

AIGAS COMMUNITY FOREST

ASSESSMENT OF PLANTATIONS ON ANCIENT WOODLAND SITES (PAWS)



The PAWS assessment was prepared by Steve Morris, Ancient Woodland Restoration Adviser on behalf of the Woodland Trust HLF funded Project at the request of the landowner



RDI Associates



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Contents

Introduction.....	3
Methodology.....	4
PAWS Management Principles.....	5
Historical Context.....	6
Survey Findings.....	13
Summary & Recommendations.....	28

Appendix 1 - A guide to understanding the Scottish Ancient Woodland Inventory (AWI)

Appendix 2 – Aigas Community Forest Compartment Map

Appendix 3 – Aigas Community Forest Suggested Working Circles

Introduction

Plantations on Ancient Woodland Sites (PAWS) are areas which have been mostly wooded for thousands of years, and have developed a biodiversity value which goes far beyond the present tree cover. Much of the 55,000ha of PAWS in Scotland is reaching the end of a first rotation under conifers. The remnant biodiversity in these sites will be put at increased risk by a second rotation of coniferous plantation.

This report provides an assessment of the PAWS area within Aigas Community Forest near Beaully, Inverness. It identifies the ancient woodland remnants on the site, assesses their vulnerability and advises on management for the maintenance and restoration of these remnants. It is hoped that such recommendations can then be taken forward in a future woodland management programme.

Emphasis is placed on a gradual management approach that allows surviving woodland remnants to adjust to a new environment over a period of time. Such an approach complements continuous cover methods of forestry or where a progressive thinning regime is possible. It is appreciated that in many areas such management options might not be available.

The Ancient Woodland Inventory (AWI) identifies significant areas of ancient woodland (both 1a & 2a) as well as Long Established of Plantation Origin (LEPO) sites, 2b) within Aigas Community Forest

It is important when using AWI data to take note of the precautions highlighted in the SNH document "A guide to understanding the Scottish Ancient Woodland Inventory" see Appendix 1.

Methodology

Research has shown that in most PAWS, remnant historical and ecological features survive in amongst the conifer crop. These can be grouped into four categories:

1. Deadwood
2. Trees and understory shrubs
3. Archaeological features
4. Woodland Plants

The assessment aims to identify the remnant features still to be found in the wood, and the level of threat that those features are under, using the following classification:

Critical: need urgent action to avoid irreversible loss or serious decline

Threatened: unlikely to be lost in the short term, given current conditions, but long term survival is doubtful without intervention

Secure: likely to remain the same or improve given the current conditions

Recommendations are given on future management of the site. These recommendations are based on the following best practice guidance:

- the premise that all PAWS are likely to retain some value from the ancient woodland
- identifying the type, distribution and condition of remnant features is key to planning operations
- gradual change and management of light levels will, in nearly all cases, be more beneficial than clear felling
- two distinct operational phases are recommended. Firstly to make the surviving features identified more robust by reducing the threats to their survival. Secondly to make long-term improvement to the ecological value of the site. The management objectives for the woodland need to be incorporated into this second phase from timber production, game management or improving capital value.

Following map research, a walk over survey was completed by Steve Morris, Ancient Woodland Restoration Adviser in 2015 this survey included 101.5 Ha of PAWS but also included most of the surrounding woodland.

PAWS Management Principles

Listed below are some management principles which should be considered in developing the gradual management approach to the PAWS areas on Aigas Community Forest

Woodland Ground Flora –

- Gradually reduce shade, but avoid removing the canopy cover entirely to avoid the dominance of coarse vegetation as well as the spread of bracken within the wood.
- Focused light thinning carried out over a number of years may bolster remnant features ahead of more disturbing operations or unavoidable clear felling.
- Avoid severe disturbance in “hotspot” areas such as in the flushed areas and streams.
- Time operations to minimise ground damage.
- Consider leaving time for brash to rot in between operations. Avoid burning as it changes soil and encourages colonisation of coarse vegetation.
- Mark wood ants nests to avoid damage during future thinning & extraction operations.

Deadwood –

- Avoid damage to old snags & stumps during future thinning & extraction operations.
- Retain any semi-mature trees in a stand to provide future deadwood habitat.
- Reduce shade gradually in the immediate vicinity to ensure the maintenance of a shaded micro-climate.

Trees and understorey shrubs -

- Retain pre-plantation aged trees and understorey including Scots pine, oak, rowan, birch, holly, hazel and aspen.
- Reduce shade gradually in the immediate vicinity of individual pre-plantation aged trees, through selective or halo thinning.
- Avoid, where possible, driving machinery over the root systems of old trees. A general rule of thumb is to maintain a zone with a minimum radius of fifteen times the diameter of the tree’s trunk.
- Identify any potential “new veteran trees” in the current plantation which could be allowed to develop, particularly in the vicinity of the existing pre-plantation aged trees.
- Re-instate appropriate shrub understorey.

Historical context

Roy Military Map 1750



Fig 1

The earliest maps of Scotland depicting woodland are the General Roy military maps from 1750 (Fig 1) this clearly shows a wooded Eilean Aigas along with wooded slopes along the west side of the river. Interestingly there is a very distinct rectangular area of trees with buildings inside it and areas of cultivated land surrounding it, (and the word Aigist?) (Fig 2).



Fig 2

OS 1st Edition Surveyed 1866 – 1875 Published 1886



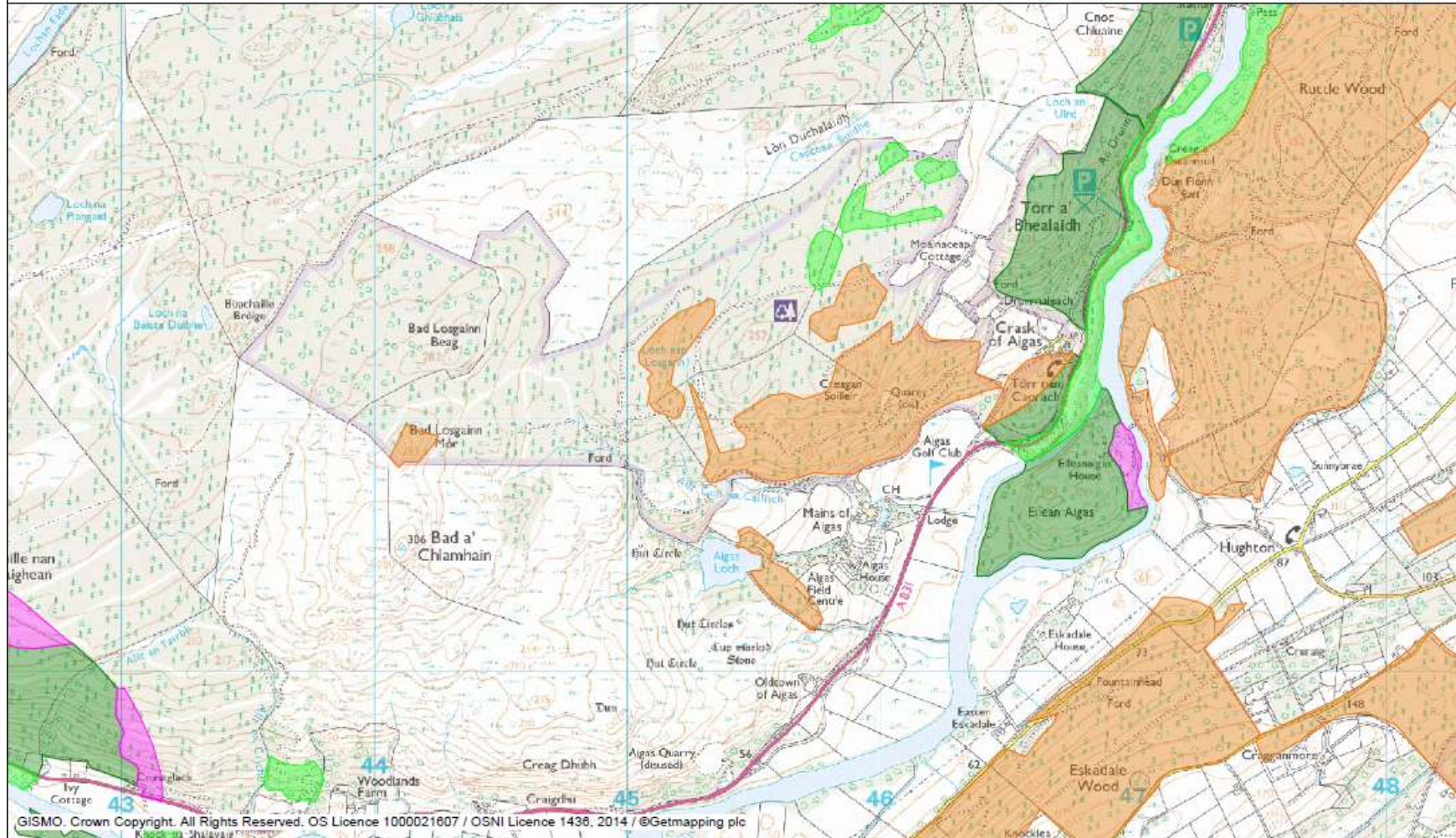
Fig 3

AIGAS

AWI

Fig 4

- Theme - AWI Scotland
- 1a Ancient (of semi-natural origin)
 - 1b Long-Established (of plantation origin)
 - 2a Ancient (of semi-natural origin)
 - 2b Long-Established (of plantation origin)
 - 3 Other (on Roy map)

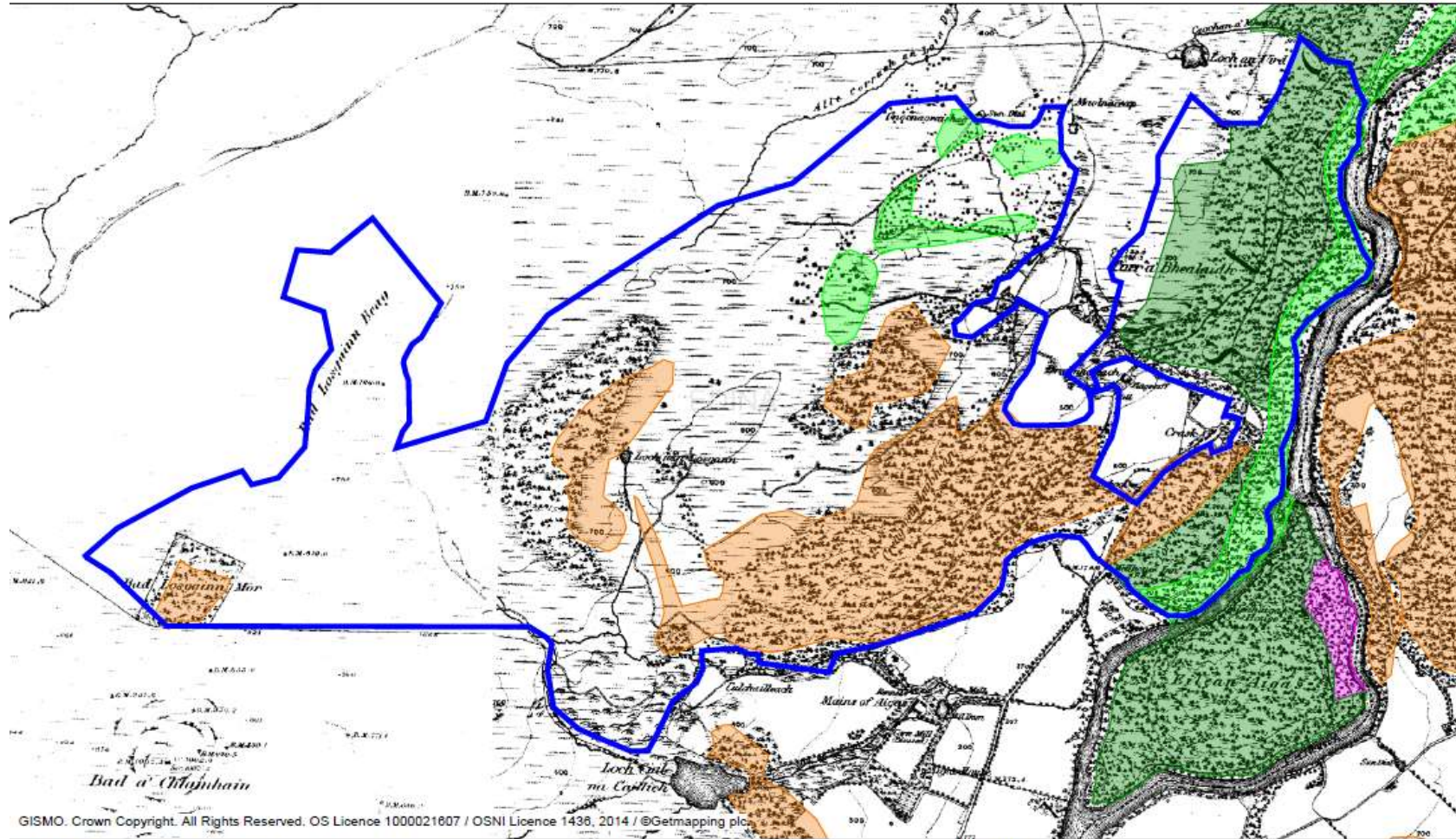


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Fig 5

The 1st edition OS map published in 1886 (Fig 3) shows a number of distinct wooded areas and this map along with the Roy map of 1750 were used as reference points to produce the Ancient Woodland Inventory (AWI) Fig 4. When the AWI is overlaid onto the 1886 OS map, (Fig 5) it can be seen that a number of mapping errors have occurred however most of the AWI areas coincide with areas that were wooded in 1860 and provide a suitable starting point for surveying.

There are 2 distinct enclosures on the 1860 map one at the West end of the woodland and a second which more closely aligns with the rectangular shape on the Roy map. The OS 6 Inch to the mile map 1843-1882 Series, surveyed in 1872, clearly shows an enclosed area of woodland suggesting exclusion of grazing animals see Fig 6 below.



Fig 6

Further investigation of later maps shows this to be a distinct enclosure in 1875 but by 1903 fences had been erected (metal deer posts still present) and more areas planted with trees, see maps below Fig 7 & 8.

Surveyed 1875 Published 1880

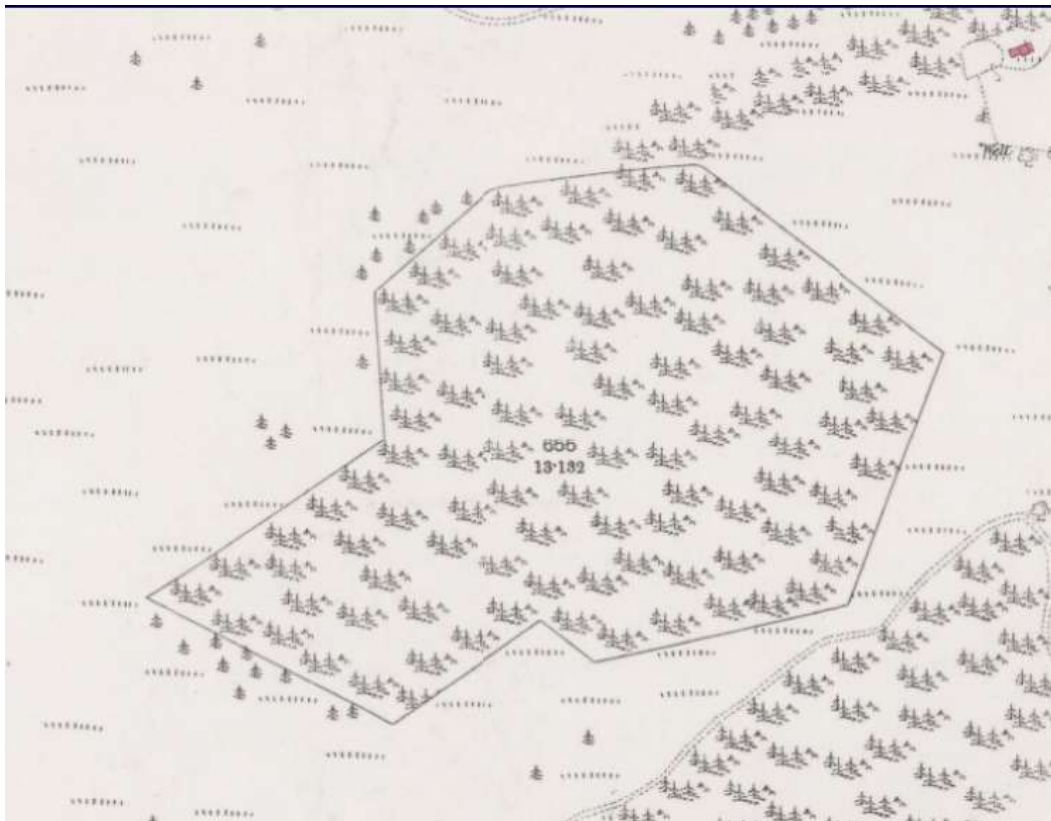


Fig 7

Surveyed 1903 Published 1904

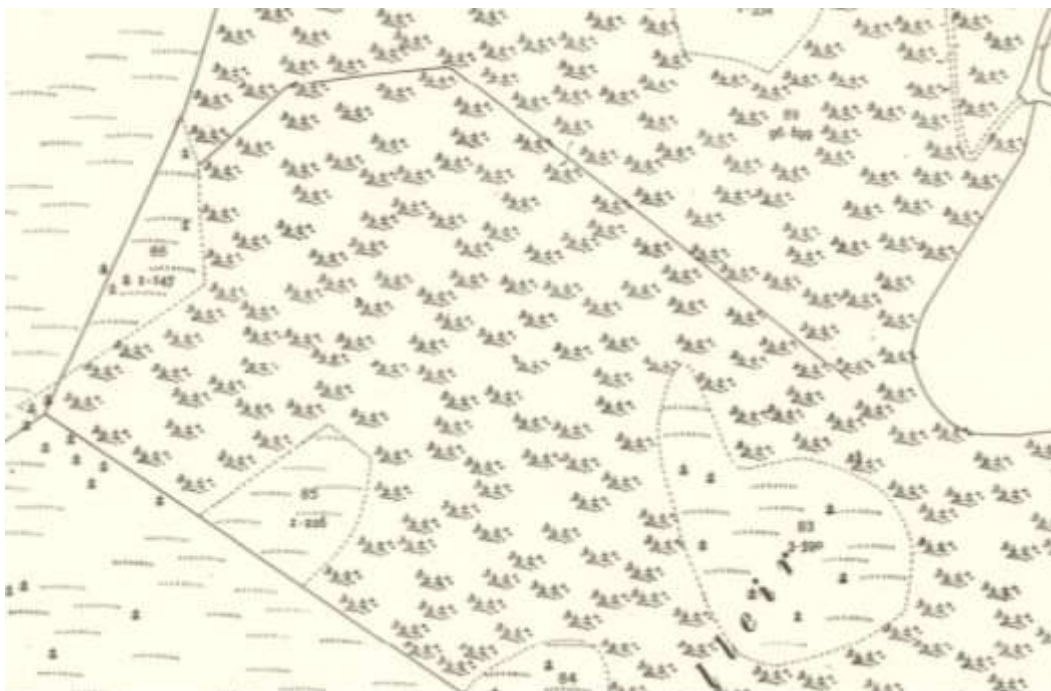


Fig 8

Surveys on the ground show that while the deer fence posts from c1872 are still present, evidence of enclosures has mostly been obscured by subsequent forestry operations & road construction. There is however a very distinct earth bank which extends from NH 4592 4252 to NH 46114235 that appears to coincide with the enclosure on the 1875 OS survey and also with what appears to be an extension of this bank on the 1903 survey, Fig 9 & 10.



Fig 9



Fig 10

The map evidence suggests there were 3 periods of woodland establishment in the area. The Roy map from 1750 clearly indicates a formal enclosure of planted trees with buildings inside. This may or may not coincide with the earth bank but this earth bank indicates that woodland was established in a number of enclosures throughout the woodland between 1750 & 1875. The woodland expanded again by 1903 and finally the areas were joined up following acquisition by the Forestry Commission in the 1950's.

Survey Findings

All references in this section refer to the Compartment (Cpt) Map in Appendix 2

Cpt 15/16 **Critical**

This area of the woodland contains a significant proportion identified as 1a ie ancient & of semi-natural origin on the AWI however with the exception of a very small area of broadleaves in the vicinity of the original road, all woodland ground flora has been effectively eliminated by the dense shade from the Norway Spruce and Douglas Fir crops established by the Forestry Commission in the 1950/60's. Waking through this area there are many dead large birch stems some still standing but mostly fallen, see Fig 11 & 12 below.



Fig 11



Fig 12



Apart from the odd gap in the canopy, noticeably on ground too steep to plant, the only place where mature native trees have survived is on the very edge of the plantation. These photos illustrate where the trees are all but swamped by the non-native conifers.

Fig 13



Fig 14



Fig 15

There are very few management options in these areas due to the terrain constraints and the size of the trees. Innovative small scale options will need to be explored to reduce the need for large scale visually intrusive clear felling.

Restocking should be of native species and the area managed for biodiversity to avoid the need to harvest "commercial" crops in the future.

The small gully which runs near to the Crask of Aigas (Fig 15) does represent an opportunity to retain some of the conifer trees. While they are also un-thinned their location is very sheltered and some small scale low intensity thinning has the potential to gradually open up the canopy by either felling to waste or ring barking a few trees to improve the light levels giving a chance for the ground flora to develop.

Cpt 14 Threatened

The gorge woodland between the road and the river Beaulieu has the most intact woodland ground flora along with a wide variety of native tree species present.

Greater Woodrush *Luzula sylvatica*, Wood Anemone *Anemone nemorosa* Wood Sorrel *Oxalis acetosella*, Bluebell *Hyacinthoides non-scripta*, Dogs Mercury *Mercurialis periclymenum*, Wood Sage *Teucrium scorodonia*, and Honeysuckle *Lonicera periclymenum* present along with numerous woodland bryophytes indicating W10 upland oak/birch woodland.



There are some spectacular contorted oak trees clinging to the sides of the gorge.

Fig 16

Non-native Invasive Species



Fig 17 Rhododendron

There are small quantities of both Rhododendron & Galtheria present which it is recommended should be controlled to prevent them spreading.



Fig 18 Galtheria

In addition there are a number of small stands of Sitka Spruce and Douglas Fir which, while of good timber quality, will represent a considerable challenge to due to terrain constraints. It is recommended that these be removed at an early stage as they are starting to suffer from wind blow and are providing a seed source for regeneration. The stand of Grand fir at the Southern end of Cpt 14 has particularly poor access and there is little value in the timber, these could be progressively removed by ring barking. There are a number of large specimen conifers which are an attractive feature of the glen as well as mature beech trees near the river which provide no imminent threat to the ancient woodland features.

Cpts 5,8,9,10 & 13 **Secure**

These compartments include areas of Long Established woodland of Plantation Origin (LEPO) and are made up of largely Scots Pine plantation much of which has been thinned in the past, the terrain is relatively even and there is good access from the road network. All of these factors combine to make it relatively straight forward to continue thinning these areas on a commercial basis with a view to moving towards a continuous cover system in the future. In amongst the Scot's Pine are small areas of Sitka Spruce and larger areas of Lodgepole Pine which are planted on wetter areas which would be better managed as wetland/mire habitats. Within these areas are some really attractive of older Scots Pine with Caledonian Pine "old growth" characteristics.



Fig 19 Caledonian Pine with Sitka Spruce Regeneration



Fig 20 Previously thinned Scots Pine stand

Cpts 7,11 & 12 Threatened

These two compartments consist of mainly LEPO areas and are made up of a range of species. The terrain varies considerably throughout this area presenting a range of challenges and opportunities for restoration activities. There are areas of Scots Pine, very similar to the areas described above, which will be relatively straightforward to manage in the same way. However there is a transition to steeper slopes that often coincides with a change in species to Douglas Fir and Norway Spruce, some of which have been thinned before although not in the recent past. It may be possible to try low level thinning in some of these areas with a view to managing for continuous cover but wind blow has already started to occur in pockets and the areas will have to be very carefully selected.

As well as recent wind blow there is evidence of much older wind damage which gives an interesting clue to the past history of the woodland. Throughout this area there are numerous examples of quite old upturned stumps often with relatively large European Larch trees growing on them which appear older than the surrounding crop trees. After walking through the woods for several days and seeing this pattern repeating itself I came to the conclusion that a significant wind event had occurred at some point prior to the majority of the trees being planted. In January 1968 a very large storm caused significant damage to woodland all across the West and North of Scotland and this may well have been the cause. The stumps are from quite large trees and are European Larch (EL) and Scots Pine (SP), suggesting that in 1968 there were significant stands of SP/EL throughout this area. When compared with the map data this coincides with the woodland expansion between 1880 and 1904, and would mean these trees would have been around 70-90 years old in 1968. Furthermore, due to the scale of the wind damage it would have taken quite a while to clear up the timber particularly when you consider the technology available at the time to tackle such a task. This would have meant that it would have taken a number of years to restock the site and in the meantime I think that many of the upturned stumps provided ideal conditions for the regeneration of EL seedlings which were then planted around see Fig 21 & 22.

There are areas within Cmpt 6 which are not within any PAWS designated areas where there is further evidence of significant wind blow this time of Sitka Spruce & Douglas Fir. In this instance there is a large amount of deadwood that is all lying in the same direction which was left in situ, suggesting that there wasn't enough resource to clear it up and the current crop of trees have naturally regenerated amongst the wind blow. It is a fascinating place and has produced ideal conditions for a wide range of woodland bryophytes to develop. Access to forest roads is quite difficult in these areas and recent wind blow has occurred nearby. While these are not technically PAWS areas it would be interesting to continue to allow the natural woodland dynamic of these non-native areas to continue see Fig 23 & 24.



Fig 21
Examples of EL regeneration on old stumps surrounded by younger trees



Fig 22

Old Wind Blow with Natural Regeneration of Douglas Fir bryophyte development



Fig 23



Fig 24

Another aspect of this area is the presence of a small number of gaps in the canopy with mature broadleaves present including Oak, Alder, Sycamore and Beech. These gaps also provide rare glimpses of woodland ground flora which can also be seen in the small areas of planted larch where it has not been shaded out.



Fig 25



Fig 25 above shows a small group of Sycamore on the woodland edge with Dogs Mercury NH 463 423

Fig 26 on the left shows a Sycamore tree surrounded by Douglas Fir.

Fig 26

Fig 27 & 28 show a spectacular native woodland remnant on a steep rocky bank with mature Oak & Elm hemmed in by non-native plantation trees NH 462 422.



Fig 27



Fig 28

Fig 29 & 30 show the rich diverse Ground Flora present in this area including Dog's Mercury, Wood Avens & Greater Stitchwort



Fig 29



Fig 30

These small woodland fragments areas could be expanded by thinning the surrounded crops either as thin to waste or ring barking as they are in relatively inaccessible places and unlikely to be a priority for harvesting in the near future.

Throughout Cmpt 7 (and extending to Cmpt 15) there are some very interesting steep rocky cliffs. These are quite unstable with very shallow soil but are also quite damp and there are mature alder trees clinging to the rock faces. These trees would benefit from a gradual increase in light levels by thinning the conifer crops around them.



Fig 31 Mature Alder clinging to steep rock face

Cpts 1 **Secure/Critical**

There is a small area of LEPO near the extreme Western end of the wood which consists of blocks of Scots Pine, Lodgepole Pine & Sitka Spruce. The Scot's pine section can be considered secure and has some quite nice older trees with Calluna/ Vaccinium/ Holcomium W18 ground flora. It has suffered both older and recent windblow, and birch has seeded into the older areas resulting in a nice mixture of ages and species. It is not necessary to clear up the recent windblow as it is adding to the deadwood resource in the woodland and may well provide opportunities for another cohort of birch to establish depending on suitable deer control. Out with the forest area, low density regeneration of Scots Pine has been established over the last 25 years or so and provides a broken forest edge to the woodland as well as informal woodland expansion. It would be beneficial to encourage this if the neighbouring landowner is sympathetic.



Fig 32 Old Scots Pine on the edge of the Woodland in Cmpt 1



Fig 33 Birch Woodland established amongst old wind blow in Cpt 1

The areas of Sitka spruce and Lodgepole Pine have effectively no remnant ancient woodland features intact and while they have been identified as critical they should not be treated as a priority. As and when it is convenient to harvest these crops it is recommended that they be encouraged to regenerate from adjacent stands of Scot's Pine and Birch.

Summary of Recommendations

Refer to Appendix 3 Suggested Working Circles (W/C)

- Working Circle (W/C) 1 Thin Scot's Pine stands with a view to managing under a continuous cover regime, remove SS & LP from wetter areas and manage as mire habitats and introduce broadleaf species into some of these areas.
- W/C 2 Explore the possibility for low intensity thinning particularly of DF in sheltered areas such as the gully near Crask of Aigas & the stand near the edge of the golf course. These stands can be used to soften the edges of future clear fell coupes and managed as long term retentions of large trees as well as the benefits of increasing light levels for woodland ground flora.
- W/C 2 Halo thin around veteran trees of particular interest are the mature oak and elm at NH 462 422 see Figs 27 – 30 E the alder trees on the steep damp cliffs in Cpt7 see Fig 31.
- W/C 3 Remove stands of non-native conifers, investigate options and possible grant via WIG or other funding.
- Bryophyte Survey – there are a wide range of habitats where a wide range of bryophyte species are thriving, specialist knowledge is required to identify the species and recommend suitable management of habitats.
- Archaeological Survey – this survey has identified a number of interesting earth banks which need more detailed surveying. This might be something that the community would be interested in progressing through the ARCH network which provides training in survey techniques contact: <http://archhighland.org.uk/>