



COED CADW  
WOODLAND  
TRUST

# Cwm Mynach

# Management Plan 2016-2021

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## THE WOODLAND TRUST

### INTRODUCTION

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

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

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

### PLAN REVIEW AND UPDATING

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 Consequently this printed version may quickly become out of date, particularly in relation to the planned work programme and on-going monitoring observations.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

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

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## WOODLAND MANAGEMENT APPROACH

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

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

All our sites have a management plan which is freely accessible via our website [www.woodlandtrust.org.uk](http://www.woodlandtrust.org.uk). Our woods are managed to the UK Woodland Assurance Standard (UKWAS) and are certified with the Forest Stewardship Council® (FSC®) under licence FSC-C009406 and through independent audit.

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

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

The following guidelines help to direct our woodland management:

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

## SUMMARY

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

## 1.0 SITE DETAILS

<b>Site name:</b>	Cwm Mynach
<b>Location:</b>	Bontddu, Dolgellau
<b>Grid reference:</b>	SH682226, OS 1:50,000 Sheet No. 124
<b>Area:</b>	382.43 hectares (945.01 acres)
<b>Designations:</b>	Ancient Semi Natural Woodland, National Park, Planted Ancient Woodland Site

## 2.0 SITE DESCRIPTION

### 2.1 Summary Description

Cwm Mynach is a hidden valley running through the wild and beautiful Rhinogydd mountain range. Follow a woodland pathway and discover breathtaking views of lakes, streams and the imperious mountains while relishing the tranquility of Snowdonia's best kept secret.

### 2.2 Extended Description

Cwm Mynach comprises almost 400 hectares, or 1000 acres, situated in the uplands of Snowdonia below the summits of the Rhinog mountains. The site encompasses much of the catchment of Llyn Cwm Mynach, an oligotrophic lake six hectares in extent, from which the Afon Cwm Mynach flows south to meet the Mawddach estuary. Much of the site, on peaty soils over an underlying geology of grits and greywackes and subject to an Atlantic climate, is markedly wet in character.

The southern half of the site includes pockets of confirmed ancient woodland, however, the site was subject to extensive commercial conifer plantation from the 1950s onward and only relatively small pockets of recognisable 'Celtic Rainforest' habitat now remain. The first phase of plantation occurred in the late 1950s. A second phase of planting, focusing on the northern areas of the site, then mainly heathland, rough grazing and bog, followed in the late 1960s/ early 1970s. Whilst some of this softwood timber is of good quality, the climate, terrain and location of the site, as well as the health of some of the conifer crops, present challenges to economic forestry management.

The site retains moss, lichen and liverwort species associated with ancient upland oak woodland (including rarities such as *Menegazzia subsimilis*) and is well connected to neighbouring woodlands including Coed Garth Gell, part of the Meirionnydd Oakwoods and Bat Sites SAC. The lower gorge of the Afon Cwm Mynach is also notable for its lower plant flora. Mining remains offer roost sites for bat species such as the Lesser horseshoe, while riparian habitats present opportunities for species such as otter and small pearl-bordered fritillary.

The site also includes significant areas of open ground - heathland, rocky outcrops and bog - which are in places, through natural processes, progressing toward secondary woodland. To the north, the site borders the Rhinog SAC, designated for its European dry heath and old sessile oak woodland, while also notable for its wet heath and blanket bog habitats and supporting a number of rare sedges, liverworts and mosses.

The restoration of Cwm Mynach to a mosaic of predominantly broadleaved woodland and other semi-natural habitats therefore presents an excellent opportunity to benefit biodiversity.

Once part of the Cymer Abbey estate, the site contains a number of historic features including abandoned buildings and sheepfolds. Mining remains dating back to the late 19th century, when a manganese industry sprang up in the valley, can still be seen.

The site can be explored via a number of forest tracks and a public byway, as well as a number of footpaths, however, its location off the beaten track at the top of a narrow lane means it attracts a modest number of visitors. The wood can be enjoyed as part of longer day walks from the main road, taking in the nearby RSPB reserve, or as a stop en route to the summit of Diffwys to the west.

Maintenance of low key public access is therefore also a priority, although development of the site as a 'destination' is not desirable.

The key features of the site are:

Plantation on Ancient Woodland Site (PAWS)

Ancient Semi-natural Woodland (ASNW - including any existing broadleaved woodland with AWI features)

Mixed Habitat Mosaic (a range of heathland, crag, scrub and bog/ mire habitats)

Secondary Woodland (mainly plantation conifer with potential for restoration to predominantly broadleaf woodland)

Informal Public Access

## 3.0 PUBLIC ACCESS INFORMATION

### 3.1 Getting there

### By bus:

The TrawsCymru T3 service provides a direct link between Wrexham and Barmouth (via Dolgellau) seven days a week.

For more information, visit <http://www.trawscymru.info/> or call 0871 200 22 33

Alternatively, contact Traveline Cymru <http://www.traveline-cymru.info/> or 0871 200 22 33

### By train:

The nearest railway station is Barmouth from where it is possible to catch the T3 TrawsCymru bus.

For more information about public transport, contact <http://www.traveline-cymru.info/> or 0871 200 22 33

### By car:

We are keen to encourage sustainable public access so we would urge visitors to reach the site on foot if possible.

### Directions:

Take the uphill turn opposite the toll bridge that connects the A496 to Penmaenpool, then proceed uphill along a steep and narrow minor road for about one and a half miles.

There is space for a small number of vehicles on the right before the road bridge, by the main entrance. This is signalled by a Woodland Trust ladderboard sign.

If parking at the old layby at the end of the tarmac further up the minor road from Taicynhaeaf, please take care to shut all gates and not obstruct access

Parking is also available at a number of locations along the A496 Dolgellau-Barmouth road, including the National Park's Fiddler's Elbow picnic site at OS Grid Ref SH667189.

## 3.2 Access / Walks

It is advisable to access Cwm Mynach on foot: parking is available in a few locations along the A496 Dolgellau to Barmouth road, including the Fiddler's Elbow picnic site.

There is a great network of recently upgraded tracks and paths you can use when exploring. They take in the wood's historical and industrial past, and you can combine them with walks around the nearby RSPB reserve and the Diffwys or Clogau gold mines. The spectacular circular walk to Cwm Mynach through the RSPB reserve at Garth Gell is available on this site to download.

Hillwalkers might also like to combine a visit with a trip along the New Precipe Walk over Foel Ispri from Ganllwyd or with a circuit of nearby Diffwys. The Mawddach Trail can also be accessed nearby by crossing the toll bridge to Penmaenpool. OS Explorer map OL18 provides details of the public footpath network and adjacent access land.

If history is your thing, head along the Old Diffwys Mine tramway - a beautiful walk and a useful link to the summit ridge of the Rhinogydd.

If you are not able to undertake such a challenging walk but still wish to visit the wood, there is limited informal parking available along the minor road from Taicynhaeaf. Take the turn uphill opposite the toll bridge connecting the A496 to Penmaenpool and proceed uphill along a steep and narrow minor road for about one and a half miles. There is space for a small number of vehicles at the main entrance, on the right before the road bridge, signalled by a Woodland Trust ladderboard sign. If parking at the old layby further up the minor road at the end of the tarmac, please take care to shut all gates and not to obstruct access.

While tranquil and inviting, Cwm Mynach is somewhat off the beaten track, so don't expect to see a lot of visitors. It's one of Snowdonia's hidden gems, and is perfect if you want to embrace the wildness and serenity of the wood. However, please help us to keep it this way by observing any notices and being patient with us during essential forest operations.

## 4.0 LONG TERM POLICY

By 2060, fifty years after it was acquired by the Trust, Cwm Mynach will support a significant continuous area of predominantly broadleaved woodland, interspersed with pockets of other semi-natural habitats. Conifers will no longer dominate the canopy and understorey, although scattered conifer will be retained as part of the woodland matrix. Instead, young and maturing oak trees will be abundant, supporting a wide range of mosses and lichens typical of upland oak woodland. Alongside them, species such as rowan and birch will thrive, while ash will occur on milder soils, with hazel, honeysuckle and bluebell. In the wettest areas, willow will be abundant, with alder along riversides. The woodland will form a key and interconnected part of the woodland network along the north of the Mawddach estuary.

Planted Ancient Woodland areas will be secure, their remnant trees and woodland ground flora robust. Grazing will be sufficiently controlled to permit tree regeneration and maintain canopy cover, but permitted or encouraged where it is beneficial to rare oakwood species and other habitats.

By preference, this transformation will be achieved by gradual means, maintaining canopy cover in existing wooded areas, especially those with ancient woodland features: thinning the conifer and managing natural regeneration to favour broadleaved trees and in so doing maintaining landscape continuity. However, clear-felling and re-stocking may occur where rendered necessary by the effects of windthrow and tree disease. During the transformation process, softwood timber will be harvested where appropriate and any income will support the Trust's woodland management activities.

The woodland will grade into scrub, heathland and bog at the upper edges of the site, providing valuable transition zone habitats benefiting a range of wildlife. Significant existing heathland areas will be retained. Wetland habitats will add interest to the site, particularly adding to its value for riparian mammals and invertebrates. Areas of anaerobic deep peat will have been restored to an appropriate semi-natural habitat condition wherever possible. Llyn Cwm Mynach itself will remain a healthy aquatic environment which adds to the landscape value of the site.

The mix of broadleaved tree cover and healthy peatland habitats will deliver a range of ecosystem benefits such as maintained water quality and carbon capture. In the long term, it is envisaged that small scale timber production will continue in some areas of the property where it is sustainable and compatible with conservation objectives, producing products such as firewood for local markets.

Although the site will retain its tranquil character, it will be visited by a moderate number of visitors each year, who appreciate the quiet and remote nature of the site, one of hidden gems of Snowdonia National Park. There will be a well-maintained network of paths and visitors will understand and appreciate the site in its historic and landscape context. Views to the lake and surrounding hills will remain a significant draw.

## 5.0 KEY FEATURES

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

### 5.1 Planted Ancient Woodland Site

#### Description

Pockets within the southern area of the site have been formally identified as Ancient Woodland in the most recent Ancient Woodland Inventory (2011), however, many of these zones were subject to conifer plantation in the 1950s, mainly with Sitka, Norway spruce and Western hemlock, with some Japanese larch and Lodgepole pine. In addition to the PAWS identified by the inventory, a number of additional stands contain ancient or established woodland indicators, particularly in the form of ground flora and scattered relic broadleaves, which suggests tree cover historically persisted in other small areas of the site, particularly on rocky ground and along streamsides: these stands should also be treated as PAWS.

Assessment had classified the planted ancient woodland areas of the site as threatened, primarily by dense conifer shade which has weakened the typical upland oakwood ground flora and prohibited significant broadleaved regeneration. Small areas, particularly within compartment 18, were regarded on acquisition as in critical condition, with ground flora remnants reduced to a few struggling specimens and pre-crop oaks overtopped by conifer in serious decline. Generally the survival of remnant features with the PAWS areas is patchy, restricted to river and track side hotspots where mature and regenerating broadleaves persist and AWI species, mainly wood sorrel and bluebell, are locally frequent, and areas of windblow where light levels are sufficient to initiate natural regeneration. Common mosses and ferns are also present within PAWS areas, however, the more specialist mosses, lichens and liverworts commonly associated with upland oakwood in this region have rarely persisted under conifer. The best survival of a typically mossy ground flora and strongest oak regeneration occurs under larch in cpt 17. However, natural regeneration appears strong across the site as a whole, which indicates that ultimately a transition from a predominantly conifer to a predominantly broadleaf canopy is entirely possible with appropriate management.

In many stands, whether PAWS or secondary, conifers were stocked up to or beyond typical commercial stocking densities at the point that the Trust acquired the wood; the introduction of continuous cover methods has come quite late in the day for many of the stands, with past attempts at thinning having been localised and rather restricted in nature. A number of planted ancient woodland stands had been clearfelled at commercial maturity shortly prior to the Trust's acquisition. Further stands were catastrophically damaged in the storms of February 2014 and have been re-stocked with an upland oakwood species mix .

Archaeological features - including farmsteads, sheepfolds and mining remains - are abundant throughout the woodland.

#### Significance

There is significant potential for the restoration or conversion of large areas of the site to upland oak woodland, with potential for fragments of upland ash wood on milder ground and wet woodland around the many pools and streamside: all are BAP habitats and a feature of nearby European designated sites. Ancient woodland is among the UK's more biodiverse and rarest habitats supporting a number of threatened species, notably lower plant life, bats and migrant birds. Once continuity of woodland cover is lost the habitat cannot be recreated, hence timely intervention in sites planted in the latter half of the twentieth century presents a unique opportunity to protect a scarce habitat than now accounts for less than 2% of UK land use. Remnant features are likely to have survived plantation and can be sensitively restored. Lesser horseshoe bats have been recorded using mine adits within the PAWS zones during their winter hibernation, whilst BAP species such as slow-worm are also present.

### Opportunities & Constraints

There is a significant opportunity to convert plantation woodland of relatively low biodiversity value into a habitat of European importance and to restore fragments of damaged upland oak and ash woodland. Natural regeneration is abundant, which will support efforts to transform the canopy into a predominantly broadleaved one in the long term. The survival of ASNW zones within and adjacent to the site suggests that ultimately the recolonisation of typical upland oakwood lower plant life is a realistic aim. There are opportunities to co-operate with large landowner-neighbours such as Natural Resources Wales, National Trust, Snowdonia National Park and the RSPB on landscape-scale initiatives.

The precautionary principle must be adopted with all PAWS or potential PAWS stands, with an assumption that valuable remnant features such as ground flora, deadwood and woodland soils persist. There is a presumption toward a gradual approach and continuous cover methods on PAWS sites. However, the site is very exposed and in places soils are waterlogged: this, coupled with no history of thinning and many over-mature stands, means that windthrow is likely; making CCF, better understood for lowland sites, more challenging or risky.

Some roadside stands are producing timber of reasonable quality, including larger dimension saw logs and bars: work in these stands should provide some surplus which will support activity in less economic areas. There is a reasonable internal forest road network and lorry access can be gained to the road network, allowing conventional harvesting and extraction. However, while the remote and rugged landscape of the site may capture the public imagination, it presents practical operational challenges, limiting the choice of machinery/ contractors available and making harvesting operations less economic. The tarmac road access to Taicyndhaef is not suitable as an extraction route and the forestry access across Coed y Brenin is currently subject to short term licence. Some of the standing crop is now over-mature, while some species (such as hemlock) are less marketable and still others (such as Lodgepole) affected by poor growth form and disease.

During restoration it will be desirable to reduce grazing in order to aid native woodland establishment, particularly that of the Rhinog goat population, however, there may be conflict here with the lower plant interest in existing ASNW areas: ultimately, a cyclical variation in grazing levels may be desirable.

### Factors Causing Change

Western hemlock, along with other conifer species, is regenerating abundantly and will need on-going control throughout the restoration phase or it may come to dominate the understorey. Rhododendron is also present and may be similarly damaging if left unchecked. There is a large feral goat population on the Rhinogydd which has already had a significant impact of restocking efforts prior to the acquisition of the site: if left unchecked this population may have a detrimental impact on natural broadleaf regeneration and hamper efforts to restore a canopy in some PAWS zones. Likewise, levels of sheep ingress from surrounding land may impact on woodland structure and species so boundary maintenance will be an on-going requirement. Deer are also present in smaller but increasing numbers, whilst a growing grey squirrel population is causing some local damage to timber trees: these impacts may increase over time.

Areas of the site are prone to windthrow, which may impact on the pace of change in light levels and this will be a factor in planning thinning operations, with a likelihood of increasing extreme weather events. Sudden opening of a canopy over PAWS areas due to windthrow could trigger a spike in competing vegetation, although the relative acidity and low fertility of much of the site may constrain this effect. Canopy closure following thinning operations will increase threat levels around remnant AW features over time if operations are not repeated. PAWS features may be damaged if harvesting operations are not appropriately managed or scheduled. Regular light thinnings as are often recommended under continuous cover systems may favour the regeneration of shade tolerant species such as conifer and beech over site-native broadleaves, so thinning cycles, patterns and intensities may need to be planned so as to ultimately achieve a shift from conifer to light demanding broadleaves such as oak.

Changes in timber values and demand may impact on the economics of restoration and the attractiveness of the work to contractors (e.g. the extraction of chipwood may be a net cost to the landowner as standing sales). Access to the site is reliant on the forest road network via the public forest estate.

Various fungal pathogens are already endemic and impacting on the health and longevity of Lodgepole pine throughout. If other diseases such as Phytophthora ramorum or ash dieback were to arrive this could alter the pace of restoration and the eventual species mix. Ultimately, there may be a fairly narrow range of potential broadleaf species that can be established given the local climatic conditions, soil acidity and so forth, which could reduce future resilience. Introduction of any non-site native species would require a conscious effort and thought process. Climate change is likely to interact with these other factors and could negatively impact on soil fertility, waterlogging and fire risk (which are already issues).

### **Long term Objective (50 years+)**

By 2060, all PAWS features at Cwm Mynach will be robust and the planted ancient woodland stands will be classed as 'restored' to predominantly broadleaved woodland, with developing structural and species diversity.

Pre-cursor trees will be free of conifer competition and some will survive to develop ancient or veteran features. Ground flora typical of upland oak woodland will expand outward from stream- and ride-side 'hotspots'. Mosses, ferns and lichens typical of upland oakwood will be found at more locations and in greater abundance across the site and will re-establish themselves as epiphytes. Natural broadleaved regeneration will be abundant and a high proportion of the canopy and understorey (c 80%) will comprise of site-native broadleaved trees, particularly oak, birch, holly and rowan, with ash and hazel on milder ground. The proportion of standing and fallen deadwood will increase over time. In wet areas, willow and alder will predominate, and areas of the site will come to resemble wet woodland, with a more natural hydrological regime. Stream and river sides will be relatively open, with only dappled or localised shade, and free of conifer regeneration. Wherever possible, a continuous cover approach will be used in PAWS zones and the transition from plantation to broadleaved woodland will be a gradual one.

Grazing and browsing will not inhibit natural regeneration and will not have a significant negative impact on ground flora. Invasive species will be absent.

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

At the end of the plan period, the PAWS assessment will be reviewed for those stands where ancient origin is known or features recorded. By 2021, no areas of PAWS will be judged to be in 'critical' condition. Initial high and medium priority ('phase 1') actions will have been taken in all PAWS zones to safeguard remnant features.

Where these priority management operations have taken place, some response in the ground flora is expected, with less bare ground and hotspots of species such as bluebell maintained and flowering well, but nowhere should there be significant dense coarse vegetation of more than 3ft depth. All mature broadleaves that remain within plantation areas will have been halo thinned, with most exhibiting some new growth. During the first two or three thinning cycles, it might be expected that broadleaf regeneration will be relatively patchy. Conifer regeneration is to be expected, due to its shade tolerant nature, but this will be managed if becoming dominant. Stream sides in PAWS stands will have been released from dense shade.

Once ancient woodland features are judged sufficiently robust, 'phase 2' interventions will begin in each stand. Early thinnings will typically be light, however, over time the intensity will need to increase in order to reduce basal areas sufficiently to allow recruitment of broadleaves and change the structure and canopy composition of the stands. Extraction of timber will be undertaken where this is both economic and possible without detriment to the conservation interest: within 'Phase 2', there is scope for selection thinnings to optimise financial returns. Operations will not cause undue ground damage or damage to retained trees.

Continuous cover methods will be favoured in PAWS areas, however, an on-going flexible response to windthrow and disease impacts may be needed, while the detrimental impacts of widespread seeding of less desirable species such as hemlock should be considered. Where canopy cover has been lost or coarse vegetation become overly dominant, woodland condition will be restored rapidly, by planting if needed. Planted trees in compartments 1,2 & 3 will be establishing well and

maintained at the required stocking, with canopy closure in some areas of the earliest plantings possible by 2020/1, at which point tree guard removal will begin.

Grazing and browsing damage will be reduced from current high levels, becoming moderate and more patchy, being kept at medium or low levels throughout the restoration phase. The frequency and distribution of rhododendron will reduce, with no flowering specimens present on site. Baseline water quality data will have been gathered from paired catchments, allowing work to commence outside the 'control' catchment by 2017.

Management to achieve this objective (summary) 2016-2021:

- Annual rhododendron control by pulling and spot treatment with glyphosate, covering the whole site over 5 years, including any riparian zones (subject to WQM 1 consent)
- On-going browsing animal impact assessments alongside periodic visits to control goats (and deer, where appropriate), with a high level of effort maintained until impacts can be classified as 'low'
- Aftercare/ beat up of planted trees in compartments 1,2 & 3
- Annual maintenance and repairs to forest road network to ensure on-going management access.
- Maintenance of all boundaries for which WT are responsible. Replacement of sections where the existing fencing and walls are in poor repair.
- Harvestable thinning operations; PAWS: cpt 2, 3, 17 & 18.
- Thinning/ clean and re-space operations, uneconomic; PAWS: cpt 2, 3 and 17.

## 5.2 Ancient Semi Natural Woodland

### Description

It is likely that most woodland on the site was subject to management of some sort as far back as mediaeval times when the site was owned by Cymer Abbey. More recently, timber may have been used in conjunction with 19th century mine operations, while the structure of some parts suggests episodes of relatively heavy grazing. Very few areas of ancient woodland at Cwm Mynach escaped plantation in the latter 20th century, however, small fragments of ancient semi-natural woodland remain at the site, notably in compartments 2, 5, 8 and 17. These areas tend to be dominated by a canopy of oak, with a locally dense understorey of birch, holly and rowan, although stream sides tend toward willow and alder with some hazel and ash. In some areas the canopy is quite young, suggesting past clearance, while in small areas, beech has been under-planted and is starting to regenerate itself within the woodland structure.

The most significant continuous area of broadleaved woodland exists to the east of Cwm Mynach Canol on steep, mossy block scree, which terrain may explain its lack of apparent commercial exploitation, semi-mature oak canopy and the notable remnant populations of typical upland oakwood mosses, lichens and liverworts that it contains: a survey in 2014 recorded a total of 91 lichen taxa in this stand and the rare Wilson's filmy fern also thrives here. Since the plantation of surrounding areas in the 1950s, the 'Ganol wood' has developed a dense understorey of birch and there is some encroachment of conifer regeneration, probably enabled by the reduction in the grazing that would have been a feature of the wood's past management.

A further refuge near to Blaen Cwm Mynach is notable for its open understorey, carpet of spring bluebells and retained epiphytic plant life; here, however, there is very little natural regeneration. To the western side of the valley, broadleaved woodland also occurs on lower ground, some mainly young growth of birch, oak and hazel, other patches with significant mature canopy oaks: these areas border relatively lichen-rich woodland fragments on land associated with Cwm Mynach Canol, where apparently an area of hazel coppice was also maintained as late as the 1950s.

### Significance

Within the site context, these areas will provide continuity of habitat and a refuge from which native plants can recolonise neighbouring areas undergoing restoration. Upland oakwood, upland ashwood and wet woodland are BAP priority habitats and are key features in the neighbouring Special Area of Conservation, important on a European scale. Upland oakwood supports a number of rare or scarce lower plant species, as well as protected species such as bats and otters, migrant birds such as redstart, wood warbler and pied flycatcher, and a wide variety of invertebrate life. Atlantic oak woodland in this zone of high rainfall is regarded as temperate rainforest, a fragmented habitat rarer than the Amazon rainforest and of which Britain has a significant proportion of the global resource. Hardwood deadwood and more mature trees are presently rare on the site and yet will become an important ecological component.

### Opportunities & Constraints

The remaining ancient semi natural woodland component on site will be an asset to restoration efforts. There is an opportunity over time to link these areas with other quality oakwood habitats lower in the valley through the restoration of neighbouring PAWS areas. Natural regeneration should be sufficient to ensure continuity of woodland cover in these areas. Nonetheless, management access in these zones is generally poor and the zones are currently fragmented. Managing grazing/ browsing pressure across the site may be difficult; while beneficial to established lichen-rich oak woodland, grazing would be a hindrance to PAWS restoration so a balance must be struck.

### Factors Causing Change

A reduction in grazing since the site was largely planted with conifer has allowed a dense understorey to develop in some areas, in particularly the 'Ganol wood' in compartment 5, which may be detrimental to lower plant diversity and would not favour certain woodland nesting birds. However, in the long term, grazing and browsing by feral goats and errant sheep may prevent natural woodland regeneration if not controlled. It is likely that the site has seen cycles of heavy and light grazing in past decades.

Bramble and bracken may increase in distribution or density. Conifer and rhododendron are likely to colonise ASNW areas if left unchecked.

Tree diseases, interacting with climate change, may impact on species composition: ash dieback is likely to impact on species diversity, whilst a disease affecting sessile oak could have devastating impacts. At present the age structure is relatively young, however, in time the levels of standing and fallen deadwood should naturally increase. At present the area of native woodland cover on the eastern flanks of valley appears to be increasing through natural succession although the pace of succession may vary according to local conditions.

### Long term Objective (50 years+)

There will be no loss of ancient semi-natural woodland on the site. The ASNW areas will comprise mainly upland oakwood habitat in excellent condition, dominated by sessile oak but with a range of other site-native species present. In wet areas, alder and willow will thrive, with pockets of hazel and hopefully ash or elm on milder ground. There will be a diversity of structure, including mature trees retained to senescence, with frequent standing and fallen deadwood. Cycles of regeneration will ensure ongoing recruitment of new trees and periodic mast years will provide seed for native woodland expansion, however, some semi-permanent glades, where the understorey remains quite open, will remain, providing a continuous habitat niche for some of the rarer lichen communities.

The site will continue to support a wide range of lower plant life typical of upland oakwood, including some less common species, becoming more frequent on bark over time. Invasive species will be absent. Coarse vegetation such as bramble and bracken will be no more than occasional in the field layer. This habitat should provide opportunities for a wide range of wildlife and potentially also in the longer term support low level agriculture, with opportunities for light winter grazing to help maintain optimal habitat conditions.

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

Standing and fallen deadwood will increase naturally over time and will be retained in situ except where paths and tracks cross the woodland. There will be frequent but uneven natural regeneration of site-native trees. Within the next five years, a number of semi-permanent glades should be established in order to secure the most fragile and rare Parmelion lichen communities in zone 5a and maintained with a minimal shrub layer. There will be a reduction in the abundance of conifer and rhododendron within ASNW areas, with no seeding individuals.

Management to achieve this objective:

Clear and maintain 15 semi-permanent glades in zone 5a as outlined in Alan Orange's lichen report (2015).

Control scattered conifer and treat rhododendron with glyphosate/ by pulling in all ASNW areas.

## 5.3 Mixed Habitat Mosaic

### Description

While roughly three quarters of Cwm Mynach is wooded, the remaining quarter supports a range of open ground and aquatic habitats which contribute significantly to the site's diversity and landscape character. To the northern, western and eastern margins of the site, woodland grades into scrub, heathland, rocky outcrops and bog, while at the heart of the site lies the six-hectare Llyn Cwm Mynach and its various inflows and outflows, bordered in places by *Molinia* bog, supporting Bog myrtle and Bog asphodel. To the northern end of the site, conifers were planted on what was previously open ground habitat in the late 1960s/ early 1970s.

Further assessment in 2015 confirmed that a large area, largely in the depression below the outflow from Llyn Cwm Mynach, retained significant depths of anaerobic peat soils and remnant peatland vegetation.

### Significance

Biodiversity Action Plan species such as common lizard, grass snake, adder and small pearl-bordered fritillary all occur on and around the site and utilise open or woodland edge habitats. Pools, streams and lakes are particular focal points for wildlife, with otter recorded from Llyn Cwm Mynach, feeding on abundant amphibian life. The wider area supports a population of IUCN red-listed upland birds, including breeding hen harrier, ring ouzel and historically black grouse (although no breeding pairs of the latter have been seen recently), which all rely on open heather moorland and rocky ground and could exploit the higher areas of Cwm Mynach given low levels of disturbance. Transition zones between woodland and open ground can be particularly species-rich.

The site is adjacent to the Rhinog SAC which is designated for its European dry heath habitats and also supports a range of other open grounds habitats of importance, such as wet heath and blanket bog. Deep peat soils have increasingly been recognised as a valuable resource: degrading deep peat can release large quantities of carbon, which is otherwise stored by functional peat bogs, whilst many of the associated habitats are rare and of considerable interest in terms of biodiversity.

The diversity of the landscape and the water features present are a significant part of the sites' landscape character.

### Opportunities & Constraints

There is an opportunity to maximise biodiversity gains by maintaining a diversity of habitats and transition zones between habitats, complementing the habitat features of neighbouring special sites and softening the abrupt contrasts in management that occur in places at the site boundary. Management access is nonetheless limited in most of the open ground areas on site due to steepness and terrain. Cutting and grazing can be costly or challenging to manage. Changes in tree cover in the catchment of Llyn Cwm Mynach may have an impact on water quality and siltation; the catchment as a whole is acid-sensitive, having been slow to recover from acid rain impacts, so forestry management should be sympathetic and follow current guidelines (with no more than 20% of the catchment, i.e. 23ha, clearfelled in any 3 year period). A strong case would need to be made for any transformation from currently wooded plantation back to an open-ground habitat in order to satisfy current felling licence/ EIA requirements, although there is good evidence presented in CEH's recent report.

### Factors Causing Change

Without long term management it is likely that much of the open ground will eventually be colonised by trees, although this may be a very slow process in waterlogged or exposed areas. Changes in hydrology with the removal of conifer will also impact on vegetation type. Without intervention by grazing or burning, heather moorland structure is likely to become less diverse, although uncontrolled fires are a risk in the locality. If neighbours were to resume heather burning as a management practice, fire breaks may be required to protect wooded areas. Grazing and browsing may increase and counteract the expansion of woodland through natural succession.

### **Long term Objective (50 years+)**

Around the northern, eastern and western boundaries of the site there will be a gradual transition from woodland to open ground habitats, allowing for some continuity from the adjacent land use: over time, the sharp demarcation between conifer plantation and open ground will soften and a dynamic mosaic of heathland, bog and scrub/ scattered trees will grade into the surrounding landscape.

Areas of deep peat (>40cm) will be restored, wherever feasible, to semi-natural habitats: a mosaic of mire, wet heath and wet woodland communities, with a naturally high water table. No further degradation of the carbon-storing peat resource should occur. Riparian zones and pool edges will benefit only from dappled shade and not be crowded by conifer. Long term results from the UK Acid Waters Monitoring Network research will indicate that Llyn Cwm Mynach is in stable or recovering condition, supporting a variety of aquatic life typical of a healthy upland catchment.

There will be continuity of open ground throughout the large block of heathland in compartment seven to the east of the site, including Craig y Merched, and here the heather moorland will be in good condition, being diverse in structure. Elsewhere, small areas of open ground will be retained where these offer good views of the surrounding landscape. Existing tracks and rides will remain open in character with a gradual edge transition to high forest, while new rides will be planned as part of any block planting. In the post-restoration phase, low levels of grazing and browsing will be tolerated where this achieves the objective of maintaining open ground areas and woodland glades. Invasive species will be absent.

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

Dense plantation conifer will be removed from areas identified as deep peat (>40cm) and a more natural hydrology restored by the blocking of forestry drainage channels and canalised streams. Once cleared, these areas should be maintained free of conifer regeneration, gradually developing a good coverage of semi-natural ground flora typically associated with peatland habitats. A significant amount of broadleaf regeneration or planting, particularly willow, is expected, but should not exceed c 25% cover, being mainly within the drier/ shallower margins of the peat area.

Rivers, pools and streamsides which are currently densely shaded by conifer will be opened up in the course of forestry operations to improve the riparian habitat and maintained free of conifer regeneration.

Any new planting or felling work along the site boundary will be planned in order to create a feathered/scalloped edge with adjacent open ground and to incorporate open rides where practicable. The rate of woodland expansion into currently open areas, and signs of browsing within these areas, will be monitored.

Invasive species such as rhododendron will be controlled, with a target of no flowering specimens.



## 5.4 Secondary Woodland

### Description

Indications of long established woodland are more or less restricted to the southern half of the wood. From cpt 6/7 & 13/14 northward, the conifer woodland is certainly recent and secondary in origin, corresponding to a second phase of coniferisation from the late 1960s onward and having been established on what would have been a mix of heathland, rough grazing, bog and mire communities, extensively drained in order to support conifer planting. The plantings vary in quality and vigour, comprising a mix of Sitka and Norway spruce, Japanese larch, Lodgepole pine and Western Hemlock, with occasional Noble fir. Broadleaved seed sources here are more limited but some species, especially willow, rowan and birch, with occasional holly and oak, are colonising any niches where light levels permit. These secondary conifer areas have potential for long term conversion to predominantly native woodland.

### Significance

The conversion of areas of secondary conifer plantation will contribute to the Welsh Government objective to double native woodland cover in Wales by 2050. The poor quality and low timber value of much of the planted crop, especially on higher ground, suggests that its conversion will not be a significant detriment to long term productive forestry, therefore it is a good opportunity for the Trust to demonstrate how similar sites might be managed to achieve broader ecosystem gains. It is expected that the conversion of the catchment of Llyn Cwm Mynach to broadleaved woodland and other semi-natural habitats will have a positive long term impact on ecosystem benefits such as water quality and carbon capture. Increasing the broadleaved component of secondary stands will help to buffer and extend the high value habitats present in ASNW/ PAWS and have aesthetic/ landscape appeal. Native broadleaves also typically support a much greater range of dependant and associated species, especially lower plants and insect life, than planted conifers in the UK.

### Opportunities & Constraints

There are opportunities to consider long term productive forestry options, whereby increased native woodland cover can be combined with some long term timber production for local markets (for instance firewood), so long as forest roads are maintained. Whilst the objective for all PAWS stands should be restoration to broadleaf woodland, in secondary stands, a higher proportion of conifer can be retained during the transformation and accepted as a component of the woodland in the longer term. Whilst much of the crop is of low economic value, some stands are accessible and amenable to commercial thinning, subject to on-going access.

For secondary conifer stands, there are a wide range of potential options available to achieve the ultimate objective of increasing broadleaved woodland cover. Whilst a CCF approach of repeated thinning interventions is preferable where it can be delivered, methods might also include selective or group felling (glades >0.25ha or clearance of existing windblow), with or without restocking by planting; non-intervention, leaving stands, particularly when inaccessible and/ or diseased, to naturally reach stand collapse and be re-structured by natural processes; clearfell and restock. This latter option should be utilised sparingly, limiting the area felled in any 3 year period to no more than 20% of the catchment (c23ha) (the Afon Cwm Mynach is classed as acid-sensitive, in addition to considerations of landscape impact). Nonetheless, for some small stands in exposed locations it may be the only realistic way to realise timber value and move the transformation process along.

There is an opportunity to build upon water quality data gathered both for the lake and two catchments within the lake basin and manipulate stands here specifically for demonstration purposes.

Some species such as red squirrel may benefit from greater conifer cover, however, studies in 2015 have suggested that there is no longer a resident and sustainable population of these animals in the immediate locality, so this should not be a constraint on the overall aim. The presence of a grey squirrel population may impact on the timber potential of some successor broadleaf species.

There may be cases where it is more appropriate to restore secondary conifer plantations to a previous semi-natural open ground habitat.

### **Factors Causing Change**

Similarly to PAWS, secondary conifer stands may be affected by tree diseases such as Phytophthora; invasive species such a rhododendron; changing soil fertility and hydrology with climate change; extreme weather events and windthrow. Browsing and squirrel damage are also likely to affect productivity, timber quality and recruitment.

### **Long term Objective (50 years+)**

By 2060, broadleaf canopy cover will have more than doubled from 2010 levels across the wood as a whole. Roughly half the secondary conifer woodland on site will be in an active process of conversion to mixed or predominantly broadleaved woodland, through a mixture of planting and natural regeneration, although conifers will still be a feature of the wood and will provide some structural and species diversity, as well as providing a marketable crop through the conversion process. Inaccessible and low priority stands will also become more diverse in structure through the action of natural processes.

There will be some expansion of scattered tree cover within heathland zones, but by the same token, some areas of secondary plantation may also revert to other habitats (see the Mosaic key feature). In areas not confirmed as PAWS, silvicultural operations may in the short term favour an economic crop where this does not conflict with the long term goal of conversion to broadleaf. Small scale timber production will continue here, providing products such as firewood to local markets.

These processes will result in significant structural changes: while in 2010, dense and even-aged stands were the rule, by 2060, at a site level, there will be a varied age structure, with many stands also having a complex internal structure, a mix of canopy, sub-canopy, understorey trees and shrubs and young regeneration. There will be an overall reduction in basal area and gradual increase in light to a level where broadleaf regeneration can compete effectively throughout most of the site. There will be variety in woodland type, ranging from sparse "woody heath" through wet woodland to wood pasture and high forest, with good species diversity given the site conditions. Grazing and browsing will not inhibit natural regeneration and will not have a significant negative impact on ground flora. Invasive species will be absent.

The restoration programme will have benefits to ecosystem function, for instance water quality and soil carbon. An ongoing water quality monitoring project will help to document these changes, comparing gradual transformation with more conventional conifer restock methodologies.

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

Active management will have been initiated in approximately half the secondary conifer stands by 2023. A broad management proposals map will be produced, indicating the outline management regime proposed for each zone in the short to medium term.

Young secondary mixed woodland with a high proportion of broadleaf will be establishing by planting or natural regeneration in a number of zones throughout the site (4a; 5f,g; 6a,b,c,d,e; 8l,m, o; 9a; 9l,n; 10c,d,e,f,g; 11g; 12m,n,o; 13b,d; 18a) whilst there will also be regeneration into open ground on the woodland edge. Planted trees in compartments 12, 13 & 18 will be establishing well and maintained at the required stocking, with canopy closure in some areas of the earliest plantings possible by 2020, at which point tree guard removal will begin. If insufficient natural regeneration has been obtained in windblown areas of cpts 6, 9 and 10 by 2019, restocking or supplementary planting will be required to restore woodland condition.

A number of stands will be selected for conversion to a regime of continuous cover management: here, thinning will start to reduce basal areas (stands 2f,h; 5e,h,i; 6f; 7a; 8a,b,d,e,f,g,n; 9e,k,p; 10a; 11a,b,c,d,e,f,h; 13a,c,e; 14a,c; 15b,c; 16b,c). The bulk of thinnings will be harvested for re-sale and provide revenue to support other non-economic activities. Operations will be managed to limit negative environmental impacts.

The remaining secondary conifer stands will either be restored to semi-natural habitats (8l,m; 9l; 11i; 12l: see Mosaic Key features) or will be managed by limited intervention, at least for the medium term: where inaccessible and prone to windthrow/ disease, it is anticipated that stand collapse and re-structuring will start to occur here (particularly in exposed stands of larch and Lodgepole) through natural processes.

In the "control" stand for water quality monitoring in 11d and parts of 12b-h, a conventional clear fell and conifer restock treatment will be applied, in contrast to thinning prescriptions in the active management catchment in 11b/ 9p.

Management actions to achieve this objective:

- Harvestable thinning operations, secondary conifer CCF: cpts 5,6,7,8,9,10,11,15,16
- Thinning/ clean and re-space operations, uneconomic; Secondary conifer CCF: cpts 4, 8,14
- Beat up and aftercare of planted trees in cpts 12 & 13; restocking if required in cpts 6, 9 & 10 in 2019.
- CF and restock the WQ monitoring control catchment

## 5.5 Informal Public Access

### Description

The site offers spectacular views and a varied internal landscape. In addition, there is potential for walkers to combine a visit with a longer loop taking in the nearby RSPB reserve, the historical interest and peak of nearby Diffwys, Foel Ispri, or Clogau gold mines. However, its secluded location means that the site will appeal most to those interested in local natural or human history or those seeking out an experience off the beaten track.

It is possible to park a small number of cars at informal parking areas, one at the southern-most entrance, the other beyond two gates on land owned by Cwm Mynach Canol, however, these are not promoted to visitors. Once on site, it is possible to complete a long circuit on good forest tracks, or a shorter loop using a public footpath crossing the river above Blaen Cwm. A permissive path following the route of the Old Diffwys Mine tramway offers historical interest and a useful link to the summit ridge of the Rhinogydd for hill walkers. A further public footpath links the meadows north of Blaen Cwm with the mountain north of Craig y Merched. The owner of Blaen Cwm allows permissive access from a forest gate and down a track in the valley bottom to rejoin the public road.

At present, Cwm Mynach attracts occasional day visitors/ hikers or overnight campers, with little evident negative impact on the site. Occasional use by pedal cyclists is evident, particularly along the public byway. The county road is also used by scramblers and 4x4s, which have been known to stray onto other unpermitted routes, although no major damage has occurred aside from occasional vandalism of locks/ chains. Craig y Merched features in the Meirionnydd Climbing guidebook although the walk-in is considerable and the crag is rarely visited. The Afon Cwm Mynach attracts occasional kayakers, however, this is an infrequent occurrence due to its technical difficulty. The lake attracts the occasional speculative fisherman and has a trout population but is not thought to have been recently stocked.

Access to the lake shore was improved within the first few years post-acquisition: a section of surfaced path now provides access to a bench on the western lake shore.

Educational, specialist and volunteer groups visit the site on an occasional basis. A number of larger organised events have utilised the site.

### Significance

The site was identified as one of Snowdonia National Park's Sixty Wonders in 2011, for its historic landscape value. It remains one of the most remote valleys in Snowdonia, although it lies within a few miles of Coed y Brenin, one of the major visitor hubs in Meirionnydd. The acquisition campaign highlighted the interest that Trust members and supporters have in these 'wild' landscapes, even if many are not able to physically visit the wood. The site will present the Trust over time with material for potential case studies which could illustrate issues around upland PAWS restoration or conversion of upland conifer to broadleaf and is of interest to specialist audiences as well as local groups and individuals. The Welsh Government values the landscape as a resource which supports the economy through tourism (2016, Year of Adventure and so on) and is keen to promote outdoor recreation for health and well-being, however, the southern part of the National Park is less well visited and the site is some distance from the main visitor hubs in Snowdonia.

### Opportunities & Constraints

Road access to the site is steep and narrow with gates on upper reaches of road, therefore large numbers of cars could not be accommodated without inconveniencing neighbours; formal car parking would require planning permission and current policy prohibits the creation of new car parking outside urban centres. Camp fires in dry weather may trigger forest fires so cannot be encouraged. Access may be disrupted in the medium term by harvesting operations. The terrain makes less able access difficult to provide on any scale.

However, there is an opportunity to work with partners such as the National Park, RSPB, National Trust and Community Councils to develop longer circular routes from existing parking areas or visitor hubs, such as the Fiddler's Elbow car park on the A496 or to link with other local trails. Public interest has been raised by the acquisition campaign and subsequent media exposure, with local interest particularly focused on the special history of the site. It may be possible to facilitate intellectual as opposed to physical access by developing online resources. In time there should be scope to offer quality volunteer opportunities which would contribute meaningfully to site management. The restoration process offers the opportunity for the Woodland Trust to develop case studies and an evidence base to support key messages to target audiences, while the site can be used to showcase our conservation work to members and supporters.

### **Factors Causing Change**

Exposure in the media and on recreation forums may increase interest among different user groups at different times. Off-road vehicle usage may increase and extend beyond the legal byway, causing user conflict, damage to tracks and disturbance. Footpath access to the site is subject to the on-going maintenance of the network by neighbouring landowners and our ability to maintain partnerships. Paths and tracks will require on-going maintenance, particularly whilst active harvesting is taking place. Neighbours have expressed concern about any potential increase in mountain biking in the area, however, the nearby multi-million pound centre nearby at Coed y Brenin is a much more obvious draw at present, with Cwm Mynach likely to attract more cross-country style riders in small numbers.

### **Long term Objective (50 years+)**

Cwm Mynach will retain a sense of remoteness and 'wildness', attracting a modest but engaged cohort of visitors who prefer to explore off the beaten track. The visitor experience should be safe, within reason, but not sanitised. Many visitors will arrive on foot, following routes promoted through partnerships with our neighbours. There will be a number of walking options, including longer and short circuits of the wood, viewpoint paths to key locations and paths linking the site with the surrounding access land and public footpath network. The site furniture will be adequate to the intended audience, in-keeping with the landscape and site character, using vernacular styles where appropriate and avoiding excessive visual clutter.

Cyclists may legally use the byway to access the site and cycling will be accepted on forest roads, however, the wood will not be developed specifically for off-road biking as other facilities exist nearby. Other appropriate recreational usage will be continue at low levels where it does not damage the quiet enjoyment or conservation value of the site or create nuisance to others.

Visitors will understand and be inspired by our vision for the site. There will be accessible information available to satisfy local interest in the history and wildlife of the wood, though most of this will be electronic. As our experience of managing the site builds, case studies and visits will help carry the Trust's message to more specialist audiences in the sector.

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

Wooden welcome signage will mark the Trust boundary at each main entrance point to the wood and be maintained in good condition. Interpretation panels will help with visitor orientation on arrival and briefly explain the Trust's vision for the wood (these may require replacement toward the end of the plan period subject to wear and tear).

The existing path network and site furniture will be maintained to allow unimpeded safe access along maintained paths, while the link across the Afon Cwm Mynach will be improved with better signage, vegetation clearance and stone pitching on wet sections. Any new or replacement site furniture should be low key and in the vernacular style. Public safety and that of our neighbours will be addressed through regular tree safety checks on relevant zones (A&B, see Site Risk Assessment), with any hazards acted upon promptly.

Any public information will encourage visitors to reach the site without driving up the narrow lane, however, those that do should be able to park vehicles without obstructing access. The new site leaflet will guide visitors to the Fiddler's Elbow car park and promote a loop walk taking in Cwm Mynach and Coed Garth Gell (RSPB) and will be distributed to TICs and other local outlets, with the potential to reprint if demand dictates.

Recreational usage will be monitored informally to build a more accurate picture of our visitors over time and any negative impacts will be tackled. Off-road vehicles will be discouraged where they have no legal right of access, with signage, gate closures and by working with neighbours and the authorities.

Volunteers will be sought where their involvement can deliver real management benefits as well as offering quality opportunities for people engagement. Where the opportunity arises, we will work with partners such as the Snowdonia Society to deliver species monitoring and practical work on site.

Educational and group visits will be welcomed subject to demand.

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## 6.0 WORK PROGRAMME

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

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Key Features Present	Designations
1a	6.48	Oak (sessile)	2015	Wood establishment	Archaeological features, Mostly wet ground/exposed site, Sensitive habitats/species on or adjacent to site	Informal Public Access	National Park, Planted Ancient Woodland Site
<p>Lying between the main track and the Afon Cwm Mynach at the southern end of the site, the canopy here comprised predominantly Sitka spruce and Western hemlock, a mature planted crop, until Feb 2014, when a major storm caused widespread damage and led to the harvesting of all the remaining conifer. The southernmost end of the compartment was recognised as PAWS in the 2011 Ancient Woodland Inventory, although PAWS features are present throughout. Remnant PAWS features remain predominantly along track and stream sides, including small clusters of precursor oak trees and associated flora including bluebell, wood sorrel and bilberry, with oak, willow, alder and birch along the Afon Cwm Mynach. To the west there is occasional natural regeneration of birch and rowan in thinned areas/ windblow glades. The compartment is crossed by a number of drainage channels and pools, with aquatic vegetation indicating that some of these are semi-permanent wet features. Mosses and ferns (both epiphytic and ground-layer) are abundant in lighter areas, however, where conifer cover was densest at the centre of the compartment there is much bare ground, although since conifer clearance this is rapidly colonising with vegetation. Western hemlock is locally abundant in the field and shrub layers, while rhododendron is scattered throughout. An old wall runs parallel with the track for much of the compartment length, a remnant of a historic tramway connected to manganese mining operations in the late 19th century, however this was damaged badly in the 2014 storm. The area was restocked with an upland oakwood mix at 1600 stems/ha early in 2015, leaving a network of un-planted rides for potential future access, and the boundary fence to the river was replaced.</p>							
2a	36.91	Sitka spruce	1958	PAWS restoration	Diseases, Mostly wet ground/exposed site, Sensitive habitats/species on or adjacent to site, Very steep slope/cliff/quarry/ mine shafts/sink holes etc	Informal Public Access	National Park, Planted Ancient Woodland Site

Comprising the south-eastern area of the site above the main track, large areas of the compartment were mapped in 2011 as Ancient Woodland/ PAWS as part of the Ancient Woodland Inventory and contain some remnant woodland features. The compartment borders unplanted Ancient Woodland and contains small areas of developing broadleaved woodland with oak, birch and rowan present as natural regeneration in the field layer and under-storey. Much of the compartment was subject to plantation in the 1950s; part of the compartment was then subject to clearfell and restocked with 'quality mix' in 2003. While the largest canopy area (approximately 21 hectares) comprises mature Sitka Spruce (which included an area of commercially over-mature specimens which were lost in a storm in 2014), Western hemlock was also planted and there is significant regeneration of this species in the understorey. There are also pockets of planted Norway spruce, Scot's Pine and Japanese larch. Upper slopes were planted with Lodgepole pine, a poor quality and largely unthinned crop, now suffering significantly from fungal infection and windthrow. Access to upper levels of the compartment is challenging, although a public footpath follows the southern boundary of the site. Where canopy cover has been lost, ericaceous flora persists, however, bracken and bramble are abundant. Scattered rhododendron is present throughout. There are a number of mining remains within the compartment. During the 2011-2016 period, a number of the better quality or accessible mature spruce and hemlock stands were thinned and the younger restocking was cleaned and re-spaced to favour broadleaf.

3a	6.38	Oak (sessile)	2013	Wood establishment	Archaeological features, Management factors (eg grazing etc), Very steep slope/cliff/quarry/ mine shafts/sink holes etc	Informal Public Access	National Park, Planted Ancient Woodland Site
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This area was clear-felled shortly prior to the Trust taking on ownership of the site. A cluster of broadleaved trees, mainly oak with ash, rowan and birch, remain in the centre of the compartment. Although not confirmed PAWS, some remnant features were identified, including occasional bluebell. Bramble and bracken are abundant on lower slopes, grading to grasses higher up. The ground is generally rocky and uneven. The compartment contains various structures associated with late 19th century manganese and gold mining, including shafts, an old level and winding houses. The zone is bounded on the upslope side by a mountain wall in good condition, however, stray sheep are almost perennially present in the area. Access is good, via a recently upgraded track suitable for quad bikes, with potential in future for visitor access to the mountain via a gated access. Good views are currently available from the track. The zone was restocked with upland oakwood species in February 2013.

3b	22.72	Japanese larch	1957	PAWS restoration	No/poor vehicular access within the site, Sensitive habitats/species on or adjacent to site, Very steep slope/cliff/quarry/mine shafts/sink holes etc	Informal Public Access	National Park
<p>The compartment, situated upslope of the main access track, comprises plantations of Norway and Sitka Spruce with some hemlock on lower slopes, grading to Japanese larch on higher, rocky, ground. Despite not being confirmed as PAWS, features suggest that part of area should be treated as such. Occasional pre-crop trees, now overtopped by conifer, remain on lower ground and broadleaved regeneration is present, particularly on outcrops and along streamsides. To the north, the compartment borders existing ancient woodland, therefore the potential for conversion to broadleaves is high. Under spruce there is sparse ground flora apparent, although stream sides support pockets of violet and wood sorrel, while in the more open areas on higher ground heather, moss and bilberry are present, grading to heathland with scattered broadleaved trees toward the site boundary. There are a number of large rhododendron bushes which are seeding into the surrounding area. The wetter, flatter terrain near the track is susceptible to windblow: some windblow pockets were opened up following thinning of the trackside stands in 2013-14.</p>							
4a	5.22	Mixed broadleaves	2002	Wood establishment	Sensitive habitats/species on or adjacent to site	Informal Public Access	National Park
<p>Clearfelled and restocked in 2002 with a mixture of native broadleaves and Sitka spruce, this compartment now comprises dense young planted woodland supplemented by natural birch and willow regeneration. To the west, the compartment borders the Afon Cwm Mynach; to the east lies the main access track. Scattered rhododendron is present. The area is wet in places where crossed by small tributary streams, with the dominant ground flora being Molinia. Bramble is frequent as a consequence of sudden increases in light at the time of clearfelling. The area is likely to succeed to semi-natural scrub and ultimately wet woodland if conifer ingress is controlled. The stand was cleaned and re-spaced to favour broadleaf in 2012-13.</p>							
5a	50.12	Oak (sessile)	1900	High forest	Diseases, Gullies/Deep Valleys/Uneven/Rocky ground, No/poor vehicular access within the site, People issues (+tve & -tve)	Informal Public Access	Ancient Semi Natural Woodland, National Park

The largest portion of this compartment comprises Ancient Semi-Natural Woodland, with a canopy of Sessile oak. A dense understorey of birch, with rowan and holly, has developed here in recent decades, probably as a result of reduced grazing pressure (those who knew the area from the 1950s recall the woodland above Cwm Mynach Canol as being much more open in aspect beneath a well-spaced oak canopy). Situated on block scree, it is likely that this area of woodland avoided significant felling for charcoal in the past and now hosts some of the best lower plant flora on the site, mainly situated on the many boulders, although some species are now making their way back onto the surrounding trees. The ground and field layers comprise a dense community of mosses, lichens and liverworts with heather and bilberry. In addition, there are pockets of PAWS and planted conifer, mainly poor quality larch but with some Sitka spruce and Lodgepole pine. Wet areas sustain patches of willow. On higher ground, woodland grades into open heathland / historic clearfells and the compartment includes the lower outcrops of Craig y Merched. Rowan and birch are rapidly colonising some of these open ground areas. There is occasional rhododendron and conifer regeneration. This compartment will likely provide the seed source for much of the natural regeneration of native woodland in the valley. Sitka stands near to the oakwood were thinned during the 2011-2016 plan period.

6a	5.56	Sitka spruce	1971	Wood establishment	Mostly wet ground/exposed site	Informal Public Access	National Park
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Planted in the 1970s as part of the second phase on coniferisation, the canopy comprises predominantly Sitka Spruce, with pockets of Japanese larch and open wet ground, the latter rapidly colonised by natural regeneration, particularly of willow. Its proximity to ancient woodland suggests a high potential for conversion to broadleaved woodland. There is little ground flora evident under the dense conifer canopy although under larch moss predominates. There are also a few hazels clinging to the edges of streams around a small knoll, associated with bluebell: this was apparently known as Boncyn y Cneuen (Nut Bank or Knoll) as in living memory, an abundance of hazels apparently grew here. A large proportion of the larch and Sitka to the south of the zone was lost to windthrow in 2014 and subsequently harvested, although small areas thinned during this same period remain intact. At present natural regeneration in these stands is slow to establish.

7a	35.98	Lodgepole pine	1970	Non-wood habitat	Diseases, Gullies/Deep Valleys/Uneven/Rocky ground, No/poor vehicular access within the site, Very steep slope/cliff/quarry/mine shafts/sink holes etc	Informal Public Access	National Park
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The bulk of the compartment comprises continuous open ground, dominated by heather, bracken and bare rocky outcrops, upon which habitat small blocks of conifer, mainly Lodgepole with Sitka spruce and Japanese larch were planted from the late 1960s. The existing area of open ground represents the single largest expanse of heathland within the site boundary and so would be desirable to retain as open ground, however, presently wooded areas will progress toward broadleaf woodland through management over time, and there will be a varying degree of transitional habitat colonised by sparse birch and rowan. AWI features are generally lacking, however, a streamside hotspot with bluebell under a canopy of Sitka spruce close to the track suggests some continuity of tree cover here. Natural regeneration of native broadleaves is present, also of Lodgepole pine. A narrow and rough public footpath crosses the compartment, leading to a stile on the boundary fence. Rhododendron is starting to establish itself on the open hillside.

8a	29.97	Sitka spruce	1967	Non-wood habitat	Archaeological features, Diseases, Gullies/Deep Valleys/Uneven/Rocky ground, Mostly wet ground/exposed site, No/poor vehicular access within the site, Sensitive habitats/species on or adjacent to site	Informal Public Access	National Park, Planted Ancient Woodland Site
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This compartment is bounded to the east by the main forest road, and to the west by Afon/ Llyn Cwm Mynach. While ancient woodland indicators are largely lacking, there is a small area of ancient woodland to the north of Blaen Cwm Mynach where a pocket of mature oaks remains, hosting epiphytic ferns and mosses above a dense carpet of bluebells. A number of mainly modified streams cross the compartment to join the Afon Cwm Mynach. For the most part, however, the compartment comprises dense secondary conifer plantation, mainly Sitka with areas of Japanese larch and poor quality Lodgepole pine, with some areas extensively drained during the planting phase. Access to the lake is possible on foot to the north of the compartment, through an area of open ground with abundant native broadleaf regeneration. Two public footpaths cross the compartment, one of which links to a footbridge across the river, allowing a circular walk, although this can be difficult to follow on the ground. The river to the south of the compartment forms a minor gorge, while closer to the lake outflow, areas of peat supporting Mollinia bog line its banks: a large area of the compartment was confirmed as deep peat following assessment in 2015 (with some areas being over 8m in depth), with potential to restore to a mix of mire, wet heath and willow scrub. Rhododendron is colonising the wetter areas of the compartment.

9a	28.15	Mixed conifers	1969	High forest	Archaeological features, Diseases, Mostly wet ground/exposed site, No/poor vehicular access within the site	Informal Public Access	National Park
<p>Small blocks of secondary plantation: Sitka spruce, Japanese larch and Lodgepole pine are interspersed with small pockets of open ground. The majority of the crop is in poor form, subject to disease and windthrow on exposed high ground, much of it being unthinned. An obvious historic structure, possibly a sheepfold, exists alongside the main track. Broadleaf regeneration exists where conditions are sufficiently light, although conifer regeneration and rhododendron are also frequent in these areas. Where ground flora is evident it comprises largely heathland vegetation with bilberry. A large area of Sitka was lost to windblow following thinning operations in 2014: the wet soils and exposure here at the highest point of the site are a challenge for management.</p>							
10a	7.13	Sitka spruce	1969	High forest	Mostly wet ground/exposed site	Informal Public Access	National Park
<p>A thin strip of land lying between the main extraction track and the fenced northern boundary of the site, a mixture of open ground and planted conifer, mainly Sitka with some Lodgepole pine mixed with recent broadleaved regeneration. During an interval in the 1990s when the site was managed by the RSPB, scallops were cut in this area with the intention of improving the marginal habitat for black grouse, resulting in pockets of open ground with brash piles, into which trees, both conifers and broadleaves, are now regenerating (however, black grouse are no longer thought to be breeding on the Rhinogs). Where tree cover is absent the vegetation is mainly dry heath. In the long term overall stocking in this area will be somewhat reduced, with a view to creating a more graduated transition from high forest through ffridd to open ground along the northern boundary, and broadleaf species favoured over conifer. This process was rather accelerated by significant windthrow in 2014, which was harvested.</p>							
11a	16.64	Sitka spruce	1968	High forest	Archaeological features, Diseases, Management factors (eg grazing etc), Mostly wet ground/exposed site, Sensitive habitats/species on or adjacent to site, Very steep slope/cliff/quarry/mine shafts/sink holes etc	Informal Public Access	National Park

Comprising the northern and western slopes above Llyn Cwm Mynach, this former heathland compartment was planted in the late 1960s with blocks of Sitka spruce (generally on wetter ground around the lake's headwaters), Japanese larch and Lodgepole pine, with planting continuing down to the water line. These blocks have been subject to past thinning in the more accessible areas, however, the less accessible points are largely unthinned (small areas were able to be thinned in 2013-14, however wet ground and windblow are limiting factors). Under larch, some broadleaf regeneration has gained a foothold and a field layer of bilberry, moss and heather is present. Rhododendron is present particularly along watercourses here. A small part of this zone has been confirmed as deep peat.

12a	45.49	Lodgepole pine	1973	Min-intervention	Diseases, Management factors (eg grazing etc), Mostly wet ground/exposed site, Sensitive habitats/species on or adjacent to site	Informal Public Access	National Park
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The compartment covers the north-western area of the site, including high ground crossing into the top of the Gamlan catchment. Much of the area was subject to plantation with Lodgepole pine, with smaller areas of Sitka and Japanese larch, in the early 1970s, having been subject generally to little management in the intervening time, resulting in dense thickets of poor quality Lodgepole, now affected as elsewhere on site by fungal pathogens. Occasional rowan and bilberry are present. Along the western boundary, streams and pools are abundant, as is Molinia bog, with smaller pockets of wet heath. The southern boundary of the compartment comprises a sheep walk: open ground providing access for stock up onto the mountain above, utilised by Fferm Cwm Mynach Isaf. In 2015-16, group fells were planned in some of the pine/ spruce stands, however, a large (4ha) area was windblown just prior to operations, so this was harvested and restocked in place of the proposed group felling. Windblow is an issue here and tree stability is poor.

13a	13.44	Lodgepole pine	1970	High forest	Archaeological features, Diseases, Very steep slope/cliff/quarry/ mine shafts/sink holes etc	Informal Public Access	National Park
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The compartment comprises steep ground on the western flanks of the valley, the majority planted around 1970 with Lodgepole pine, mostly unthinned. In the late 1990s, small areas were planted with mixed conifers, and conifer regeneration is also occurring. Where there is a developed ground flora, it comprises mainly heathland or Molinia bog species, however, under dense lodgepole the ground is mainly bare. The Diffwys tramway, now a permissive path, cuts diagonally through the compartment, linking to the mountain above via a ladder stile. The tramway once served a manganese mine and was linked to the mine itself by an aerial ropeway and a series of inclines. In places, the tramway was supported by a substantial drystone causeway, still visible. Small group fells were undertaken in 2015-16 and restocked with broadleaf.

14a	5.00	Lodgepole pine	1970	High forest	Archaeological features, Diseases, Sensitive habitats/species on or adjacent to site	Informal Public Access	National Park
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Comprising the steep western bank of the Afon Cwm Mynach where it exits the lake, the compartment is dominated by poor quality Lodgepole pine, largely unthinned at the time of acquisition. There is also a small area of Sitka and some open ground along the riverside. Rowan and birch regeneration occurs in areas of windthrow, as do mosses and bilberry, however the ground under dense conifers is often bare. Along the riverside there are some pockets of Molinia bog with scattered birch and rowan, as well as a number of well-established rhododendron near the lake outflow. Areas of the zone were lightly thinned in 2015-16.

15a	5.26	Mixed conifers	1991	High forest	Diseases, Gullies/Deep Valleys/Uneven/Rocky ground, Sensitive habitats/species on or adjacent to site	Informal Public Access	National Park, Planted Ancient Woodland Site
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Situated between the Afon Cwm Mynach and the public byway, the compartment contains a mixture of thicket stage planted spruce and Lodgepole pine, leaving the ground beneath often bare, with occasional bilberry. These stands were thinned for the first time during the 2011-16 plan period. A small group of Noble fir was also planted near the riverside. Occasional broadleaves occur along the riverside and birch, rowan and willow regeneration is occasional within the crop. Rhododendron, including some larger bushes, is scattered throughout. The southern boundary of the compartment follows a drystone wall and a public footpath, which links to the eastern side of the valley via a footbridge. A sheepfold is situated at the riverside.

16a	26.79	Mixed conifers	1999	Wood establishment	Archaeological features, Mostly wet ground/exposed site	Informal Public Access	National Park
<p>A large block of dense mixed conifer planted in two phases during the 1990s, mainly Sitka and Lodgepole but with patches of larch and other conifer species in the mix. Small open areas are rapidly filling with conifer regeneration, although broadleaved regeneration and bilberry is also frequent along ridesides and in wetter spots. Initial operations to restructure the stands to favour broadleaf were undertaken in 2011-16. Small streams/ springs crossing the compartment provide a water supply for Cwm Mynach Isaf. Possible mining remains exist on the western site boundary, where the planted area becomes sparse and grades into heathland and bog. Rhododendron is scattered throughout.</p>							
17a	11.87	Japanese larch	1955	PAWS restoration	Archaeological features, Sensitive habitats/species on or adjacent to site	Informal Public Access	National Park, Planted Ancient Woodland Site
<p>Mapped in part in the 2011 inventory as ancient woodland, this compartment now contains a complex mix of pre-crop oak, regenerating broadleaves and plantation crops of various species, notably Japanese larch but also Lodgepole pine, Norway spruce and exotic beech. An area of a little over 2ha was clearfelled prior to acquisition: it was not restocked but is rapidly regenerating, mainly with larch and other conifers. Conifer species, especially spruce and hemlock, are starting to invade the understorey in some parts of the compartment: operations in 2012-13 cleaned some of the dense understorey conifer regeneration to favour broadleaf. Ground flora including bluebell and wood sorrel is present in patches, with bracken and broadleaved regeneration, including hazel, perhaps a remnant of a small coppice apparently maintained in the locality up to at least the 1950s. The riverside zone contains some mature oaks and abundant ground flora. A fragment of adjacent ancient oak woodland just off the Woodland Trust site contains some notable lichen flora. Alongside the track, the remains of a post-mediaeval farmstead can still be seen.</p>							
18a	9.25	Mixed native broadleaves	2013	Wood establishment	Gullies/Deep Valleys/Uneven/Rocky ground, Management factors (eg grazing etc)	Informal Public Access	National Park

On steep east facing ground, subject to clearfell of a standing conifer crop in the 2000s, the compartment was restocked twice by planting prior to acquisition, with an almost total failure rate due to goat browsing. Occasional young conifer and broadleaves are present to the north of the zone, probably established by natural regeneration and a small cluster of etiolated larch remains near the byway. A scattering of pre-crop oaks, now sharply exposed, are also present and visible from the public byway. The ground is rough and rocky, with evident flora comprising mainly grasses, heather and occasional bilberry, with foxglove, bracken and bramble. The area was restocked with broadleaves early in 2013, mainly oak with rowan and birch, grading into heathland near the mountain wall.

18b	12.44	Japanese larch	1955	PAWS restoration	Gullies/Deep Valleys/Uneven/Rocky ground, No/poor vehicular access within the site, Sensitive habitats/species on or adjacent to site	Informal Public Access	National Park, Planted Ancient Woodland Site
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This compartment contains an area of confirmed PAWS identified on the 2011 inventory and much of the compartment exhibits some indication of remnant features, including flora such as wood sorrel and bilberry and remnant mature oaks. The largest area of plantation, dating back to the mid 1950s, comprises Japanese larch, with some areas of poor quality Lodgepole on higher ground and a dense block of now over-mature Western hemlock alongside the public road. Hemlock is now regenerating vigorously under the larch canopy and dominated the under-storey in places until clearance in 2012-13, although hazel, willow and birch also occur in lighter pockets and at ride and road edges. Within the block of hemlock, pre-crop oaks exist, all overtopped: some are now standing deadwood, however a number persist in poor condition. Fragments of more semi-natural woodland habitat persist along the southern boundary of the compartment and similar habitats continue over the site's boundary wall. A public footpath cuts the southern corner of the compartment (although this cannot be followed through adjacent land), while a good forest track leads out onto neighbouring land, providing access for extraction from plantation areas to the south across Trust property.

19a	6.03	Other		Non-wood habitat	Sensitive habitats/species on or adjacent to site	Informal Public Access	National Park
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Llyn Cwm Mynach lies at 287 m altitude. The lake consists of two distinct basins; the southern section comprises a shallow limb separated from the deeper northern section by an old and broken stone causeway. The maximum depth of 11 m occurs in the northern basin in a localised hollow. Discrete drainage to the lake is by three small inflows and it is drained to the south-east by a stream which flows to the Mawddach estuary. At some stage in the past a wooden weir (now derelict) was constructed at the outflow, presumably to raise the level of the southern section of the lake. The catchment of Llyn Cwm Mynach covers an area of 119 ha and reaches a maximum altitude of 680 m. The solid geology of the catchment consists of Cambrian siltstones to the north and grits and greywackes of the Cambrian Rhinog formation to the south. The north and east of the catchment is dominated by amorphous blanket peats, whereas acid ranker soils characterise the south and west. There are areas of exposed rock on the steeper slopes to the west. The lake and its catchment receive an annual rainfall of c. 2200 mm. Approximately half of the catchment is forested with Japanese larch, Lodgepole pine and Sitka spruce planted between 1967 and 1973. The remainder is acid moorland characterised by *Calluna* and *Vaccinium* and utilised as rough grazing for sheep. The lake is among 25 upland sites monitored by the UK Acid Waters Monitoring Network as part of a long term study on the impacts of acid rain on water quality. At present there is little known recreational use, although the lake adds significantly to the landscape value of the site. A path crosses compartment 11 from the west to the lake shore, where a bench is situated.

## Appendix 2: Harvesting operations (20 years)

Forecast Year	Cpt	Operation Type	Work Area (ha)	Estimated vol/ha	Estimated total vol.
2016	2a	Thin	0.50	60	30
2016	2a	Selective Fell	9.55	26	250
2016	12a	Selective Fell	15.71	57	899.67
2016	13a	Thin	0.33	61	20
2018	5a	Thin	20.69	3	71
2018	8a	Clear Fell	11.14	278	3100.68
2018	9a	Clear Fell	2.97	411	1221
2018	11a	Clear Fell	4.18	239	1000
2018	12a	Clear Fell	5.85	9	50
2018	17a	Thin	4.93	15	75
2019	2a	Thin	6.87	83	569
2019	3b	Thin	13.19	20	270
2019	5a	Thin	1.24	55	68
2020	2a	Thin	5.49	48	264
2020	3b	Thin	4.73	40	190
2020	5a	Thin	5.89	57	333
2020	6a	Thin	0.81	52	42
2020	7a	Thin	1.20	54	65
2020	8a	Thin	7.79	63	494
2020	9a	Thin	2.75	44	122
2020	13a	Thin	0.21	45	9.5
2020	15a	Thin	4.43	42	185
2020	16a	Thin	3.16	21	67
2021	9a	Thin	3.74	36	135
2021	10a	Thin	0.26	33	8.5
2021	11a	Thin	5.41	49	267
2021	11a	Clear Fell	3.80	244	928
2021	17a	Thin	4.43	60	268
2021	18b	Thin	9.52	60	574
2022	3b	Thin	0.63	37	23
2022	4a	Thin	4.18	11	47

2022	8a	Thin	1.55	23	35
2022	14a	Thin	3.99	43	173
2022	16a	Thin	1.89	10	18
2022	17a	Thin	0.94	2	2
2024	2a	Thin	12.60	12	150
2024	13a	Selective Fell	10.44	57	600
2025	5a	Thin	0.90	13	12
2026	8a	Thin	2.70	36	97
2026	9a	Thin	2.97	43	128
2026	13a	Thin	0.33	27	9
2026	15a	Thin	4.61	43	200
2026	16a	Thin	8.00	38	300
2028	2a	Thin	7.04	43	300
2028	3b	Thin	6.30	24	150
2028	5a	Thin	9.17	38	350
2028	6a	Thin	1.16	86	100
2028	7a	Thin	1.85	46	86
2028	8a	Thin	8.09	62	500
2029	9a	Thin	3.74	42	156
2029	10a	Thin	0.43	47	20
2029	11a	Thin	13.09	34	450
2029	17a	Thin	4.91	80	391
2029	18b	Thin	9.52	55	526
2030	2a	Thin	6.68	45	300
2030	8a	Thin	2.06	39	80
2030	14a	Thin	4.43	43	190
2032	5a	Thin	0.90	13	12
2033	8a	Thin	2.70	36	97
2033	9a	Thin	2.97	43	128
2033	13a	Thin	0.33	27	9
2033	15a	Thin	4.61	43	200
2033	16a	Thin	8.00	38	300
2035	2a	Thin	7.04	43	300
2035	3b	Thin	6.30	24	150
2035	5a	Thin	9.17	38	350
2035	6a	Thin	1.16	86	100

2035	7a	Thin	1.85	46	86
2035	8a	Thin	8.09	62	500

## GLOSSARY

### **Ancient Woodland**

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

### **Ancient Semi - Natural Woodland**

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

### **Ancient Woodland Site**

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

### **Beating Up**

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

### **Broadleaf**

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

### **Canopy**

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

### **Clearfell**

Felling of all trees within a defined area.

### **Compartment**

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

### **Conifer**

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

### **Continuous Cover forestry**

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

### **Coppice**

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

### **Exotic (non-native) Species**

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

### **Field Layer**

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

### **Group Fell**

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

### **Long Term Retention**

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

### **Minimum Intervention**

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

### **Mixed Woodland**

Woodland made up of broadleaved and coniferous trees.

### **National vegetation classification (NVC)**

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

### **Native Species**

Species that arrived in Britain without human assistance.

### **Natural Regeneration**

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

## **Origin & Provenance**

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

## **Re-Stocking**

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

## **Shrub Layer**

Formed by woody plants 1-10m tall.

## **Silviculture**

The growing and care of trees in woodlands.

## **Stand**

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

## **Sub-Compartment**

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

## **Thinning**

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

## **Tubex or Grow or Tuley Tubes**

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

## **Weeding**

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

## **Windblow/Windthrow**

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