



ANCIENT WOOD PASTURE SURVEY

SUTHERLAND

REPORT PREPARED FOR THE NORTH HIGHLAND FOREST TRUST
BY ADELE BECK, GREAT GLEN ECOLOGY
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Thanks also to the landowners and land managers who have granted permission for this study, and in many cases shown considerable interest in the project.

BACKGROUND

This project was commissioned by Steve Robertson of the North Highland Forest Trust (NHFT). The objective is to carry out a basic survey of the ancient wood pasture resource in Sutherland, and to identify the needs of future management.

The emphasis of this study has been to identify woodland which could be described as having been culturally modified, for instance by coppicing or pollarding, where remnants of ancient woodland are in fact "living archaeology" which give an insight into how the woodlands were managed and utilised by local people in recent centuries.

Such woodlands are often biologically rich, as the act of pollarding or coppicing will prolong the natural life of a tree way beyond its normal expectancy. In Sutherland most remnants of ancient wood pasture have developed from natural woodland, and may provide a core of ecological continuity for species, particularly lichens, which take a long time to colonise an area and are often lost through disturbance. The sites themselves are usually found amongst a species-rich, grassy ground flora, which may have developed as a result of hundreds, if not thousands, of years of grazing from large herbivores.

Much progress has been made in recent years to promote the cultural and biological importance of ancient wood pasture. However many woodland sites across Sutherland have not yet been recognised or studied, largely due to the scale and remoteness of this wild part of Britain. There is always the risk that some valuable sites could be lost through inappropriate management, or simply fall apart with old age before we have had a chance to study and learn from them.

This basic study is a starting point for future work. I have attempted in a limited period of time to collate information from a wide range of sources - archaeologists, woodland surveyors, woodland historians and government agencies as well as historic maps and archaeological records.

The result is firstly an inventory of existing and potential ancient wood pasture sites across Sutherland which I hope people will continue to develop, and secondly a relatively detailed examination of seven ancient wood pasture remnants.

The detailed study of seven sites helps to give an impression of the nature and condition of these fascinating ancient woodland remnants across Sutherland, and gives an idea of the management required if at least some of these sites are to be preserved, or even revived, for future generations.

METHOD

This study was undertaken in the following stages

Stage 1: Review and map the existing knowledge of Ancient Wood Pasture

Stage 2: Undertake a detailed survey of 7 sites

Stage 1: Review and map the existing knowledge of Ancient Wood Pasture.
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The sources of information on existing and potential sites of Ancient Wood Pasture (AWP) in Sutherland are numerous. The following approach was employed in order to gather up this knowledge into a form which can be easily interrogated and interpreted.

- Analysis of historic maps based on the William Roy Military Survey of Scotland (1747-55), John Home's Survey of Assynt (1774) and the Ordnance Survey 1st edition (1856-91)
- A review of existing records and literature. Of particular value was the Royal Commission on the Ancient and Historic Monuments of Scotland (RCAHMS) website.
- Liaison with key sources of local knowledge. This included woodland historians, woodland surveyors, archaeologists and landowners.
- Interrogation of data using Geographical Information System software (GIS). GIS is a powerful tool which can be used to pinpoint potential AWP sites, for instance where archaeological records are associated with ancient semi-natural woodland remnants.
- A limited number of rapid site visits were undertaken to confirm the presence, condition and type of a number of AWP sites where this cannot be determined from a desk top study.

Information was mapped and gathered into a spreadsheet to include the following information. This data can be imported into GIS.

- Site location
- AWP type if known (using criteria described by Holl & Smith, 2002)
- Archaeological records
- Adjacent ancient semi-natural woodland
- Source of information
- Date of site visit if carried out

Stage 2: Undertake a detailed survey

Seven sites recorded during the first stage of this study were selected for detailed field survey following liaison with NHFT. The following information from each site on a landscape scale, stand scale and from a sample of individual trees was gathered.

Landscape scale:

1. Map extent of AWP
2. Map adjacent semi-natural habitats and make a rapid visual assessment of broad NVC type.
3. Record and photograph archaeological features, for instance lazy beds, stone dykes, terracing, platforms or signs of settlement

Stand scale:

1. Photograph and record AWP type based on stand structure and management (Holl and Smith, 2002).
2. Record AWP habitat types based on the assemblage of semi-natural plants, from a rapid visual assessment of NVC type (Rodwell 1991-9)
3. Note indicators of long established woodland (Crawford 2009, Dobson 2005).
4. Comment on threats to the continuity of AWP (overgrazing, underplanting with conifers, proportion of dead trees relative to live trees)
5. Comment on the ecological value of the site (potential to support invertebrates, birds, mammals, rare plants).
6. Make recommendations for future management, to include maintenance, restoration or expansion.

Individual Tree (based on a sample of 5 representative veteran trees)

1. Photograph
2. Record species
3. Subjective assessment of tree age
4. Record form (Quelch, 2007)
5. Record height of pollard head if present
6. Record whether the following attributes are present, which are characteristic of pollards, and assign a pollard score as developed by Quelch (2007).
 - Bolling or pollard head
 - Multiple branching at pollard head
 - Cut branch stubs at pollard bolting
 - Shoots above pollard bolting obviously younger than main stem
 - Burr tissue at the bolting as a result of past cutting
 - Crossing over of branches or shoots arising at the bolting
 - Unnatural branch angles at the bolting
 - Fusing of pollard shoots
 - Hollowing of main stem
 - Air trees present

*Each attribute is assigned a score of 1, to give a numeric pollard score which allows the strength of evidence of past pollarding to be objectively compared between individuals and sites.

Limitations of survey

The identification of archaeological features found during fieldwork have been made by surveyors with a background in woodland ecology and management, who are not expert archaeologists.

The individual veteran trees selected for survey were not done so on a random or systematic basis, but were subjectively selected on the strength of evidence of past woodland practices such as pollarding or coppicing. In many cases these individuals were sparsely distributed, and so do not give an accurate impression of the entire woodland as it is today.

The tree ages of veteran trees have been broadly and subjectively assessed. Accurately ageing the types of veteran trees encountered pose a number of practical difficulties which may be overcome by specialists, but are beyond the remit of this study.

RESULTS OF DESK TOP STUDY

A total of 41 existing and potential sites were identified across Sutherland. The location and distribution of these sites are shown in Map 1, Appendix I and in the Appendix II.

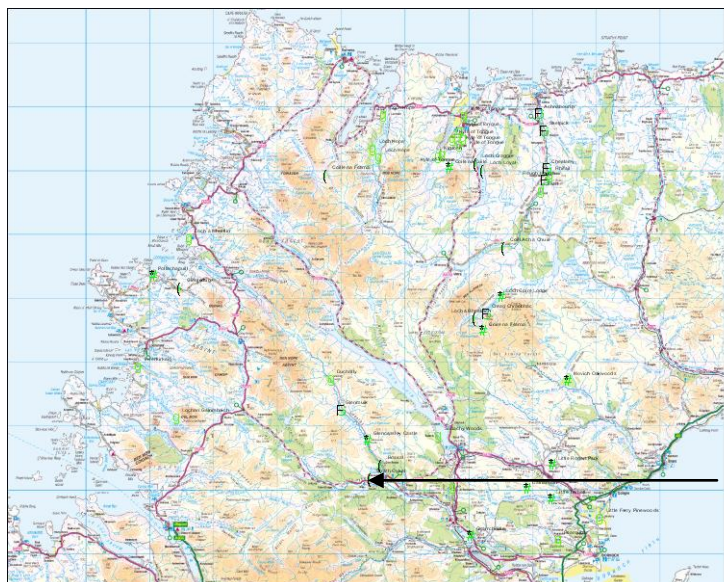
Of these sites nine had records of veteran trees and potential wood pasture. More detail was available on sites which were clustered around the south-east of Sutherland and Assynt, where local interest had focused the study of six woodlands where the presence of ancient wood pasture had been confirmed.

Seven sites were selected for a detailed investigation across Sutherland based on areas with continuity of woodland habitat since the 18th Century, and proximity of historic settlement, drove roads, shielings and other archaeology

One of these sites had been previously investigated for ancient wood pasture, at Glenleraig in Assynt. Some of the remaining woodlands had casual records of veteran trees, but otherwise little was known about the presence, condition and extent of ancient wood pasture or veteran trees. Two of these sites, Coille na Fearnna near Foinaven and Loch a' Bhealach near Ben Klibreck were remote sites with records of shielings nearby.

RESULTS OF SITE STUDIES

1. COILL A CHNOCAIN, STRATHOYKEL



Description

This is an exceptional stand of Ancient Wood Pasture which lies on south facing slopes in Strath Oykel, NC 444 015. It is remarkable to find such an extensive and yet accessible area of veteran oak which, amongst other events, has survived the demand for timber during the Industrial Revolution and two world wars. Although many generations have lapsed since these trees were last pollarded the site is still grazed by cattle, and even at the time of survey in early April it was apparent that the flora here is particularly rich. Several archaeological features were found within the site.

Analysis of historic maps

Coill 'a Chnocain, or wood of the small hill, appears in the 1757-55 Roy Military Survey which at that time was linked to woodland in nearby Glencassley. Three settlements appear on the Roy Survey close to the woodland, Craigan, Oape and Doune whilst two buildings at Inchnadamph are shown within the woodland. The open area around Craigan is shown as cultivated land. Two castles are shown to the west, although it is unclear of their condition at this time. No road is shown, although presumably there would have been a regular passage of people and animals along the glen between settlements

By the OS first edition of 1856 to 1891 the extent of the woodland has been reduced to something similar to the boundaries of today (refer to Map 2 Appendix I). The pattern of settlement is now concentrated along the road and river, whilst buildings associated with the woods and hills have disappeared. A road is clearly shown to the north of the River Oykel, whilst a network of tracks can be seen to the south.

Archaeological records

A possible broch has been recorded at Doune NC 444 009 (Mackie, 2007) whilst the website of the Royal Commission for the Ancient and Historical Monuments for Scotland (RCAHMS) cites clearance cairns and three hut circles close to the south-west corner of the woodland (NC 431 014).

Description of woodland and features

The core area of ancient wood pasture extends to some 22 hectares, with the highest proportion of veteran trees associated with archaeological features to the west of the site. As noted all veteran trees are oak *Quercus petraea* and are estimated to be at least 250 years old, probably much more, although no core samples were taken. There is also a cohort of maiden oak which are thought to be younger – estimated at between 120 to 180 years old, but again no core samples were taken.

A number of possible archaeological features were noted during the field survey which are shown on Map 2 Appendix II with photographs in Appendix IV.

Amongst these features are two possible hut circles or charcoal platforms of between 4-6 metres in diameter, two areas of raised, flat ground which appear to be man made and several very old field walls. Two of these are found to the west of the site, and converge as if for herding animals into a confined area. Alternately they may form the boundaries of a triangular enclosure.



Above The remains of a very old dyke. This is one of two dykes which converge near the foot of the slope


The ground flora found amongst veteran oak was unusually rich for the region, even in early April. Mixed grasses were dominant, which included Yorkshire fog *Holcus lanata* as well as a number of grasses unidentifiable due to the time of year. Amongst the grasses were a range of herbs normally found amongst neutral or base enriched soils such as creeping and bulbous buttercup *Ranunculus repens* and *R. Bulbosus*, opposite-leaved golden saxifrage *Chrysosplenium oppositifolium* and grass of Parnassus *Parnassia palustris*. Common nettle *Urtica dioica* was frequent indicating nitrogen-rich soil. Further west the ground flora becomes much more like

that found in a semi-natural oak woodland, with scattered bracken *Ptilium aquilinum*, wood sorrel *Oxalis acetosella* and a range of pleurocarpic mosses and grasses. Here there are a much higher proportion of maiden trees which may not be as old as the veteran oak.

On higher slopes towards the north-eastern corner the oak gives way to scattered birchwood and wet heath.

Description of Selected Trees

Photographs and a brief description of five trees selected for a closer look follows

	TREE NO	1
	SPECIES	<i>Quercus petraea</i>
	FORM	Pollard
	ESTIMATED AGE	250 years or more
	POLLARD SCORE	4
	NVC	Similar to W7

	TREE NO	2
	SPECIES	<i>Quercus petraea</i>
	FORM	Pollard
	ESTIMATED AGE	250 years or more
	POLLARD SCORE	5
	NVC	Similar to W7



TREE NO	3
SPECIES	Quercus petraea
FORM	Double stemmed pollard
ESTIMATED AGE	250 years or more
POLLARD SCORE	5
NVC	Similar to W7



TREE NO	4
SPECIES	Quercus petraea
FORM	Maiden
ESTIMATED AGE	150-200 years
POLLARD SCORE	n/a
NVC	W11



TREE NO	5
SPECIES	Pinus sylvestris
FORM	Multi stemmed now fused together
ESTIMATED AGE	150-250 years
POLLARD SCORE	n/a
NVC	W11

Historic interpretation

It seems likely that the oldest veteran oaks on this site pre-date the Roy Military Survey of 1747-55. Certainly the Roy maps show settlement associated with the woodland, whilst the systems of very old field walls suggest domestic livestock have been enclosed and herded within the woods for many centuries.

The swelling, or “skirt” found around the base of veteran trees indicates generations of browsing and grazing. Similarly the abundance of plants associated with base rich, base neutral and nitrogen enriched soils may be a direct result of centuries of dunging and grazing by domestic stock which has continued to the present day.

There can be little doubt from the considerable swelling and burring around the pollard heads that the older, veteran oak were once systematically pollarded for many years, if not centuries.

At the time of the Roy Military Survey Coil a Chnocain was linked by woodland on higher slopes to woodland in nearby Glen Cassley. By the 1st edition OS maps of 1872-74 the wood has been much reduced, to boundaries similar to those of today today. Either the woodland has been cleared by this time, or the shorter lived birch and pine which tends naturally to dominate the thin rocky soils of higher slopes has declined and not regenerated due to an increase in grazing pressure from sheep and deer.

At some point herbivore pressure has been sufficiently low to allow the younger cohort of oak, estimated at between 150 to 200 years old, to become established. Oak is a large-seeded species which is not tolerant of shade, suggesting this cohort may have become established following the clearance of an earlier oakwood. Certainly oak was in considerable demand for charcoal production to fuel the iron-making industry of the 18th and 19th centuries, which could explain woodland clearance at this time. However the younger cohort of oak is made up mainly of maiden trees, suggesting the practice of pollarding had declined by this time.



Above Possible charcoal platform or hut circle, approximately 6 metres in diameter

If this theory of woodland clearance and regeneration at some point between 1810 and 1860 is correct it is interesting to note that the older, veteran oak survived felling. Perhaps by this time the trees were already well established pollards with a massive bole, and it was too difficult to attempt to fell the main stem.

One probable reason for a reduction in herbivore numbers between 1810 and 1860 is of course the Clearances; mass depopulation of the Highlands through eviction, immigration and the prolonged potato famine which started in 1846. Presumably there would have been a period of low grazing pressure between domestic stock being taken off the ground as people left, and before deer and sheep numbers rose as a result of large scale sheep farming and the concept of sporting estates.

The core oak pasture may have continued to be valued for cattle shelter, firewood and fodder into the early 20th century, and the practice of pollarding continued. Haldane (1997) describes how, in living memory at the time of writing during the late 1990s Strath Oykel was an important drove route between Ullapool and the late Autumn sale in Ardgay.

Finally the massive Scots pine (tree 5) appears to be derived from a bundle of trees which have fused together. The multiple stems originate from ground height, as Scots pine does not coppice this suggests the main stem originates from a number of individual trees which were concentrated in a small area and have fused together. The cause of such a dense regeneration of pine trees into a localised area of approximately 2 metres across is open to speculation. Scots pine will often regenerate in dense clumps on disturbed or burnt ground - perhaps this is the site of an old camp fire site. There is some scarring on the road side of the tree which may indicate previous tapping of resin for fir candles, an early form of lighting.



Above Scar on a Scots pine close to the road, possibly as a result of resin-tapping for fir candles.

Options for future management

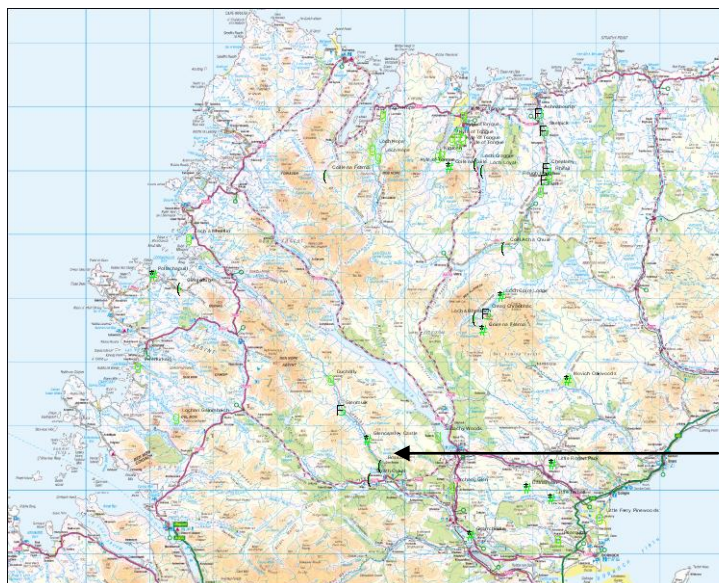
It is astonishing to think that such a superb example of Ancient Wood Pasture is not well known or designated. Given the age, extent and location of this site it is a fabulous resource, biologically and culturally, which must be important on a national, if not international, scale. There is considerable potential for education and interpretation as the site is easily accessible.

Clearly Balnagown Estate value this wood pasture as it has survived into the 21st Century in reasonable condition. The area is currently grazed by cattle which will help to maintain the diverse ground flora. However there are no oak trees of less

than approximately 150-200 years old, and the practice of pollarding has long since declined. Grazing levels from domestic stock and deer are too high to permit natural regeneration.

It would be relatively simple to establish young oak trees at a low density throughout the area with small scale cattle fencing, and with an increased demand for firewood in recent years perhaps even encourage a revival of pollarding. The maiden oak trees of between 150-200 years old are probably now too old to survive pollarding.

2. ROSSAL, GLEN CASSLEY



Description

Rossal lies within Glen Cassley (NC 456 042) within an area long associated with both woodlands and people. The current woodland includes remnant of Caledonian pine and birch wood along with birch and alder dominated wet woodland. Much of the mature coniferous woodland now present in the glen appears to have been planted during the early 20th Century, supplemented with planting of both native and exotic species from the 1960s onwards.

Analysis of historic maps

The Roy Military Survey of 1747-55 shows twelve settlements along the length of Glen Cassley amongst what appears to have been an extensive area of woodland (Map 3). The Iron Age Broch nearby is marked clearly as Castle Achness.

By the OS 1st edition maps of 1872 to 1874 the estate lodge, Glen Cassley Castle, and Achness Castle is now marked as a Pictish tower. The number of settlements along the glen has been reduced to seven, which, instead of being made up of several buildings as on the Roy map, are now usually single buildings except around Glen Cassley Castle.

The wooded area has been dramatically reduced, and a road along the Glen constructed. The stone bridge in nearby Rosehall was constructed in 1823 (RCHAMS website) and it seems likely that a road would have been constructed at about this time. The RCHAMS website also cites two unroofed buildings and an oval enclosure in Rossal at NC 466 042 which were thought to have been abandoned during the clearances of the eighteenth and nineteenth centuries.

Description of woodland and features

The practice of systematic pollarding is not as apparent here as in nearby Strath Oykel, and there is a more random and scattered distribution of individual trees associated with signs of cultivation, which may have been modified by coppicing or pollarding. Glencassley has been managed as a sporting estate since the nineteenth century, and consequently red deer are likely to have influenced the form of trees which have developed over the last 150 years or so. Birch and alder are the dominant native species found amongst the unenclosed pastures which run along the foot of the glen.

A detailed survey of trees and archaeological features was concentrated around the sheepfold below Bad Mor (Map 3, Appendix 1). An old field boundary, faint signs of possible rig and furrow cultivation and a stone dyke diverting a burn from cultivated ground below were found.

Description of Selected Veteran Trees

Photographs and details of five selected trees are given below.

	TREE NO	1
	SPECIES	<i>Betula pubescens</i>
	FORM	Pollard
	ESTIMATED AGE	150-180
	POLLARD SCORE	4
	NVC	W7/W11

	TREE NO	2
	SPECIES	<i>Betula pubescens</i>
	FORM	Open grown maiden or lapsed pollard
	ESTIMATED AGE	120-180 years
	POLLARD SCORE	3
	NVC	W7/11



TREE NO	3
SPECIES	<i>Betula pubescens</i>
FORM	Lapsed pollard
ESTIMATED AGE	100-150 years
POLLARD SCORE	4
NVC	W7/11



TREE NO	4
SPECIES	<i>Alnus glutinosa</i>
FORM	Pollard originating from coppice
ESTIMATED AGE	250+ years
POLLARD SCORE	6
NVC	W7/11



TREE NO	5
SPECIES	<i>Alnus glutinosa</i>
FORM	Lapsed pollard
ESTIMATED AGE	180-220 years
POLLARD SCORE	3
NVC	W7/11

Historic interpretation

Archaeological records within Glen Cassley date back to the Iron Age, at which time the glen appears to have been well populated, with a number of roundhouses and brochs recorded near Rossal.

The Roy Military survey of 1747-55 shows a mosaic of fields, settlements and woodland along Glen Cassley, and it seems very likely that the woods of that time would have been managed for firewood, fencing, building materials and fodder. The wet, nutrient flushed soils on lower slopes were favoured for cultivation. Effective drainage of these soils would have been important before crops could be grown, borne out by the remaining signs of diverted burns and the faint impression of possible rig and furrow.

Despite the long history of human settlement within the glen woodland was still at that time extensive, suggesting the numbers of herbivores were much lower than today, allowing the woodland to regenerate when coppiced or pollarded.

By the 1870s the woodland has shrunk dramatically, presumably as a result of the both woodland clearance and an increase in sheep and deer. The size and distribution of the population has also changed, and the only settlement within Glen Cassley with more than one building is around Glen Cassley Castle. Presumably these buildings were to house the cooks, gardeners, gillies and other staff associated with the Victorian fashion for sporting lodges. A number of square sheep folds are present throughout the glen which also appear to date from this era.

Clearly Glen Cassley had not escaped the pattern of mass migration from the Highlands during the nineteenth century following food shortages, eviction and the introduction of sheep farming. The five veteran trees which were examined in detail reflect this change in the population, society and land management. The alder (trees no 3 and 4) were thought to be the oldest trees examined at around 200 years old or more, and are also the only trees which appears to have been routinely pollarded. This suggests trees were actively managed for materials, fodder and firewood until the end of the eighteenth century and early nineteenth century. However the birch trees examined were thought to be between 120 and 180 years old and do not show signs of repeated pollarding due to the absence of a swelling at the pollard head. The form of three of these trees suggests that they may have been cut once or twice opportunistically, but not as an established system of managing trees for human benefit. If this is correct the practice of actively managing wood pasture must have disappeared somewhere between 1830 and 1890, about the same time at which the glen was depopulated.

Options for future management

The remains of what may once have been a fairly extensive wood pasture is now very sparse and browsed by red deer particularly in winter months. Although many generations of grazing and dunging from red deer has maintained the flora of a wood pasture it has also prevented the regeneration of young trees. Establishing young trees by small deer exclosures dotted throughout the existing, open woodland could easily be achieved. Once young trees are established the practice of pollarding for firewood could be encouraged.

3. LOCH A BHEALAICH, BEN KLIBRECK



Description

An extensive and fascinating relict of ancient birch and alder wood pasture lies to the south of ruined shielings, at the eastern tip of Loch a Bhealaich (Map 5). Loch a Bhealaich adjoins the larger Loch Coire, within a sheltered and relatively fertile glen to the south of Ben Klibreck which is something of an oasis amongst the expansive wilderness of surrounding peat bog and wet heaths.

Analysis of historic maps

Loch a Bhealaich is remote, and the area is not mapped in any detail on the Roy Military survey of 1747-55.

The 1st edition OS maps of 1872 to 1874 shows the extent of broadleaved woodland is similar to today. A track leads east from the northern tip of Loch Coire, which is about 8 kilometres from the relict of wood pasture. The sporting lodge which now stands at the northern tip of the loch is not shown, and amongst the nearest settlements are Alltnaba and at Attalaird, about 5 kilometres to the east on the northern shore of Loch Coire.

An account on the RCHAMS website describes Alltnaba as "...an area of minor depopulation consisting of the footings of four buildings and two stone walled enclosures in an area of cleared land enclosed by a dilapidated earth and stone bank. The central building, presumably the dwelling house, measures 34m by 5m, and two buildings NW of the enclosure measure about 12m by 5m, all the walls being 0.4 to 0.5m high. A kiln, an enclosure and several stone clearance heaps, as well as large scatters of stones which may be the sites of buildings were also noted."

A second account from an A Mackenzie made in 1946 states that this settlement was cleared in 1807-14.

The ruined shielings below the wood pasture are not shown on the 1st edition OS maps, however the remains of several rectangular buildings where the Allt na Caillach joins the Allt Coire Fearna are recorded.

Description of woodland and features

Much of the surrounding woodland consist of semi-natural birchwood, which although in decline is considerably younger than the ancient birch trees which make up the relict of wood pasture (Map 4). The veterans are birch and alder pollards, hanging with a rich assemblage of lichens, bryophytes and ferns. The ground flora associated with the ancient wood pasture is relatively rich in vascular plants compared to the flora within the adjacent semi-natural birchwood. Amongst a grass dominated sward small herbs such as clover *Trifolium repens* and creeping buttercup *Ranunculus repens* are abundant.

Description of Selected Veteran Trees



TREE NO	1
SPECIES	Betula pubescens
FORM	Pollard
ESTIMATED AGE	250+
POLLARD SCORE	6
NVC	W7/W11



TREE NO	2
SPECIES	Betula pubescens & Alnus glutinosa fused together
FORM	Pollard
ESTIMATED AGE	250+
POLLARD SCORE	7
NVC	W7/W11



TREE NO	3
SPECIES	<i>Alnus glutinosa</i>
FORM	Pollard
ESTIMATED AGE	250+
POLLARD SCORE	7
NVC	W7/W11



TREE NO	4
SPECIES	<i>Alnus glutinosa</i>
FORM	Pollard
ESTIMATED AGE	250+
POLLARD SCORE	7
NVC	W7/W11



TREE NO	5
SPECIES	<i>Alnus glutinosa</i>
FORM	Pollard
ESTIMATED AGE	250+
POLLARD SCORE	7
NVC	W7/W11

Historic interpretation

The ancient birch and alder above the shielings of Loch a Bhealach have the form of trees which have been systematically pollarded for many centuries, with prominent swellings at the pollard head. The composition of the ground flora bears some similarity to semi-improved grassland in contrast to the surrounding mires and mossy flora of the adjacent semi-natural birchwood. It is difficult to say whether this flora is wholly attributable to centuries of grazing animals. Large herbivores may have always favoured this site if there is a localised flush of nutrients from base rich rock or mineral flushing, and subsequently a richer array of grasses and herbs. Perhaps the first human settlers established themselves on these same sites, hunting and domesticating the herbivores which were already there.

Whichever came first, the remains of shielings above the loch shore suggest seasonal occupancy of the site over many centuries. The shieling shown below appears to be large and more elaborate than its neighbour to the east. There the remains of two internal compartments, and a stone dyke outside the building which extends to what appears to be a man made ford across the narrows joining Loch a Bhealach and Loch Coire.



Above Remains of shieling and stone dyke which extends into the water

The remains of what I assume is another shieling to the east is barely discernable, and is oval in shape with no sign of internal compartments. This may be older, and of the turf wall on stone construction which is a technique known to date from the middle ages (Ritchie and Wordsworth, 2010),

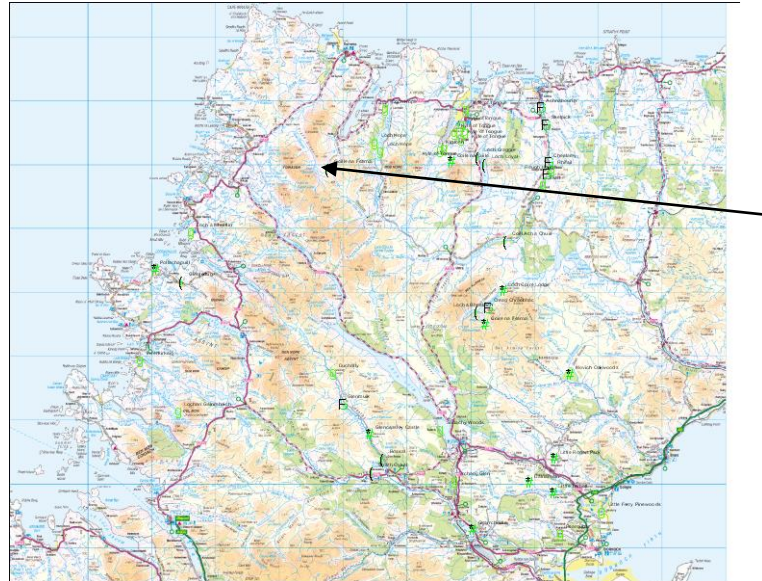
The account of clearances in nearby Alltnaba between 1807 to 1814 may date the time at which the shielings and wood pasture were abandoned, and account for the pulse in regeneration amongst the semi-natural woodland. The sporting lodge at the head of Loch Coire was established towards the end of the nineteenth century, from which time the area has supported sheep farming, fishing and red deer stalking.

Options for future management

These ancient trees provide a fascinating insight into how the woodland was once managed. A number of the trees appear to be self pollarding, as older pollard shoots have become rotten, collapsed and been replaced by new growth. The area has been favoured by red deer for many generations, which has maintained the ground flora around the wood pasture but prevented the regeneration of young trees. There is a cohort of scattered birch trees, most of which are derived from phoenix growth, on which small scale pollarding could be attempted with care – perhaps as a source of firewood for the popular bothy on the shores of Loch Coire. Ideally regeneration of birch and alder should be encouraged, amongst which individuals are selected for pollarding.

There was not sufficient time during field survey to investigate the woodland and archaeology at the head of Coire na Fearnna, but this would also be an interesting area to examine at some point in the future

4. COILLE NA FEARNA, FOINAVEN



Description

Coille na Fearna is an interesting remote remnant of ancient alder wood pasture which lies approximately 7 kilometres south of the head of Loch Eriboll. The nearest signs of historic human settlement are found 3 kilometres to the north of Coille na Fearna, at Strathbeg, which is now uninhabited apart from a hill bothy used by walkers.

Analysis of historic maps

The Roy Military Survey of 1747-55 maps the topographic features of Strathbeg and Coille na Fearna accurately, but does not record any woodland. The nearest settlement then is at a township now called Polla, where a number of houses and an extensive area of cultivation is shown.

The First Edition OS maps of 1872 to 1874 show the boundaries of the wood pasture as similar to today. The semi-natural birchwood which is now found on steeper slopes opposite the wood pasture is not marked, suggesting that the semi-natural woodland has expanded slightly. Carraehandubh is the nearest settlement 2 kilometres to the west, which is linked by a track to Polla at the head of Loch Eriboll. A single building is shown at Strathbeg, which is now a ruin.

Description of woodland and features

Coille na Fearna bears many similarities to the fascinating and remote wood pasture of Loch a Bhealach previously discussed. A number of ancient alder pollards have survived amongst a grassy, herb-rich ground flora, and are surrounded by semi-natural birchwood which is much younger, but in itself is old enough to be in decline.

The veteran alder pollards support a rich array of lichens, many of which are indicators of ecological continuity amongst old growth woodlands such as the lungwort lichen *Lobaria pulmonaria*. An interesting and unusual find so far north was the lichen known as "yellow speckled belly" or *Pseudocyphellaria crocata*.



Above Yellow speckled belly *Pseudocyphellaria crocata*

Although few signs of archaeology were obvious within the woodland there are numerous signs of settlement and cultivation at Strathbeg, approximately 3 km to the north.

The only obvious archaeological feature found within the boundaries of the Ancient woodland was an oval depression in the ground measuring 2.5 x 1.5 metres which appeared to be man made. Perhaps this could be the remains of a small shieling hut.

There are many signs of permanent habitation around Strathbeg, however, which reflect the changes in human occupancy over many centuries.

To the north of Strathbeg the remains of a low stone wall built in a circle and measuring 6 metres in diameter was found, which perhaps could be the remains of a roundhouse (A8 on Map 4). Signs of cultivation, thought to be the remains of lazy beds, were found nearby, as was a sheep fold thought to be Victorian (A1 on Map 4).



Above Remains of hay or grain stack stand

The existing bothy at Strathbeg must have been built after the 1st Edition OS maps of 1872-3, however an apparently older, ruined building lies immediately adjacent to it (A3). The building shown on the 1st edition OS maps is easily locatable on the ground, and is now a ruin (A5). A raised, oval platform of stones is present to the

east of the existing bothy which also appears to be the foundation of a much older building measuring approximately 4 x 2.5 metres (A4).

Finally a very old field boundary is clearly visible on the ground to the south-east of the bothy, a few metres from the Allt Coille Fearnna. On the corner of this boundary is a raised circle of stones measuring approximately 2.5 metres in diameter. Could this be a corn kiln?

Description of Selected Veteran Trees



TREE NO	1
SPECIES	<i>Alnus glutinosa</i>
FORM	Pollard
ESTIMATED AGE	180-250
POLLARD SCORE	5
NVC	W7/W11



TREE NO	2
SPECIES	<i>Alnus glutinosa</i>
FORM	Lapsed pollard
ESTIMATED AGE	180-250
POLLARD SCORE	4
NVC	W7/W11



TREE NO	3
SPECIES	<i>Alnus glutinosa</i>
FORM	Pollard
ESTIMATED AGE	250+
POLLARD SCORE	7
NVC	W7/W11



TREE NO	4
SPECIES	<i>Alnus glutinosa</i>
FORM	Pollard
ESTIMATED AGE	250+
POLLARD SCORE	8
NVC	W7/W11



TREE NO	5
SPECIES	<i>Alnus glutinosa</i>
FORM	Pollard
ESTIMATED AGE	250+
POLLARD SCORE	8
NVC	W7/W11

Historic interpretation

Although this interesting remnant of ancient wood pasture is not shown on the Roy Military survey it seems probable that woodland on this site has been continuous for many centuries, both from the great age of some of the veteran alder and from the presence of old forest indicator lichens. The flora here is similar to that found in semi-natural slope alder woodland, and these veteran trees are likely to be descendants of the original native woodland prior to settlement by man.

This area would certainly benefit from the eye of an expert archaeologist as there are signs of human occupancy around Strathbeg which may date back as far as the bronze or iron age if the identification of a large hut circle is correct.

Strathbeg itself has the appearance of an established settlement, with a series of ruined rectangular and oval buildings which pre-date the later Victorian bothy and nearby sheep fank.

The evidence of lazy beds, old field boundaries and the possible corn or hay stacking base all have an air of permanent settlement rather than shielings.

Some evidence of more recent and sporadic pollarding can be seen amongst a few of the trees adjacent to Strathbeg, perhaps during the collection of firewood. However the core area of wood pasture seems to be some three kilometres to the south, across a difficult expanse of boulder scree and peat bog. Perhaps there were once shielings amongst the wood pasture made of turf and wood which have left few obvious traces.

A familiar pattern of centuries of occupancy, where the woodlands were systematically pollarded is evident – followed by clearance and large scale sheep farming, The Victorian bothy seems to be about the same age as the large sheep fank to the north, and perhaps was built to house a shepherd. The expansion in woodland to the east of the ancient alder woodland may have occurred at this time,

in between the clearance of people and their domestic stock and an increase in sheep and red deer.

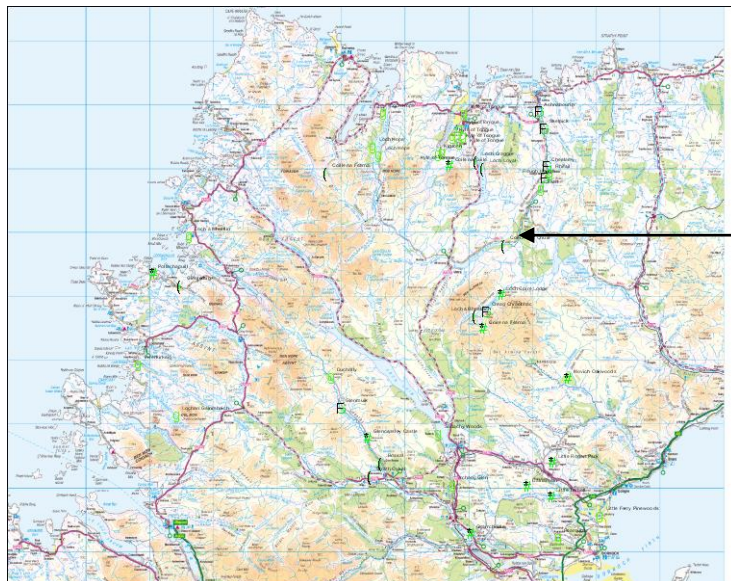
Options for future management

This site may well be the best example of an ancient wood pasture this far north. The veteran alder pollards are particularly rich in lichens, with a cursory examination revealing some interesting and unusual species not previously recorded in the area.

As with other sites red deer are maintaining a grassy sward, but preventing recruitment of young trees; if no action is taken to rectify this it is likely that the woodland will eventually disappear. A careful balance will need to be made between encouraging natural regeneration but preventing a dense forest of birch saplings and rank vegetation developing which

Although it would be desirable to continue the practice of pollarding here following the establishment of young trees it is unlikely to be practical and sustainable at such a remote location, and perhaps the emphasis of management should be on maintaining woodland cover without damaging the assemblages of lichens and vascular plants.

5. COILLE ACH A CHULL, LOCH NAVER



Description

Choill Ach a'Chull is an ancient woodland dominated by birch, which lies on the southern banks of Loch Naver beneath the ruins of a township abandoned in the Clearances.

Analysis of historic maps

The Roy Military Survey of 1747-55 shows that the boundaries of broadleaved woodland have not altered significantly, although the orientation of the loch shore is not accurate. Two settlements are associated with the woodland; Richallvag to the west and Ach a'Chull and Achness to the east. Ach a'Chull and Achness show extensive cultivation and no woodland immediately adjacent to the settlement, which is now under a coniferous plantation. On a landscape scale there are numerous settlements and cultivation recorded on the Roy maps along the shores of Loch Naver and Strath Naver to the north, suggesting that the area supported a considerable population at one time.

By the first edition OS survey of 1872-3 Ach a'Chull has been abandoned, although five buildings and five unroofed buildings are shown at nearby Achness. The Iron Age broch on the loch shore is clearly marked as a hut circle.

Description of woodland and features

The remains of a large broch over 16 metres in diameter is clearly visible to the east of the woodland on a spit of land projecting into Loch Naver.

Within the woodland boundary a circular enclosure and clearance cairns were found on the south-east corner. A birch tree estimated at between 180 and 220 years old, and which showed some indication of having been pollarded, was found growing from one of these clearance cairns.

Immediately to the south-east of the woodland there are well preserved ruins, clearance cairns, field boundaries and rig and furrow cultivation at Ach a'Chull from what must have been an extensive township of some sixteen buildings and six enclosures. The RCHAMS website also records two corn kilns on this site.



Above Clearance cairn, cultivation and the remains of a township at nearby Ach a'Chull

There appear to be three age classes of birch trees within the woodland. The most recent appears to date from approximately 1950-1960, and may have become established at the same time as the adjacent coniferous plantation. The second cohort is made up of trees of approximately 150-220 years old, which show some signs of pollarding although not systematic and regular pollarding. Many of the trees within this age class are derived from “phoenix” growth. It is difficult to be sure whether the low branching and open grown form of many of these trees have developed as a result of a combination of “phoenix” growth and generations of heavy browsing by red deer and sheep.

Finally the remains of one birch tree estimated as over 250 years old showed signs of having been systematically pollarded over many years.

Description of Selected Veteran Trees



TREE NO	1
SPECIES	Betula pubescens
FORM	Lapsed pollard or open grown maiden
ESTIMATED AGE	150-200
POLLARD SCORE	4
NVC	W11/17



TREE NO	2
SPECIES	Betula pubescens
FORM	Pollard, now naturally pollarding
ESTIMATED AGE	250+
POLLARD SCORE	8
NVC	W11/17



TREE NO	3
SPECIES	Betula pubescens
FORM	Lapsed pollard or open grown maiden
ESTIMATED AGE	150-200
POLLARD SCORE	4
NVC	W11/17



TREE NO	4
SPECIES	Betula pubescens
FORM	Twin stem lapsed pollard
ESTIMATED AGE	200-250
POLLARD SCORE	7
NVC	W11/17



TREE NO	5
SPECIES	Betula pubescens
FORM	Lapsed pollard
ESTIMATED AGE	150-200
POLLARD SCORE	6
NVC	W11/17

Historic interpretation

Given the long history of human settlement dating back at least to the Iron Age, it seems almost certain that Coil Ach a'Chull would once have been an essential source of firewood, timber, shelter and fodder. The application of the pollard score developed by Peter Quelch has proved particularly interesting on this site. The few remaining trees estimated as being 200 years old or more have a much higher pollard score suggesting routine pollarding over a long period. This very neatly fits with the records on the RCHAMS website which show the nearby township at Ach a'Chull as being cleared between 1814 to 1819, after which time practices and traditions associated with the woodland must have changed radically.

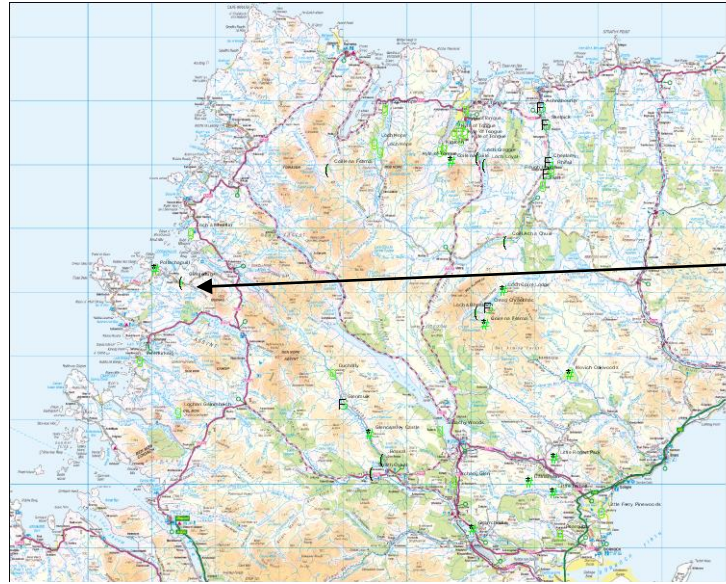
There is weaker evidence of pollarding amongst the cohort of birch trees estimated to be between 150 and 200 trees old. Those selected for a detailed examination (1,3 and 5) were individuals showing the strongest signs of having been pollarded amongst a generation of trees which appeared predominantly to be open grown maidens many of which were derived from "phoenix" growth. It is likely that pollarding for firewood continued at a much lower intensity following the clearances, a theory supported by the higher pollard score of individuals thought to be within the 150-200 year age class in easily accessible areas to the east of the woodland.

I could find little evidence of cutting, burring or swelling amongst the youngest cohort of trees, which were thought to have become established during the 1950s. Many of this generation are however derived from phoenix growth and retain an open form. Presumably the cessation of any form of pollarding or coppicing reflects the fall in the demand for firewood as mains electricity was introduced to local villages.

Options for future management

The oldest trees on this site which give an insight into how the woods may once have been managed are now very sparsely distributed. However they appear to now be self-pollarding and may endure for some years to come. There is an adequate distribution of younger trees which will at least ensure continuity of the woodland habitat, although the local population and traditions which drove the practice of pollarding have long disappeared. Theoretically it would be possible to attempt to re-introduce this practice by cautious pollarding of some of the younger birch trees.

6. GLEN LERAIG, ASSYNT



Description

A very interesting remnant of veteran pollards on old shieling ground lies on the north facing slopes of Glen Leraig, at the head of Loch Nedd, Assynt. I was shown around the site by Robin Noble, an enthusiast in woodland history who lives nearby, and who pointed out the archaeological features and a number of interesting veteran trees associated with the old shieling.

A core of ancient hazel, birch and rowan pollards can be found here surrounded by a extensive tract of semi natural oak, birch and hazel woodland. The flora associated with the ancient pollards is species-rich compared to the surrounding woodland, and includes yellow pimpernel *Lysimachia nemorum* and closely grazed meadowsweet *Filipendula ulmaria* amongst a sward of grasses. The veteran trees support a rich assemblage of bryophytes and lichens.



Above An ancient hazel pollard festooned with the lichen *Degelia plumbea*, an oceanic species

There appear to be three broad age classes within the woodland. The oldest of these includes trees which are estimated to be at least two hundred years old, which includes all of the veteran pollards described later. A second pulse of regeneration appears to have occurred approximately 150-180 years ago whilst the most recent cohort consists mainly of birch which became established during the 1950s (pers comm. Robin Noble).

Analysis of historic maps

A detailed inventory of Assynt was carried out in 1774 by John Home, and the accurate maps which he produced provide an amazing insight into the distribution of woodland, shielings, pastures, settlement and other features. A settlement of seventeen houses and an enclosure at what is now Nedd is shown to the west, whilst the remains of a smaller settlement to the east of Glen Leraig housed 90 inhabitants (Noble, 2000).

By the 1st Edition OS maps the woodland appears to have grown to boundaries similar to today, and the cultivated fields have disappeared. The settlement at Nedd has expanded to twenty seven houses, whilst one unroofed house is shown immediately to the east of Glen Leraig.

Description of woodland and features

Undulating rows of lazybeds can clearly be seen beneath a dense canopy of lapsed birch coppice and rowan close to the road, whilst further signs of cultivation are visible adjacent to the core area of veteran pollards. Stone boundary walls can be found to the west, south and east of the old shieling ground.



Above Lazybeds under a dense canopy of birch and rowan

At one point the burn which runs along the eastern boundary of the shieling has been directed into a deep, straight channel where it runs across a plateau which would once have been prone to flooding.



Above The remains of a stone wall along the southern boundary, with lazybeds behind.

The veteran trees show strong evidence of repeated pollarding, at a height much lower than other sites so far examined averaging between 1-1.2 metres. Many of these trees are single stemmed hazel pollards. Robin Noble pointed out a hazel and rowan which had become fused together, with a cut stump from a cross cutting saw concealed by moss.



Above Evidence of past cutting

Description of Selected Veteran Trees



TREE NO	1
SPECIES	<i>Corylus avellana</i>
FORM	Low pollard
ESTIMATED AGE	200+
POLLARD SCORE	8
NVC	W9/W11



TREE NO	2
SPECIES	<i>Betula pubescens</i>
FORM	Lapsed pollard
ESTIMATED AGE	200+
POLLARD SCORE	7
NVC	W7/W11



TREE NO	3
SPECIES	Corylus avellana
FORM	Lapsed pollard
ESTIMATED AGE	200+
POLLARD SCORE	6
NVC	W7/W11



TREE NO	4
SPECIES	Corylus avellana
FORM	Lapsed pollard
ESTIMATED AGE	200+
POLLARD SCORE	7
NVC	W7/W11



TREE NO	5
SPECIES	Corylus avellana fused with Sorbus aucuparia
FORM	Low hazel pollard with rowan "air tree" now collapsed
ESTIMATED AGE	200+
POLLARD SCORE	10
NVC	W7/W11

Historic interpretation

The boundary of the core of veteran trees surviving today is strikingly similar to the shieling ground shown by John Home, and gives a sense that woodland on shielings was intensively managed presumably for fodder, firewood and fencing.

The lazy beds which can be found on the shieling ground raise an interesting consideration of how crops were grown in an area used in summer months for the grazing of livestock. Perhaps the lazy beds here pre-date the use of the area for summer grazing, or perhaps this fertile site was used intensively for both crop growing and the grazing of cattle which presumably would have been separated by fencing.

The height of pollards within Glen Leraig is generally lower than that found on other sites in Sutherland, and in most cases would not have been beyond the reach of browsing cattle. This suggests that livestock were either excluded from the woodland after cutting, or were present in low enough numbers to allow re-growth of cut shoots.

A comparison between the John Home survey of Assynt in 1774 and the 1st Edition OS maps shows an increase in population in nearby Nedd, where the number of roofed houses has risen from 17 to 27. This may have occurred when, during 1812, the populations of both Ardvair and Assynt were evicted (Noble, 2000). The two areas were combined as one sheep farm, where "one shepherd's cottage replaced the village which had formerly housed 90 individuals." Further evictions from the inland glens of Sutherland to make way for sheep may have added to the coastal population (Devine, 1994).

Nedd remained an active crofting community from the time of the Clearances, and continued to cut firewood from the adjacent woods. Robin Noble explains the pulse of regeneration dating from the 1950s by the arrival of mains electricity, at which time many people stopped cutting firewood in favour of the convenience of electric heating.

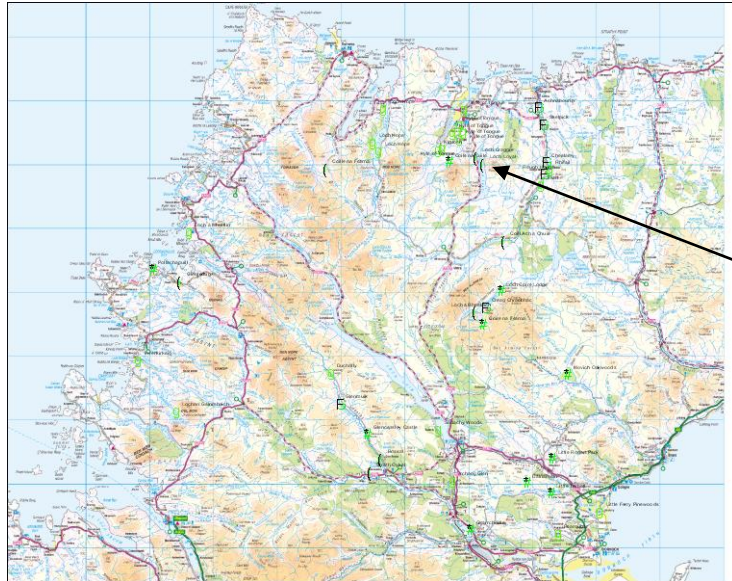
Options for future management

The relative accessibility of this woodland, and the increased demand for firewood as a result of rising costs of fuel, may make a revival in the practice of pollarding for firewood plausible. Certainly there is an adequate proportion of birch young enough to respond to pollarding.

However a number of the more palatable species such as hazel, holly and ash are not represented in this younger generation of trees, but could be planted if protected from red deer.

The combination of well preserved ancient veteran trees, the accuracy of the maps of John Home and the abundance of pre-clearance archaeology make this woodland unique and invaluable in interpreting how woodlands were used during the eighteenth century, before the social structure of Sutherland changed unrecognisably during the Clearances. Given the location and accessibility of the area this site could be promoted as an educational facility.

7. LOCH CRAGGIE & LOCH LOYAL, TONGUE



Description

There are several interesting veteran trees of a great age concentrated in a relatively small area amongst ancient semi-natural woodland on the south-west banks of Loch Craggie, whilst the woodland on the nearby north-east bank of Loch Loyal may also have been culturally modified.

Analysis of historic maps

The Roy Military survey of 1747-55 shows no woodland around the south-west banks of Loch Craggie, although the woodland on the north-east is a good deal more extensive than it is today. The Roy Maps are likely to be reasonably accurate, as any woodland here would have been of military interest, with an important road running adjacent to them which linked Tongue to the south. However a small area of wood pasture may not have been seen as an important resource to the military, and hence was not mapped in any detail.

A settlement is shown on the Roy Maps of some half a dozen houses to the south-west of the woodland, called Rianlalian. Cultivated ground around this settlement is mapped, whilst an additional three settlements are shown further south, to both the east and west of Loch Loyal.

By the OS 1st edition these settlements have disappeared, but a new building and large enclosure has emerged at Achnaclach, to the north-east of Loch Loyal. The extent of woodland has reduced dramatically on the eastern shore of Loch Loyal, to similar boundaries to today. A track is now marked which leads along the eastern shore of Loch Loyal and over the adjacent hills to Borgie Bridge.

Description of woodland and features

Veteran trees are confined to a small area within a semi-natural woodland which is dominated by birch and rowan. Many of these trees are derived from phoenix trees, and there are many windblown trees within the woodland which are developing into phoenix trees.

Apart from the few veteran trees which have survived, there are many trees with an open and contorted form. These appear to have developed from phoenix trees, and

have been heavily browsed by red deer for many years. In many cases these have a similar form to veteran pollards, but lack the swelling at the pollard head and in fact are burred from the ground up to the maximum reach of red deer.



Above A “phoenix” tree in the making, with open and contorted form

There are several archaeological records which date human occupancy back to prehistoric times. These include Victorian records of a carved stone with four handles taken from an island on Loch Loyal, and a bronze axe found on the shores (RCAHMS website). A kerb cairn, which is a prehistoric monument, is present on the beach between Loch Loyal and Loch Craggie.

Although signs of cultivation can be seen to the south-west of the Loch Craggie woodland I did not find any archaeology within the woodland, although it may have been obscured by trees and windblown root plates.

Steve Robertson, of the North Highland Forest Trust, has investigated archaeology features immediately to the north of the woodland. There is evidence here of rig and furrow cultivation on rich soils, along with the remains of a circular structure, possibly a broch. Four long house footings were recorded, a possible kiln and ditches. Steve notes that two sources of historic mapping (Pont 1580/90s and Blaeu 1654) show a more extensive cover of woodland on the west shore of Loch Loyal and Loch Craggie.

Description of Selected Veteran Trees



TREE NO	1
SPECIES	Betula pubescens
FORM	Phoenix, possibly from old pollard
ESTIMATED AGE	100-150
POLLARD SCORE	4
NVC	W17



TREE NO	2
SPECIES	Betula pubescens
FORM	Lapsed pollard
ESTIMATED AGE	200+
POLLARD SCORE	7
NVC	W17



SPECIES	Betula pubescens
FORM	Lapsed pollard
ESTIMATED AGE	200+
POLLARD SCORE	4
NVC	W17



TREE NO	4
SPECIES	Sorbus aucuparia
FORM	Lapsed pollard
ESTIMATED AGE	200+
POLLARD SCORE	4
NVC	W17



TREE NO	5
SPECIES	Betula pubescens
FORM	Lapsed pollard or open grown maiden shaped by deer browsing?
ESTIMATED AGE	180-200
POLLARD SCORE	4
NVC	W11/W17



TREE NO	6
SPECIES	Betula pubescens
FORM	Lapsed pollard
ESTIMATED AGE	200+
POLLARD SCORE	5
NVC	W11/W17

Historic interpretation

An interpretation of how the woodland on this site has been utilised in the past is challenging. The exposure and shallow, waterlogged soils mean the woodland is repeatedly disturbed by wind, which makes any trace of archaeology difficult to identify. The resulting “phoenix” trees and heavy browsing by deer produce individuals with an open, contorted form hard to distinguish from individuals which have been pollarded.

However, a few veteran trees have survived on deeper soils which appear to be older than the surrounding “phoenix” and have strong evidence of pollarding. In the area immediately adjacent to the core of surviving veterans on the west shore of Loch Craggie the flora is richer than elsewhere, and it is possible that this site was managed as wood pasture. Perhaps this small group of veterans were the only trees present when the area was mapped in the 18th Century by Roy, and later by the 1st edition OS survey, and so were considered too small or insignificant an area of woodland to map. One likely theory on the woodland history, suggested by Steve Robertson, is that these pollards seeded new woodland along the banks of Loch Craggie after nearby settlements were abandoned in the early 19th Century.

Much clearer from both the historic maps and site archaeology is the usual pattern of depopulation between the period of the Roy maps 1st Edition OS maps, and the appearance of sheep folds and a shepherd’s cottage at Achnaclach.

Options for future management

If sufficient interest exists locally there is the potential to re-introduce the practice of pollarding for firewood on this site, provided pollards are well above the height of red deer. A further option may be to fence the woodland from deer and introduce cattle, where pollarding could also be trialled as a source of fodder for cattle. Pollarding will certainly reduce the frequency of windblow.

DISCUSSION

Many individual veteran trees within the woodlands which have been examined are thought to have pre-dated the Highland Clearances, and as such provide invaluable evidence of how people lived. The practices of seasonal herding and grazing, the growing of crops in close proximity to woodland and what seems a relatively sustainable practice of pollarding for firewood, fodder and materials are likely to be centuries older than the surviving veteran trees which we are privileged to see in our lifetime.

It is apparent that mass migration, eviction and commercial sheep farming changed the long established structure of Sutherland society irrevocably during the early nineteenth century, and at this time the seasonal pastoral practices long associated with the woodlands, such as pollarding and herding of cattle, largely disappeared.

The displacement of small domestic herds which grazed woodland seasonally with ever increasing numbers of free ranging sheep and red deer are likely to have reduced both the extent and species diversity within woodlands. Conversely there are some areas, for instance at Glen Leraig, where very low levels of grazing have resulted in dense regeneration and a shading of ground flora and lichens.

Many of the sites examined would benefit from further botanical and expert archaeological survey in order to build an accurate picture of how woodlands were utilised, and to catalogue the unique biological richness which seems to be associated with these ancient relicts of woodland.

The results of this basic survey have at least reinforced the fact that ancient wood pasture is a resource which is invaluable in both cultural and biological terms. With an increased demand for firewood and environmentally sustainable food production new markets are emerging. Combined with the added energy that comes from a renewed interest in the fuller utilisation of woodlands by communities, it may be possible to bring some of these ancient working woods back into some form of sustainable management on the more accessible sites.

In summary the following factors will need to be considered in the management of future wood pasture:

- Identification and development of markets,
- Recruitment of young trees where no regeneration is present
- A revival in the practice of pollarding on appropriate and selected trees young enough to respond,
- Controlled grazing
- Thinning of dense regeneration

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APPENDIX I – Maps

APPENDIX II- Existing and potential AWP sites*

APPENDIX III- Stand and individual tree data*

APPENDIX IV – Archaeological records*

APPENDIX V – Photographs*

*** Only on the CD which accompanies this report**