WOODLAND
TRUST SCOTLAND

Loch Arkaig Pine Forest

Management Plan
2019-2024

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MAPS

THE WOODLAND TRUST

INTRODUCTION

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

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

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

PLAN REVIEW AND UPDATING

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 Consequently this printed version may quickly become out of date, particularly in relation to the planned work programme and on-going monitoring observations.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

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

WOODLAND MANAGEMENT APPROACH

The management of our woods is based on our charitable purposes, and is therefore focused on improving woodland biodiversity and increasing peoples' understanding and enjoyment of woodland.

Our strategic aims are to:

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

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

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

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

The following guidelines help to direct our woodland management:

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

SUMMARY

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

1.0 SITE DETAILS

Site name:	Loch Arkaig Pine Forest
Location:	Spean Bridge
Grid reference:	NN147877, OS 1:50,000 Sheet No. N/A
Area:	1027.31 hectares (2538.54 acres)
Designations:	Planted Ancient Woodland Site

2.0 SITE DESCRIPTION

2.1 Summary Description

Loch Arkaig Pine Forest is one of the UK's most significant fragments of native Caledonian pinewood. It lies within an iconic landscape of sparkling lochs fringed by mountains and heather-covered moors. With its rare wildlife and flora, this vast forest is a hugely exciting recent purchase for the Trust.

2.2 Extended Description

The Loch Arkaig Pine Forest consist of two separate woodland areas known as Glen Mallie & the Gusach, extending to over 1000 ha, which lie on the South side of Loch Arkaig to the west of the small communities of Achnacarry, Bunarkaig and Clunes in Lochaber. They are part of a larger area of Caledonian Pinewood inventory woodlands, covering a total of approximately 4900 ha (including the buffer zone), 3800 ha of which is under the ownership of the Achnacarry Estate. The woodlands consist of remnant stands of Caledonian Pine, upland birch woodland, upland oak woodland, wet woodland and significant areas of PAWS.

The Loch Arkaig Pine Forest was acquired in partnership with Arkaig Community Forest SCIO (ACF) who have ownership of two specific areas of woodland - totalling around 53 hectares. The ACF ground comprises a lovely area of restored native pinewood at the western end of the Glen Mallie forest block, as well as an area of partially-restored pine and birch woodland around a long-

abandoned settlement known as Ard Nois in the Gusach. There is close collaboration over the management of the whole site between the two organisations, which is underpinned by a Memorandum of Understanding and overseen by an Advisory Board.

The Loch Arkaig Pinewood site is one of 35 native pinewood sites first identified by Steven and Carlisle in their book The Native Pinewoods of Scotland (1959) which described in great detail the history, vegetation, silviculture and ecology of the most genuinely native and semi-natural pinewood sites in Scotland. Further work by Tuely (1995) identified 84 Caledonian Pinewood Inventory (CPI) sited in Scotland – subdividing some of the larger sites, such as Loch Arkaig into multiple sites/stands – and covering 18000 Ha in total. There are a total of eight mapped units linked by the CPI buffer zone covering the entire south side of Loch Arkaig, stretching to Loch Lochy at Bunarkaig, the upper reaches of Glen Mallie, including Puiteachean pinewood (SSSI) in neighbouring Glen Loy as well as Allt Dubh on the North shore of Loch Arkaig and the dark mile.

Loch Arkaig lay at the heart of the 1745 Jacobite rebellion and Bonnie Prince Charlie is thought to have hidden in the forest after defeat at the Battle of Culloden. In 1746 gold sent from Spain to support the rebellion was said to have been hidden in the forest and, still undiscovered, has become known as the treasure of Loch Arkaig or the Jacobite gold.

Between 1942-1946, due to its isolation, the forest, along with Achnacarry Castle, (the ancestral home of the chiefs of Clan Cameron), was used as the training ground for Churchill's Allied commando units in World War II, recognized by the nearby Commando memorial. The Clan Cameron Museum near Achnacarry House is a place of pilgrimage for Clan Cameron members around the world, and traces the Clan's history for 27 generations, back to the 14th Century. The current Chief of Clan Cameron continues to live at Achnacarry Castle.

The ancient pine woods of the Scottish west coast, such as those found at Loch Arkaig, are part of the vast boreal forests which encircle the northern hemisphere and, due to their very high rainfall, are part of what's known as temperate rainforest.

The forest is home to a large number of ionic veteran Scots pine trees as well as some of Scotland's most high profile species, including nesting sea eagles, ospreys, otters, pine martens, red squirrels, red deer and black grouse . Pinewood plant life is often dominated by acid tolerant plants like bell heather, blaeberry and crowberry, amongst which grow more delicate flowers such as lesser twayblade and intermediate wintergreen.

Man's impact on this ancient landscape has been significant. A fire started in the glen by commando training operations during World War II, severely damaged large swathes of forest, leaving behind hundreds of charred pine skeletons that still dominate the landscape. The historic exploitation of timber, planting of non-native trees, and overgrazing by deer and sheep, have all left Loch Arkaig pine forest degraded and the remaining fragments in decline.
The main population centre of Fort William – 'the outdoor capital of the UK' is situated 15 miles to the south at the end of the Caledonian Canal. It is a major destination for tourists as well as the area's major employer with an Aluminium smelter and BSW's sawmill. There is a small Forestry Commission car park at Cia-Aig falls which facilitates visitor access to the site. There are currently no formal paths within the forest other than a forest track which runs from the White Bridge into Glen Mallie.

3.0 PUBLIC ACCESS INFORMATION

3.1 Getting there

On the A82 Fort William to Inverness road, 1.2km (0.75 mile) north of Spean Bridge, turn onto the B8004 at the Commando Monument. Follow this single track road to Gairlochy for 3.2km (2 miles). Once you have crossed the Caledonian Canal on a swing bridge, take the next right onto a smaller single track road signposted to Achnacarry. Stay on this road, following the west shore of Loch Lochy for 4.8km (3 miles) until you reach the tiny hamlet of Clunes. At this point the road takes a sharp left-hand bend and leads you along the dark mile - a deeply wooded section of road flanked by walls and trees carrying a tremendous thickness of moss - until you reach a small Forestry Commission car park on your right-hand side. The public road continues along the north shore of Loch Arkaig for another 15 miles and you can get some fabulous views of the woodlands from this road but bear in mind it is narrow and twisty.

From the Forestry Commission car park, walk to the Woodland Trust-owned woodland by following the road for 300m then turning left at the head of the loch past a gateway with stone pillars which says ‘Private Road’ (access on foot or by bicycle only). Continue along a causeway and over a timber-decked bridge. After crossing the bridge, turn right past a green metal barrier. A track then follows the south shore of the loch through the woodland.

The nearest bus stop is situated next to the Forestry houses on Clunes Rd, approximately 2 miles away. Further information about public transport is available from Traveline – www.travelinescotland.org.uk or phone 0871 200 2233.

3.2 Access / Walks

There are no way-marked routes in the wood but the track leading on from the green metal barrier takes you through enchanting broadleaf woodland with large veteran beech and oak trees on either side, to an old bothy at Invermaille once used by shepherds. This is now managed as a bothy by the Mountain Bothies Association. The more adventurous walker can use this route to access the upper reaches of Glen Maille and the mountains beyond.

4.0 LONG TERM POLICY

Loch Arkaig Pinewoods will be fully restored native woodland standing as a beacon of good practice in nature conservation, and bringing social and economic benefits to the local community.

Towards that vision, management interventions will create the conditions where natural ecological processes can return – lessening the need over time for further management interventions.

Ultimately we would like to see a thriving mosaic of diverse woodland ages and stages naturally regenerating alongside open areas and scrub habitats. These would support a wide range of appropriate native flora and fauna.
The restoration of Loch Arkaig Pine Forest to a resilient, dynamic mosaic of habitats would be a catalyst for landscape restoration across neighbouring land, and across the highlands.

Local people and others of all ages will be engaging with the forest in meaningful way as volunteers, using it as an educational resource and for informal recreation. There will be a network of low impact path routes that will make the forest more accessible. However, it is not anticipated that there will be large numbers of visitors. The forest will be well known and valued by many people across the UK who will not necessarily visit in person.

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

The PAWS survey carried out by Upland Ecology in 2015 used a range of references including the Ancient Woodland Inventory, 1st Edition 1860 OS, Roy Maps and the Native Woodland Survey of Scotland to identify nearly 700 Hectares of PAWS woodland made up of 395 Ha of PAWS and 297 Ha of restored PAWS.

Following the devastating fire in 1942 the two forest areas were purchased by the Forestry Commission in 1966 and afforested with Sitka spruce, lodgepole pine and small areas of larch. The two areas were deer fenced and shallow ploughed where access permitted, remnant stands of Scots pine along with small groups and individual veteran trees were retained throughout these areas.

Influenced by the work of Steven and Carlisle (1959) the Forestry Commission policies on Caledonian Pinewoods changed dramatically in the decades following the acquisition from one of afforestation with non-natives to restoration and in 1997 a major restoration programme was undertaken. This involved fell to waste of the young conifer crops; the forester who planned and carried out this work, David Whittaker, still lives in Clunes and was consulted about the rationale for which areas were felled and which left. The objective was to restore the areas with the best remnant features and focus on areas with good populations of native trees present. The restoration was concentrated in areas where the non-native trees were growing less well. Areas where trees had potential to produce timber were left to grow on.

In Glen Mallie this policy resulted in a patchwork effect of large contiguous areas being felled, smaller groups of native trees opened up and individual veteran trees being halo thinned in plantations. Shortly after the fell to waste was carried out the woodlands were fenced and deer control carried out. This work resulted in a massive pulse of predominantly birch regeneration which is now around 20 years old. This is complemented by smaller amounts of pine regeneration along with some pine regeneration which originates from the initial fencing of the site and contemporaneous deer control.

In much of the restored PAWS areas it is difficult to find evidence of the original planting, and often only after some close inspection is it possible to find signs of ploughing or debris from the fell to waste. The overall impression is very pleasing with different tree species and age ranges present across large areas. One aspect of the restoration work that was less successful was halo thinning of veteran Scots pine, many of these have suffered in recent years largely in competition from light as the surrounding plantation trees have grown very tall around them. There are also small quantities of natural regeneration of non-natives most of which is currently kept in check by deer browsing but will rapidly colonise when that pressure is reduced.

The areas of PAWS left in Glen Mallie are made up of small ‘islands’ of Sitka spruce surrounded by

regenerated birch towards the eastern end in the lower parts of compartments 1,2 & 3. This changes to more contiguous plantations of Sitka and Lodgepole pine in the upper part of Cmpt 3, most of Cmpt 4 and the lower part of Cmpt 5. The Sitka spruce is well grown & of good timber quality on the lower slopes, growth rates slow as the gradient rises and on the higher ground there are areas of check on peaty soils. Small areas of endemic windthrow are present throughout and is increasing year on year particularly in cmpt 5

In the Gusach there has been less regeneration of birch, along with fewer examples of halo thinning, however some very attractive woodland has resulted from the restoration work, with irregularly spaced mature and pole stage Scots pine andoccasional veteran Scots pine and large standing deadwood scattered throughout.

The unrestored PAWS areas in the Gusach are very different consisting mainly of lodgepole pine. There is very little Sitka spruce and some areas of larch. The lodgepole originates from at least two provenances and shows variation in growth with the Alaskan generally growing faster but with very heavy branching, the inland provenance trees are slower grown and much lighter branched. The lower timber value and access restrictions in the Gusach present major constraints to harvesting options.

A recent peat depth and NVC survey in the Western end of the Gusach (Cmpts 7 & 8) has identified significant areas suitable for restoration to peat along with low density peatland edge woodland.

Significance

Loch Arkaig Pine Forest forms part of a group of Caledonian Pinewood Inventory sites on the South side of Loch Arkaig and are of particular significance because they are an example of pinewood western temperate rainforest. Glen Mallie in particular has a high level of deadwood largely as a result of the fire in 1942, which may prove to be significant for specialist invertebrates and lichens.

Restoration of PAWS represents the only opportunity to increase the area of ancient woodland with semi-natural characteristics.
A healthy restored PAWS resource at Loch Arkaig will connect the fragments of ancient woodland components, and ensure the whole site operates as a functional ecosystem.

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

Opportunities & Constraints

Opportunities:

The restored areas of PAWS demonstrate the opportunity to continue the process in the remaining plantation areas. The ‘ideal’ condition to support the fullest range of pinewood specialist flora and fauna is a diverse structure, density and age range, including open areas.

There is an opportunity to manage the woodlands through continuous cover forestry to create a permanently irregular structure across the whole site with the potential to produce timber products such as firewood from thinning stands of birch as well as high quality, slow grown timber from Scots

pine.

The site provides an opportunity to demonstrate the benefits of restoration to other landowners, partnership working with the local community & collaboration with a traditional estate. Restoration benefits underpinned by research and monitoring of a range of habitats demonstrating change over time can also be demonstrated by setting up long term surveys to monitor changes.

Constraints:

The major constraint on the management of these woodlands is the limited access to each of the sites. Glen Mallie is serviced by a 4x4 track which is accessed via the White bridge which has a weight limit of 7.5 tonnes.

There is currently no vehicle access to the Gusach which is only accessible via boat. This restricted access presents a serious constraint on the management of the woodlands particularly as the non-native trees in the PAWS areas have reached a size where clear felling the timber is the only option on the majority of the areas, due to the risk of wind throw.

There are also access issues on the site itself with steep slopes and fragile soils alongside which, the previous restoration work has left areas of PAWS isolated which will require very careful planning of harvesting operations and may restrict machinery choices or harvesting system.

Deer pressure is high across the site as indicated by herbivore impact assessments carried out in 2017 & 18, and browsing will remain a major constraint on successful tree regeneration as well as the development of ground flora.

Fence repairs carried out in Glen Mallie in 2018 followed by the Gusach in 2019/20 will prevent incursion of deer numbers into the woodland and allow the resident population to be managed, culling levels will be determined by continued monitoring of impacts.

Controlling deer numbers to a level where natural regeneration of native trees is successful will also result in significant quantities of non-native regeneration which will need to be managed until there is no longer a seed source.

Other non-native invasive species present a threat to the forest. Rhododendron is present within the woodland areas with a particular concentration at the eastern end of Glen Mallie. Lever & mulch work carried out during 2018 has made a significant impression on this and more work will be carried out in the next 2 – 3 years with a view to eradicating the species from the site.

Galtheria is present as a dense thicket in the Clan Cameron graveyard at the entrance to the site and a few small seedlings have been reported in Glen Mallie. Vigilance will be required to ensure this species is not allowed to spread uncontrolled.

Japanese knotweed is present in small quantities on the neighbouring estate land near the entrance to the forest on the shore of the loch, some control has been carried out in recent years and it will be monitored to ensure there is no risk of it spreading on to WT/ACF areas.

Beech is also freely regenerating from the veteran trees planted at the eastern end of the Glen

Mallie track, the veterans themselves are providing interesting lichen hosts as well as rot holes for decay fungi and invertebrates so these will be retained but the regeneration will be removed gradually as it reaches pole stage as firewood or sooner where this is threatening remnant ancient woodland features.

Similarly pests and diseases are a risk. Currently Dothistroma needle blight (DNB) has been detected at low levels in Lodgepole pine in the Gusach and is being monitored, there is potential for this to infect the native Scots pine but current advice is that this risk is minimal. There is potential for this to increase and for new plant health issues to arise.

The current policy is reverting to site native species largely through natural regeneration, which is also current advise for climate change mitigation in native woodlands.

This is a very large scale restoration project and represents a considerable management challenge. The recent appointment of a Project Development Manager should provide more time for the site manger to concentrate on site based aspects of the project. Landscape impacts of the restoration are significant, particularly the timber extraction from The Gusach block.

The presence of wild boar on the site can be seen as both an opportunity and a constraint. The disturbance of the soil will aid tree regeneration, but will it also have negative impacts. There is a need to develop monitoring protocols to monitor these impacts.

Factors Causing Change

Natural Succession, grazing & browsing by deer, invasive tree species, wind damage

Long term Objective (50 years+)

Ancient Woodland components in PAWS areas will be secure within a woodland habitat which through continuous cover management will develop strong semi natural characteristics, including a predominance of native tree species, a varied structure, a diverse ground flora, frequent standing and fallen deadwood and the absence of any significant threats from invasive species.

The removal of all of the non-native trees from the site in the next 20 years combined with a reduction in herbivore impacts will allow the native woodland to expand internally and result in a 'pulse' of predominantly birch regeneration which will compliment the existing age and species diversity on the site.

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

1. During 2019, upgrade to White Bridge, track into Glen Mallie as far as the red house with relevant bridge & culvert replacements to facilitate timber harvesting in PAWS areas, all work to be supervised by a suitably qualified civil engineer to ensure all relevant standards and health and safety are complied with.

2. Road upgrade to be extended from the red house to the bothy corner and 2 new road spurs constructed in 2020.

3. Clear Felling of all of the Sitka Spruce and Lodgepole Pine along with the majority of the Larch in Cpt 5 is planned for 2021. Careful felling and extraction of the timber will be required around the

numerous veteran Scots Pine and standing deadwood present in the non-native plantations. Opportunities to thin & retain some of the Larch will be taken for two objectives: firstly to retain a canopy in small sheltered areas with the potential to retain future timber resource for a small scale mobile mill operation, and secondly to precipitate wind throw to provide opportunities for native trees in particular Scots Pine to regenerate on upturned stumps, a common occurrence in Western pinewoods.

4. Temporary deer fencing of the majority of felled areas in Cpt 5 in 2022, fence lines to be determined after the felling, to provide protection to tree regeneration from deer browsing during the establishment phase of up to 10 years. Consider the use of 'brash' fences in some locations.

5. Felling of Sitka ‘islands’ adjacent to the track in Cpt 1b,2g & 3e in 2020, followed by temporary deer fencing of larger coupes (1b & 2g), fence lines to be determined after the felling, fence construction to take place in 2021 (consider the use of 'brash' fences in some locations).

6. Large scale felling of Sitka Spruce and Lodgpole Pine plantations in Cpts 2 & 3 to be carried out in 2022 – 2023, this will necessitate the construction of a new access track through an area of restored birchwood in Cpt 3d which will need to be carefully planned and executed. The felling operations will also require the major extraction routes repaired to provide ATV access tracks for deer management.

7. Major fence repairs will be carried out to replace sections at the Western end of the Gusach in 2020 with on-going minor repairs in 2019/20 with a view to having the boundary fence fully deer proof by the end of 2020.

8. Fell to waste operations will target areas of unmerchantable timber in Cpt 5d, 2f & 3f, depending on access issues some of this will be carried out as part of the harvesting operations while other areas will be stand-alone motor manual operations, the aim being to complete 70% of this work by 2025.

9. Rhododendron control through lever and mulch will continue (mostly in cpt 1a) with the aim of removing all of the rhododendron in Glen Mallie by the end of 2020.

10. Annual herbivore impact surveys will be carried out in both forest blocks to provide evidence to support deer cull levels to achieve appropriate levels of natural regeneration

11. Baseline surveys of a range of taxanomic groups including breeding birds, lower plants, invertebrates and mammals will continue in 2019 and a monitoring schedule will be drafted by the end of 2019 to identify the frequency of repeat surveys and any further surveys which might be required.

12. By end of year 2020 we will have identified a series of measures of success/ thresholds for conservation objectives (such as ancient woodland ground flora/ dead wood/ native canopy/ natural regeneration/ iconic species etc) based on the baseline habitats and species survey data being collected at the moment.

13. Restocking of felled areas will be achieved predominantly by natural regeneration with an expectation that initially this will consist of 90% birch with variable densities ranging from 5000

stems per ha on lower slopes to 900 stems per ha in areas further from a viable seed source.

5.2 Community Woodland Group

Description

Loch Arkaig Pine Forest was acquired in partnership with community group and charitable organisation Arkaig Community Forest (ACF). The aims and objectives of both the Woodland Trust and Arkaig Community Forest match very closely and a memorandum of understanding which outlines the basis of the partnership between the two organisations has been agreed.

The MOU includes the following statements:

The Community Group and the Trust will work together to restore native woodland habitats and to secure multiple benefits in terms of sustainable rural development from the site.

Both parties are agreed that the Forest shall be restored to native woodland, native Caledonian pinewood and associated habitats, in accordance with the Trust's Woodland Management Approach and Ancient Woodland Restoration Guide.

Both parties are committed to creating tangible community benefit and developing social enterprise within appropriate parts of the Forest, and will ensure that this is allowed to develop as deemed appropriate by both parties under the management planning process and structure.

This close collaboration with a community group is a unique situation for the Woodland Trust and there is a determination to see it succeed. It has attracted a lot of attention from community organisations such as the Community Woodland Association (CWA) who actively support the project.

Research is being carried out by the University of the Highlands & Islands to capture the socio-economic benefits the project may deliver over the next 20 years, with baseline surveys being carried out in 2018.

Arkaig Community Forest directly own around 50 ha of forest including an area of restored PAWS in Glen Mallie and in the Gusach, an area surrounding the old settlement of Ard Nois. The two groups communicate formally via regular ACF board meetings and through an 'Advisory Board' chaired by Jon Hollingdale of the CWA.

Four local people have set up Arkaig Forestry Cooperative and deliver ongoing practical work. Their support during 2017/18 included supporting the set up and maintenance of the live osprey camera, numerous environmental surveys, rhododendron control, fence surveys and repairs.

Significance

This unique collaboration between an NGO and Community group is very significant in terms of demonstrating a different approach to delivering environmental benefits whilst working with and supporting the aspirations of local people.

Opportunities & Constraints

Opportunities:

Loch Arkaig pine forest offers an interesting opportunity to demonstrate both the environmental and socio-economic benefits of a forest restoration project. By working with local contractors to deliver much of the work (where they have relevant skills & experience to do so), the hope is that this inward investment will positively impact the local economy and support the viability of remote rural communities.

This is already having an impact through the formation of the Arkaig Forestry Cooperative. As more work is delivered on site, particularly when the major infrastructure works and harvesting begin, the ripple effect of the project budget will have a bigger impact. It is hoped to develop opportunities for training, work experience and potentially apprentice's through partnership working with both ACF and the main timber contractor. Regular dialogue with ACF through meetings and collaborative workshops provides meaningful engagement of local community members in the management of the forest.

There are opportunities to develop innovative ways for local people to benefit from various aspects of the forest from initiatives such as wood lots, access to firewood, venison, Non Timber Forest Products as well as health and wellbeing benefits associated with spending time outdoors.

Constraints:

There are many challenges of partnership working and working with local communities. We appreciate there is an imbalance in scale and resources available to each of the organisations; a large NGO with a sizable project team and administration to support is not comparable with a small group of local volunteers working in their own time with very limited resources.

The Woodland Trust has a very clear set of aims and objectives and systems to ensure these are delivered and measured. The aims and objectives of ACF match very closely those of the Trust but they have limited capacity to develop and deliver these.

Given the mismatch in capacity, the Trust risks overwhelming ACF with information and requests for responses. Access issues associated with steep ground, a limited number of tracks and the perimeter fence are also physical barriers to developing community based initiatives in the forest

Factors Causing Change

Changes to key WT staff – Site Manager or Project Development Manager or changes to ACF board members present risks to the relationship between the two organisations.

The delivery of large scale restoration involves major infrastructure work in 2019 and significant timber harvesting from 2020 onwards, with associated timber haulage on local roads.

Despite significant efforts to communicate the potential impacts of these developments to local residents, the reality is this work is unlikely to suit all parties and potentially it will put a strain on the partnership between the two organisations.

Long term Objective (50 years+)

To sustain a strong and stable partnership approach to the management of the Loch Arkaig Pine Forest that delivers the environmental and sustainable development aspirations of both partners.

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

1. To identify suitable areas of the forest to be used by community members for wood lots and establish a trial area by the end of 2019.

2. To include community engagement workshops as part of the survey and monitoring programme – in 2019 hold a lichen workshop and fungi foray.

3. Identify suitable contract work to be undertaken by Arkaig Forestry Cooperative in areas where they are able to provide relevant knowledge and expertise and can deliver at a market benchmarked rate. This is likely to include coordinating & delivering the survey programme, fence maintenance, rhododendron control, fell to waste operations, raptor work and help to support the Site Manager. Work programme to be agreed each year in advance.

4. Ensure regular collaboration and dialogue with ACF through attendance at ACF Board Meetings and Loch Arkaig Pine Forest Advisory Board Meetings.

5.3 Ancient Semi Natural Woodland

Description

The Ancient Woodland Inventory identifies significant areas of ASNW within the Loch Arkaig Pinewoods.

There is map based evidence from the 1654 Blaeu Atlas, Roy c1750 the OS 1st Edition c1860 and the Annexation survey carried out by William Morison in 1772.

The last of these describes Glen Mallie having “A thick cover of Birch intermixed with Hazel, Alder and Fir” the western area is described as having “A thick cover of Stately Firs intermixed with Birch at the east end” – fir being old Scots for pine.

The PAWS survey carried out by upland Ecology in 2015 identified only 41 ha of the site as Ancient Semi-natural Woodland with an additional 297 Ha of restored PAWS.

The majority of the ASNW areas are found in Glen Mallie on the lower slopes of compartments 1c, 2c & 3d with the dominant woodland type being upland birch woodland comprising NVC classification W4, W11 & W17 woodland. These consist mainly of pole stage downy birch which probably coincided with the fencing of the site in the early 1970’s, along with oak, ash, hazel, rowan, alder, wych elm, bird cherry, hawthorn, holly, Scots pine, eared and grey willow.

There are scattered veteran holly, oak and birch present throughout and a number of mature beech trees near the track with a range of regenerated beech at the Eastern end of Cpt 1c.

Within Cpt 2c there is a small (1.8 Ha) stand of mature and veteran Scots pine, situated on a prominent knoll which seems to escaped the worst effects of the 1942 fire and subsequent felling. The vegetation is typical of W18 and is dominated by rank heather, there is limited regeneration of birch and Sitka present along with Scot’s pine regeneration in adjacent open land.

In the Gusach the PAWS survey identifies two small adjacent areas in cmpt7 j&k comprising a mixture of open habitats and wet woodland W4/W7 on the edge of Loch Arkaig consisting predominantly of riparian alder woodland.

As well as the ASNW areas described above there are significant ancient woodland features across the majority of the site such as mature and veteran trees which have been included in the PAWS section, particularly within restored PAWS areas.

Significance

Loch Arkaig Pine Forest forms part of a group of Caledonian Pinewood Inventory sites on the South side of Loch Arkaig and are of particular significance because they are an example of pinewood western temperate rainforest.

Glen Mallie in particular has a high level of deadwood largely as a result of the fire in 1942, which may prove to be significant for specialist invertebrates and lichens.
The relatively small areas of ASNW combined with the large amount of ASNW features present on the site as a whole, means there are robust areas of native woodland habitat and high potential for future continuity of habitats on this site.
Management and maintenance of the ASNW component of the site contributes to meeting the Woodland Trust objective of "No further loss of ancient woodland".

Opportunities & Constraints

Despite the existing ASNW fragments despite being dominated by pole stage birch they have a wide range of mature tree species present providing seed sources for regeneration.

The main constraint is the high level of browsing pressure affecting recruitment of seedling regeneration. The presence of adjacent stands of non-native trees presents a threat of non-native regeneration within the ASNW when these browsing pressures are reduced.

Factors Causing Change

Natural Succession, grazing & browsing by deer, invasive tree species, wind damage, climate change and tree disease.

Long term Objective (50 years+)

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

A permanently irregular age structure will develop within the woodland creating opportunities for the recruitment of future veteran trees, and the on-going retention of associated ancient woodland species and assemblages.

Frequent standing and fallen deadwood will be present on the site and there will be no significant threats from invasive non-native species.

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

1. Major fence repairs will be carried out to replace sections at the Western end of the Gusach in 2019 with on-going minor repairs in 2019/20 with a view to having the boundary fence fully deer proof by the end of 2020.

2. Annual herbivore impact surveys will be carried out in both forest blocks to provide evidence to support deer cull levels, to achieve natural regeneration.

3. Baseline surveys of a range of taxonomic groups including breeding birds, lower plants, invertebrates and mammals will continue in 2019 and a monitoring schedule will be drafted by the end of 2019 to identify the frequency of repeat surveys and any further surveys which might be required.

5.4 Connecting People with woods & trees

Description

The site currently has little in the way of visitor facilities or infrastructure. There are no way marked trails and the closest car park to the site is approx. 900m from the Glen Mallie entrance at the Chia-aig waterfall.

The car park is owned and managed by Forestry Commission Scotland and has space for approx. 12 vehicles. The site has a single ladderboard welcoming visitors to the forest. Small numbers of bikers and walkers use the unsurfaced track to the bothy at Inver Mallie.

The hamlets of Achnacarry, Bunarkaig and Clunes are all close by and include around 40 residents. The nearest town is Fort William, a 40 minute drive. It markets itself as the 'Outdoor Capital of the UK' and has a population of around 10,000 people - though this increases significantly with tourist traffic over summer. The 79 mile long Great Glen Way, one of Scotland's Great Trails, passes through the hamlet of Clunes, approx. 2 miles east of the forest entrance. It is estimated 2000 people complete the walk each year.

Whilst there is much spectacular scenery and iconic wildlife to appreciate at Arkaig, the remote nature of the site and a lack of infrastructure mean it is inappropriate to develop as a large scale visitor destination. Instead the Woodland Trust is focussing on using digital technology to engage members and supporters with the site and our restoration work. In 2017 we installed a camera on the nest of a breeding osprey pair at Arkaig and relayed the live coverage to the Trust website 24 hours a day. This rare insight into the private lives of a raptor pair proved to be a hit and we aim to continue bringing Arkaig wildlife into the homes of supporters across the UK using innovative digital technology.

Events at Loch Arkaig have so far been focussed on getting to know the local community and introducing the site to project stakeholders and funders. Pivotal to our work at Arkaig is the support of community group and project partner Arkaig Community Forest (ACF). ACF kindly share their use of a local forest school hut for private meetings and gatherings.

Neighbouring Achnacarry Estate shares the access road to the Glen Mallie end of the forest. Their business interest Achnacarry Sporting, regularly transports paying guests to the hill behind the pine forest for stalking and tours.

There is an occasional Woodland Working Group of approx. 8 local volunteers at Arkaig who meet 2 or 3 times a year to carry out practical conservation activities.

The nearest primary school is in Spean Bridge, approx. 10 miles away, school role 115 pupils. The nearest secondary school is Lochaber High, role 819 pupils. Spean Bridge and Roy Bridge primary schools have previously been involved in funded outdoor learning projects at the Forest School in Clunes.

The nearest Trust owned woodland to Loch Arkaig is Balmacaan Wood on the shore of Loch Ness.

Significance

Loch Arkaig Pine Forest is one of Scotland's few remaining ancient Caledonian pinewood remnants. It is of high conservation value and it offers significant opportunity not only to restore a large area of ancient woodland but also to demonstrate restoration practice to landowners across Lochaber and beyond.

The forest is home to a large number of ionic veteran Scots pine trees as well as some of Scotland's most iconic wildlife including ospreys, sea eagles, red squirrels and pine martens. Wildlife cameras have already recorded the presence of badgers and wild boar in the forest and we're in the process of surveying ground flora to find out what plants, fungi and bryophytes are present.

The Loch Arkaig area is steeped in history: a consignment of Jacobite gold is said to be buried on the loch shore; generations of Clan Cameron have lived in the area since the 14th century; the loch is rumoured to have its very own water horse or kelpie and it features in the memorable opening scene of Harry Potter and the Deathly Hallows Part 2.

The forest was the training ground for the country's first commandos from 1942 to 1945. A serious fire started by a commando training operation in 1942 destroyed many of the pine trees over an area of around 3000 acres and the silver silhouettes of standing dead trees are a visible reminder of man's impact on the landscape today.

Opportunities & Constraints

To develop access facilities in line with harvesting plans and community demand.

Over the next few years, planned restoration work will include significant harvesting of plantation areas.

Access tracks will be created to enable management of these areas post felling and these same tracks could provide informal access to new areas of the forest for more adventurous visitors. There is however no short term plans to signpost this access.

Long term a way marked trail could be installed in the Glen Mallie block, within walking distance of the Achnacarry Museum. This would ideally lead to a viewpoint highlighting the extent of the forest and the stunning lochside scenery - but options for still have to be fully considered.

The Cia-Aig waterfall and car park is a popular visitor attraction. There is potential to install an orientation panel here that promotes forest restoration and encourages informal access to the bothy via the forest. A similar information panel could be installed at the bird hide on the west side of the Loch overlooking Loch Arkaig pine forest?

Arkaig Community Forest is in the process of buying the Forest School hut at Clunes. In the future this could be a good venue for hosting school and community groups visiting the area for learning / recreation. It might also provide an ideal location for showcasing the live ospreycam and encouraging walkers passing by on the Great Glen Way to become members and supporters.

We are unlikely to consider introducing small scale public events until the majority of harvesting works are compete. We will however continue to tour stakeholders and supporters around the site as required.

There is an opportunity to increase volunteer activity at Arkaig and recruit lead volunteers who will receive appropriate training so they support the woodland working group to deliver a range of practical tasks. Highland conservation groups can be approached.

Constraints

Due to significant harvesting operations over the next 5 years, access to the site for recreation and learning purposes will be limited. Unsurfaced access routes are likely to become wet and boggy and car parking is restricted to the capacity permitted by the Forestry Commission car park.

Our live ospreycam depends on the provision of rural broadband courtesy of local provider Lochielnet. The stability of this service is subject to weather conditions.'

Factors Causing Change

Capacity of local working group to sustain delivery of conservation activities.

Restoration activities will effect the delivery of informal visitor facilities.

Long term Objective (50 years+)

The local community will value the forest for the environmental, social and economic benefits it delivers

Local people and others of all ages will be engaging with the forest in meaningful way as volunteers, using it as an educational resource and for informal recreation.

There will be a network of low impact path routes that will make the forest more accessible. However, it is not anticipated that there will be large numbers of visitors.

The forest will be well known and valued by many people across the UK who will not necessarily visit in person but will engage virtually via a series of innovative digital communications.

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

Maintain Woodland Working Group (WWG) and volunteer numbers so they continue to deliver practical and valuable conservation activities in the forest.

Increase WWG days in the forest from 2 in 2018 to 4 in 2019 and aim for 6 per year from 2020 onwards.

Continue to bring Arkaig wildlife into the homes of supporters across the UK using digital technology. Ensure training of local contractors by Spring 2019 to ensure they are able to carry out maintenance to osprey camera equipment.

5.5 Open Ground Habitat

Description

As well as including open ground as part of the mosaic within woodland areas there are parts of the site which consist of wet heath with peat depths greater then 50cm. Some of these areas have been afforested and should ideally be restored to peatland.

Significance

These are UK priority habitats and the restoration of important semi-natural open ground habitats within forests is part of the Trusts management approach.

Opportunities & Constraints

Opportunities:

Funding through the Peatland Action Plan, provides an opportunity to remove a significant area of non-native conifers from these areas of the site. Habitat and peat depth surveys have been carried out over the majority of these areas and the associated report provides recommendations to restore both open bog habitat and peatland edge woodland.

Constraints:

As with much of the rest of the site access is a major constraint with the areas suitable for restoration to peatland habitats having a greater depth of peat combined with the presence of smaller trees, making it difficult to get suitable machine on to carry out the work. Specialist low ground pressure machines will be required, however providing access for these machines to areas of the Gusach and subsequent refuelling will be a major logistical challenge.

Factors Causing Change

Changes to the watertable caused by drainage ditches and ploughing. Windthrow and regeneration of non-native tree species. Impacts of deer trampling.

Long term Objective (50 years+)

To clear significant areas of non-native conifers from areas of peat and create a mosaic of habitats with areas of open ground along with low density native woodland.

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

1. Complete habitat and peat depth surveys in Glen Mallie by the end of 2019

2. Arrange a site visit with Lochaber Fisheries Trust by 31st March 2019 to scope out a funding application for the 2019 funding round.

3. Contact FCS to look at recent developments in peatland restoration and arrange reciprocal site visits during 2019.

6.0 WORK PROGRAMME

Year	Type of Work	Description	Due By

APPENDIX 1: COMPARTMENT DESCRIPTIONS

Cpt No.	Area (ha)	Main Species	Year	Management Regime	Major Management Constraints	Key Features Present	Designations
1a	50.80	Scots pine	1700	Min-intervention	Gullies/Deep Valleys/Uneven/ Rocky ground	Community Woodland Group	
A large and diverse sub-compartment of very uneven terrain, mostly north facing with some very steep slopes and a deep gully on the Western boundary. There is a mixture of veteran Scots pine and younger downy birch present at very variable spacing from individual veteran pine trees, small stands of older pine, a lot of standing deadwood from the 1942 fire and scattered regeneration of downy birch dating from the enclosure of the woodland in the 1970's. Other native tree species present include silver birch, rowan, alder, eared & grey willow and two stands of aspen. The lower portion of the site was ploughed and planted with Sitka spruce in the 70's and subsequently felled to waste on the 90's. There are some large rhododendron bushes present concentrated in the Eastern part of the compartment along with smaller seedling established throughout. There are also significant amounts of Sitka regeneration currently suppressed by deer browsing. It is notable for the presence of an osprey nest in a mature Scots pine tree & Allt na h'Eiridh raised bog area – significant and distinctive (and relatively accessible) open habitat degraded by ploughing, planting, rhoddies, sitka regen and herbivore impacts – undergoing restoration.							
1b	6.68	Sitka spruce	1971	PAWS restoration	Gullies/Deep Valleys/Uneven/ Rocky ground	Community Woodland Group	Planted Ancient Woodland Site
Steep sloping, north facing site with mineral soil, consisting mainly of good quality unthinned Sitka spruce, it is a PAWS site and there are one or two veteran oak and holly present as well as some more recently regenerated birch. There is a steep, narrow ATV track providing access.							
1c	10.49	Downy birch	1973	High forest	Gullies/Deep Valleys/Uneven/ Rocky ground	Community Woodland Group	
Steep sloping, north facing site with mineral soil, with native broadleaved trees - birch oak and holly, there are scattered veteran trees present notably holly which may have been pollarded to provide fodder for livestock. The majority of trees are relatively young pole stage downy birch which probably regenerated when the site was fenced to establish conifer crops in the 1970's. There are also a number of mature/veteran beech trees present at the eastern end near to the track along with a small amount of regenerating beech from seedling to semi-mature. The eastern end of the compartment also includes a number of small crags rich in bryophytes and liverworts, with Wilson's Filmy Fern Hymenophyllum wilsonii recorded. A limited amount of fell to waste has also taken place. Presence of charcoal platforms, and veteran Scots Pine and Oak inc culturally modified tree/s. Some Silver Birch (Betula pendula) also present. Good mineral soils (although wet!) – brown earths/cambsiols on the lower slopes above the track amidst the birch regen. Elsewhere (SCPTS 1a, 1c,1d) mainly peaty podzols, peats and peaty gleys.							

1d	26.89	Open ground		Non-wood habitat		Community Woodland Group	
Significant rocky outcrops, boulders as well as blanket bog, wet and dry heath and areas of bracken. Includes ancient woodland - low density native pinewood - fragments outwith fence, including dead snags and veteran trees on lower slopes							
2a	26.67	Scots pine	1700	Min-intervention	Gullies/Deep Valleys/Uneven/ Rocky ground	Community Woodland Group	
Uneven terrain, mostly north facing with some very steep slopes and a deep gully on the eastern boundary. There is a mixture of veteran Scots pine and younger downy birch present at very variable spacing (and a significant amount of open space) from individual veteran pine trees, small stands of older pine, a lot of standing deadwood from the 1942 fire, scattered regeneration of downy birch and a significant stand of mature Scots pine on a prominent knoll. Rhododendron and Sitka spruce regeneration present.							
2b	29.69	Open ground		Non-wood habitat		Community Woodland Group	
Significant rocky outcrops, boulders as well as blanket bog, wet and dry heath and areas of bracken. At the upper margins of the forest there are a few stunted trees present and no planting of non-natives was carried out.							
2c	12.69	Downy birch	1700	High forest	Gullies/Deep Valleys/Uneven/ Rocky ground	Community Woodland Group	
North facing slope rising steeply from the loch side track, native broadleaved trees on mineral soils, predominantly mature and pole stage downy birch long with a wide range of other species including rowan, ash, hazel, wych elm, bird cherry, holly, eared willow, grey willow and Scots pine. Presence of charcoal platforms, and veteran Holly and Oak inc culturally modified tree/s. Some Silver Birch (Betula pendula) also present. Good mineral soils (although wet) – brown earths/cambsiols on the lower slopes above the track amidst the birch regen.							
2d	7.57	Sitka spruce	1971	PAWS restoration	Gullies/Deep Valleys/Uneven/ Rocky ground	Community Woodland Group	Planted Ancient Woodland Site
Gently sloping with a northerly aspect bounded by a small watercourse on the western side, this compartment consists of a stand of Sitka spruce established in the early 1970's with good growth at the bottom of the slope gradually reducing in size higher up the hill.							

2e	5.63	Sitka spruce	1971	High forest	Mostly wet ground/exposed site, No/poor vehicular access within the site	Community Woodland Group	
Relatively small area of poor quality mixture of Sitka and Lodgepole pine growing in quite peaty ground, which due to its inaccessibility should be reverted back to a peatland habitat by fell to waste.							
2f	4.63	Sitka spruce	1971	High forest	Mostly wet ground/exposed site, No/poor vehicular access within the site	Community Woodland Group	
Sitka spruce & Lodgepole pine planted on peaty soils which are in check.							
2g	2.72	Sitka spruce	1971	PAWS restoration	Gullies/Deep Valleys/Uneven/ Rocky ground, No/poor vehicular access within the site	Community Woodland Group	Planted Ancient Woodland Site
Two isolated stands of mature Sitka spruce adjacent to the main access track surrounded by native woodland, growing on good mineral soil with resultant very good growth of high quality timber. Both stands rise steely away from the track, within the Eastern stand there is a narrow riparian strip of native woodland as well as a number of veteran holly trees on the edge of both conifer areas.							
3a	15.99	Sitka spruce	1971	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
A stand of Sitka spruce stretching from the mid to the higher slopes on this north facing slope with growth rates dropping off considerably at the higher elevations tailing off in to checked trees.							
3b	9.41	Lodgepole pine	1971	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
A swathe of poor quality south costal Lodgepole pine on either side of a stand of Sitka (Cmpt 3a), characterised by swept bases and heavily branched trees on the mid slope of this compartment.							
3c	11.79	Lodgepole pine	1971	High forest	Mostly wet ground/exposed site	Community Woodland Group	
Lodgepole pine planted on the upper margins of the slope on poor peaty ground, there is very little opportunity to establish native woodland in this part of the site apart from the in the narrow gully to the west of the area.							

3d	16.20	Downy birch	1700	High forest	Gullies/Deep Valleys/Uneven/ Rocky ground	Community Woodland Group	
North facing slope rising steeply from the loch side track, native broadleaved trees on mineral soils, predominantly mature and pole stage downy birch long with a wide range of other species including rowan, ash, hazel, wych elm, bird cherry, holly, eared willow, grey willow and Scots pine. Presence of charcoal platforms, and veteran Holly and Oak inc culturally modified tree/s. Some Silver Birch (Betula pendula) also present. Good mineral soils (although wet!) – brown earths/cambsiols on the lower slopes above the track amidst the birch regen.							
3e	2.23	Sitka spruce	1971	PAWS restoration	Gullies/Deep Valleys/Uneven/ Rocky ground, No/poor vehicular access within the site	Community Woodland Group	Planted Ancient Woodland Site
A group of isolated 'islands' of Sitka spruce surrounded by native broadleaved woodland located near the bottom of the steep north facing slope an relatively good mineral soils. the timber quality and growth rates of the Sitka are both very goo but the location of the timber will make it challenging to harvest, there is a narrow ATV track which provides access through the native woodland (cpt 3d) but a new route will need to be created to allow for the extraction of timber in these areas and to provide accss to the rest of the compartment.							
3f	15.96	Sitka spruce	1971	High forest	Mostly wet ground/exposed site, No/poor vehicular access within the site	Community Woodland Group	
Sitka spruce & Lodgepole pine planted on peaty soils which are in check.							
3g	8.98	Open ground		Non-wood habitat	Mostly wet ground/exposed site	Community Woodland Group	
Open ground either within planted non-native plantation or at the top of the slope above the plantation, in both cases the soils consist of peat of varying depth and should be retained as open ground							
3h	2.99	Sitka spruce	1971	PAWS restoration		Community Woodland Group	
A stand of Sitka spruce stretching from the mid to the higher slopes on this north facing slope with growth rates dropping off considerably at the higher elevations tailing off in to checked trees.							

3i	2.24	Open ground		Non-wood habitat		Community Woodland Group	
Riparian area with mature Scots pine and birch present in low numbers							
3j	0.92	Downy birch	1971	PAWS restoration		Community Woodland Group	
Riparian area with mature Scots pine and birch present in low numbers							
4a	25.29	Sitka spruce	1971	PAWS restoration	No/poor vehicular access within the site	Community Woodland Group	Planted Ancient Woodland Site
The major component of a large contiguous area of PAWS consisting of a solid area of Sitka spruce on the mid slop of the compartment the North facing slope is reasonably even and accessible in this part of the site and the timber quality and tree size reasonable which will make timber harvesting of these areas relatively straightforward and cost effective.							
4b	8.74	Sitka spruce	1971	PAWS restoration	No/poor vehicular access within the site	Community Woodland Group	Planted Ancient Woodland Site
Smaller groups of Sitka amongst larch and native broadleaved woodland, timber quality is generally quite good but localised areas of wet ground combined with the adjacent woodland types might present some harvesting challenges, there is also a significant area of windblow in the north end of this sub-compartment (clearly visible on aerial photographs).							
4c	9.32	Sitka spruce	1971	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
A mixed stand of Lodgepole and Sitka located at the bottom of the slope, a spur road from the main track is planned which will provide good access for timber harvesting in this area, timber quality and size good.							
4d	5.78	Sitka spruce	1971	PAWS restoration	No/poor vehicular access within the site	Community Woodland Group	
Fairly uniform stand of Sitka towards the top of the plantation, modest growth							
4e	25.77	Lodgepole pine	1971	PAWS restoration	No/poor vehicular access within the site	Community Woodland Group	

Lodgepole pine stands growing at the top of the plantation, form is generally quite poor with slow growth and heavy branching, with low timber value and very long extraction distances the harvesting of this timber represents a considerable challenge and fell to waste may be a more economically viable option. In terms of restocking, the upper third of these areas should be should be considered for low density edge woodland providing good habitat for black grouse.							
4f	11.76	Hybrid larch	1971	PAWS restoration	No/poor vehicular access within the site	Community Woodland Group	Planted Ancient Woodland Site
There are considerable areas of Larch present on the lower slopes Scattered veteran Scots pine and birch amidst mixed conifers on lower slopes. Patch of W9 type field layer vegetation noted under larch in one area (Dog's Mercury indicative of rich soils and future Ash-Elm type woodland)							
4g	8.53	Downy birch	1700	High forest	Gullies/Deep Valleys/Uneven/ Rocky ground, No/poor vehicular access within the site, Sensitive habitats/species on or adjacent to site	Community Woodland Group	
This is part of a very large area of restored PAWS which is contiguous with most of Cpt 5a, it consists mostly of regenerated pole stage birch with occasional mature Scots pine along with standing deadwood from the 1942 fire the western edge is formed by a steep gully running N-S which is rich in bryophytes and has significant amounts of mature pine and birch present.							
4h	20.12	Open ground		Non-wood habitat		Community Woodland Group	
Mostly heather moorland between the planted trees and the deer fence							
4i	19.56	Sitka spruce	1971	High forest	Mostly wet ground/exposed site	Community Woodland Group	
Sitka & Lodgepole pine planted on unsuitable ground near the top of the plantation resulting in very poor checked trees.							
4k	4.25	Downy birch	1700	Min-intervention	Gullies/Deep Valleys/Uneven/ Rocky ground	Community Woodland Group	
Steep riparian area on western side of Allta Bhathaich with mature Birch and Scots pine trees							

4l	2.69	Downy birch	1900	PAWS restoration	No/poor vehicular access within the site	Community Woodland Group	
A small area in the centre of cmpt 4 mostly made up of mature birch trees but with large open grown Sitka also present on relatively wet ground							
4m	1.70	Sitka spruce	1971	PAWS restoration	No/poor vehicular access within the site	Community Woodland Group	
Patch of windblown Sitka mostly surrounded by Larch							
4n	3.69	Downy birch	1971	Min-intervention	Mostly wet ground/exposed site	Community Woodland Group	
Area of restored PAWS dominated by mature birch trees some Sitka regeneration present.							
4o	3.57	Lodgepole pine	1971	High forest	Landscape factors, No/poor vehicular access within the site	Community Woodland Group	
Small area on the upper margins of the plantation dominated by very poor quality Lodgepole pine planted outside of the PAWS zone. the low value timber of this sub cpt and of the surrounding areas will probably result in fell to waste operations and restocking with low density woodland edge broadleaved woodland							
5a	73.82	Downy birch	1700	High forest		Community Woodland Group	
This sub compartment consists of entirely native woodland and contains evidence of a complex picture of management over the last two or three centuries. The South West corner high up the hill contains significant remnants of Caledonian pine. The effects of the 1942 are still evident in places with many charred snags along with evidence of harvesting using axes and crosscut saws which may have taken place after the fire damage. The remainder of the sub cpt is dominated by a dense cover of young pole stage birch with the occasional large veteran Scots pine towering above them, two of which were chosen as sites for new osprey platforms in 2018. occasional veteran birch are present as well as pole stage scots pine and regenerating Sitka. a well constructed ATV track provides partial access through this area but would benefit from being extended to provide access for deer control and informal public access.							
5b	11.46	Sitka spruce	1971	PAWS restoration		Community Woodland Group	

An area of relatively flat grown on the Northern edge of the woodland, it benefits from reasonable access having an ATV track running through it although this would benefit from upgrading to allow 4x4 access. It is dominated by well grown Sitka Spruce which is suffering from windblow in a number of places. A spur road providing timber wagon access is planned to be constructed in 2019 to enable this area to be harvested in 2020. A significant feature of this cpt is the presence of numerous veteran scots pine along with many fire scorched snags, despite halo thinning carried out in the 90's the high growth rates of the surrounding Sitka have resulted in most of these suffering from light competition, many have died in recent years and most of the remainder are in very poor condition. A small amount of remedial extension to some of the halo thinning was carried out in 2017.							
5c	10.92	Hybrid larch	1970	PAWS restoration		Community Woodland Group	
A group of hybrid larch between the Sitka plantation and the restored PAWS higher up the slope. the larch is variable quality and is also suffering from the effects of wind throw, despite this it would be interesting to try and retain some of these mature trees for different reasons. Firstly as a potential resource for small scale milling but also for experimental thing to create wind throw in the future, the reason being to produce exposed soil and raised positions for trees to regenerate in. There is much evidence of previous examples od upturned root plates providing opportunity for tree regeneration throughout the Western end of Glen Mallie and in numerous other Western pinewoods where ground conditions are often too wet to promote regeneration particularly of Scots pine. there are numerous scorched snags as well as mature Scots pine with large spreading crowns which as would be expected are doing much better in the Larch stands than the adjacent Sitka.							
5d	14.00	Sitka spruce	1982	PAWS restoration		Community Woodland Group	
This area was established much later than the rest of the plantation and escaped the chop of the 90's saws because it was heavily deer browsed and was hidden by bracken. This has resulted in a large area of stunted multi stem Sitka spruce along with some birch of varying size and a scattering of mature Scots pine. Felling to waste of the Sitka will produce low density native edge woodland.							
5e	2.12	Downy birch	1700	Min-intervention	Mostly wet ground/exposed site	Community Woodland Group	
This is a small area of flat wet ground in the North west corner of the site consisting of scattered mature and veteran Scots pine and pole stage birch with evidence of fell to waste activity							
5g	1.61	Scots pine	1700	Min-intervention		Community Woodland Group	
A couple of small stands of mature/veteran scots pine							

5h	0.69	Lodgepole pine	1971	PAWS restoration		Community Woodland Group	
Poor quality Lodgepole pine - clear fell with adjacent Sitka							
6a	42.93	Scots pine	1700	High forest		Community Woodland Group	
A large area of restored PAWS stretching for over 1 Km along the south shore of Loch Arkaig and continuing almost to the upper margins of the forest to the west of the Allt na Briobaig. The woodland consists predominantly of irregularly spaced mature and pole stage scots pine with occasional veteran Scots pine and large standing deadwood scattered throughout. Broadleaved trees are common throughout with veteran oak present and patches of dense alder wet woodland (W7) occurring at the mouths of the burns. the understorey is generally typical blueberry and heather W18 although with a high presence of bracken.							
6b	44.10	Lodgepole pine	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
Mature Lodgepole pine with endemic windthrow effecting up to 50% of the compartment, the canopy includes some broadleaves - downy birch, eared willow, grey willow, rowan and bird cherry as well as a few veteran Scots pine. Halo thinning around the pine has been carried out and seedlings of Scots pine and rowan are present but heavily browsed.							
6c	24.72	Lodgepole pine	1974	Non-wood habitat		Community Woodland Group	
Monoculture of Lodgepole pine on the upper reaches of the forest outside of the PAWS area, field layer dominated by molinia							
6d	28.85	Open ground		Non-wood habitat		Community Woodland Group	
6e	6.75	Hybrid larch	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
A stand of hybrid large on the mid slope with slightly better soils present, approx. 50% is windblown, there are a lot of old stumps present which are supporting populations of lower plants.							
6f	2.17	Sitka spruce	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site

North east corner of the forest with large Sitka spruce, suffering from windthrow dominating, veteran holy and oak present							
6g	3.18	Hybrid larch	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
Small area of hybrid larch and lodgepole pine							
6h	1.79	Hybrid larch	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
Small area of hybrid larch near the shore							
6i	2.09	Sitka spruce	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
4 small isolated blocks of Sitka							
6j	3.70	Lodgepole pine	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
Stand of Sitka spruce/lodgepole pine contiguous with another area of lodgepole pine to the south							
7a	55.64	Scots pine	1700	High forest		Community Woodland Group	
A large area of restored PAWS consisting of groups of irregularly spaced veteran and mature Scots pine with occasional pole stage and regenerating Scots pine with frequent large standing deadwood throughout. birch, alder, holly and rowan are also scattered throughout the area. there is evidence of extensive fell to waste carried out in the late 90's. Wood ants present – early thinnings/FTW of SS and LP recommended in places to avoid shading out existing nests.							
7b	44.52	Lodgepole pine	1974	PAWS restoration		Community Woodland Group	
Extensive area of Lodgepole pine on the upper margins of the forest with relatively poor growth, occasional mature Scots pine present							
7c	26.19	Lodgepole pine	1974	High forest		Community Woodland Group	

Lodgepole pine of very poor growth growing on peat of varying depth, survey carried out by Upland Ecology in March 2018 recommends reverting most of this area to open peatland habitat with some areas of peatland edge woodland to the north.							
7d	34.04	Lodgepole pine	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
Sub-compartments d, e, f & h from a large contiguous area of Lodgepole pine across most of the lower slopes of compartment 7, there is a lot of variation in the quality of the timber and Sitka spruce makes up a small component in places							
7e	15.65	Lodgepole pine	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
Sub-compartments d, e, f & h from a large contiguous area of Lodgepole pine across most of the lower slopes of compartment 7, there is a lot of variation in the quality of the timber and Sitka spruce makes up a small component in places							
7f	11.22	Lodgepole pine	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
Sub-compartments d, e, f & h from a large contiguous area of Lodgepole pine across most of the lower slopes of compartment 7, there is a lot of variation in the quality of the timber and Sitka spruce makes up a small component in places. Wood ants present – early thinnings/FTW of SS and LP recommended in places to avoid shading out existing nests.							
7g	5.56	Hybrid larch	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
Stand of reasonable quality hybrid larch on slightly drier ground							
7h	9.48	Lodgepole pine	1974	PAWS restoration		Community Woodland Group	Planted Ancient Woodland Site
Sub-compartments d, e, f & h from a large contiguous area of Lodgepole pine across most of the lower slopes of compartment 7, there is a lot of variation in the quality of the timber and Sitka spruce makes up a small component in places. Wood ants present – early thinnings/FTW of SS and LP recommended in places to avoid shading out existing nests.							
7i	9.51	Scots pine	1700	Min-intervention		Community Woodland Group	
Small groups of mature Scots pine and scattered birch within the extensive area of Lodgepole pine							

7j	23.18	Open ground		Non-wood habitat		Community Woodland Group	
Unplanted areas within and above areas of lodgepole pine, dominated by Calluna							
7k	5.29	Downy birch		Min-intervention	Mostly wet ground/exposed site	Community Woodland Group	
Area of alder dominated woodland along the south shore of the loch extending inland either side of a small watercourse							
8a	27.60	Lodgepole pine		PAWS restoration		Community Woodland Group	
This is a significant area made up of predominantly Lodgepole pine, growth rates are very variable throughout cpt8, this sub-compartment has relatively healthy trees of good form all be it relatively small and slow grown.							
8b	13.02	Lodgepole pine		Non-wood habitat		Community Woodland Group	
Sub-compartments b&c form alternating 'strips' of lodgepole pine at the far western end of The Gusach with different provenances chosen to reflect the soil types. This is corroborated by the peat depth survey which identifies areas to restore to open ground (which correspond with very poor trees in c) and areas suitable for peatland edge woodland (which correspond with better growing trees in b).							
8c	14.93	Lodgepole pine		Non-wood habitat		Community Woodland Group	
Sub-compartments b&c form alternating 'strips' of lodgepole pine at the far western end of The Gusach with different provenances chosen to reflect the soil types. This is corroborated by the peat depth survey which identifies areas to restore to open ground (which correspond with very poor trees in c) and areas suitable for peatland edge woodland (which correspond with better growing trees in b).							
8d	21.18	Open ground		Non-wood habitat		Community Woodland Group	
Significant areas of open habitat both within and outside planted areas consisting of varying depths of peat.							

8e	5.45	Scots pine		Min-intervention		Community Woodland Group	
A riparian strip adjacent to Allt a choire ghlais consisting of veteran & mature Scots pine, holly, birch and alder trees, includes the main population of Juniper bushes on the site (some 10-20 bushes in total). Will require careful targeted management of herbivore impacts to allow this population to thrive and expand.							

Appendix 2: Harvesting operations (20 years)

Forecast Year	Cpt	Operation Type	Work Area (ha)	Estimated vol/ha	Estimated total vol.
2020	1b	Clear Fell	6.30	595	3750
2020	2g	Clear Fell	2.70	593	1600
2021	5b	Clear Fell	8.20	598	4900
2021	5c	Clear Fell	9.10	330	3000
2022	2d	Clear Fell	7.50	333	2500
2022	2e	Clear Fell	5.60	0	0
2022	2f	Clear Fell	4.60	0	0
2022	3a	Clear Fell	8.00	300	2400
2022	3c	Clear Fell	11.80	161	1900
2022	3f	Clear Fell	15.90	0	0
2022	3h	Clear Fell	2.99	251	750
2022	7c	Clear Fell	26.20	57	1500
2022	8a	Clear Fell	27.60	119	3290
2022	8b	Clear Fell	13.00	80	1040
2023	3a	Clear Fell	8.00	300	2400
2023	3b	Clear Fell	9.40	160	1500
2023	3e	Clear Fell	2.20	450	990
2023	6b	Clear Fell	22.00	80	1750
2023	6c	Clear Fell	18.50	84	1550
2023	6e	Clear Fell	6.75	163	1100
2023	6f	Clear Fell	2.20	432	950
2024	4a	Clear Fell	25.30	427	10800
2024	4d	Clear Fell	5.78	426	2460
2024	4e	Clear Fell	15.77	126	1990
2024	4i	Clear Fell	9.56	0	0
2024	4o	Clear Fell	3.57	86	307
2024	7d	Clear Fell	15.20	99	1500
2024	7f	Clear Fell	5.60	134	750
2024	7g	Clear Fell	5.56	225	1250
2024	7h	Clear Fell	6.48	173	1120
2025	4b	Clear Fell	8.74	342	2990

2025	4c	Clear Fell	9.32	309	2880
2025	4f	Clear Fell	11.76	349	4100
2025	7b	Clear Fell	44.50	80	3560
2025	7d	Clear Fell	17.00	98	1670
2026	7d	Clear Fell	17.00	98	1670
2026	7e	Clear Fell	15.60	105	1640
2026	7f	Clear Fell	5.60	134	750
2027	6b	Clear Fell	22.00	100	2200
2027	6e	Clear Fell	6.75	200	1350
2027	6g	Clear Fell	3.18	208	660
2027	6h	Clear Fell	1.80	139	250

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.

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