

Ledmore & Migdale

(Plan period – 2020 to 2025)



WOODLAND
TRUST

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Introduction to the Woodland Trust Estate

The Woodland Trust owns and cares for well over 1,250 sites covering almost 30,000 hectares (ha) across the UK. This includes more than 4,000ha of ancient semi-natural woodland and almost 4,000ha of non-native plantations on ancient woodland sites and we have created over 5,000ha of new native woodland. We also manage other valuable habitats such as flower-rich grasslands, heaths, ponds/lakes and moorland.

Our Vision is:

“A UK rich in native woods and trees for people and wildlife.”

To realise all the environmental, social and economic benefits woods and trees bring to society, we:

- **Create Woodland** – championing the need to hugely increase the UK’s native woodland and trees.
- **Protect Woodland** – fighting to defend native woodland, especially irreplaceable ancient woodland and veteran trees; there should be no loss of ancient woodland
- **Restore Woodland** – ensuring the sensitive restoration of all damaged ancient woodland and the re-creation of native wooded landscapes.

Management of the Woodland Trust Estate

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.

The following principles provide an overarching framework to guide the management of all our sites but we recognise that all woods are different and that their management also needs to reflect their local landscape, history and where appropriate support local projects and initiatives.

1. Our woods are managed to maintain their intrinsic key features of value and to reflect those of the surrounding landscape. We intervene in our woods when there is evidence that it is necessary to maintain or improve biodiversity, safety and to further the development of more resilient woods and landscapes.
2. We establish new native woodland for all the positive reasons set out in our Conservation Principles, preferably using natural regeneration but often by planting trees, 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. Where possible, we pro-actively engage with people to help them appreciate the value of woods and trees.
4. The long term vision for all our 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 natural and cultural heritage value of sites is taken into account in our management and in particular, our ancient trees are retained for as long as possible.
7. Land and woods can generate income both from the sustainable harvesting of wood products and the delivery of other services. We therefore consider the appropriateness of opportunities 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 encourage our woods to be used for 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. We maintain a network of sites for long-term monitoring and trials leading to reductions in plastics and pesticides.
10. Any activities we undertake are in line with our wider Conservation Principles, conform to sustainable forest management practices, are appropriate for the site and balanced with our primary objectives of enhancing the biodiversity and recreational value of our woods and the wider landscapes.

The Public Management Plan

This public management plan describes the site and sets out the long term aims for our management and lists the Key Features which drive our management actions. The Key Features are specific to this site – their significance is outlined together with our long, 50 years and beyond, and our short, the next 5 years, term objectives for the management and enhancement of these features. The short term objectives are complemented by an outline Work Programme for the period of this management plan aimed at delivering our management aims.

Detailed compartment descriptions are listed in the appendices which include any major management constraints and designations. Any legally confidential or sensitive species information about this site is not included in this version of the plan.

There is a formal review of this plan every 5 years and we continually monitor our sites to assess the success of our management, therefore this printed version may quickly become out of date, particularly in relation to the planned work programme.

Please either consult The Woodland Trust website

www.woodlandtrust.org.uk

or contact the Woodland Trust

operations@woodlandtrust.org.uk

to confirm details of the current management programme.

A short glossary of technical terms can be found at the end of the plan.

Location and Access

Location maps and directions for how to find and access our woods, including this site, can be found by using the following link to the Woodland Trust web-site which contains information on accessible woodlands across the UK

<https://www.woodlandtrust.org.uk/visiting-woods/find-woods/>

In Scotland access to our sites is in accordance with the Land Reform Act (of Scotland) 2003 and the Scottish Outdoor Access Code.

In England, Wales and NI, with the exception of designated Public Rights of Ways, all routes across our sites are permissive in nature and where we have specific access provision for horse riders and/or cyclists this will be noted in the management plan.

The Management Plan

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GLOSSARY

1. SITE DETAILS

Ledmore & Migdale

Location:

Spinningdale, Bonar Bridge Grid reference: NH661904 OS 1:50,000 Sheet No. 21

Area:

693.81 hectares (1714.44 acres)

External Designations:

Ancient Semi Natural Woodland, National Conservation Review site, National Scenic Area, Scheduled Ancient Monument, Site of Special Scientific Interest, Special Area of Conservation

Internal Designations:

Ancient Woodland Restoration Project

2. SITE 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. 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.

4. KEY FEATURES

4.1 f1 Ancient Woodland Site

Description

From 2020, the key features 'Ancient Semi Natural Woodland(ASNW)' and 'Plantation on Ancient Woodland Sites (PAWS)' have been brought into this single key feature. This is to bring the PAWS objectives into line with internal PAWS guidance, to simplify the Management Plan reducing the number of key features, and to reduce duplication of objectives and information across key features.

The earliest available map evidence of woodland on the site is the Roy map of c1760, on which only Ledmore Oakwoods are identifiable. The Burnett and Scott map, surveyed 1831-32, shows what appears to be mixed plantation forest extending from Ledmore Oakwood (compartment 7) over the top of A' Chraigs and down to Spinningdale Bog (compartments 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' Bhealaich to the north of Migdale Rock (sub compartments 3e, 3d, 3c, 3i, 3j, 2a, 2b). The OS 1st edition map c.1860 shows woodland extending over the whole of the present day site, the only exceptions being Spinningdale bog, the summit of Migdale Rock, and a few farmstead fields.

By far the most significant part of the ancient woodland component is Ledmore Oakwood SSSI/ SAC(compartment 7). Within the Ancient Woodland Inventory (AWI) this is classed as 1a. This area of 72.19ha is dominated by hybrid oak *Q. petraea* x *Q. 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'. 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 (sub compartment 3e, AWI classification 2a), and is also known to have been coppiced in the 18th century. A third fragment of oakwood lies within the newly purchased Fairy Glen (sub compartment 1h), and is classed as Long Established Woodland of Plantation Origin (AWI classification 2b).

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

Ledmore & Migdale was extensively planted with larch and Scots pine, starting in the late 18th century, 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 WWII to fell timber for the war effort (Matheson 2014). This 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.

Migdale Pinewood SSSI (compartment 3) is one of the most northerly pinewoods in Britain. Parts of the woods were planted around 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 Migdale Rock, all age classes of pine are represented and extensive areas of juniper form an understorey, principally in the scree belt. A significant number of ancient pinewood indicators are present amongst the vascular plant, lichen and invertebrate populations throughout Migdale Pinewoods. This suggests that either the ancient pinewoods relic 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.

A total of 270.76ha of the site is classed as ASNW through the Ancient Woodland Inventory (AWI) meaning that woodland has been there since at least 1860 and, in the case of Ledmore Oakwood, at least 1750. Of this, 95.82ha remains as ASNW, with the remaining 174.94ha designated as PAWS. Outwith the AWI areas, there are three further areas of woodland that appear on the c1860 Ordnance Survey 1st edition maps:

- The first area is across much of the northern aspect of A'Chraisg (sub compartment 6a) and stretching to an area of around 86ha. This is featured on the Burnett and Scott map (1831 to 1832) in addition to the OS 1st edition map and appears to have plantation banks on the west side that correspond with current evidence on the ground. The area is remembered as being mature Scots pine and is likely to have been planted as part of the 19th century planting so could fairly be classed as LEPO but there is no evidence to suggest PAWS (2b). The 1940 estate forestry maps show the area as felled or about to be felled mature woodland, and available for planting transferring the area from 'growing mature' to 'cleared ground'. Adjacent areas were planted to the west shortly after 1940, and to the east in the 1970's. Much of the 86ha is regenerating with Scots pine and birch and has areas of wet upland heath that may retain open woodland characteristics. The ground flora is largely indicative of a long period of openness and wet heath with few woodland plants and woody evidence in banks.
- The second area is the large uniform birch stand between the Fairy Glen road and the Achue road (much of the mid part of sub compartment 1a and almost the entirety of 1c to 1g) and covers 116ha. This area is shown as woodland on the Ordnance Survey 1st edition map and, as with the above, was clear felled in the early 1940's and is shown on the estate maps as such. As with the above, the area is remembered as being mature Scots pine and is likely to have been planted as part of the 19th century planting so could also fairly be classed as LEPO (AWI classification 2b). Plantation banks can be found in sub compartments 1d and 1e. The 1969 forestry map shows the area as unstocked woodland, apart from a small area of sub compartment 1e that was under planted. This area to the north of the Allt nan Eun and east of the track shows little evidence of this supplementary planting and appears not to have any difference to adjacent woodland on the ground. Indeed, this is slightly more open. It could be considered that the small area in 1e is therefore PAWS, but the evidence on the ground suggests that this under planting largely failed. Ground flora suggests an open canopy woodland for a considerable period of time with open wet heath areas showing no sign of woodland cover.
- The third area is across the middle of the face of Creag a' Bhealaich (sub compartments 2a to 2d) and totals 23ha. Woodland along the lower slopes of this area in sub compartments 2a and 2b are shown on the Burnett and Scott map and is shown to have spread further up Creag a' Bhealaich to the south east of the Allt Coire nan Cuorach on the OS 1st edition map. Parts of this are shown on the AWI, with part remaining outwith the PAWS zone. It is thought this area was part of the large scale 19th century plantings and largely felled during the 1940's. Estate planting maps show dense supplementary planting here by 1969 and the area (particularly 2a) shows this Scots pine crop well. A fire in the 1980's damaged much of this young crop, leaving the site a scattered pine woodland with bracken heavily encroaching. Given the long evidence of woodland on site and subsequent planting, it is appropriate for this 23ha to be considered PAWS of semi natural origin (AWI classification 2a). There are ancient woodland indicator ground flora through this area including chickweed wintergreen, primrose, dog violet, and wood sorrel.

Given these additions, the total area of the site that can be considered to be ASNW stands at 495.76ha. The majority of this (319.8ha) is considered to be Long Established Woodland of Plantation Origin (AWI classification 2b). Ancient woodland from 1860 (AWI classification 2a) represents 103.77ha. Ledmore Oakwood (AWI classification 1a) found on maps from 1750 covers 72.19ha.

Currently, the PAWS zones are Scots pine dominated, although it seems likely that at least the south facing slopes of Migdale Rock and Creag a' Bhealaich would formerly have been more diverse with a significant or dominant broadleaf component. Only occasional non-native conifer species survive from former plantations, including a 0.5ha block on the south face of Migdale Rock (sub compartment 3c), a small block of Douglas fir (sub compartment 8b) that remains from the 2010 felling that is now part of the restock, and an area of Lodgepole pine in sub compartment 8c. Individual seed producing Norway spruce spread throughout 9a and 9b were removed in 2018.

Of the 16 PAWS zones, seven are classed as restored (zones 1,2,5,6,8,9,12) with a further zone that could be considered as such and will be assessed to be formally moved to that status by 2025 (zone 6). Two of the 'secure' zones require small scale management in the next five years to manage invasive or coarse vegetation (zones 9 and 12). Six zones are classed as threatened due to non-native conifers, coarse vegetation, and invasive plants. Three zones are classed as critical due to woodland loss in the case of zones of 11 and 15, and due to high levels of invasive non-native plants and non-native conifers in zone 16.

Ground flora under existing canopy is dominated by blaeberry and heather, with greater or lesser diversity of ancient woodland indicator flora including pinewood specialists Creeping Ladies Tresses, lesser Twayblade, and recently translocated Twinflower. 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. These areas continue to be monitored for change and sensitive interventions are recommended in this plan where relevant. 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 wind blow, fire or felling in the past 30-80 years, and where bracken has become well-established.

Significance

The large areas of ASNW within Ledmore & Migdale woods and the extensive buffering by other woodlands of semi natural origin to the east and west, 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'.

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

Opportunities

Ledmore Oakwood:

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 the opportunity to diversify the age structure by:

- Favouring oak in the existing exclosures (7g).
- Providing the opportunity for oak planted at the west end of oakwood (7b) in 2003 to grow beyond browse height.
- Ensure planted oak in 8b continue to thrive without competition.
- Where there is good recruitment of other broadleaves, such as rowan and birch, demonstrating reduced browsing impacts and sufficient light, to supplement this with oak, and protect through small scale exclosures.

Pinewood:

The pinewood component across the whole site has a varied structure and has been expanding and diversifying through natural regeneration and restoration of the PAWS zones. This is providing an opportunity for ancient woodland species to expand their range from the core ASNW areas. As this has become more robust, it has provided the opportunity to carry out translocations of red squirrel and twinflower (both in 2019). There are opportunities to showcase these projects within a restoring pine woodland ecosystem.

Deer management:

There has been a significant increase in effort and cull level across the site since 2016, with damage reducing year on year to bring the population to a sustainable level addressing three issues:

- Damage to designated sites, recruitment and soils across the site.
- Creating a safety issue on the A949.
- Causing a significant economic impact on nearby farm and croft land.

Through the above, there is the opportunity to demonstrate the possibility of broadleaf recruitment outside of fencing in some locations and in partnership with wider interests through the South East Sutherland Deer Management Group.

PAWS:

Tree species on the site as a whole are artificially segregated due to past management. The relatively treeless PAWS zone 11 (parts of sub compartment 2c and 2d) with its diverse remnant flora has the potential to be restored to a more 'natural' and diverse woodland habitat. Other relatively open areas in PAWS zones 4 (sub compartment 3b) and 13 (sub compartments 3g to 3ii) also offer opportunities for enrichment with broadleaved species. In pinewood PAWS areas outwith Migdale Rock (PAWS 10 and 14), there is the opportunity to develop these woodlands further through opening up deep crowned trees and free up features as set out in the reviewed PAWS strategy.

Constraints

Coarse and invasive vegetation:

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. The management of bracken has been identified within some PAWS zones as necessary where encroachment or density has become an issue. Outwith PAWS, bracken is a serious constraint to recruitment in the western third of Ledmore Oakwood. The high cost of this work and methodology required which takes several years, is a constraint to the scale it could be carried out.

Rhododendron is scattered throughout sub compartments 7e, 7f, 8a, and 8c, with occasional bushes in 3i and 3j. This continues to be a local constraint to the establishment and spread of ancient woodland plants and could become a wider issue if not controlled.

Gaultheria is spreading throughout the eastern third of Ledmore oakwood (sub compartment 7g) shading out the ground flora community, with patches being found in 8a, 8b, 8c, 9a, 9b. This is a particularly challenging plant to manage.

Recruitment and diversity:

Despite deer pressure being lower than at the review of the previous plan, deer pressure remains medium to high across the site (Herbivore Impact Assessment 2019). Continued reduction targeting key locations, such as Ledmore Oakwood, will continue to be a major feature of this plan to increase recruitment and reduce damage to ground flora and soils. Some fencing will be required to assist young growth in some locations.

Much of the northern boundary of the site is with the Skibo Estate common grazings. The aged fence is porous and requires collaboration with the grazings committee to replace to halt sheep incursions.

There are insufficient oak seed trees beyond Ledmore oakwood (compartment 7). Any planting undertaken would include an element of oak if appropriate.

Other:

The welcome arrival of red squirrels in 2019 results in a reduced period during the year for felling operations although, with the relatively small scale of likely operations, this can be accommodated. Before felling work is planned, the latest Scottish Forestry advice on felling in red squirrel areas will be consulted and used for planning operations.

Twinflower in 5c and 10a have established well from January 2019. These areas are to be excluded from mechanical harvesting and avoided. Should additional light be required, consider motor manual felling and ringbarking.

Archaeological remains can be damaged by forest operations. Any management interventions to favour PAWS restoration on the site of the Canadian Forestry Corps sawmill (PAWS zones 6,7,8) are likely to be detrimental to the features.

The presence of larch in the area around Migdale Rock (compartment 3) 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 and increase shade on ancient woodland flora.

Factors Causing Change

Natural succession.

Grazing, browsing, and ground damage by deer, or changes in behaviour as a result of deer management activities.

Invasive non-native shrubs.
Regeneration of non-native trees
Encroachment of bracken.

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, 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 non-native species and coarse vegetation.

Ancient Woodland components in PAWS areas will be secure within a woodland habitat which 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 non-native shrub species. Non-native tree species will be accepted as an occasional feature of the canopy outwith the designated sites. In suitable areas, oak will have been re-established as a component of the woodland structure.

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

Recruitment:

To continue with the programme of deer management reducing damage to 'low' in at least 50% of the site, with the remainder of the site being no higher than 'medium' by 2025, using the Herbivore Impact Assessment (HIA) Woodland Grazing toolkit. Cull effort and disturbance will be particularly concentrated on the Migdale Rock and Ledmore Oakwood designated sites with the aim of at least 50% of monitoring points within these being classed as 'low' by 2025.

This will be achieved by:

- Maintaining the disturbance effort throughout the highest impacted areas, particularly Ledmore Oakwood SAC (compartment 7), reducing browsing impacts at key times of year. This will be through dedicated weekly outings from April to August annually.
- Having a reliable, professional deer management contractor in place to deliver an effective cull; reviewing the contract annually as required.
- Having an annual cull informed by the HIA results; reporting of effects on neighbours, designated sites, and road users.
- Carrying out annual HIA monitoring and revisiting the Nearest Neighbour plots used from 2015 to 2019 every three years (2022 and 2025) to provide more detailed insight.
- Utilising authorisations to maximise effectiveness and manage localised issues; reviewing this annually with Nature Scot.
- Through a separate consent from Nature Scot, to trial the use of a deer deterrent product 'Trico' on up to 500 trees twice per year for a three year period commencing in 2023 on trees in shelters in the west end of Ledmore Oakwood to help inform the decisions on the use of this across the wider site and beyond.
- Maintaining and improving the site infrastructure and access to increase effectiveness through the site maintenance work programme. This will involve:
 - o In 2021 opening up 600m of old track on the north side of Migdale Rock SSSI and building a wooden ATV bridge.
 - o Improvements to the track and path surface and drainage in the wood to the west of the Achue road (sub

compartments 1f and 1g) in 2022. This will prioritise the 500m bulldozed route on the eastern side and the 300m path from the Achue back track to the pedestrian bridge.

o By the end of 2023, improving drainage and surfacing on the 1.5km route from the bridge over the Spinningdale burn to the turning circle behind Rose Cottage and from the 'Y' junction to below 'Philip's' bench (sub compartments 6a, 10a, 9b, 8a).

o Annual repairs clearing topsides ditches, culverts, cross drains, cutting back vegetation and scrub.

- Playing an active role in the South East Sutherland Deer Management Group managing deer in line with our own, and our neighbours', objectives where possible through attendance at meetings, annual payments, and active discussion.
- Maintaining existing deer fencing to be deer proof through annual checking and prompt repair. To follow up repair with ground checking and thermal survey to monitor for incursions.
- Limiting deer control in the most popular areas for visitors (main track from Spinningdale to Migdale) so that visitors have an increased chance of seeing deer and to retain rutting stags when possible.
- By 2021, halting sheep incursions through patching the worst holes and communicating regularly with crofters. By 2025 to have the most porous sections of the 2km fence replaced.

Diversity:

To retain and increase the diversity of the woodland element of the site through:

- At the west end of Ledmore Oakwood SAC (sub compartment 7b), from 2021, to develop this area of potential woodland through:

o In 2021, gather the remaining 200+ redundant tree shelters and re-use or dispose. Work with volunteer groups and schools to cut back gorse from all planted trees, creating at least 10 gorse fences or corrals to deflect deer from small groups of planted oak, aspen, and hazel to allow them to grow beyond the tops of the shelters. Indicatively, these corrals should be roughly round or oval and be between 3m and 10m in diameter. Whip bracken within corrals and in isolated areas away from main deer paths.

o From 2022 to 2025, repeat bracken control. At the end of this management plan cycle, and at the mid way point of the LTFP, revisit this area with Nature Scot to discuss future potential options, particularly if young trees are not clearly demonstrating a positive response to the interventions up to 2025.

o 2022 - remove rabbit fences at plots 7gC and 7gH leaving corner posts for future reference.

o 2023 - favour young oak within plots 7gA, 7gD, 7gE, 7gG by felling rowan and birch immediately adjacent to provide them space to grow without issue from browsing in a dense mixed plot by removing any direct competition while retaining the diversity within the plots. All trees to be felled are under 10cm dbh.

- From 2021, to control bracken around planted trees in the Fairy Glen (sub compartment 1h). By the end of the plan period, to plant an increased mix of hazel, rowan, holly, and aspen in the lower part of the sub compartment at least 20m away from archaeological features. This would be 100 trees of each species, and ideally planted by the community or school pupils.

Protecting ground flora:

For the course of this management plan, and the first phase of the LTFP, the control of bracken has been identified in two priority locations – PAWS areas within Migdale Rock SSSI (sub compartments 3b and 3h (PAWS zones 3, 4, and 13) and the west end of Ledmore Oakwood SSSI/SAC (sub compartment 7b and 7f):

- Ledmore Oakwood - Mechanically roll bracken as far as safe to do so within the one hectare area in sub compartment 7b, and to manually whip bracken in areas where there are young trees and sufficient light in locations that can be readily protected through deer management, up to a total of two hectares. Outside of the oakwood, to roll upto six hectares of bracken, reducing density and vigour of the plant to consider planting and improving scope for deer management.

- Migdale Rock - Mechanical control is not possible due to the rocky nature of these areas and increased access by opening the track and building the bridge will permit an increase in deer management, allowing regeneration to develop.
- If possible, to include rolling the 0.5 hectare area in PAWS zone 9 to halt encroachment within this 'secure' zone.

Small scattered Gaultheria patches in sub compartment 7e (PAWS zone 16), compartments 8 and 9 (PAWS zone 14 and 16) that total an area of 0.1ha and the developing carpet of around 0.75ha in the east end of Ledmore Oakwood (sub compartment 7f) to be controlled annually through strimming in Spring then following up with spraying in summer. Where practical, to manually remove plants where in small isolated locations that are manageable.

Sub compartment 7f, compartments 8 and 9 (PAWS zones 14, 15, 16), and sub compartments 3i and 3j (PAWS zones 3, 4, 12) to be systematically combed for rhododendron bushes and pull young growth where found. Work through annually tackling 3i and 3j in 2021, 9a and 9b in 2022, 7f in 2023. This task undertaken by volunteers.

Restoring PAWS:

The threats from invasive plants and over browsing that affect much of the site are not particular to PAWS zones and the short term objectives set out above manage these issues. The PAWS strategy map and table provide spatial information on the location of the management set out within the PAWS zones in this key feature. The below sets out silvicultural interventions to the PAWS zones:

- To remove European larch from 3b and 3c (PAWS zone 3) in a phased approach from 2021 to 2025.
 - o 2021 – Remove all young growth and fell or ringbark all isolated trees within sub compartment 3b, retaining the few out with the SSSI as a cultural and visual element in sub compartment 5b.
 - o 2022/3 – Fell and extract 0.25ha from west end of sub compartment 3c (PAWS zone 3) with the aim of selling the high quality timber for local construction or innovation. Repair track following work, extracting during dry or frozen weather where possible.
 - o 2024/5 – Fell and extract remaining 0.25ha larch from west end of sub compartment 3c (PAWS zone 3) with skidding of timber to track side in different routes, scarifying to promote regeneration of pioneer tree species and juniper. Repair track following work, extracting during dry or frozen weather if at all possible.
 - o Supplement pioneer regeneration with the planting of 50 aspen and 50 hazel in the next management plan (2026), the second part of the LTFP.
- To begin the process of recreating 'lost' woodland in sub compartment 2c and 2d (PAWS zone 11):
 - o 2023 – Build 2 0.5ha exclosures choosing lines to keep fences off skyline and to include part of the Allt Coire nan Cuorach. Post and wire deer fencing and marked to stop bird strikes. Access route via old farmstead tracks.
 - o 2024 – In each of the two 0.5ha exclosures, at a 2.5m spacing, plant 80 of each of the following species; sessile oak, aspen, rowan, holly, and hazel. 15 wild cherry to be planted scattered through the two plots in sheltered locations.
 - o 2024 - Control bracken in fence annually; fell all larch regeneration in open ground.
- In sub compartment 8b (PAWS zone 15) cut back at least 50% of all broom by the end of 2022 to ensure this is not impeding the growth of planted trees or natural regeneration. Review once cut and assess if additional volumes require control. To remove tree shelters from all trees within this area by the end of 2022.
- Remove the stand of Douglas fir on the edge of sub compartment 8b (PAWS 15) in winter 2021/22 and replant in spring 2023. Across the 0.2ha area, plant with 90 sessile oak, 30 aspen, 45 holly, 60 hazel, 15 crab apple and 15 wild cherry; protect using recycled shelters and replace 600m stock fence on march. This planting will be supplemented through natural regeneration of downy birch and Scots pine.
- Fell and ringbark the lodgepole pine and Douglas fir scattered across 8a and 8c (PAWS zone 16), managing 25% (35

trees) in each of 2022 and 2024 in this management plan, and in 2026, and 2028 in the next, and the second part of the LTFP to provide a volume of deadwood over a slightly prolonged period. If suitable weather and ground conditions, a proportion at the western side could be extracted for small scale firewood use locally.

- In 2024, to work through sub compartment 2a and 2b (western part of PAWS zone 10) to halo thin all potential deep crowned pines, non-pine species and blaeberry ensuring bracken is not provided with sufficient light to encroach, felling no more than 10 cubic metres of young pine. Trees to be ringbarked and felled to recycle, given the small volume of the timber and likely impact from extraction.

4.2 f2 Mixed Habitat Mosaic

Description

In Key Feature 1: 'Ancient Woodland Site', the long term aims and objectives are set out to vary the main structure of the woodland, expanding and diversifying this component across the site. The habitat mosaic of this diverse woodland along with the open ground component of the site is hugely varied. Managing the site in the long term for a wide range of species and habitat needs, requires different micro habitats that need to be either managed for, protected, or in some cases created or reduced.

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

The main components are birch and pine dominated woodland representing almost two thirds of the site. The age diversity of these woodland components is widely varied across the site, although the highest proportion of this is post 1950s as the site recovered from the large scale felling carried out in the 1940s. The woodland not felled is maturing semi natural woodland and planting from the early to mid-19th century. Open ground (as identified through the 2014 Native Woodland Survey of Scotland (NWSS) is just over 20%. This figure is an absolute minimum with many open woodland areas having large canopy gaps.

As the woodland develops over the next 20+ years and management to diversity stands is realised, the structure of the site will begin to alter slightly, favouring mixed native broadleaved woodland. This is particularly the case for planting areas outlined in Key Feature 1 such as sub compartment 2d (PAWS zone 11), 8b (PAWS 15) and 7b. In areas where pine regeneration is developing, particularly in compartments 3 and 6, an increase in pine woodland will be seen. These changes will be subtle, however, with an average loss of only 1.2% of open ground per decade forecast for the next two decades within the LTFP.

In addition to these dominant tree species, minor tree species are represented in varying levels. These are vital components of the woodland for biodiversity interest and can also be of importance for 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. The site is particularly notable for its abundant juniper. It is unfortunate that the disease of juniper *Phytopthera austrocedri* has been known to the west of Bonar Bridge for some years and with the movement of deer and people, it is likely the disease may affect the juniper population in this wood in years to come.

The south facing crags of Migdale Rock support a calcareous cliff sub-montane flora including rock rose *Helianthemum nummularium* wild strawberry *Fragaria vesca*, pyramidal bugle *Ajuga pyramidalis* and rock cinquefoil *Potentilla rupestris*.

Rock cinquefoil is known at just two locations in Scotland, the other being at nearby Loch Fleet.

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 200m stretch where there are locally lime-rich conditions.

The site is a haven for a huge abundance of wildlife and is used by students and universities because of its diversity, scale, and northerly latitude. Researchers study here to understand species behaviour, monitor effects on species due to climate change, or as a refuge for species previously lost and threatened elsewhere. Invertebrates have been well documented on the site through the hard work and dedication of the late Philip Entwistle recording over 500 species. Studies have shown the importance of the site for Scottish, hairy, and slave-maker ants, all of which are near their northern limit and are isolated geographically due to historical woodland loss across the country. These ants thrive here and management considers the impacts and benefits of a diverse structure on species such as this. A very rare furrow bee discovered here in 2017 has the largest known colony anywhere in the north Highlands, with Exeter University carefully studying and maintaining the site.

With a robust habitat in a stable and improving condition, the site welcomed back the rare pinewood plant Twinflower through a translocation project with the North Highland Twinflower project in 2019. Later in 2019, red squirrels were translocated back to the woodland and these charismatic creatures quickly settled in. In future years, similar projects will be considered for the site if appropriate.

As well as Schedule 1 bird species breeding or using the wood for feeding, summer migrant passerines breed here with some near their northerly limit. The site has also been identified as an area suitable for the potential expansion of capercaillie from stable populations to the south of the Dornoch Firth.

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)(Entwistle 1998).

Spinningdale Bog SSSI, a rare 'valley mire' habitat, is unusual in the site in that it is managed as an open ground habitat for the long term. This designated site supports dense stands of reed canary grass *Phalarus arundinacea* and common reed *Phragmites australis* plus a variety of other species including bogbean *Menyanthes trifoliata*, bottle sedge *Carex rostrata*, marsh ragwort *Senecio aquaticus*, marsh cinquefoil *Potentilla palustris* and bog pondweed *Potamogeton polygonifolius*. The bog also supports the bog orchid *Hammarbya paludosa* and coralroot orchid *Corallorhiza trifida*. In addition, it 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*, and the jumping spider *Salticus cingulatis* (Entwistle 2008).

Numerous Sphagnum species are found on the bog, including fine bog moss *S. recurvum*, which is dominant, together with blunt leaved bog moss *S. palustre*, *S. pappilosum*, and *S. capillifolium*.

This plan, and the Long Term Forest Plan intention over the next 20 years, seeks to maintain around 20% open ground throughout as a vital component of the structure of this site. This includes maintaining Spinningdale Bog SSSI as an open valley mire at the openness achieved by 2018 following significant scrub clearance. The current open ground

component of the site represents a range of habitats including wet and dry acidic heath, dwarf shrub heath, blanket mire, screes and cliffs, acidic grassland, marshy grassland, and wet flushes.

The majority of open ground comes from natural or human intervention in the last 70 years. The most significant of this is the felling of around two thirds of the site in the 1940's when two Canadian Forestry Corps logging camps were operating on the site. This was followed by a large windblow event in the 1950's on the north side of Migdale Rock and fires in the 1980's on A'Chraigs, Migdale Rock, and Creag a' Bhealaich.

A significant regeneration pulse comes from the 1980's and early 1990's, likely due to a period of high culling effort by the sporting tenant. New seedling recruitment has slowed since then 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.

Significance

The mosaic of woodland with open ground habitats in such a complex mix has created a very diverse habitat which is significant in its location and scale in south east Sutherland.

The biodiversity of the site has been recognised with the Ledmore Oakwood, Migdale Rock, and Spinningdale Bog SSSI designations, with Ledmore Oakwood also boasting the additional SAC designation.

The robustness and resilience of the site has been recognised in using this site for the translocation of threatened species appropriate to the site.

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. Through working with neighbouring landowners through the DMG, there is the potential for the habitat on the peripheries to increase in their diversity as deer pressure reduces.

This large, contiguous area of semi-natural woodland is important in the context of climate change, as it is likely to be more stable and resilient than the more fragmented native 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, with few areas outside of Strathspey having such significant a population. There is no indication of *Phytopthera austrocedri* currently (2020) and being a slightly isolated population diverse in age and structure may be an advantage for the longevity of this species in the wood.

The mixed habitat mosaic supports a range of species, 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.

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

Opportunities:

Through careful interventions, the site can be further increased in diversity through the increase of tree species in parts of the site identified through the PAWS strategy, increasing the areas classed as mixed native broadleaves.

Aspen is a particularly important species in the wood supporting a wide range of other species, with a dedicated previous project in sub compartment 2b. Through identifying, mapping and scoring the health and security of each stand, the species can be encouraged to increase its scale in the wood in appropriate locations with sympathetic management, protection, and planting.

Where there are particularly unusual tree species for the wood (rock whitebeam and crab apple) to look to use existing specimens as a seed source, and if possible plant further specimens in appropriate locations. If not possible, to source suitable saplings to plant.

For other under-represented species such as bird cherry, wild cherry, hazel, holly, and, in places, sessile oak, to plant these as part of a mix suitable to the site and ground to increase diversity and seed trees.

Where invasive non-native species are threatening niche habitats, such as Cotoneaster on the crags of Migdale Rock, to use the management interventions as demonstration opportunities, and interest users, land managers and the local media to assist in reducing the spread of these species, and in reporting other such species through the Scottish Invasive Species Initiative.

The control of bracken in priority locations can be carefully monitored to demonstrate effectiveness and costs of methods used.

With Spinningdale Bog SSSI largely cleared of scrub, to the scale to protect the features of the site, there is the opportunity to look further at what further restoration could take place to ensure the long term stability of the bog without regular human intervention.

Constraints:

Deer browsing is a constraint on successful tree regeneration and on the survival of veteran hazel stools. Deer present a serious threat to new recruitment of seedling regeneration, with Juniper being especially vulnerable to browsing.

Due to the presence of *Phytophthora austrocedri* to the west of Bonar Bridge, the current advice from SNH is to not plant juniper on the site, so any increase in cover would be reliant on the management of favourable conditions adjacent to existing stands.

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 topography of the site makes it challenging to carry out mechanical control on a meaningful scale apart from a very few locations making large scale control time consuming and costly.

There is a lack of quality data on the health and abundance of aspen across the woodland. As a key habitat for such an abundance of insects in particular, building this baseline will enable us to manage for the species as part of the woodland composition.

There are few specimens of rock whitebeam or crab apple. As part of enrichment planting in appropriate locations, to consider these two species.

The site is an island oasis for Scottish wood ants, and a particularly important location in Sutherland for hairy wood ant and slave maker ant, with these three species requiring well-lit glades and woodland edge. The maintenance of such a habitat should not diminish diversity, but limits the succession of these areas of ground as the site develops.

The management of Cotoneaster on the cliffs of Migdale Rock and the control of Gaultheria in Ledmore Oakwood are challenging due to the topography and/or difficulty in managing the plant itself. These plants are also in the wider environment so management interventions will need to be ongoing to be successful if control at source is not possible.

Management interventions to increase diversity must ensure no damage to existing diversity. Whilst there is an abundance of biological recording across the site it is not held in a way that can be easily accessed or interrogated to support management practice.

There is well documented archaeological, cultural, and historical human use of the site. Any management must take these into account and take steps to not damage remnants and protect them where possible.

Ash die back was first confirmed on site in 2021, although there are very few ash on site, although there are two very large ash associated with farmstead buildings by Kyloag. Phytophthora austrocedri, a disease to affect juniper is known locally near Bonar Bridge, although not known on site. This proximity may have a bearing on juniper health here in future. There is no evidence of Dothistroma, which would be most detrimental to the site.

Factors Causing Change

Natural succession
Invasion by non-native species, or the further spread without intervention.
Grazing, browsing, and ground damage by deer, or changes in their behaviour as a result of deer management activities.
Hydrological changes.
Encroachment of bracken.
Tree disease.

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. Over the next 20 years, as the woodland cover increases slightly, the existing woodland will also increase in diversity and structure and lay the foundations for future recruitment of new woodland across the site.

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

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 status as assessed by SNH.

The valley mire feature will continue to support viable populations of the specialised plants and insects which depend on the habitat it provides.

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

Understanding and protecting existing under represented species:

- By the end of the plan period, to have all aspen mapped and each stand scored for security. To consider management interventions at vulnerable stands to be included as part of the next management plan, and phase two of the LTFP. To remove 120m of rabbit fenced aspen enclosure in 2b as ineffective and as part of mitigating for new fencing in 2d. Fence to be removed as part of 2d fence contract with posts being recycled for pinning, etc, as required. Retain deer enclosure in 2b for aspen.
- To develop a plan with Trees for Life to establish saplings from the seven rock whitebeam on site and aim to plant saplings from our own specimens by 2025.

Protection of, research, and management for, existing known features. While the site is managed in a holistic way, there are a number of particular species or habitats which require a level of intervention to allow them to continue to thrive:

- Support Trees for Life monitoring of the red squirrel population as directed by them.
- To annually monitor the establishment, spread, flowering, and seeding of the five mixed clone twinflower patches in sub compartments 4a, 5c, 10a.
- By 2024, to resurvey known ant colonies and establish a programme of work, or forecast of work, to ensure these colonies have the opportunity to survive and spread where appropriate.
- With advice from Exeter University, to carefully manage the successional vegetation on the furrow bee bank in sub compartment 1a to retain the population and breeding area.
- By the end of the plan period to eradicate Cotoneaster from the cliffs of Migdale Rock (sub compartment 3d).
- As part of tree safety monitoring work, to assess the health of the ash as these few trees decline due to ash die back.
- In 2022 and 2025, to sweep the 12ha of the open central area of Spinningdale Bog (sub compartment 4a) for alder and willow regrowth from the clearance work carried out from 2012 to 2017. In each sweep round, to use a clearing saw to cut growth and paint stump with glyphosate. This will retain the bog as an open feature for the many species that rely on this unusual habitat.
- In 2025, to plan for the resurvey of the Coppins & Coppins lichen survey in Ledmore oakwood (compartment 7) to take place in 2026, 25 years after the original survey.

- While the bracken dominant open glades are favoured by pearl bordered fritillary, the deep bracken developing in many of these is detrimental. Through bracken management for ground flora, it will be beneficial to monitor the forecast increased presence of the species. This will be available as a project for interested students or volunteers when available, along with discussion with Butterfly Conservation and Nature Scot, with the aim to have some results of the impacts by 2025 to inform the second half of the Long Term Forest Plan.
- To compile known biological recording data into a single data set, and create a mappable database that can be used to inform potential impacts from management prescriptions. This will be funding dependant, and aims to be achieved ahead of the LTFP mid-term review in 2025.

4.3 f3 Archaeological Feature

Description

The built history of the site is fascinating, and provides a very useful insight to the structure and diversity of the site as it stands today. In managing with, and for, these features, we can respect the built past of the site while developing its future, or reverting it back to a previous state, depending on the habitat and condition.

A total of 40 features or groups of features of archaeological and historic interest have been recorded in Ledmore & Migdale woods, including a concentration of chambered cairns, three of which are Scheduled Ancient Monuments (SAMs).

There are extensive post medieval sites including relatively complex townships such as at Kyloag (sub compartment 1a), Torroy (sub compartment 1b) and Creag na Sroine (sub compartments 8a and 8b), some small isolated farmsteads and some individual buildings, such as the corn mill on Spinningdale burn (sub compartment 5b). The recently purchased Fairy Glen (sub compartment 1h) is another particular hot spot with a chambered cairn, and more recent historic interest with footings for one of Carnegie's bridges and a stone carved for the opening of the Fairy Glen in the early 1900's, leading to the site of a former cabin in sub compartment 1e.

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

Perhaps the most mysterious, however, is the report of a 'tunnel' discovered in the 1950's on the North side of Migdale Rock, now lost.

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 with the three scheduled monuments being of national interest.

Opportunities & Constraints

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

Management operations, including felling, path or 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)

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

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

4.4 f4 Connecting People with woods & trees

Description

Ledmore and Migdale Wood occupies a commanding position in the landscape, stretching from the northern shore of the Dornoch Firth, through Ledmore Oakwood, over the hills of A'Chraisg and Migdale Rock, and onto Creag a' Bhealaich. It can be seen from the Dornoch Bridge just five miles away on the A9 - part of the hugely popular North Coast 500 route. It sits mostly within the 7500 hectare Dornoch Firth National Scenic Area and is a dominant part of the view from the B9176 'Struie' road from the large viewpoint layby above the south shore of the Dornoch Firth.

Its scale, diversity, designations, species, translocations and built history make this a fascinating site to explore and learn about the wonders of trees and woodland in a Highland landscape. It provides abundant opportunities for education, engagement, and enjoyment while respecting the nature of the site and the communities who live and work alongside it.

The main car park for the site sits half a mile from the community of Spinningdale on the unclassified road to Migdale. It can be found by following the brown tourist signage on either side of the community of Spinningdale. The car park can take up to ten cars and has orientation information, a map, and a site leaflet. 200m beyond, up a fairly steep slope, is the partially restored Torroy Croft building, used regularly as a base and shelter for groups and events. Torroy Croft is open throughout the year for the public to use responsibly and is a popular picnic spot. Three other entrances also have orientation boards.

The site has an extensive footpath and track network. A number of waymarked trails invite users to explore the many vantage points and varying habitats the site has to offer. In total there are around 12 kilometres of footpath, including four waymarked routes of varying lengths and difficulty. Many of the routes are firm vehicular tracks made from locally sourced materials and some previously bulldozed routes have been improved over the years. Some of the footpath sections are undergoing improvements to surfacing and drainage to further improve usability. For less able visitors, the site leaflet features a route marked in yellow that avoids steps and a gate. It runs from the car park along the unclassified road to the path network.

There are a number of routes through the site classed as 'Core Paths'. These are the main routes through and within the site, and link up the site path network with a wider network of paths and routes classified as Rights of Way. These include routes that link with a picturesque path along the north shore of Loch Migdale to the community of Migdale.

In addition to the main car park at Torroy, there is parking available for two vehicles on the north east edge of the wood along the Achue Road marked on the leaflet. There is also parking for three vehicles at the west side of the wood on the northern shore of Loch Migdale, accessed via the narrow road off the Bonar Bridge to Migdale road.

There are five benches through the site which are marked on the site leaflet. Two of these have been hand carved from oak cut onsite and are painstakingly crafted to represent features of the woodland. They are a real feature of a visit to the site.

Ledmore and Migdale woodland is situated within a 20 mile radius of a population of over 10,000, including the towns of Tain and Dornoch and numerous coastal villages. It is five miles from the main A9 trunk road, and a one hour drive north of Inverness. Local tourism has sky rocketed in recent years with the development & promotion of the North Coast 500 route that this passes within five miles of the site on the A9. South East Sutherland is a popular holiday destination with beaches, golf, and the coastal Dunrobin Castle. Inland tends to see fewer tourists and these appear to be the visitors seeking particular attractions or experiences.

Limited data on visitor numbers (supported by data from comparable local sites) suggests visitor numbers in the region of 8000-10000 per annum. This has increased anecdotally due to the installation of tourist signage in 2017, the production of a new site leaflet in early 2019, and promotion associated with the red squirrel translocation in late 2019. The increase in visitor numbers has also increased the number of instances of wild camping, campfires, visitors with dogs, and litter. While the vast majority of these access takers are responsible and follow the guidance set out in the Scottish Outdoor Access Code, there have been a small number of instances of irresponsible behaviour.

From 2012 to 2016, a Lottery funded project called 'People and Trees' ran a series of successful events engaging people in the cultural history of the wood and gathering information and stories. In 2014, 1000 people attended events linked to the project. Since 2016, a series of smaller events have been run annually aimed at engagement and education around the responsible use of the woodland, management of the woodland and local wildlife. These have been reasonably well attended with one event attracting 35 attendees.

Currently, the site has 20 volunteers who are involved with the red squirrel translocation project, twinflower translocation, or as Woodland Wardens.

Through the John Muir Award and Rural Skills levels 4 and 5, Golspie High School has used the woodland for educational purposes with other school and nurseries using the site for trips and sponsored walks.

A total of 40 features of historical interest have been recorded on 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

Ledmore and Migdale Wood is an important landscape feature which contributes to the dramatic setting of the Dornoch Firth National Scenic Area.

The scale and diversity of the site is locally significant as there are few other locations in Sutherland where you can be immersed in a vast native wooded landscape.

The site is just five miles from the hugely popular North Coast 500. Management of the tourists who venture to quieter locations such as Ledmore & Migdale should be carefully considered.

Public access to and through the site is significant for local walkers, cyclists and horse riders. The site is the backdrop to nearby Loch Migdale, a draw for wild swimmers and canoeists.

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

Opportunities & Constraints

Opportunities:

Being within five miles of the North Coast 500, and seven miles from the tourist hub of Dornoch, there is an opportunity to increase site awareness and footfall. The approach needs to be considered carefully however. Many sites around the NC500 quickly become inundated with campers, litter, and waste. While it may be desirable to increase visitors to the site, we would prefer to attract audiences looking for quiet recreation.

The new North Highland Initiative website and accompanying visitor leaflet will entice holiday makers to spend more time outdoors and off the beaten track (as opposed to the traditional NC500 one night stop over). Leaflet text and website content is being developed currently (June 2020).

The education element could be developed more meaningfully as society progresses through the COVID-19 pandemic. With a requirement for smaller in-school class sizes, the site could be utilised as a venue for outdoor learning. This idea could be developed with the High Schools in Tain, Dornoch, and Golspie, as well as local primary schools (dependent on funding and transport limitations).

Given the rich biodiversity of the site, there is an opportunity to engage, inspire, and inform visitors and interested groups and individuals about the species that thrive in the woods, as well as the work done to manage for them.

With the car park and Torroy Croft shelter, the site is well set up for a range of guided walks and events.

Some of the volunteers involved with the squirrel translocation have requested additional tasks and opportunities to assist with the management of the site.

Some of the management elements of the site such as removal of Cotoneaster on Migdale Rock, could be used to demonstrate management and potentially engage audiences remotely through video and social media.

Through local groups and organisations, such as Gearrchoille Community Woodland and Tain District Field Club, there are opportunities to share information, expertise and data to further inform the management of the site and to develop closer links with others.

The newest part of the site, the Fairy Glen (sub compartment 1h) is very close to the village of Spinningdale and is readily accessible from the road. With the area being deer fenced, making it slightly different to the wider wood, it provides an opportunity to develop this part of the woodland closely with the community to manage the area in a way that suits their needs as well as our own. This could include using hazel coppice, planting, as well as community picnics, story telling, etc.

Constraints:

While the site provides a vast range of opportunities with schools, communities, users, and wildlife, one of the largest constraints is the capacity of the Site Manager, and the budget available to deliver these elements. Funding will be sought through FGS and other avenues to bring in contractors to run walks and events when possible.

The site is a wild woodland, and the management of the site needs to work sympathetically alongside its key features. With this in mind, information panels tend to only be at site entrances, or for specific projects, such as the red squirrel release. Signage will not be placed throughout the woodland. Paths and tracks will be functional for management and access by vehicles so will mostly always be a rougher robust surface rather than the more finely built and maintained surfaced routes more often found in lowland or peri-urban settings

Around Torroy, there are kissing gates and a set of steps impeding access for some from the car park. The road route marked on the leaflet is the only easy access route.

Steep, unstable, or wet ground, make it difficult to create access to some of the more desirable locations such as Spinningdale Bog or the top of Migdale Rock. Improved access would also result in the loss of ancient woodland ground flora habitat.

The site has a reasonably high tick population with Lyme's disease known to be in the area.

Factors Causing Change

Anticipating an increase in rainfall, and coming in more extreme bouts, water on the paths together with a forecast increase in the number of visitors to the site will require a higher specification of path with more labour intensive maintenance programme.

Long term Objective (50 years+)

Ledmore and Migdale will provide an extensive area of quiet informal recreation for a wide range of users both from the local area and from further afield. Sensitive use of the site will be encouraged via targeted communications. Visitors will be reminded to behave appropriately and respect the value and importance of this wood for local people and wildlife.

Entrances and signage will have a welcoming appearance and there will be a network of robust paths providing a range

of linear and loop routes suitable for walkers, horse riders and cyclists, where possible linking to the wider path network.

The use of the site for education will have increased as a result of visits from local schools and Universities, as part of John Muir Award, Rural Skills, or particular studies of certain species or groups.

Where appropriate, local businesses and individuals will be supported through the provision of available timber to assist in the manufacturing of local products that will have an association with Woodland Trust.

There will be a group of well supported volunteers delivering elements of the engagement, research, and maintenance programme of the site.

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

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

- Ensuring that entrances and signage are welcoming to visitors and well cared for (annually).
- Ensuring that all 12km of managed paths are kept well-drained and free from encroaching vegetation by cutting, and that access features (e.g. bridges, steps, entrances, boundary features, etc. are kept in good order (annually).
- Ensuring that all viewpoints are maintained free of encroaching vegetation, where it is obscuring the view (annually).
- 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).

The visitor welcome and experience will be further enhanced by:

- Carrying out improvements to the path and track network as set out KF1.
- Install an additional bench, designed and carved by Bill Ross and to be installed once completed in sub compartment 6a looking north east over Spinningdale and Creag a' Bhealaich.

Visitors will be attracted to the wood and informed about walk routes, responsible access, and points of interest by the following improvements:

- To bring the leaflet and on-site boards together by replacing on-site orientation boards with new design maps and information in 2025, with the board celebrating the natural and cultural history of the site.
- To review the site leaflet before each reprint to amend any changes or errors annually.
- Maintain the wood's facebook page as a key tool to engage directly with a dispersed community of users.
- To review and reduce the volume of waymarking on site through:
 - o When replacing waymarkers in 2025, to ensure the different coloured routes are marked on the same post to reduce the quantity of posts in the wood.
 - o Removing confidence markers in 2025.
- Working with the Highland Council Access Officer, to ensure signage is in place at locations where there are repeated instances of non-compliance with the Scottish Outdoor Access Code, ensuring visitors are aware what their rights are and are not, particularly around fires, uncontrolled dogs, and latrines.

The site will be used for education and engagement by:

- Developing a Woodland Working Group to take on elements of the work programme.
- When planting trees in the Douglas fir felled area (sub compartment 8b) in 2023, to plan for the planting of this to be carried out as an event for local people in the spring.
- To invite each local Primary and Secondary school to the site once per year, if supported by suitable external funding

to provide a safe and educational experience for the classes attending.

- To develop a programme of guided walks and events with input from volunteers, the community, Highland Council Ranger Service, ourselves, and partners that develops further understanding of the importance of the woodland, how to use the place responsibly, the usefulness of the timber product, and of the history of the site. Again, the scale of this will be dependent on the availability of funding.
- There will be the opportunity for volunteers and/or students to take on aspen and ant monitoring mentioned in KF2 if the right person or people come forward.

5. WORK PROGRAMME

Year	Type Of Work	Description	Due Date
2020	WC - Tree Weeding / Fertilising	Works associated with tree weeding and fertilising operations to ensure the successful establishment of planted trees	August
2020	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	August
2020	WC - Tree Weeding / Fertilising	Works associated with tree weeding and fertilising operations to ensure the successful establishment of planted trees	August
2020	SL - Routine Safety Work	Works associated with undertaking planned visitor and structure safety orientated actions, such as erection/creation or maintenance of safety features such as fencing, rails, re-pointing of retaining walls etc	October
2020	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	October
2020	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	October
2020	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	October
2020	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	October
2020	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	November
2020	AW - Visitor Access Infrastructure	Works associated with the construction of a new or extension to existing car parking facilities.	December
2020	SL - Tree Safety Works - Zone A	Work associated with planned tree safety works alongside areas such as car parks, roadsides and boundaries	December
2020	SL - Routine Safety Work	Works associated with undertaking planned visitor and structure safety orientated actions, such as erection/creation or maintenance of safety features such as fencing, rails, re-pointing of retaining walls etc	February
2021	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	March

Year	Type Of Work	Description	Due Date
2021	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	April
2021	WC - Tree Weeding / Fertilising	Works associated with tree weeding and fertilising operations to ensure the successful establishment of planted trees	June
2021	CS - Ecological Survey & Assessment	Use of external consultants to support the provision of ecological surveys, assessment and biodiversity / species monitoring	November
2021	CS - Ecological Survey & Assessment	Use of external consultants to support the provision of ecological surveys, assessment and biodiversity / species monitoring	November
2021	HF - Invasive Plant Control	Works associated with the control of invasive plants / vegetation posing a threat to a historical or cultural feature/ building or area – such as Japanese knotweed	November
2021	WMI - PAWS Restoration	Works associated with the restoration phase of Planted Ancient Woodland Sites (PAWS) such as halo thinning around existing native trees, thinning and felling works, ride restoration, access improvements to aid restoration.	January
2021	WMI - PAWS Restoration	Works associated with the restoration phase of Planted Ancient Woodland Sites (PAWS) such as halo thinning around existing native trees, thinning and felling works, ride restoration, access improvements to aid restoration.	January
2021	WMI - PAWS Restoration	Works associated with the restoration phase of Planted Ancient Woodland Sites (PAWS) such as halo thinning around existing native trees, thinning and felling works, ride restoration, access improvements to aid restoration.	January
2022	SL - Tree Safety Emergency Work	Work associated with unplanned emergency tree safety works – such as clearance of fallen trees/branches and associated repairs	February
2022	AW - Management Access Maintenance	Works associated with the maintenance of management access infrastructure and tracks Such as repairs to vehicle entrance points, maintaining vehicle bridges and repairing / reinstating surfaced management access routes.	March
2022	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	March
2022	WC - Fencing	Works associated with fencing to protect planting areas	March
2022	WC - Fencing	Works associated with fencing to protect planting areas	March
2022	WC - Fencing	Works associated with fencing to protect planting areas	March

Year	Type Of Work	Description	Due Date
2022	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	March
2022	WMM - Invasive Plant Control	Works associated with the on-going management of invasive plants– such a repeat cutting and control treatments	June
2022	WC - Tree Weeding / Fertilising	Works associated with tree weeding and fertilising operations to ensure the successful establishment of planted trees	July
2022	WMM - Invasive Plant Control	Works associated with the on-going management of invasive plants– such a repeat cutting and control treatments	July
2022	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	September
2022	HF - Invasive Plant Control	Works associated with the control of invasive plants / vegetation posing a threat to a historical or cultural feature/ building or area – such as Japanese knotweed	October
2022	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	October
2022	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	November
2022	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	November
2022	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	November
2022	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	November
2022	WMM - AWS silviculture	Works associated with silvicultural operations within ancient woodlands to meet our primary aims of conserving woodlands and encouraging public enjoyment– such as the removal of non-natives, thinning and promotion of native trees and shrubs, creating and managing view points and providing welcoming sites for visitors	November
2022	WMM - AWS silviculture	Works associated with silvicultural operations within ancient woodlands to meet our primary aims of conserving woodlands and encouraging public enjoyment– such as the removal of non-natives, thinning and promotion of native trees and shrubs, creating and managing view points and providing welcoming sites for visitors	January

Year	Type Of Work	Description	Due Date
2022	HF - Invasive Plant Control	Works associated with the control of invasive plants / vegetation posing a threat to a historical or cultural feature/ building or area – such as Japanese knotweed	January
2023	SL - Tree Safety Works - Zone A	Work associated with planned tree safety works alongside areas such as car parks, roadsides and boundaries	February
2023	AW - Visitor Access Maintenance	Works associated with the maintenance of existing visitor access infrastructure and paths. Work could include items such as repairing pot-holes and path surfaces, mowing grass paths, path widening, maintaining footbridges and steps, cleaning signage etc,	February
2023	AW - Management Access Maintenance	Works associated with the maintenance of management access infrastructure and tracks Such as repairs to vehicle entrance points, maintaining vehicle bridges and repairing / reinstating surfaced management access routes.	March
2023	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	March
2023	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	April
2023	PE - Interpretation & Signage	Works associated with the provision of visitor signage, waymarking, interpretation features and leaflets	April
2023	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	April
2023	AW - Visitor Access Maintenance	Works associated with the maintenance of existing visitor access infrastructure and paths. Work could include items such as repairing pot-holes and path surfaces, mowing grass paths, path widening, maintaining footbridges and steps, cleaning signage etc,	May
2023	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	May
2023	WMM - Invasive Plant Control	Works associated with the on-going management of invasive plants– such a repeat cutting and control treatments	May
2023	AW - Visitor Access Maintenance	Works associated with the maintenance of existing visitor access infrastructure and paths. Work could include items such as repairing pot-holes and path surfaces, mowing grass paths, path widening, maintaining footbridges and steps, cleaning signage etc,	June

Year	Type Of Work	Description	Due Date
2023	WMM - Invasive Plant Control	Works associated with the on-going management of invasive plants– such a repeat cutting and control treatments	July
2023	WC - Tree Weeding / Fertilising	Works associated with tree weeding and fertilising operations to ensure the successful establishment of planted trees	August
2023	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	August
2023	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	September
2023	AW - Management Access Maintenance	Works associated with the maintenance of management access infrastructure and tracks Such as repairs to vehicle entrance points, maintaining vehicle bridges and repairing / reinstating surfaced management access routes.	September
2024	WC - Tree Planting / Seeding	Works associated with tree planting / tree seeding for woodland creation sites	April
2024	WMM - Invasive Plant Control	Works associated with the on-going management of invasive plants– such a repeat cutting and control treatments	May
2024	WC - Invasive Plant Control	Works associated with noxious or invasive weed control on woodland creation sites	May
2024	WC - Tree Weeding / Fertilising	Works associated with tree weeding and fertilising operations to ensure the successful establishment of planted trees	August
2024	PC - Deer Control - Shooting	Works associated with deer management by shooting – such as stalker costs, high seats, signage, maintenance of tracks and open ground provided specifically for deer management etc	August
2024	WMM - Invasive Plant Control	Works associated with the on-going management of invasive plants– such a repeat cutting and control treatments	August
2024	WC - Invasive Plant Control	Works associated with noxious or invasive weed control on woodland creation sites	August
2024	WMM - General Site Management	Works associated with maintaining conservation and physical features within the sites such as boundary ditches, fences and walls, hedges,	October
2024	WMM - AWS silviculture	Works associated with silvicultural operations within ancient woodlands to meet our primary aims of conserving woodlands and encouraging public enjoyment– such as the removal of non-natives, thinning and promotion of native trees and shrubs, creating and managing view points and providing welcoming sites for visitors	November

Year	Type Of Work	Description	Due Date
2024	WMI - PAWS Restoration	Works associated with the restoration phase of Planted Ancient Woodland Sites (PAWS) such as halo thinning around existing native trees, thinning and felling works, ride restoration, access improvements to aid restoration.	November
2024	WMI - PAWS Restoration	Works associated with the restoration phase of Planted Ancient Woodland Sites (PAWS) such as halo thinning around existing native trees, thinning and felling works, ride restoration, access improvements to aid restoration.	January
2024	AW - Management Access Maintenance	Works associated with the maintenance of management access infrastructure and tracks Such as repairs to vehicle entrance points, maintaining vehicle bridges and repairing / reinstating surfaced management access routes.	January
2025	PE - Events - Tree Planting	Provision of materials needed to support public, corporate and school events associated with tree planting /activities such as refreshments / shelters / materials / mobile toilets	April
2025	WMM - Invasive Plant Control	Works associated with the on-going management of invasive plants– such a repeat cutting and control treatments	May
2025	WC - Invasive Plant Control	Works associated with noxious or invasive weed control on woodland creation sites	May
2025	WMM - Invasive Plant Control	Works associated with the on-going management of invasive plants– such a repeat cutting and control treatments	May

APPENDIX 1 : COMPARTMENT DESCRIPTIONS

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
1a	18.05	Birch (downy/silver)	1940	PAWS restoration	Archaeological features	Ancient Semi Natural Woodland, National Scenic Area
<p>South facing slope between the unclassified Migdale road and the west end of the Achue track.</p> <p>Predominantly well-spaced, mature Birch woodland regenerated since the large scale felling during the Second World War, 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 are frequent. There are occasional areas of Scots Pine regeneration becoming more frequent to the north.</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 sub compartment 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>Almost half of this compartment is recorded as Ancient Semi Natural Woodland (ASNW) on the Ancient Woodland Inventory (AWI), with small pockets identified within the Planted Ancient Woodland Site (PAWS) strategy. There is no discernable difference on the ground between native woodland (ASNW) and PAWS so has been removed from the PAWS strategy considered as restored. Bracken is an issue within both descriptions and will be considered for management regardless of status of PAWS or not. 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). Three veteran Scots pine have been recorded for the Ancient Tree Hunt in this sub compartment.</p> <p>The sub compartment 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>						
1b	3.09	Mixed native broadleaves	2013	Wood establishment	Archaeological features, Housing/infrastructure, structures & water	National Scenic Area

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
					features on or adjacent to site	
<p>Young native woodland planted 2013 in a previously bracken-dominated field on a moderate south-facing slope.</p> <p>Torroy farmstead is in the NW corner of the sub compartment 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.</p> <p>A small area in the SW corner of 0.5ha is within the ancient woodland inventory as ancient woodland of semi natural origin.</p> <p>The south west facing bank from the car park to the restored building is home to a very large colony of furrow bees being studied by Exeter University for their unique behaviour, compared to the behaviour of the same species in the south of the UK.</p>						
1c	27.51	Birch (downy/silver)	1940	Min-intervention	Housing/infrastructure, structures & water features on or adjacent to site	National Scenic Area
<p>Very large swathe of even aged birch regeneration across a south facing hillside, probably derived from natural regeneration following larg scale felling during the Second World War.</p> <p>Predominantly <i>B. pubescens</i> with some <i>B. pendula</i> above Rhivra. Density varies & includes some large scattered glades, especially in the northwest corner.</p> <p>The birch becomes progressively more stunted towards the east of sub-compartment. Scots pine and birch is regenerating throughout the sub compartment, vigorously in places. Thinning to waste was carried out over 19ha Birch in 2002.</p> <p>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.</p> <p>A former Scottish Water tank is situated at the west end of the sub-compartment, this is now privately owned. In the north west corner, there are the remains of a group of buildings.</p>						
1d	23.36	Birch (downy/silver)	1940	Min-intervention	Archaeological features	National Scenic Area, Scheduled Ancient Monument

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
<p>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.</p> <p>The Rhivra or Achaidh chambered cairn by the Achue track is a Scheduled Ancient Monument [Index no. 1803]. There is a second cairn and a farmstead also within this sub compartment.</p> <p>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.</p>						
1e	23.82	Birch (downy/silver)	1940	Min-intervention	Archaeological features, Gullies/Deep Valleys/Uneven/Rocky ground	National Scenic Area
<p>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.</p> <p>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.</p> <p>The whole of the sub-compartment 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. The South West corner is Ancient Semi Natural Woodland - Long Established Woodland of Plantation Origin.</p> <p>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.</p>						
1f	9.2	Open ground		Min-intervention	null	National Scenic Area
<p>Flat, open heather moorland developing into low density bog woodland above south facing slope supporting a large area of raised blanket bog with very stunted, 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.</p>						
1g	30.32	Birch (downy/silver)	1940	Min-intervention	Archaeological features, Services & wayleaves	Ancient Semi Natural Woodland,

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
						National Scenic Area
<p>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. There is scattered no native conifer regeneration in the southern edges.</p> <p>The wooded areas bordering the moor are composed of dense, scrubby silver birch regeneration to the north, semi mature silver birch to the south west, pine and birch to the south, a wet area with dense birch and goat willow at the south east corner, and a strip of open mature silver birch along the roadside to the east. Gorse is frequent in glades and as an understorey throughout.</p> <p>The gully of the Allt Ruadh marks the southern boundary of the property. The south east and south west corners of the sub compartment 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.</p> <p>The whole of the sub compartement is shown as woodland on the OS 1st edition map c.1860. Part of the SW corner is recorded as ASNW - Long Established Woodland of Plantation Origin.</p>						
1h	2.83	Birch (downy/silver)	1940	Min-intervention	Gullies/Deep Valleys/Uneven/Rocky ground, Services & wayleaves	National Scenic Area
<p>Purchased in 2020 as a fenced area to the south west of 1e, this compartment is made up of birch with some hazel, cherry, holly, willow and alder in the northern half, and mature sessile oak in the southern half. In the upper half, the ground flora comprises of greater woodrush, grasses and bluebell. In the southern half, bracken has becomes dominant, although some planting of oak in some canopy gaps will assist in reducing the capability of dominance in the long term, although lateral light from the fields will also be an ongoing issue going forward.</p> <p>Designated as Ancient Semi Natural Woodland - Long Established Woodland of Plantation Origin, and part of a slightly larger block of ASNW within the area adjacent in sub compartment 1e and 1g. It first appears as woodland on the Murnett and Scott map in 1831.</p> <p>The cultural history in this small compartment is vast. Two chambered cairns at the southern corner and a dedication memorial stone to a Carnegie family member. the route to the cabin in 1e crossed the stream mid way up the compartment with the stone abutments still visible and in good repair. To the uphill of this is the real gem of this spot, a carved stone bearing Carnegie's name opening the Fairy Glen in 1907.</p>						

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
2a	12.58	Scots pine	1975	PAWS restoration		National Scenic Area
<p>South facing slope above the Spinningdale-Migdale public road, supporting Birch and Scots Pine regeneration at all stages, with a small area of mature Scots Pine woodland on the west bank of the Allt Coire nan Caorach. Much of the regeneration is more than 40 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. A small area in the north of the sub compartment is ancient woodland of semi natural origin.</p> <p>The sub compartment suffered fire damage in the 1980's, which may have been less severe here than in the remainder of compartment 2, allowing regeneration to become established earlier.</p> <p>Pearl Bordered Fritillary has been recorded in this sub compartment (Butterfly Conservation Scotland).</p> <p>An overgrown forest track leads from the road on the east side of the burn towards a ruined farmstead in sub compartment 2b. This sub compartment appears as unenclosed woodland on the OS 1st Edition map, and on previous maps including Burnett & Scott 1855. The area to the south east of the stream is thought to be have been part of the large scale 19th century plantings and felled during the 1940's with subsequent woodland damaged through fire.</p>						
2b	10.71	Scots pine	1975	PAWS restoration	Archaeological features	Ancient Semi Natural Woodland, National Scenic Area
<p>Gentle to moderate undulating south facing slope, between the Spinningdale-Migdale public road and a (partially overgrown) forest track on its northern edge.</p> <p>The sub compartment 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 of around 15 to 20 years old is present, except in areas dominated by bracken. Pine regeneration becomes frequent at lower levels.</p> <p>There are occasional groups of mature Aspen in the centre and towards the E of the sub-cmpt with two fenced plots also in the sub compartment, with limited success for suckering. The very rare Hoverfly <i>Hammerschmidtia ferruginea</i> which develops in the bark of recently dead Aspen and feeds on the decaying cambium has been recorded at Ledmore & Migdale (Entwistle 1998).</p>						

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
<p>Several veteran Hazel stools survive adjacent to the Achue track, with some seedling regeneration. Oak, Rowan and Juniper are occasional throughout.</p> <p>A number of notable Lichen species, 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 <i>Formosa aquilonia</i> has been recorded on this area (Entwhistle 1998).</p> <p>There is a ruined farmstead in the NW corner, largely destroyed by a later forest track. This sub compartment 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.</p>						
2c	22.4	Scots pine	1975	PAWS restoration	Very steep slope/cliff/quarry/mine shafts/sink holes etc	National Scenic Area
<p>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.</p> <p>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.</p>						
2d	27.91	Open ground		PAWS restoration	Very steep slope/cliff/quarry/mine shafts/sink holes etc	National Scenic Area
<p>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.</p>						
3a	4.99	Scots pine	1880	PAWS restoration	Archaeological features, Services & wayleaves	Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
<p>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.</p> <p>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)</p> <p>A number of ancient pinewood indicators are present in this sub-cmpt including lichen and invertebrate species assemblages (Coppins & Coppins 2001; Entwistle 1998)</p> <p>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.</p>						
3b	12.83	Scots pine	1950	PAWS restoration		National Scenic Area, Site of Special Scientific Interest
<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>						
3c	22.69	Scots pine	1880	PAWS restoration	Housing/infrastructure, structures & water features on or adjacent to site	National Scenic Area, Site of Special Scientific Interest
<p>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</p>						

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
<p>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).</p> <p>A number of ancient pinewood indicators are present in this sub-cmpt including invertebrate and lichen species assemblages (Coppins & Coppins 2001; Entwistle 1998)</p> <p>The Slave Making Ant <i>Formica sanguinea</i> is present at the E end of the subcmpt.</p> <p>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.</p> <p>A fire swept over Migdale Rock and through this compartment in 1880, destroying what was then describes as a young plantation.</p> <p>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.</p>						
3d	10.31	Scots pine	1880	Min-intervention	Very steep slope/cliff/quarry/mine shafts/sink holes etc	National Scenic Area, Site of Special Scientific Interest
<p>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.</p> <p>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, <i>Potentilla rupestris</i>. RBGE carries out regular monitoring of Rock Cinquefoil.</p> <p>Non-native cotoneaster is present.</p> <p>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.</p>						
3e	2.81	Sessile oak	1880	Min-intervention	Very steep slope/cliff/quarry/mine shafts/sink holes etc	National Scenic Area, Site of Special Scientific Interest
<p>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</p>						

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
PAWS, but has strong semi-natural characteristics. 1 veteran Scots pine has been recorded for the Ancient Tree Hunt in this sub-cmpt.						
3f	4.5	Birch (downy/silver)	1900	Min-intervention		Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest
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	39.6	Scots pine	1930	PAWS restoration		National Scenic Area, Site of Special Scientific Interest
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.						
3h	31.68	Scots pine	1955	PAWS restoration		National Scenic Area, Site of Special Scientific Interest
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						

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
underground tunnel was uncovered in this vicinity during the logging operations after the 1950's storm, but subsequently lost.						
3i	13.69	Scots pine	1880	Min-intervention	Very steep slope/cliff/quarry/mine shafts/sink holes etc	National Scenic Area, Site of Special Scientific Interest
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.						
3j	11.52	Birch (downy/silver)	1900	Min-intervention	Mostly wet ground/exposed site	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 <i>Pinguicula lusitanica</i> 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	29.21	Open ground		Non-wood habitat	Mostly wet ground/exposed site,	Ancient Semi Natural Woodland,

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
					No/poor vehicular access to the site	National Scenic Area, Site of Special Scientific Interest
<p>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 confirmed as pure wild apple and, at time of writing, the most northerly wild apple in mainland Britain, and of 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.</p>						
5a	1.83	Alder species	1960	Min-intervention		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	7.08	Birch (downy/silver)	1920	Min-intervention	Archaeological features, Gullies/Deep Valleys/Uneven/Rocky ground	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</p>						

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
<p>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	5.74	Scots pine	1900	PAWS restoration	Archaeological features	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	112.28	Birch (downy/silver)	1970	Min-intervention		National Scenic Area
<p>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'Chraig. 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).</p>						
7a	4.15	Open ground		Min-intervention	Archaeological features	National Scenic Area, Scheduled Ancient Monument, Site of Special Scientific Interest, Special Area of Conservation

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
<p>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.</p>						
7b	6.4	Open ground	2003	Min-intervention	Archaeological features	National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
<p>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.</p>						
7c	6.63	Birch (downy/silver)	1900	Min-intervention	Archaeological features	Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
<p>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.</p>						
7d	9.08	Open ground	1980	Min-intervention	Archaeological features	National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
<p>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.</p>						
7e	2.8	Birch (downy/silver)	1980	Min-intervention		National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
<p>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.</p>						
7f	53.37	Sessile oak	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	Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation
<p>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 <i>Formica aquilonia</i> and <i>F. lugubris</i> 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</p>						

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
<p>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.</p>						
7g	5	Mixed native broadleaves	1998	Wood establishment		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 fF 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	21.51	Scots pine	1960	PAWS restoration	Archaeological features	National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
<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	11.56	Mixed native broadleaves	2017	PAWS restoration	Archaeological features, null	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. The majority of the subcompartment was deer fenced in winter 16/17 and planted in March 2017 with sessile oak majority, hazel, rowan, aspen, with small scale additional planting of juniper, alder and willow in 2018 and 2019.</p> <p>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 ringbarking 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	2.83	Birch (downy/silver)	1960	PAWS restoration		Ancient Semi Natural Woodland, National Scenic Area, Site of Special Scientific Interest, Special Area of Conservation

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Designations
<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	8.07	Scots pine	1960	PAWS restoration		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	31.42	Scots pine	1975	PAWS restoration	Mostly wet ground/exposed site	National Scenic Area
<p>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.</p>						
10a	7.56	Scots pine	1950	PAWS restoration	Mostly wet ground/exposed site	National Scenic Area
<p>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 gean.</p>						

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.

Windblow/Windthrow

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

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