to promote natural regeneration or allow planting.

Long Term Retention

Discrete groups of trees (or in some cases single trees) that are retained significantly past their economic felling age. Operations may still be carried out within them and thinning is often necessary to maintain stability.

Minimum Intervention

Areas where no operations (such as thinning) will take place other than to protect public safety or possibly to control invasive exotic species.

Mixed Woodland

Woodland made up of broadleaved and coniferous trees.

National vegetation classification (NVC)

A classification scheme that allows an area of vegetation to be assigned to the standardised type that best matches the combination of plant species that it contains. All woodlands in the UK can be described as being one of 18 main woodland types (W1 - W18), which principally reflect soil and climatic conditions. For example, Upland Oakwoods are type W11, and normally occur on well drained infertile soils in the cooler and wetter north and west of Britain. Each main type can be subdivided into numerous subtypes. Most real woods contain more than one type or sub-type and inevitably some woods are intermediate in character and can't be properly described by any sub type.

Native Species

Species that arrived in Britain without human assistance.

Natural Regeneration

Naturally grown trees from seeds falling from mature trees. Also regeneration from coppicing and suckering.

Origin & Provenance

The provenance of a tree or seed is the place where seed was collected to grow the tree or plant. The origin is the geographical location within the natural range of a species from where seeds/tree originally derives. Thus an acorn collected from a Turkey oak in Edinburgh would have an Edinburgh provenance and a southern European origin.

Re-Stocking

Re-planting an area of woodland, after it has been felled.

Shrub Layer

Formed by woody plants 1-10m tall.

Silviculture

The growing and care of trees in woodlands.

Stand

Trees of one type or species, grouped together within a woodland.

Sub-Compartment

Temporary management division of a compartment, which may change between management plan periods.

Thinning

The felling of a proportion of individual trees within a given area. The remaining trees grow to fill in the space created.

Tubex or Grow or Tuley Tubes

Tubes placed over newly planted trees or natural regeneration that promote growth and provide protection from animals such as rabbits and deer.

Weeding

The control of vegetation immediately around newly planted trees or natural regeneration to promote tree growth until they become established. Either by hand cutting or with carefully selected weed killers such as glyphosate.

Windblow/Windthrow

Trees or groups of trees blown over (usually uprooted) by strong winds and gales.