WOODLAND HISTORY SECTION

NOTES XIII

Steven & Carlisle’s ‘The Pinewoods of Scotland’ – 50 years on

THIRTEENTH MEETING

TUESDAY 28TH OCTOBER 2008
SCOTTISH NATURAL HERITAGE CENTRE
BATTLEBY, PERTH
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The Scottish Woodland Discussion Group is managed by a committee composed of Chris Smout, Peter Quelch, Jonathan Wordsworth and Mairi Stewart.

Front cover photograph: Jock Carlisle at home in Little River, Ontario in 1995. (John Fowler)
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INTRODUCTION

Chris Smout

The annual meeting of the Scottish Woodland History Discussion Group took place at the SNH countryside centre at Battleby on 28th October, 2008, with some 80 members signed up. The good turn-out was to mark the 50th anniversary of the publication of Steven and Carlisle, The Native Pinewoods of Scotland -- in reality this took place in March, 1959, so we jumped the gun a little, but this was as near as we could arrange.

Steven and Carlisle’s wonderful book was a milestone for Scottish forestry and conservation. They were not the first to admire the beauty and the depth of history of the woods – that goes back at least to David Nairne’s famous lecture in Inverness in 1892. But they were certainly the first to make the scientific and historical case for their conservation, and to draw up the authoritative inventory (later updated and now made available by the Forestry Commission). The Native Pinewoods was also the first monograph devoted to the history and ecology of any species of native tree in Britain, and as woodland history of very high quality it predated Oliver Rackham by a generation.

The first paper in celebration was my own, discussing about a dozen pinewoods that have apparently disappeared between 1500 and 1800, at least as woodland eco-systems, though some are still represented by scattered pines. Steven and Carlisle assumed that there had been very heavy losses in that period, but this does not appear to have been the case. Where there were losses, it seems as if climate change in the Little Ice Age might have combined with peasant grazing to bring it about, and that any commercial exploitation (which occurred only in a few cases like Glen Orchy) merely delivered the coup de grace.

Richard Tipping followed, reviewing recent research into the palaeoecology of pinewoods. By using carbon-dated pine stumps and the stomata of needles in addition to fossil pollen data, and by examining more sites, the earlier picture has been substantially modified. The old view that there were two discrete invasions of pine, one from the north west and one from the south, has been challenged in favour of a more general spread from the south, though possibly from Ireland as much as from England. There are many mysteries – pines came and went in the landscape, briefly reaching even the north coast of Caithness and Sutherland before retiring again, and even such an iconic, heartland site as Mar Lodge turns out to have experienced lengthy interruptions when heath replaced the pines. And there is much that is unexpected – axe marks found on a pine stump in the north might reasonably be supposed to have occurred when the tree was felled, but carbon-dating showed the tree had already been dead 2000 years in the bronze age when the marks were made.

The current state of dendrochronology research was then explained by Coralie Mills, especially the efforts to construct a time sequence for pine in Scotland to match those of the Baltic and Scandinavia. Most pine used in prestigious historic buildings in Scotland was imported, and matches series from Norway, Karelia and Belarus. Such native pine as was used in construction appears often to have been small and young, yielding only thirty or so rings, which are too few to use for analysis. However, coring living trees in Glen Loyne, Ballochbuie, Mar and Affric is producing a series that goes back in one case to the mid-fifteenth century. Also there are possibilities in exploring sub-fossil pine from lochs and in looking at some of the smaller vernacular buildings in Speyside that might have used local pine.

Peter Quelch took us into Glen Loy to examine the wood of Puiteachan through a series of maps and investigations on the ground. He showed how the present pinewood and the ancient broadleaf pollards associated with it may be the relics of a wood-pasture that changed into denser woodland only in the past two centuries. It was interesting to see a photo of a very old pine with a scar made from hacking out candle fir a century or two ago. The whole area, now so remote and thinly inhabited, is still redolent of the people who once made their living there, and Peter showed how the archaeology of the old enclosures and of the trees themselves can bring this past to life.

After lunch, we had a real treat when John Fowler recounted his interview with Jock Carlisle at his home in Canada after his retirement. Most young research fellows these days have a peaceful life spent mainly in the library, but not Carlisle. After being inspired by the great Duncan Ross, forester at Glen Tanar, to go and seek out all the known woods, he set off with his gun to shoot down the pine cones and an old army ground – sheet to sleep on. What he endured in order to collect the material for the book is incredible – sleeping in the woods in winter, stripping off to cross cold deep streams, being shot at by a shepherd who mistook him for a poacher, and suffering a serious accident in Dibiedale, after which he crawled and staggered nine miles to the road to get help. None of this in the least
dimmed his sense of wonder at the forests and his excitement at the project. It was also good to learn from Graham Tuley that Aberdeen University has Carlisle’s original field notebooks, which he is cataloguing and which will later be made available on the web.

Clifton Bain then explained about his investigations in the 1980s into the state of the woods on behalf of the RSPB, and gave his impressions of the progress made since that time, and Irvine Ross rounded off the day from the perspective of a forest manager, explaining the situation from the 1970s onwards and venturing an optimistic look into the future. We have come a long way since the representative of a commercial forest company proposed cutting down the native woods of Glen Tanar and starting again with something more profitable!

The discussions as usual were wide ranging and lively, but again and again emphasised our great debt to Steven and Carlisle. Although their book did not prevent the misuse of many of the woods in the decades following publication, through allowing over grazing by sheep and deer, and underplanting with non-native trees by the Forestry Commission and by private owners, it provided the rationale for better treatment. The importance of the Aviemore symposium in 1975 was stressed for the part it played in rekindling interest in the book. The Forestry Commission came close to boycotting that meeting, but afterwards attitudes began to change, as voluntary bodies supported financially by NCC and SNH became involved in woodland ownership, and above all when the Forestry Commission in the 1980s underwent a complete change of heart. It became a real leader, by restoring the very woods it had imperilled (like Glenmore and Glengarry), and giving grants to others to do the same, or to plant new native pine woods and enclose or extend the old ones. The recent restoration of Glen Feshie by its present owner was especially welcomed – what a bone of contention that has been over the years. Without being too complacent, we did think that if Steven and Carlisle could see the woods today, they would feel pleased.

We were sorry not to have had with us Peter Wormell, largely responsible for the restoration of the Black Mount pinewoods and Finlay Macrae, a former student of Professor Steven and long associated with Glen Affric, to share their long experience and recollections. Finlay kindly sent in his talk (see below) and we hope to publish Peter’s review of the Black Mount pinewoods, on which he is currently working, in a future issue of NWDG Notes.
A HANDFUL OF LOST PINEWOODS, 1600-1800

Chris Smout

If you look through Steven and Carlisle’s great book, I don’t think you will find a single pinewood mentioned there that is not still present today. Some in the last 50 years have been damaged by being under-planted with Sitka, but most of these have been at least partially restored since by the Forestry Commission, like Glenmore and Glengarry. Some have been not under-planted, but enveloped by Sitka or lodgepole pine, so that they have had no room to regenerate outside their bounds, like the Black Wood of Rannoch. Some have been prevented by grazing pressure from regenerating at all until recently, like the Mar Lodge woods. But they have not gone. They are still there and they are glorious. Because Graham Tuley and others have looked harder since, there is now available from the Forestry Commission an even longer inventory of ancient Caledonian pine woods than we had from the book.

On the other hand Steven and Carlisle wrote under the impression that what they had surveyed was a small remnant of much more extensive woodland cover that had persisted until the end of the middle ages. Thus Carlisle wrote in R.G.H. Bunce and J.N.R.Jeffers, Native Pinewoods of Scotland (1977) that the woods were ‘probably little affected until lowland timber was exhausted in the sixteenth and seventeenth centuries’ and ‘the seventeenth century can be regarded as the time when the Highland forests began to lose their primeval innocence’. This was the accepted view of the time, expressed earlier by Fraser Darling, copied by him from James Ritchie, and originating in modern form in David Nairne’s paper in the Transactions of the Gaelic Society of Inverness in 1892, though not all agreed. Cosmo Innes, the historian, in 1861 thought the medieval woods were much as the modern ones in extent, and Hugh Boyd Watt, among forest ecologists, in the Annals of the Andersonian Institute (1900) doubted if there was good evidence for an enormous medieval wood.

We now believe that Innes and Watt were nearer to the truth than Nairne and Fraser Darling, and that the days of maximum extent of ancient pine lie 4-6000 years ago, not 500 or even 2000 years ago. That does not stop the RSPB and other charities speaking of less than 1% of the old Caledonian pine forest now remaining, and therefore of a need to plant native pine throughout its old range, as though we could ever recreate the world of the prehistoric hunter-gatherer in a completely different climatic and ecological regime.

It is, however, certainly true that some pine woods have been lost from Scotland in historic time, but unfortunately medieval sources are not good enough to tell us before 1500 how many those might be or when they went. Place-name evidence is seductive but ambiguous, as many ‘ghuisican’ type names could equally well refer to deposits of fossilised bog pine 4000 years old or more. But from 1500 onwards we are on firmer evidential ground, and between that date and 1800 I have found about a dozen woods that have disappeared. Actually, many of those have not totally vanished – some have had the core ripped out of them but exist as peripheral remnants mentioned in Tuley’s modern inventory, or could be regarded as former outliers of woods still there, or while no longer functioning woods at least have a few trees remaining. The list is not exhaustive, and some may know of others. But they are an interesting bunch.

Here is the list on the map.

1. Glen Cassley, south-west of Loch Shin in Sutherland, otherwise known as Dirry Meanach. Our only authority for this having been a native pinewood is a statement in Pennant, 1769, who had it on hearsay – but was a careful enquirer. Other early authorities speak of this glen (and Strathoykel into which it flows) as being well wooded without specifying the type of wood. It lies north of the Strathcarron woods, the northernmost Caledonian pine forest in Steven and Carlisle.

2. Little Loch Broom, where the Earl of Cromartie in a paper to the Royal Society in 1710 described seeing, when he was only 19, in 1651, a little plain about half a mile round ‘all covered over with a firm standing wood, which was so very old that not only the trees had no green leaves but the bark was totally thrown off; which the old countrymen who were in my company told me was the universal manner in which firwoods did terminate’. Fifteen years later he came back and there was no trace of the wood left. He was told it had all slipped under the peat. There are still remnant pines in Tuley’s inventory

3. The vicinity of Loch na Sealga, where Timothy Pont in the final decade of the sixteenth century found and mapped some sixteen miles of pine wood along the strath leading down the Gruinart river, and where there is place-name evidence for pine in the side glens. He called the area a ‘mechty parck of nature’, a phrase that suggests an open
character to the woodland like a gentleman’s hunting park. Traces remain on Roy’s map, but it was going fast and is now reduced to a fragment in Tuley’s inventory.

4. Knoydart, where there is a strath called Gleann na Ghuiserein seen by Pennant in 1772. He described seeing vast numbers of pines springing up following a fire, ‘many years ago’ – perhaps a revenge burning by the British Navy following the ’45. The regenerating wood must have suffered some disaster subsequently as it was never heard of again.

5. Glencoe, illustrated in Pont’s sixteenth-century map with the phrase ‘many firwoods here abouts’, and well attested in estate papers and contracts of sale of wood to Ireland and the Lowlands. It belonged partly to the Duke of Argyll and partly to Stewart of Appin. It is not heard of again after the end of the eighteenth century.

6. Loch Etive. This is actually a grouping of four small woods on the shores of the loch, exploited by both the Irish, by lowlanders and by locals. Little is heard about them after about 1750, but they were never extensive.

7. Glen Orchy. The story has been uncovered and well told by Fiona Watson in *Native Woodlands of Scotland*, so I need not dwell long upon it. Briefly, the woods, seven of them in different parts of the glen, were sold to Irish adventurers in 1723 on condition they felled nothing below 24 inches diameter at 3 feet from the ground, and
exempting one area, Glen Strae. When they had finished operations, the estate declared the woods destroyed, but admitted privately that when they came to be felled there had turned out to be no regenerating trees under 24 inches, except in two areas. At the time the wood was described by the purchaser as the finest and tallest in Scotland, and seems to have had a wide reputation, even appearing on Corelli’s map of Scotland of 1689 as the ‘Caledonia Silva’. It is doubtful if the Irish deserved the opprobrium heaped on them, firstly because the exempted wood of Glen Strae has also vanished, having been cut later in the eighteenth century by local people, and partly because the two areas that had young wood, Loch Tulla and Crannich, are still there. They are described now as the woods of the Black Mounth and were recently celebrated in a fine book by Peter Wormell. What happened in Glen Orchy looks like a failure of regeneration prior to the fellings.

8. Glen Lochay. This is probably the location of the ‘wood of Corriechurk’ from which Campbell of Lawers sold 315 pine trees in 1635. This is its only record in history. Steven and Carlisle were aware of scattered pines in the glen, but cited the Black Book of Taymouth to the effect that early in the 17th century there had been planting in there. I cannot find this reference and in any case it would not have been on the land of Campbell of Lawers. On balance it is more likely to have been a small natural wood than a plantation.

9. Coille Mhor, Strathnairn. In tradition there was a great pine wood here that Mary Queen of Scots ordered to be cut down to drive out bandits and wolves. There is not a shred of evidence for this improbable story, but I had the good fortune once to fly over the hill of this name in a helicopter and can confirm there are a few pines still on the hill. Nothing reliable is known of its history or its going.

10 and 11 are in the upper parts of Glen Luibeg and Glen Derry, high on the Mar Lodge estate, identifiable as separate woods on an estate map of 1703 but now gone. Cordiner at the end of the eighteenth century described both glens as full of dead standing timber of considerable size.

There may very well be others, particularly if you consider contractions rather than extinctions -- indeed the last two may be regarded as contractions of the Mar Lodge forest. The Wood of Meggernie in Perthshire, for instance, was considered by Steven and Carlisle as very much diminished from its previous extent along the adjacent stream-beds, but it is still an important and functioning wood.

We should note, in conclusion, three points. First, in the majority of these cases there is no evidence of outsider exploitation – only in the case of Glencoe, Loch Etive, Glen Orchy and possibly Glen Lochay (in a small way) is there evidence of outsiders being involved. At least in the case of Glen Orchy, felling looks to be the proximate but not the ultimate cause of disappearance, which was probably failure of regeneration. Second, the woods are mainly northern and western, where regeneration has always been considered difficult in contrast to the eastern pine woods. Some of the most dramatic disappearances here, like Loch na Sealga and Little Loch Broom, lack any evidence at all of outsiders coming near them, though it would be wrong to assume they were not subjected to local forms of exploitation, presumably especially as grazing and shelter. Thirdly, at least three of the woods, Coille Mhor, Glen Luibeg and Glen Derry, were at high altitudes where Scots pine today would have difficulty thriving. Fourthly, only in the case of Knoydart might sheep grazing in the modern sense be a contributory factor, as all the other woods had gone before the Lowland sheep arrived.

My suggestion is that the decline of these woods was almost entirely natural, and brought about by the rigours of the Little Ice Age which reached its lowest point in the seventeenth and eighteenth centuries. Elsewhere in Europe the tree-line in these centuries fell by up to 200 feet, and rising winds, increased rainfall and falling temperatures would take their toll in marginal places. The Scots pine is on the edge of its world range in Scotland, and is known in prehistory to have been very sensitive to variation in environmental conditions in Scotland.

One moral from history is this. Those who wish to extend the planting of Scots pine throughout its past range in Scotland should recall that over much of this range it was only intermittently viable even thousands of years ago, and it should not be assumed to be viable there today in view of some of its historical difficulties. It is still more foolish to plant beyond that known range, to take in the Isle of Skye, for instance. The disappointing record of much grant-assisted planting in such areas seems entirely understandable in the historical context.
POLLEN, PINE STUMPS AND PINEWOODS: A BRIEF REVIEW OF RECENT DEVELOPMENTS IN PALAEOECOLOGY

Richard Tipping

Introduction
Once upon a time, only some 15-20 years ago (Birks 1989; Gear & Huntley 1991; Tipping 1994; Bennett 1995) we thought we were close to understanding much of the migration of Scot’s pine into Scotland and the subsequent population fluctuations. John Birks (1989) could draw on many radiocarbon-dated pollen diagrams to show that pine (Pinus sylvestris L.) migrated to southern and eastern England across what was the dry North Sea from the continent very early in the present interglacial: conditions at the tail-end of the last glacial period before c. 11000 years ago were too harsh for its growth. This southern population spread towards Scotland but through competition with deciduous trees failed to approach what is now the border. The Scottish population always remained separate. Because its pollen is found in abundance first around Loch Maree some 9300 years ago, we assumed this Scottish population colonised Scotland from the west and north west, perhaps growing where would now be offshore but was then terrestrial because of relatively low sea level. A second Scottish population arrived across the Irish Sea from Ireland to grow in the Galloway Hills.

The northern Scottish population spread rapidly east and south because it could compete more successfully with deciduous trees this far north, though climatic constraints may have prevented it from spreading further north. From its establishment across the central and northern Highlands a series of shocks to the populations occurred, most often understood in climatic terms (Bridge, Haggart & Lowe 1990; Gear & Huntley 1991), impacted several times on the range and vigour of Scot’s pine, leading by around 3800 years ago to population collapse in northern Scotland and fragmentation into the few core areas we now seek to conserve.

Most of our data in this narrative came from radiocarbon-dated pollen analyses. We knew that pine pollen is abundantly produced and widely dispersed so that pine pollen proportions over-estimate the proportions of pine trees in a landscape: most workers accepted a cut-off of 20%: only when pine pollen in a diagram reached 20% did we think the tree was growing locally. Pine stumps could be studied because they are the clearest evidence for local growth (e.g. Birks 1972, 1975), though by-&-large the only information sought from stumps was their location. But to map the past distributions of pine from their stumps would, we knew, be problematic because it’s not cheap to radiocarbon date all the pine stumps and because some might still be hidden beneath peat. By the mid-1990s, though, work was beginning to show that pine stomata from the needles could be preserved in peat or lake sediments (Bennett 1995) and that they were much better than pollen at indicating the local growth of the tree because they don’t get blown around so much. Now, many of these ideas are in a state of flux.

The first appearance in Scotland and Scandinavia of Scot’s pine: new data
Most palaeoecologists now working on Scot’s pine routinely analyse stomata as well as pollen. Cindy Froyd (2005) examined stomatal and pollen data in lake sediments from northern Scotland. At two sites, Loch an Amhair and Dubh-Lochan around Inverness, she looked more carefully than we would normally do for stomata in sediments older than the first appearance >20% of pine pollen. At Loch an Amhair in east Glen Affric the earliest stomata were found around 10100 years ago, 1800 years before pine pollen percentages would seem to indicate local growth: at Dubh-Lochan single stomata were found 9600 years ago when pine pollen was recorded at <1%, some 800 years before the pollen record would suggest local growth.

These data create serious interpretative problems for us. Now we have periods in the past, at least when pines first colonised, when pine pollen appears to have been under-representative of the tree. Pine trees grew and shed stomata but not enough pollen for us to interpret. Cindy Froyd doesn’t explain this anomaly: rather she just reports it. Perhaps two scenarios might be envisaged. The first is that the stomata in the lake sediments might be from the very few trees then present in the landscape and that by chance these “lonesome pines” happened to grow very near to lakes. This seems to rely on chance too much but the alternative is equally problematic. Pine trees were not so lonesome, scarce still but evenly spread across the landscape allowing the odd tree near a lake to drop its stomata, but for some reason the trees were not producing pollen, perhaps through colonisation being attempted in a harsh environment. Pine can be self-pollinated under extreme conditions, meaning that pollen production and dispersal would be restricted, but the offspring are not viable: there is no regeneration. In this scenario, the stomata that Froyd found are from isolated pioneer trees that failed to regenerate so that pine trees had to colonise time and time again before they achieved a foothold.
Currently we seem to have two reliable indicators of local pine growth in the past, pine wood and stomata, and one – pollen – which is now of uncertain value. However, after Leif Kullman (2002) recently reported high on a mountain on the Swedish-Norwegian border, stems of Pinus sylvestris, together with macrofossils of tree birch (Betula pubescens) and spruce (Picea abies) radiocarbon-dated to before the beginning of the present interglacial, from 17000 to 12000 years ago, a vigorous debate ensued with pollen analysts (Birks, Larsen & Birks 2005) because there is no pollen evidence for these trees in this very cold period. We might see more such debates as these as established models start to break down. For example, the identification by Vasari & Vasari (1968) of a pine needle in lake sediments in Aberdeenshire dated to the glacial period, ignored for many decades, may require re-consideration.

**Pollen, stomata and pine stumps at Loch Farlary, Sutherland**

Perhaps the best evidence for past populations of Scot’s pine might come from combining all three data sources from the same place. At Loch Farlary near Golspie in Sutherland all three sources were analysed to understand the dynamics of pine populations in the middle of the present interglacial, between 5500 and 4500 years ago (Tipping et al 2007, 2008). We generated data from pollen and stomatal analyses, dated by radiocarbon and tephra, from a deep peat sequence that is around five metres from a thick layer of pinewood identified by peat-probing a small grid some 25x15m across. Eight stumps, stems or roots of the pines were radiocarbon-dated. We found that all but one stump died between 5100 and 4350 years ago: from tree-ring correlations between the trees we think that most trees rapidly colonised the peat surface around 5300 years ago. However the pollen record five metres away suggests that pine re-colonisation occurred some 500 years later, around 4800 years ago, when, ironically, most of the trees that we found growing on the bog were dying. Even more problematic is that stomata are very rare in the period 5100 to 4350 years ago when lots of trees grew very close by and when their pollen was also abundant. In this 800 year period none of these three indicators of local growth agree. We do not understand this: we seem to have pine trees growing but not able to produce pollen or lose their needles. We might suggest that these pine trees were in some way unhealthy although tree-ring counts on six stumps show that these trees were on average 217 years old when they died: one was 368 years old; the smallest was still 137 years old.

**New pollen data on the earliest pine populations in Scotland**

Notwithstanding our worries over pollen diagrams, most new data are based on this source. We are now uncertain of the migration patterns described from pollen data by Birks (1989) but using his criteria for defining local pine growth we can re-examine his distribution pattern. In south west Scotland there is now evidence that pine populations could be found down to sea level from early in the present interglacial, after 9300 years ago (Nichols 1967; Wells et al 1999; Tipping, Haggart & Milburn 2007): it may be that seeds floated across the Irish Sea to the sandy soils of the coast first, only then spreading to the acid soils of the uplands by 8000 years ago. In the eastern Cheviot Hills above Rothbury pine stumps and pollen indicate establishment around 8000-7500 years ago (Manning & Tipping unpublished), indicating an early postglacial flourishing of pine much further north than thought by Birks in 1989. Pine also probably grew high in the Southern Uplands at this time (Tipping 1997, 1998), in cold north-facing gullies, so the gap in central Scotland where pine did not grow is narrowing. Yet careful identification by Jim Dickson (1988; Ramsay & Dickson 1997) of stumps reported as ‘fir’ by 19th century naturalists in raised mosses showed that the majority reported are not of pine at all: there are now only three localities in central Scotland with pine stumps – all radiocarbon-dated – at Drumbow (3100 years ago), Coatbridge (6100 years ago) and near Johnstone (4800 years ago), a rather confusing scatter of dates that probably indicates only the adventitious colonisation of ‘lucky’ seedlings.

**The fragility of past pine populations**

We have known for a long time that pine was the native tree most sensitive to disturbance (Bennett 1984): populations seem at times to have vanished almost in the blink of an eye. There are three periods, broadly, when pine populations over wide areas were lost, either temporarily or permanently. The first was soon after pine had become established, some 7800-7400 years ago. On Rannoch Moor, Bridge et al (1990) correlated their pollen and pine stump evidence for population collapse to a record from the Cairngorm purportedly of fluctuating precipitation (Dubois & Ferguson 1985) and suggested that increased rainfall led to peat formation and that pine roots became waterlogged. Dubois & Ferguson’s (1985) may not mean what they thought it meant, however. Re-examination in 2006 (Tipping 2008) of one of Bridge et al’s (1990) sites, at Clashgour near Loch Tulla, focused on extracting data from the abundant pine stems and boles exposed by peat erosion by measuring the orientations of roots connected to boles and the directions the stems fell. There are more roots pointing west than would be expected by chance, probably because the trees were buttressing themselves to resist winds funnelling from the west (Nicoll & Ray 1996). Nevertheless most stems toppled to the east, blown down by a westerly wind. Whether wind-stress (Quine 2003) is a significant factor in sustained declines of pine populations is unclear because regeneration need not be affected but the data remind us that climate change is not to be understood only in terms of temperature and rainfall.
Pine populations in the Galloway Hills and on the Galloway coast died out around 7800-7400 years ago and never returned to south west Scotland (Tipping 1997). Partial reductions in pine woodlands are also seen on the west and north west coast from Skye northward at this time (Bennett 1984). In eastern Scotland, however, pine woods seem to have pushed from the Cairngorms down the Dee Valley to the hills above the coast (Tipping 2007) and in the Northern highlands pine became established, spreading eastward to around Loch Farlary by 7500 years ago (Tipping et al 2008). This geographical pattern is confusing: if these opposing trends were both generated by changing climate, as is most often assumed, the responses of pine trees to this climate change were not the same over Scotland. This pattern might suggest a much sharper differentiation around 7500 years ago between an oceanic west and a more continental east of the country (Tisdall 2003).

Between 6400 and 6000 years ago pines were lost from around Loch Farlary (Tipping et al 2008), first seen in the pollen record at 6400 BP and 400 years later in an absence of stomata. In this period the high-altitude Cairngorm pine trees, probably never closed woodland, began to decline (Tipping 2007) and on Rannoch Moor pine woodland was again fragmented (Bridge et al 1990). Again climate is usually suspected to have been causal: most detailed climate records agree that the climate became colder and wetter abruptly after 6200 years ago for several hundred years.

Recovery was complete and no part of Scotland affected at this time seems to have lost its population permanently. Indeed, after 4500 years ago populations expanded their range to the north coast of mainland Scotland. The final pine decline between 4200 and 3800 years ago is regarded by some as sudden, occurring over a short interval within the period 4200 and 3800 years ago, caused by abrupt climate deterioration, in particular by rapid increases in rainfall, and water-logging of what had been dry soils and blanket peat (Gear & Huntley 1991; Huntley, Allen & Daniell 1997). There is actually little direct evidence for rainfall to have increased in northern Scotland 4000 years ago (Charman et al 2006; Tipping et al 2008). Human impact through rapid deforestation in the early Bronze Age has never been rejected as causal in this pine decline (Birks 1975; Bennett 1995). At Loch Farlary the reason for our work was to test this idea because Bruce Field, a Golspie peat-cutter, was retrieving a lot of pine wood bearing axe marks which were not his. We found that Bronze and Iron Age people were indeed chopping through wood but the wood, mostly roots, had been dead for more than 2000 years (Tipping et al 2007). We have explained this by later prehistoric peat-cutters trying to remove wood to reach under to find good, wood-free peat, just as Mr. Field is now. We still have no evidence that people wiped out the pinewoods of northernmost Scotland, and still we assume that climate was responsible but we become keenly aware that we haven’t identified the precise climate trigger. In Glen Affric the woodland fragmented and retreated eastward (Davies 1999; Tipping, Davies & Tisdall 2006) 3800 years ago to east Glen Affric, around Loch an Amair (Froyd & Bennett 2006) where the woodland survived. This type of movement may again represent a steepening of the oceanic-continental climate gradient.

The persistence of core areas
Not all pine trees away from the core areas like Abernethy and east Glen Affric died some 4000 years ago. Some records show the pine population slowly ebbing away over thousands of years, true also of other trees, gradually overwhelmed by people, by livestock, peat spread (Tipping 1994) and perhaps by long-term losses in phosphorus, a key nutrient in the soil (Wardle, Walker & Bardgett 2004). Many of our pine woods died away with a whimper.

The woods in east Glen Affric represent one of only a few core areas surviving today. The number of these apparent core areas is falling, however, as on the Mar Lodge Estate, Danny Paterson (pers. comm.) is showing that the present pine population has no link with the original woodlands. We cannot assume continuity with the past just because pine trees grow today.

And the future?
Finally we might look to the future with two observations. First, analyses by Helen Shaw in east and central Glen Affric (Shaw & Tipping 2006) is suggesting that the pine wood there might now be advancing westward once more. We don’t know why: it may be because seed is spreading from the exclosures founded several decades ago by the Forestry Commission, or it may be a response to the climate change of the last several decades. Finally, computer models developed by Robert Crawford (2008) of what might happen to our pinewoods if mean annual temperatures changes in the next 50 years show that if summers warm by 4°C we gain more pine trees; if the winters warm by 4°C – we lose them all.
References


INTRODUCTION
This paper focuses on the development of native pine dendrochronology in Scotland, based on investigations of historic pine timbers and ancient pine woodlands as part of the Native Oak and Pine Dendrochronology Project (Crone & Mills 2008a). The results will be published in full in appropriate journals within the next few years. In this NWDG celebration of Steven and Carlisle’s work, which championed the case for the conservation of the ancient pine woods, it seems appropriate to emphasise the importance of these woods as a resource for scientific research into aspects such as their past exploitation, their future management and climate change studies. These issues are not divorced from each other, as was recognised in Steven and Carlisle’s (1959) remarkably holistic appreciation of historical, ecological and management issues.

Dendrochronology, as undertaken within the heritage sphere, is capable of providing not just dates but also precise information on provenance of timber. Information on age of trees, growth rates, wood-working techniques, timber dimensions and quality is also obtainable in the course of the work. Together, these strands contribute to understanding wider issues such as: historic woodland stand dynamics; historic management regimes; the nature of timber exploitation in the past; the development of the timber trade; and the impacts of trade and exploitation on Scottish woodlands.

So why is native pine a focus of dendrochronological development for cultural heritage purposes in Scotland? In the UK, the application of dendrochronology in heritage dating has traditionally concentrated on oak. In England, for example, a great network of oak chronologies has been developed and it is a routine matter to date oak timbers. Dating is not so straightforward in Scotland, due to the more complex history of timber supply and the fewer native chronologies so far available. Pine is common as a timber in Scottish buildings, especially after AD 1600, and the historic exploitation of native pine woodlands lends the development of pine dendrochronology a special prominence here. Another impetus is that conservation interest in post-medieval and early modern buildings has grown enormously in the UK over the last 15 years or so. Pine is common in these later buildings, but very little historical pine tree-ring work had been done in the UK until recently.

The Native Oak and Pine Dendrochronology Project is being undertaken to further the application of dendrochronology in the Scottish heritage arena (Crone & Mills 2002; 2008a). Prior to this project, there were no long native pine chronologies for Scotland. There were some pine chronologies based on living trees from the Highlands (Hughes 1987) but only giving good coverage back to the 18th Century and not thought old enough to date most historic pine timber given the long overlap needed. This paper concentrates upon the recent development of native pine woodland reference chronologies and parallel investigations of historic buildings with pine timbers in Scotland.
Background: Scottish dendrochronology
Before AD 1000, there are only a few dated tree-ring chronologies from oak on early historic archaeological sites in Scotland (Crone 1998), and none so far from Roman or Prehistoric sites, at the time of writing. Tree-ring coverage for oak improves dramatically in the medieval period, based on timbers from urban excavations and standing buildings (Crone 2000; Crone & Mills 2002). Good quality native oak timber is still available in medieval times, at least in areas such as NE and SW Scotland. So far, there are no dated pine timbers from the medieval period, apart from some early 16th century Scandinavian pine boards imported for the use in the Renaissance Palace at Stirling (Crone 2008a). By the late medieval period there is compelling tree-ring evidence that Scottish woodlands could no longer meet the home demand for oak timber. Few buildings after 1450 contain native oak, and the frequency of imported and re-used oak increases (Crone & Mills 2002; 2003; Crone 2008a). In the 17th and 18th centuries much more pine is found in buildings and, until recently, the few dated examples have had imported pine. However, the picture of increasing importation may be exaggerated. Imported timbers are easier to identify because there are far more reference chronologies available abroad, and there is a large body of undated historic timber samples in Scotland which do not match foreign chronologies. Some of these must be native. Proof depends on developing a network of native chronologies with which to match this material.

ANCIENT PINE WOODLANDS: NATIVE REFERENCE CHRONOLOGY EXPANSION
Expansion of the native pine chronology coverage in Scotland is being pursued in two ways. The primary mechanism so far has been building chronologies from long lived trees in the surviving ancient pine woodlands, and this will continue. Collaborating dendroclimatologists Rob Wilson and Neil Loader are starting to explore sub-fossil pine in lochs, to push tree-ring coverage back further in time. If successful, the longer chronologies will be applied in both heritage and climate reconstruction spheres.

The work at some of the oldest living pine sites in Scotland to create longer native chronologies is summarised below. Much of this work has been undertaken in collaboration with Colin Edwards and Rob Wilson, and will be published more fully elsewhere.

Glen Loyne pine chronology: AD 1459-2001
The sparse ancient pine woodland at Glen Loyne is extremely stressed and slow-grown, and was chosen as the first study site because Colin Edwards had previously identified the extreme ages of the trees here. A chronology has been constructed covering the period 1459 to 2001, 543 years in length, and the oldest tree sampled started growth in the 1450s (Mills 2005). This chronology considerably extends the period of native pine tree-ring coverage for Scotland. There were many technical problems to overcome in making this chronology, including missing rings and extremely compressed growth. While Loyne has the potential to assist dating due its extreme age, its slow growth and stressed forms might be atypical of preferred building material.

Ballochbuie pine chronology: AD 1589-2003
Ballochbuie, on the Balmoral Estate, Deeside, was more straightforward, with better conditions for pine growth. Cores had been taken by Glenn Iason of MLURI for an ecological study. A chronology built from these cores spans AD 1589 to 2003, some 415 years, and there is potential to get back further (Mills 2006). This chronology was the first to extend pine tree-ring coverage for north-east Scotland, with the previous longest chronology from the area being Inverey, going back to 1706 (Hughes 1987). Ballochbuie matches extremely closely with other woodlands on Deeside. It shows weaker matches with sites from north-west Scotland, including Loyne, indicating that a network of regional pine chronologies will be required for historic dating purposes in Scotland. A network is also fundamental in allowing historic timbers to be provenanced closely.

Glen Affric pine chronology: AD 1709-1996
Glen Affric was selected because of the dead standing stems thought to have potential to extend back before Hughes’ (1987) chronology from living trees which went back 1735. The work has strengthened the replication considerably and allowed a modest extension back in time to 1709 (Fish et al 2007a). Rot in the standing stems limited their usefulness. Affric shows good correlation with Ballochbuie and more modest correlations with Loyne.

Mar Lodge Stage 1 pine chronology: AD 1629-2004
Mar Lodge, Upper Deeside, was selected because it is known to have been exploited for timber during the post-medieval period. Mar timber was likely to be found in historic buildings on the estate and more widely. Mar had also benefited from extensive core sampling by Colin Edwards of Forest Research. For Stage 1 a total of 200 living trees were analysed from four different woodlands at Mar (Glen Derry, Glen Luibeg, Dubh Ghleann and Glen Quoich). Twenty disks from dead trees scattered over the estate were also analysed. Previously, Inverey was the oldest woodland chronology from the area, back to 1706 (Hughes 1987). The first stage of work improved the replication, and hence the signal for the area and extended coverage back to 1629, with Glen Derry having the oldest trees (Fish et
This led to a second stage of chronology development at Glen Derry, reported below. These new Mar chronologies show very good correlations especially with Ballochbuie.

**Mar Lodge Stage 2 (Glen Derry North) pine chronology: AD 1477-2008**

A second stage of work at Mar Lodge involved sampling trees at Glen Derry and Luibeg, resulting in a considerable extension back in time at Glen Derry North. The Luibeg samples proved rather even aged at about 200-250 years, and have not yet been measured. However, Glen Derry revealed some unexpectedly old trees which extended the Mar pine chronology coverage back considerably, to AD 1477. Only one sampled tree goes back into the 15th Century, while a few originate in the late 16th or early 17th century. The core from the oldest tree did not quite reach centre. It was estimated to have started growth in the 1450s, and is very similar in age to the oldest tree at Glen Loyne.

**SEEKING NATIVE PINE TIMBER IN BUILDINGS**

Originally it was thought that historic buildings might provide a means of extending pine chronologies. Extensive reconnaissance has been undertaken in the north east as part of the Native Oak and Pine Project to find buildings with suitable pine timbers. We looked at buildings of all types, at first concentrating efforts away from the coast (Crone & Mills 2008a). Many buildings have lost their original roof structures but where historic timbers survive, pine is commonly present. However it is usually fast grown and too young for tree-ring dating to work. Given the lack of long-lived pine in the historic building stock, the approach has shifted away from using historic timbers for chronology building, and towards testing whether it is possible to date young pine timbers against the growing network of native woodland reference chronologies.

**Castle Grant**

One of the better candidates for identifying native pine timber was Castle Grant with much pine in the roofs which, given the location, was likely to be native (Crone 2006). Further investigation showed that most timbers were too young for useful analysis, apart from eight pine timbers with between 80 and 146 rings from the earliest roof, believed to be 16th Century. However, only two sequences matched each other so a site chronology could not be constructed and no individuals matched with dated chronologies, at home or abroad (Crone 2006). As the network of native chronologies grows, it may become possible to date and provenance these timbers.

**Duff House & Fort George**

There were reasons to suspect that Fort George and Duff House might contain some native pine, principally the documentary evidence. Assessments revealed some longer sequences which, if native, could assist chronology building (Crone & Mills 2008a). Duff House was an ideal candidate. It was designed by William Adam for Lord Braco, and built between 1735 and 1740, after Braco acquired the Mar Estate. Adam and Braco fell into legal dispute and consequently documentary evidence survives regarding its construction. A Court of Sessions record states:

> ‘And as for the Timber, the Petitioner provided himself partly from his own Woods in Braemar, where there are very fine Trees, which he caused to be flotted down the River Dee to Aberdeen, and from thence brought about to Banff, and partly by Cargos, which he caused to be imported for his own Use from Norway, and some part of the Timber…..were furnished to him by Mr William Adams of Edinburgh, Architect’

The records showed that timber from Norway and Mar had been used but no native material was identified by the analysis. The Duff House chronology (1565-1737) matched chronologies from Norway and Sweden (Crone 2008). There were many fast grown timbers in the roof which were not sampled, some with as few as 15 rings, which could be the Mar timber mentioned in the documents.

At Fort George, two sources of pine timber were identified (Crone & Mills 2008b), but both proved to be imported. The Ordnance Store South chronology (AD 1492-1744) matches chronologies from Latvia, Lithuania, Sweden and England, reflecting widespread use of this particular source of imported pine, representing timber from the Belarus region exported through Riga. The results for the Chapel and Staff Block pine timbers (AD 1350-1764) indicate a common source area in Karelia, a region which straddles the Finnish Russian border today (Crone & Mills 2008b). There was some much younger pine timbers (30-50 years) in the roof of the barracks which were too young for analysis. These could be the native Scottish material thought to be present (Crone & Mills 2008b).

**Buildings in the Mar Lodge area, Upper Deeside**

Analysis completed since the conference has tested the feasibility of dating young pine timbers in vernacular buildings near source woodlands when local reference chronologies are available, using Mar Lodge as a test case (Mills 2009). This test proved successful. For the first time anywhere in the UK, dendro dates have been obtained for native pine timbers in historic buildings, and have shown that local timber was used.
Plate 2  The Red House, Mar Lodge Estate (L, photo Coralie Mills), contains a remnant pine cruck frame from an earlier phase of building. Dendro sampling of the cruck elements (R, photo Anne Crone) has allowed them to be dated against the local Mar Lodge area woodland chronologies.

Cruck elements within The Red House, at Mar Lodge Estate, were felled in AD1799 and AD1808, for sequences with 86 and 102 rings respectively (Mills 2009). The main construction of a cruck-frame byre at Inverey has felling dates of AD1799/1800 and a remodelling phase of AD1815 (Mills 2009). Surprisingly, over half of the timbers at the byre had more than 100 rings. The results from these two buildings indicate that previous in-situ visual assessments of pine timbers have sometimes underestimated sequence lengths and dating potential. However, success is not guaranteed even with local chronologies available: timbers from Derry Lodge could not be dated because they were mostly too young, came from multiple sources and were in poor condition leading to core fragmentation.

The outcomes of this research can be deployed as useful guidance on the best way to secure dendro-dates for such buildings in the future. The good condition of the timbers, their sequence lengths and the number of samples per construction phase are important factors in influencing dating success for pine in buildings (Mills 2009). Having multiple samples with over 80 rings from the same phase represents the ideal situation. It is necessary to have local reference chronologies available to date and provenance such material. The strategy of developing a Scottish network of local pine reference chronologies from ancient woodlands is working and should be continued. There is now much greater potential for dating the rural vernacular historic building stock in Scotland (Mills 2009).

The need for protection of historic timbers
The owners of buildings mentioned in this paper have taken great care of their historic timbers and have been keen to allow this research to take place. However, all too often over the last 20 years, in the heritage dating work more generally, samples have been salvaged from the skip or the bonfire pile after they have been stripped out during development work. There is little protection for historic timbers when alteration or demolition takes place, even if the building itself is listed. There is a need to protect historic timbers specifically for the rich information they contain, not just about their own history but about the larger history of Scotland’s environment, economy and trade. Conservation efforts have tended to concentrate on high status buildings but the modest buildings are very important too, and more likely to contain native Scottish timber.

NEXT STEPS IN PINE DENDROCHRONOLOGY DEVELOPMENT IN SCOTLAND
As the funding for the Native and Oak and Pine Dendrochronology Project approaches its conclusion, new sources of support will be required to continue research in Scottish pine. Further opportunities to expand the network of native woodland pine chronologies will be sought, looking for other areas with long-lived trees. A wider, denser network of woodland-specific native pine chronologies will be required to allow dating and dendro-provenancing to work properly. The other main objective will be to extend the chronologies back further in time, before the period covered by the old living pines. This would aid both historic and climate research, and is being undertaken collaboratively with dendroclimatologists Rob Wilson and Neil Loader. They have undertaken exploratory sampling of living trees and sub-fossil material in Glenfeshie, Rothiemurchus and around Loch Morlich (Wilson 2008). Analysis is in progress, and the sub-fossil material shows promising signs of covering a long period, but currently there are few Speyside living tree samples which extend back beyond the mid-19th century. A wider sampling programme is planned.
The expanding network of native pine chronologies still has rather sparse geographical coverage, and it would be desirable to augment this. Some particular priorities are evident. Speyside clearly has a rich tradition of native pine exploitation and will be a particular focus of future chronology expansion. This could assist the dating of some recently investigated Speyside vernacular buildings, where dating has not yet proved possible (Crone 2009). Much of the native pine tree-ring research undertaken so far has concentrated in the north east, and the western pinewoods are not well-represented. Creating a stronger network for westerly pine woodlands would be a great advantage, given their history of exploitation for timber export to Glasgow and beyond.

It is clear that the Scottish post-medieval buildings so far investigated do not contain the old slow-grown pine expected of ancient pine woodland. Where the timbers are native or thought to be native, they are commonly from young trees which started life in the late 17th or early 18th centuries. This provokes the conclusion that much of the timber is from plantations or regenerating woodlands, and of course landowners were creating plantations in this period, both for ornament and economy (House & Dingwall 2003). The results beg the question as to why it has not yet been possible to find any timber from older trees felled in the native pine woodlands during the post-medieval period. Even if their economic use was beset with problems of timber quality and transportation, exploitation of the ancient pine woods during the 17th to 19th centuries is well documented, as related by Steven & Carlisle (1959, 58-60), and explored in greater detail by several authors since (for example, Smout 1997; Smout & Lambert 1999; Stewart 2003; Smout et al 2005). It may be that we must examine far more Scottish buildings and search further afield for such material, much of which was destined for specialist uses like ship-building, mast-making and for export by external timber merchants. Scottish boatbuilding using native timber was important into the 19th Century, not just on the coasts but also on inland waters (Skelton 1994; Stewart 2003, 92). An assessment of the dendrochronological potential of timber in any surviving historic Scottish-built vessels would be worth attempting. A comparison of undated pine timbers in English post-medieval buildings is underway with Cathy Tyers, dendrochronologist at English Heritage, to discover whether Scottish native pine is represented there, as might be expected from the history of exploitation by external timber merchants (Smout et al 2005, Chapter 8). A similar exercise might be usefully undertaken in Ireland, from whence some of these merchants came (Smout et al 2005, 200).

CONCLUSION
A larger body of historic native pine sequences, dated and provenanced against a growing network of native woodland chronologies, would clearly have benefits for the understanding and conservation of our built heritage. It would also allow meaningful investigation of the wider themes of historic woodland stand dynamics; historic management regimes; the nature of timber exploitation in the past; the development of the timber trade; and the impacts of trade and exploitation on Scottish native pine woodlands. Such themes will be pursued as the body of Scottish native pine tree-ring data grows.

ACKNOWLEDGEMENTS
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PUITEACHAN NATIVE PINEWOOD, GLENLOY – RECENT FIELD INVESTIGATIONS

Peter Quelch

Background
I have been associated with Glenloy since the mid 70s when I was based in FC’s Torlundy office. However my interest in the native pinewood from a woodland history or archaeology point of view is more recent. Several years ago I noticed the presence of very ancient open-grown pines, also old oaks which seemed to be pollarded. I focussed more closely on this woodland archaeology in 2008 to be able to present a paper to the Scottish Woodland History Discussion Group at the annual SWHDG conference on 28.10.08 at Battleby on Coille Phuiteachain. My work combined field observations with old map research to uncover something of the history of this western native pinewood over the last 300 years or so.

Professor Christopher Smout who chairs SWHDG has written about the exploitation of this woodland during the 18th C (Smout 1997), and has also sent me further information (App 2). The early 20th C history of the woodland as an early state-owned nature reserve and how it came to be designated as such is covered by RA Lambert (1997) in Scottish Forestry journal.

Description of the current woodland
The location of Puiteachan pinewood is at the west end of four miles of single track public road in Glenloy. The entrance to the glen itself is about 4m north of Banavie, on the west side of the Caledonian Canal. The pinewood lies at the far end of the woodland holding of Forestry Commission Scotland which stretches the whole southern side of Glenloy. The FC also owns forests on the north side of the first half of the glen, including an interesting oak woodland open to visitors. The riverside woodlands on the way up the glen are very attractive too.

The best viewpoint of the native pinewood is from a junction with a track at Achnaherrie ruin about a mile before the small FC carpark is reached. A viewpoint halfway up this track (which leads into a privately owned forest block) gives a panorama of the whole of Coille Phuiteachain with native pines and birch. The main part of the native pinewood starts abruptly at a narrow gully which dissects the south side of the glen, at the point where the forestry road stops and a tractor track continues a little further west. However there is no easy access to that part of the woodland from the public road without walking the length of the forest road from the junction with the public road at Inverskilavulin. The historic part of the wood is best accessed from the small FC carpark at the sharp bend in the public road a mile further on.

The wood is impressively large when seen from Achnaherrie and continues with natural pine and birch to the end of the forest just beyond Puiteachan cottage. A further area of open land west of Puiteachan is currently being allowed to regenerate naturally with pine and birch extending the woodland still further. In fact there is a remnant wooded gully at the west end of that land. Beyond that is open hill beside an old drove road which leads eventually to Fassfern on Loch Eil.

Brian Choille and other native woodland remnants
One other native woodland remnant exists beside the track to Fassfern and is very visible from the carpark and bridge at Puiteachan. A scattered wood pasture on the north side of the glen, and reaching to quite an altitude, is clearly visible beyond the farmhouse at Achnanellan. The author has not yet walked through this wood pasture but the old maps show it as having derived from extensive natural woods, probably mainly of birch.

1 SWHDG which has been holding annual woodland history seminars in Scotland since 1995 is now administered by the Native Woodlands Discussion Group.
2 The spelling of this Gaelic placename is simply Puiteachan when referring to the cottage, but when describing the woodland (Coille) it becomes Coille Phuiteachain. This accords with nomenclature on the current OS maps.
3 The exploitation of natural origin pinewoods in Lochaber (Loch Arkaig and Glenloy) are contrasted with a similar history in Rothiemurchus pinewood, in Chapter 9 ‘Cutting into the Pine’ in the book edited by TC Smout titled Scottish Woodland History, Scottish Cultural Press, Edinburgh, 1997.
5 Nomenclature for this and neighbouring old settlements is discussed later, but this simplified name is easiest to use here.
6 This link to Fassfern is historically significant as many of the previous inhabitants at Achnaherrie in the 18th C were from a branch of the Cameron family at Fassfern (see more detail later).
The far western end of this wood pasture was dense enough in the 1860s to be shown as woodland on the 1st Ed OS map with the name Brian Choille. OS maps since then also show that western area as wooded and with that distinctive name. Scattered native trees also extend eastwards most of the way to Achnanellan, for example on the 1920s OS 1” map, indicating that the Brian Choille woodland may once have been more extensive. The 1st Ed six inch map of the 1860s clearly shows denser woodland at the west end of Brian Choille with the eastern half as open wood pasture, yet with no enclosing dykes or fences visible. Brian Choille is a typical example of the way in which unenclosed woodlands and wood pastures of natural origin are depicted on the first edition OS maps.

However, by contrast Roy’s map of 1750 shows no woodland west of Achnanellan but an extensive woodland east of the farm extending to Achnaherrie, of which no trace now remains. Immediately some of the difficulties and frustrations of old map research become apparent with this example. One almost starts to distrust the 18th C surveyors – or perhaps the cartographers who wrote up the field data? Did they omit or include woodlands through error, or did they have surveyor’s rules or judgements on which woods were worth including in the finished map (perhaps just the ones with valuable timber?). Or were there indeed so few trees or the trees were so sparsely distributed at the time that it hardly constituted woodland, or was too remote for exploitation?

Defining the question ‘What is a woodland?’ is still a dilemma in surveying and mapmaking. Naturally-regenerating woodlands change their boundaries, structure and condition over time, particularly in open un-enclosed landscapes as in the Highlands of Scotland. For these reasons woodlands which at the time of survey had just been cut or coppiced might be omitted, as well as any wood pastures of very low stocking density, especially if these woodlands were not only sparsely stocked but had also recently been cut over, or were unenclosed. These problems of cartographic recording criteria certainly affect Phuiteachan wood, so we will return to this question.

Fig 1: Oak pollard and pine shows the unusual mix of veteran pine and worked oaks in the same location opposite the old cottage. Photo: Peter Quelch

History of Coille Phuiteachain through old map research
The earliest map covering Glenloy in the online map library of the National Library of Scotland is that of Robert Gordon 1650. This map clearly shows the south side of Loch Arkaig to be densely wooded but only shows a scatter of woods south towards Loch Eil, (however the tree or woodland symbols do look rather stylised). The Glenloy area is shown as more wooded than east of the River Lochy. The only place-name close to Glenloy is that of Torrechastell (Torcastle) beside the river, which was the previous seat of the Camerons of Lochiel. A drawing of how the castle perhaps looked is shown on the Clan Cameron website based on measurements of the ruins taken in 1871. Hermann Moll’s map of 1745 is small scale and slightly diagrammatic but also names Torre Castle, and shows ‘Loch Arcog’ as being surrounded by woodland.  

General Roy’s survey of about 1750 gave us a series of country-wide maps of quite a different quality, at a scale of one thousand yards to one inch. The map is rather pictorial compared to the later Ordnance Survey maps and lacks

7 Maps referred to can be viewed on the NLS website at: http://www.nls.uk/maps/.
contours, but does have shading to depict relief. It shows woodlands very clearly, but the difficulties of knowing whether absence of a wood on Roy means that it was really not there in the middle of the 18th C is problematic. Because the purpose of the map was military not every land feature is shown. Studies have shown\(^8\) that Roy omits some woods which were definitely there at the time, as they are visibly recorded on detailed contemporary estate plans by other surveyors. This was the time of the beginning of land and farm improvements and so many estates were surveyed at large scale, accurately, and in detail. Such a plan exists for Lochiel estates, including the pine woods at Glenloy and Loch Arkaig, through surveyors employed by the Commissioners for Forfeited Estates (William Morison surveyor in 1774). A small-scale plan of the whole area is on display in the Clan Cameron Museum and we will examine this next.

However, what does Roy show in 1750? The Roy map covering central Glenloy shows woodlands on the south, west of Barr but not as far west as Achnaherrie. By contrast the north side of the glen west of Achnaherrie as far as Achnanellan is shown as wooded, but not the area west of Achnanellan later shown as Brian Choille on OS maps as discussed above. One suspects this may be a mistake in mis-placing the Brian Choille woodland on the map? However Puiteachan wood is not shown at all on Roy.

So the other settlements shown clearly on Roy close to Puiteachan (a name which does not appear on Roy) are Achnachury on the north side of the river and Achnaulan. No buildings or arable are shown at Puiteachan, but archaeological evidence of an old building is discussed below. However it is possible that the building which I call ‘Old Puiteachan’ post-dates Roy’s survey of 1750. Either that or it has been omitted as insignificant, being only a single cottage with tiny and rough fields compared to the larger settlements nearby (I favour this later option).

The settlements around Barr are fascinating as depicted on Roy, since the once sizeable settlement of Barr is not even named on the later 1st Ed OS map in 1860. Firstly the houses at Barr are shown on Roy on the west side of the main burn which flows south. Immediately across the River Loy is the settlement called ‘Iner Urk’ on Roy, with the mill ‘A Vulan’. Of course it was not easy for military surveyors who did not speak Gaelic to get place-names down accurately and so the place-name spelling is awkward compared to the more carefully surveyed OS map a century later. The main thing is that these settlements are shown as busy working clusters of subsistence farmer’s buildings at the time, ie farmtouns. Roy has striped symbols for arable land, reminiscent of the rig and furrow ploughing common at the time.

These place-names also recur on a small-scale map of about 1820 by John Thomson who uses the name spelling, going from west to east, of: Achnanillan, Achnahary, Wulan and Inverark, also Loy Water, but does not name Barr. This confirms that Inverark and Wulan are seen as two separate settlements at that time. Thomson shows no woodland or arable symbols.

So the 1774 Forfeited Estates Survey is a very useful comparison to Roy, coming only 24 years later. However this was a time of significant land changes, and changes in Glen Loy followed the failure of the Jacobites in the ’45 of whom Lochiel was a key member, hence the estate forfeiture to the crown in the aftermath. Detailed maps of farm leases at that time\(^9\) are particularly useful. The overview map in the local museum\(^10\) is also excellent in getting a land-use picture over the whole Lochiel estates.

Looking again at map accuracy by comparison, the plan for Barre farm clearly shows the buildings all on the east side of the ‘Altcoryleaten’ burn, unlike Roy, so that seems to show up a clear mistake on Roy in the location of the township compared to a major burn, though some arable is shown on the west bank on the 1774 plan. The new combined name of Inneruiskevulen is now used for the farm north of the river, and this is now understandable as the mouth of the mill stream, uisk meaning water, vulen the mill, and gives meaning to the house name Inverskilavulin which appears on the 1st Ed OS map and has been used ever since. The Clan Cameron website gives a correct Gaelic spelling for this place-name of Inbhir Uisg a’Mhuilinn, stating that a branch of the MacGillonie Camerons lived here from the 15th C to the early 19th C. The extensive archives on the Clan Cameron website also record that Inverskilavulin was home to the last Cameron of Letterfinlay c1864.

\(^8\) A critique of Roy maps and their accuracy is given by Prof Smout on pages 59-64 of the book ‘A History of the Native Woodlands of Scotland 1500-1920’, by TC Smout, Alan R MacDonald and Fiona Watson, EUP, 2005.

\(^9\) A series of large scale farm plans within Lochiel estates at 1774 was kindly copied to me from Stirling University data by Mairi Stewart, themselves taken from the National Archives of Scotland ref E786/50. Their purpose was to help set farm rents for the Forfeited Estates Commissioners.

\(^10\) Thanks are due to the Clan Cameron Museum curator Denis Muir for opening up the museum out of season to show me the map and for allowing me to photograph it.
Fig 2: Extract of 1774 Forfeited Estates Survey showing woodland on the farm of Achnaherrie, approximately the location of Puiteachan pinewood today. Photo: Peter Quelch. Courtesy: Clan Cameron Museum.

The most relevant farm plan is that of Achnaherrie (this is the spelling used in the farm plan of 1774) as this plan actually shows Puiteachan wood, though it is again not named as such. There is a relatively small rectangle of woodland corresponding with the lower part of the current reserve above and south of the River Loy, and on this plan it is annotated ‘Birch w. some firs’. This is a very significant early record of the wood, even though the extent of the wood seems minimal compared to now. The composition of mainly birch with some firs (ie natural pines) is of special interest and will be considered later.

The tenancy at Achnaherrie in the mid 18th C is listed in a document in the Clan Cameron Archives website as holding eight families, mostly of MacGilIonie stock, living here in 1750. Cameron of Fassifern built a handful of houses here in 1747, with tenants being mainly Camerons, a MacPhail, a MacVicar and a MacNeill. MacGillonie seems to be an older name for the Glenloy branch of the Clan Cameron11. The same website gives a possible meaning for Achnaherry as being the ‘field of the boundary between two marches’, possibly referring to an old land division between Strone farm and Fassfern lands to the west.

First Edition OS 6 inch to the mile, approx 1860.

In the relatively short time since the estate survey Puiteachan woodland has expanded significantly. The 1st Edition OS map which we know to be accurately surveyed shows extensive woodland on the slopes south of the small woodland shown on the 1774 estate plan. The extended woodland is named as Coille Phuiteachain, and the small roofed cottage of (‘old’) Puiteachan is shown where the current house ruins are. The location of the current ‘new’ Puiteachan cottage is labelled only as a sheepfold on the 1st Edition map.

Achnaherrie is shown as a few un-roofed buildings at this time and named as Achadh na h’Eirghe. It has been abandoned by 1860 as a working farmhouse12, and sheepfolds have been erected just above the old village. The same is true at Inverskilavulin and the old settlements of Barr and Inerurk as shown on Roy no longer exist. Achnanellan has also survived as a main farmstead, also with its sheepfold, on the 1st Edition. All these changes no doubt reflect a significant change in land use at about the end of the 18th C, from several townships engaged in subsistence farming to a reduced number of large sheep farms.

11 The Clan Cameron website explains that the Clan derived from 3 older septs: MacGillonies of Strone, MacMartins of Letterfinlay & MacSorlies of Glen Nevis. The old names became disused when all parts of the united clan took the name Cameron.
12 A list of rents for Lochiel estate c1789 by Col Allan Cameron, shown on the Clan Cameron archive website, lists Achnaherry as combined with the lease for Strone farm at that time.
Later editions of OS maps
The second edition map of 1895 shows Puiteachan much as on the 1st Edition, with the old croft-house and the old track leading to it, and the woodland much as in 1860. There is one archival reference to the old cottage in the Clan Cameron archives which translate the place name as meaning either ‘The swelling knoll’ or ‘The young moorfowl place’\textsuperscript{13}, and notes that in 1875 Puiteachan is listed as a ‘shepherds dwelling house’. So the gazetteer on the website translates the woodland place-name as ‘Wood of the Swelling Knoll’

However by the third edition OS maps of 1905 a significant change has occurred, the old house has been abandoned and the new croft-house (still occupied today) has been built a little west of the old house, on the site of the sheepfold shown on the 1st Edition map. The extent of woodland is unchanged from the second edition map.

Puiteachan old house
Much of the archaeological evidence of Puiteachan wood relates to the old house and the series of embanked enclosures close to it. The enclosure just to the north of the house is clearly shown on the 1st Edition OS map, and large sections of the boundary banks can be traced through the woods today, including distinctive burnside dykes with veteran low pollarded alders adjacent. Note that the old track to the original house does not come from the ford or bridge as it does currently, but from a ford over the river downstream to the east.

What the 1st Edition map does not show is a distinctive enclosure with curving dyke immediately to the south of today’s ruined building, with the rear wall of the building being part of the enclosure wall. Each end of the curving shaped wall ends at the gully of the burn. A third smaller enclosure can still be traced across the burn from this second enclosure but is not quite so obvious. These enclosures mostly have only moderately young birch within them, although older trees are found along the bank itself, including some old pines. Clearly the enclosures were for safe-keeping of livestock and to prevent them straying to the wider woodland and hill beyond. There are also small areas of potentially arable land within the enclosures, mainly within the northern one. The boundary bank trees of the northern enclosure are now excellent for old-growth lichens, as they are both ancient and also open-grown compared to the woodland trees.

One other related piece of woodland archaeology in Coille Phuiteachain is what appears to be a level platform at a strategic location beside the burn and adjacent to a holly, at NNE 09594 N84275. There is every possibility that charcoal would have been made in this wood from oak or other hardwoods, perhaps in earlier times before it became an open wood pasture with pollards. Excavation might demonstrate the use of this platform for charcoaling, as it fits the usual physical requirements of a charcoal platform.

Puiteachan – possible sawpit
At the end of the northern enclosure nearest to the River Loy is the rectangular outline of a sunken building, open at the north (lower) end. This building is not shown on any of the maps, and needs archaeological investigation to explain it better, as it may be a cart-shed, but it would also fit the shape and size of a saw-pit. There is an old oak tree at the entrance to the pit with iron pegs in it indicating human interference and not so long ago, but this could be part of old fencing.

\textsuperscript{13} The moorfowl meaning is the one adopted by the current owners of Puiteachan and is repeated on their house sign.
It is possible that pine logs from Puiteachan pinewood were dragged by horse and sawn at this location before onward cartage. It is interesting to note in the accounts of wood cutting in the mid 18th C (App 1) that several carpenters refer to cutting planks in Glenloy, not just extracting logs, implying that the planks were sawn in Glenloy presumably in a saw pit. For example ‘William Ewing, carpenter, 1753 … had sawn 100 planks for William Stewart in Glen Loy’. The track and possible sawpit on the edge of Puiteachan smallholding close to the main drove road would be ideally located for such an installation.

More than that, the thought does occur that the house and smallholding at Puiteachan, being set apart from the main farmtowns at Achnaherry and Achnanellan, might have housed someone specialising in woodland work, hence them living almost on the job as it were. The small field enclosures would have allowed the woodman/smallholder and family to grow their own food, but his main work may have been in the woods, for example as a skilled sawyer using the saw pit?

Puiteachan croft\textsuperscript{14} can be compared with a very similar isolated low status croft located right beside extensive oak woodland with tiny fields and an adjacent sawpit, which can be seen just off a trail in Taynish NNR oakwoods, Knapdale, at NR732847. Perhaps these two examples of woodland smallholdings are early equivalents of the sort of smallholding later set up during the 20\textsuperscript{th} C by the Forestry Commission at most of its new rural forests to attract stable and skilled forest workers (men also readily at hand in case of forest fires), known as ‘forest worker holdings’\textsuperscript{1}? In fact Puiteachan and Taynish woodmen’s cottages seem to be prototype ‘Forest Crofts’ as are now being discussed!

It would be good to get archaeological work on the remaining walls and buildings at Puiteachan to try to ascertain its real age. It is of interest however that in Prof Smout’s notes on the documentary history of woodland exploitation in Glenloy (App 1) that one account in 1755 names the wood or location as ‘Putichan’. That naming of the wood or the croft helps show that the settlement at Puiteachan is indeed probably quite ancient, even though it was always probably a small settlement, even a single cottage, compared to the townships on the other (south-facing) side of the glen of Achnanellan and Achnaherrie.

\textbf{Culturally modified trees}

The reason I have spent some time describing the old house and its associated enclosures is that the working of trees for some sort of woodland produce, presumably by the last farmers in that dwelling, have left a legacy of a number of worked veteran trees of the following types:

\begin{itemize}
  \item \textbf{Oak} – pollards of various heights, in a zone on the east side of the Puiteachan Burn and yet mostly quite near the old house and its enclosures.
  \item \textbf{Alder} – low pollards, high-cut fused stools, mostly close to the burnsides. This is a type typical of many other Scottish wood pastures.
  \item \textbf{Ash} – one high pollard in ash survives, of very distinctive shape, quite high up in the woodland.
  \item \textbf{Birch} – a small number of downy birch low or stub pollards or high cut fused stools, mostly high up in the wood above the other pollards. This high level situation for this type of birch stub pollard is typical of wood pastures in the Lake District, and some Scottish wood pastures.
  \item \textbf{Scots pine} – a moderate number of huge open-grown and branchy pines, close to and mixed with the old oaks, and a scatter extending further east right up to the gully boundary of the old wood.
\end{itemize}

\textbf{Candle fir pines}

Many of these veteran pines show old axe scars which appear to be cutting into the resinous heartwood, not typical of attempts to fell the tree, but probably as a way of harvesting resinous ‘fir candles’ or candle-fir\textsuperscript{15} used as alternatives to rush or candle lighting, and perhaps also as kindling for fire-lighting. This cutting deep into the interior of already old trees leaves a distinctive hollow and the axe marks which are probably themselves well over a hundred years old.

\textsuperscript{14} The word ‘croft’ is being used for convenience but this smallholding may not constitute a croft as such. It is interesting that a scholarly critique of the Roy map (Whittington and Gibson,1986) (full reference in Smout, 2005) states on page 40 that in the Military Survey, ‘housing of the cottar class has usually been omitted’, and perhaps this is true for Puiteachan in the mid 18\textsuperscript{th} C. Perhaps the cottage was improved for use by a shepherd during the early 19\textsuperscript{th} C. This is my speculation but seems to fit the various evidence. TC Smout in ‘A History of the Scottish People’, Fontana, 1985, p 135, defines cottars’ living conditions thus: ‘all had a hut and a kailyard, a small amount of fertile land on the infield, and the right to graze a few animals on the moor’. This seems to describe Puiteachan well, within a woody setting.

\textsuperscript{15} This old form of lighting is described on page 184 of ‘Highland Folk Ways’ by IF Grant, Birlinn, 1995, first published in 1961. The author describes the use for lighting of small slivers of well dried resinous pine, held in clips on iron stands, which were normal in inland districts until the end of the 18\textsuperscript{th} C. Dried pine knots were also used in the same way.
are still quite discernible in the dry heartwood protected from rain and rot by the surrounding cavern of wood. Many branches on these pines have also been cut and the scars are visible, but the shape of many of these old pines almost resembles a pollard, perhaps caused by repeated cutting back of multi-stem or branchy pines.

**Puiteachan as a previous wood pasture**
Open grown and pollarded trees are typical of wood pastures – in fact in the wider upland countryside that is more or less the only place they are found. The most worked trees are those quite close to the old house of Puiteachan, mostly within 200m or so of the ruins. The presence of this scatter of veteran worked trees is strong evidence for a historic wood pasture where probably cattle were pastured under the worked trees in this rough terrain. Interestingly there are today many plants indicative of lime richness eg Dogs Mercury growing amongst the Molinia grass, an unusual sight. This lime richness would make the site all the more useful to early farmers for sheltered grazing.

The limited extent of veteran trees ties in with the estate plan for Achnaherrie farm in 1774 where only a small area of trees is shown at Puiteachan, close to the river and east of the burn, which coincides with the current veteran trees. The much more extensive woodland that appears on the 1860 1st Edition OS has regenerated from the scatter of old veteran trees which have acted as seed sources. Today the worked veteran trees of the 18th C wood pasture are still there, along with cohorts of trees which arose during the early 19th C, and at various times since then, including pine planted on open knolls during the early and mid 20th C by the Forestry Commission.

![Fig 4: an unusual ash pollard surviving in the eastern part of the pollarded section of Puiteachan woodland. (Photo: P Quelch)](image)

**Puiteachan as an ancient woodland of natural origin**
As discussed above the number of historic maps pre-dating the 1st Edition OS map are few in number and only the 1774 farm plan for Achnaherrie actually show any trees at all in Puiteachan wood. However aspects of botany are indicative of the site being seminatural woodland of ancient origin despite the modest map evidence. Both the bryophytes and lichens have been surveyed in the last year or so during training courses for lower plants, and results show the sort of richness typical of ancient woodlands. SNH’s ancient woodland inventory classifies much of the site as ancient, despite the absence from Roy.

My hypothesis would be that the wood is absent from Roy, not because the surveyors had a bad day and omitted it (though this is very possible), or because it didn’t actually exist, but that as a very open and extensively cut-about and grazed wood pasture it did not meet their criteria for woodland for mapping. Puiteachan cottage I suggest probably did exist at the time of the Roy survey but being single, small and poor was probably also omitted from the map.

It is known from documentary history that during the 17th and 18th C much pine was felled in Glenloy, and that while timber felling on Lochiel estates was more regulated in Glen Mallie and on Loch Arkaig side, the woods in Glenloy were treated as being more for local use. Indeed Cameron of Fassiefern claims during arguments with the Forfeited

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16 A more detailed woodland archaeology study would plot the positions and record, measure, describe and illustrate all the veteran trees. A pattern of distribution might then emerge. In any case such a survey would be a useful record of this biocultural heritage, which of course is made up of living trees which will not last forever. Further insight into the old trees would come from a ring count study of all the types of tree and the pollard branches to determine ages of trees and dates of last cutting. Also tree ring studies on the various ages of non-veteran pines would demonstrate the history of tree regeneration since the 18th C wood pasture phase for Puiteachan.
Estate Commissioners\textsuperscript{17} to have old rights to take wood in Glenloy for his sub-tenants use, and the connection with Fassfern is also touched on above.

\textbf{Conclusions}

The history of Puiteachan wood demonstrates several features:

An ancient mixed woodland with both pines and broadleaves of natural origin can go through a very open wood pasture phase with scattered trees of poor form during the late 18\textsuperscript{th} C and for an unknown period before that, due to cutting by adjacent tenants for fuelwood and possibly tree-leaf fodder for tenants’ livestock.

It is possible that during the 19\textsuperscript{th} C some of these traditional uses of the woodland continued in this remote location while a shepherd occupied the old house right up towards the end of that century. Tree ring dating studies might help date the time of last cut for the old pollards. Similar dendrochronology studies are underway at present in other Scottish wood pastures.

A respite from grazing obviously occurred early in the 19\textsuperscript{th} C after the change to sheep farming and the loss of the old multi-tenant townships in Glenloy. The old wood pasture acted as seed source and regenerated a whole new woodland within the influence of the seed trees, as evidenced by the extensive woodland on the 1\textsuperscript{st} Ed OS map in 1860.

Indeed it might also be said that the pollarding actually protected the old trees from felling, as the trees would have had little or no timber value, and legally or at least through tradition, they were regarded as being the tenant’s own trees. Other woodlands on the estate say on Loch Arkaig side with no such tenants’ rights were put out for exploitative sale, and many woods which had better pine timber were no doubt lost for good through not replanting or regenerating, in contrast with Puiteachan which later regenerated from the old and scattered seed trees.

This case study shows that given the right conditions (which may involve more than just excluding deer by fencing) many more of the open wood pastures in Scotland, some of which are not even mapped, could be saved and converted back to mixed seminatural woodland, along with much of their original biodiversity. \textsuperscript{18}

Wood pasture structure can then be seen to be not only a form of biocultural heritage in the legacy of veteran worked trees associated with the post-medieval settlement archaeology alongside, but can also be seen in the longer term as only a phase within a longer history of that woodland.

The woodland structure and biodiversity of Coille Phuiteachain has been enhanced by its wood pasture history and now it contains veteran worked trees of several species as well as a range of younger age classes.

In any case the history outlined above, which of course can be improved on through further archaeological and documentary research, is a fascinating one and lends itself to interpretation to the public by a trail leaflet or other means.

Finally the old Puiteachan house quite possibly represents an early example of a Forest Croft!

\textsuperscript{17} For a more full account in Chpt 9 of the book ‘Scottish Woodland History’, edited by T C Smout, Scottish Cultural Press, 1997.

\textsuperscript{18} A further case study on FCS land which clearly shows this sort of regeneration of a mixed and biodiverse woodland from a previous wood pasture phase is Achnatra woodland, Inveraray.
A TALK WITH JOCK CARLISLE

John Fowler

In the winter of 1995 I visited Jock Carlisle at his home in the little town of Deep River, two miles’ drive into the interior from Ottawa, as part of my research for a book on the Scottish woodlands. Carlisle had gone to Canada some time after the publication of The Native Pinewoods of Scotland to take up a senior post in forest research in Ontario, and was by then retired. So, snowbound one December evening, we settled down by the stove and he reminisced at length about the years he spent working with Henry Marshall Steven, professor of forestry at Aberdeen, on what would become their pinewoods book. It was something of an epic story.

It began in 1950. Carlisle, an Englishman in spite of the name Jock which he adopted later. As Alan Carlisle (his byline on the book), recently graduated in forestry at Bangor, he turned up at the forestry department in Old Aberdeen to be interviewed for a research fellowship by Professor Steven and his colleague, a Doctor Laing. I’m not sure that the publication of a book was envisaged as the end product at that time.

The two academics were very different characters, as he made clear.
Dr Laing was a marvellous, little roundish man with twinkling eyes and a marvellous sense of humour. Professor Steven was amiable, helpful, but distinctly sober and austere. He had about him a certain severity. This didn’t upset me too much because I’d observed that quite a number of people from Aberdeen were sober and austere. Most of the technical supervision was by Laing. Professor Steven’s supervision was concerned with strategy rather than tactics. His interest was in the history. Originally Professor Steven said very simply, go and study the pinewoods. It was Dr Laing, I think, who directed me to go and talk with the head forester at Glentanar, at that time the legendary Duncan Ross.

The first time I met him, frankly I was a little scared of him, until I got to know him and he knew what I was after. For some time he and I walked over the forest – he was physically very strong and could walk and walk – and I began to get a feeling for it. He taught me the right questions to ask which is the hardest part of any scientific research. He had an intellect like a razor and a remarkable instinct as a forester. He was the only man I’ve come across who could tell when there was going to be an excellent seed crop four years ahead. He had a great affection for the old forest and all the time he was trying to find answers for its natural regeneration.

I admired him almost more than anyone else I’ve met, and ever since, when I had a problem, I would ask myself what would Duncan say if I did this or that.

Early on I examined all the sites people said were natural. In some cases it was very arguable. I then began following a multitude of red herrings. At university people said you should look at the old maps and find all the places called Guibhas, which is the Gaelic name for Scots pine, and see if there are any original pine forests there. All over the Highlands there are places called Guibhas. There’s even a place here in Canada called Guibhas. Well, Dr Laing said, it gives you an excellent excuse to go on a detailed excursion all round the Highlands. So that’s what I did.

[Carlisle soon gave upon the Guibhas trail and relied on other leads, including the evidence of his own eyes. He tramped round the Highlands dressed in tweed jacket, cord breeches and heavy leather climbing boots equipped with nails known as trigounies – and sometimes with a shotgun slung over his shoulder, for shooting down specimen cones from inaccessible branches.]

A lot of the areas where there were rumours of old pinewoods weren’t easily reached. So if possible I went up the mountains and walked along the ridges and examined the glens under me, not with binoculars but with a telescope I still have. The trouble was that the early owners from the 1600s onwards would collect seed from the old pine forest and plant it elsewhere even where there hadn’t been a forest before, a situation further complicated by the fact that some of the owners had tried to make their woods look like a natural forest. So to make a decision on whether they were natural forest I had to hunt through the records, and if I could find a reference to an extensive pine forest there before 1600 then it was almost certainly original.

Also, and this is most unscientific, after I’d had heaps of experience someone might say ‘this is natural’. It would have all the characteristic and I’d walk around, but something within me would say otherwise. When I hunted up all the records, as a rule my hunch was correct.

From 1950 to 1952 I was on an ancient bicycle which I’d had in the RAF. I would cycle as far as I was able, hiding it amongst the rocks and heather until one day in Glen Quoich I returned to find a stag had completely wrecked it and I had to hike home. A wrecked Raleigh may still be in the undergrowth. Then I received a little inheritance and was able to purchase a little 1938 Morris car. Excellent – until one day, going over some remote Highland stream the bridge collapsed under me. After that I purchased a sporty Lea Francis, it had a racing engine which helped. But it was not designed to go over those awful Highland roads. I was breaking axles.

I found it was essential to operate all through winter. In some forests I’d be out for about a week, sleeping under the rocks and all that kind of thing. My rations were dates, raisins and Healthy Life biscuits.

The item I had to get first was climbing boots. Early on I purchased a heavy oiled Barbour which was excellent providing you weren’t being strenuous, and I did also use an ex-army groundsheet but there really wasn’t any answer. If you had anything for the rain it was heavy and it was hot and often I just said skip it and got soaked. Sleeping out, I sheltered under an army oilsink. But can you imagine waking up early in the morning and there are hinds all around you and an eagle overhead?

My gear varied. I was carrying an army rucksack and always safety equipment, sweaters and even a drug like benzedrene because when you get exhausted it’s dangerous sometimes, you can take a pill and your eyes open instantly and you’ve got boundless energy.
In my rucksack I was hauling around rocks and cones and samples of soil, sometime the pack weighed fifty pounds. Going over awkward ground with a fifty-pound pack is not my idea of enjoyment. Early on I had to hike in Affric, twelve miles each way, and once into the forest in Affric it isn’t easy, humps and all, and the end I was so exhausted I said why am I doing this?

I was healthy! Some of the terrain was beyond belief. Once I nearly died. I had decided to hike up to the end of Alladale. It was icy and there were snowstorms, but I decided to hack on and see what was up there. So I carried out a rather superficial survey and then I thought, people had said there were still remains of pines in Diebiedale so I decided to go over the hill and see what was there. When I got over the hill I encountered a terrible, terrible storm. So I said, Jock, this is being very stupid, turn back, go home.

I guess I must have been tired, I slipped on ice and fell over a cliff. When I woke I was paralysed from the waist downwards. I reckoned I’d smashed my spine. This was one of the few times I hadn’t told anyone where I was going. There wasn’t going to be any help. You’re dying. Then I remembered deer I’d seen in the forest and how the foxes had eaten their entrails whilst they were still alive. – Jock, you’d better damn well do something!

I started imaging. I remember looking at my toes and saying: Move, you bastards, move, wiggle, wiggle. [After a long time he managed to get to his feet. He fell over a lot. But he did manage to get moving, awkwardly and very painfully.] To begin with I was on my hands and knees and then I graduated to stumbling. Quite soon I had to go over a river. It was icy. I took off most of my clothes and with great invective and cursing and swearing and howling and yelling, stumbled across, waist deep in places, half falling in it all the time. [He thought he must have covered about ten miles overnight though he remembered very little about it. He failed to notice passing at least one habitation.]

I ended up lying on my side beside a road and I feebly tried to signal some cars to stop but they all thought I was drunk. Eventually a very elderly gentleman halted his ancient vehicle and he took me to my room at a temperance hotel in Ardgay. Temperance! – they’d never heard of temperance. They filled me full of hot whisky, tea and aspirins. I was fairly badly injured, actually.

The funny thing is, nobody thought of calling a doctor. In those days you didn’t. I could stagger to a potty to relieve myself but I couldn’t scrub myself. The two old women who owned the hotel decided I needed a wash. So they stripped me stark naked, these two old girls, and the ribaldry was very entertaining.

Sometimes I stayed overnight with a gillie, or a crofter, sometimes in a barn, or a ruin. And sometimes I put up in the landowner’s house. Or hotels. Some hotels had a roaring fire in what they called the commercial room, but mostly there was just a smouldering turf in the hearth, and some had no fire at all. These hotels were just awful, they were freezing. It wasn’t a question of pyjamas, because you didn’t ever take your clothes off.

[It wasn’t all field work, and much of his time was spent in the laboratory. But tramping around the hills and the woodlands was the best of it.]

Immediately I enter the woods I feel entirely at home. The fact is that during that whole excursion I was supremely happy. I was doing something I liked doing more than anything else. And furthermore I was being paid for it – not very much, but I was being paid. I thought this was the most marvellous thing that anyone could ever have. Being up in the mountains and forests for ages alone completely altered the way I saw myself and the way I saw others. It certainly altered my attitude to the forests and wildlife and made me ask myself some very fundamental religious and philosophical questions.

I had been raised in a university where the principal aim of forestry was to establish the trees and harvest them. I had never before thought of looking at the forest as a whole and the interactions within the trees, the fauna and the vegetation. Once you begin to see the forest as a whole you see it as a gigantic organism all on its own.
TO STAND IN THEM IS TO FEEL THE PAST

Finlay M MacRae

To stand in them is to feel the past

I hope to present some of my views on the retention and further regeneration of natural and native woodland in the Highlands and in particular Glen Affric and adjoining glens, where I had the good fortune to work for 25 years.

I have never found it easy to look at natural woodland and conservation in isolation, and my thoughts often wonder, to embrace wilderness and landscape, since all come within the total landscape equation.

A devotee of Aldo Leopold and John Muir and men of that stature, their great wisdom filters down to me.

Leopold said, and I quote:

“Ability to see the cultural value of conservation and wilderness boils down in the last analysis, to a question of intellectual humility. The shallow minded man, who has lost his rootage in the land, assumes that he has already discovered what is important.

It is only the scholar who appreciates that all history consists of successive excursions, from a single starting point, to which man returns again and again to organise yet another search for a durable scale of values.”

Great areas of natural native woodland, closely associates with conservation and wilderness have been lost in the hurry to create production forest, much of it seriously out of touch with our landscape and indeed our natural history.

The country that respects its tradition lives.

“To stand in them is to feel the past”

So said Professor Steven in his introduction to his unique work *The Native Pinewoods of Scotland*. I believe that Steven embraced all natural and native woodland in that statement. I had the good fortune to study under Steven when he was Professor of Forestry at Aberdeen in the late 40s and 50s. Many years later good fortune smiled on me again, when Strathglass, Glen Strathfarrar, Glen Cannich and Glen Affric fell within my forest district.

All three glens had elements of native woodland and the native Pinewood was especially prominent in Glen Affric.

I believe it was isolation that saved these woods from complete removal.

One day accompanied by the late Tom Weir, that great wanderer, author and naturalist, I set out to walk from Beauly in the East to Kintail in the West right across the very waist of the Highlands. This is how Tom saw the land and what he said:

“I believe this to be the greatest cross country walk in Scotland, if not in Europe. I hope the area will be kept in its natural state and set aside for conservation and especially to the perpetuation and care of our natural woodlands.”

I had always regarded Affric as “the Jewel in the Crown” of the northern conservancy.

Here was different woodland, a one-off in silvicultural terms, a step back to look into the past, and hopefully a step forward into the future.

I am now knocking on the door of 86 years of age, and hoping that it will be opened, even a chink. I may well be a thorn in the flesh of the Forestry Commission and indeed the benevolent treasury, if such organisations have any flesh left on their bones.

When I took over Affric in 1963, the area was vibrant following the work of the great Hydro Electric schemes, where some 1500 men found employment.

With a Head Forester in charge, there was a squad of between 50 and 60 men, with plenty of accommodation at hand.

Today I gather there are less than 10 men in the glen.
Prior to 1963 a number of timber sales of Birch and Pine had taken place. Some thinning had been carried out to break up the birch wood canopy and then replace the area with Scots Pine. Unfortunately much of the birch wood over storey had been destroyed in the great gale of 1953.

The replanting of these areas was done with Scots Pine transplants raised in the Black Isle Nurseries from a wide variety of provenances ranging from areas such as Loch Maree, Achnashellach etc. None of this early planting came from Affric seed. Some thinning of Affric Pine was carried out on the South side of Benevian with a view to creating conditions for natural regeneration.

Some felling was indiscriminate and Glen Cannich was denuded, the timber sold standing, a scattering of Birch, Alder, Rowan and Aspen remained. Glen Cannich was then given over in the main to Lodgepole Pine, an invader from Western Canada where it thrived on very poor land.

Once an area has been cleared on its natural climax Pine Forest, it is too late to take sensitive remedial action and regrettably Glen Cannich had never appeared in the plan to regenerate the Scots Pine wood, even by planting if necessary. The scattered remaining broadleaves, of no use to the timber merchant, helped to soften Glen Cannich and today it is visually acceptable.

Lochs Benevian, Affric, Mullardoch and Monar were the main reservoirs for the Hydro Electric schemes. Apart from Affric, saved at the last minute, all the areas were dammed and flooded, changing the whole appearance of the countryside.

An area of about 2000 acres of pine forest on the South side of Loch Benevian was deer fenced. The loch side was not fenced, largely because I suspect because of the cost and in the mistaken belief that a deep wide loch would act as a barrier to red deer.

Yet Benevian woods had always been the over wintering ground for Affric and adjacent deer forests. When the lochs froze over deer crossed to their former over wintering ground with its fine shelter and ample browse. Deer, natural woodland animals dislike periods of long wet weather and lose condition very quickly. I recall measuring 27 inches of ice on Loch Benevian one severe winter – deer crossed the loch, dry shod as it were.

During periods of heavy hind shooting, usually in January or February it was often possible to drag carcasses to the loch side, where they could be rafted and dragged across the loch using horses. On an odd occasion a Land Rover could be used as the dragging vehicle – a practise not to be recommended. Land Rovers, as some of you will remember, were very scarce in the early 50s and 60s. The loss of a Land Rover and more seriously the crew would call for the completion of many forms and possible dismissal. The ‘Health and Safety at Work’ act was merely a foetus at that time.

Many years later I was privileged to visit Eastern Siberia. I had two objectives in mind.

1. To see Scots pine growing naturally in the “cold pole of the world”
2. To visit Lake Baikal and the vast Taiga

I found it difficult to believe that Lake Baikal contained about a fifth of the world’s fresh water. About 400 miles long and immensely deep, a remarkable fresh water continent, it sometimes froze to a depth of 3 metres. The Russians were able to lay a rail track on the lake in severe weather and transport timber to sawmills etc.

I found the expanse of the Taiga and the immense areas of water, some of them flooded for Hydro Electric power, quite shattering and our Scottish forests and adjacent lochs became totally insignificant.

At times of prolonged frost when the ice melted on the Affric lochs with a sudden thaw, there was much damage to loch side trees and fences. The original 2000 acres enclosure had to be completely fenced, and many miles of road were constructed. Many patterns of selective felling were tried, the timber being sold at roadside in small parcels.

While selected seed trees were carefully spaced out there was little evidence of natural regeneration. Birch and other broadleaves were retained and the mix greatly enhanced the scenery. I have always felt that enhancement of our scenery should not be overlooked.

Assuming that natural regeneration from mother trees 100 to 150 years old would be slow and very difficult in the deep heather and peat, it seemed that the best way forward was to go for planting with native stock. Cone collection
from trees about 50 feet high with broad crowns proved to be far from easy. A young fit volunteer using a ladder climbed into the crown of the tree, then using a long handled rake dislodged as many cones as he could reach, and they were caught in tarpaulins spread around the base of the tree. Once on a short visit to Aberdeen I decided to call on Professor Steven, to tell him of our exploits in the native pinewoods. I told him of our cone collection method and how we selected trees with a straight stem and lightly branched crown, and of course a good supply of cones. He advised me to collect from the full range of trees present, and to avoid over selectivity, explaining that we might fail to safeguard the unique gene pool. We took his advice.

The cones were bagged and sent to the Black Isle nursery where the seed was extracted by hand and cleaned. Heathland nurseries had been prepared in advance, within or on the fringe of mature established pine stands. Seed sowing was done by hand, fairly sparsely, and with care, and the beds were then covered with strong grit. On a cold spring day in the Black Isle a female staff of some 50 ladies knelt or sat down to weed the emergent seedlings. I'm not sure that we would get anyone nowadays to do this boring yet delicate job, and at times the language was not fragrant.

After careful lifting, the seedlings were lined out in well-prepared and lightly fertilised beds. After two seasons a six to eight inch transplant was strong enough to be returned to the harsh conditions of Glen Affric, after careful nursing in the Black Isle.

Over a number of years eight million transplants of Affric origin were returned to the glen for planting. Many systems of cultivation were attempted in the rough terrain. Ploughing, using a wide variety of plough heads turned out to be unsuccessful. The plough usually left a large mound of raw material in its wake, into which it was well nigh impossible to set up an eight-inch transplant. Ploughing was abandoned.

Areas from two to five acres were carefully selected, drained by hand and peaty turfs spread out at sufficient spacing to take 1500 to 2000 transplants per acre. All transplants were fertilised by hand with GMP. Despite such careful preparation and the raising of good planting stock, there was quite significant damage by deer, frost etc.

Deer had considerable range within our 2000-acre enclosure and they were difficult to control. Additionally, incursions during heavy snow when fences were insecure, added to the entrapped deer numbers. The hand drained and fertilised planting meadows provided fresh browse.

Clearly the answer lay in reducing the size of the large enclosure making it easier to control deer. So the 2000 acre enclosure was divided into three equal lots, using as few gates as possible – people don't like gates and often leave them wide open. I am sure that the current freedom to roam legislation will leave you in great doubt about securing specific vulnerable areas.

Within each new enclosure there was room for a range to move quietly and gently and move deer to the assistant rifle. The system worked well and rangers became very effective with this method. In three years we were able to abandon planting in favour of natural regeneration.

Additionally many broadleaves survived and the whole area took on a more natural and colourful appearance, the broadleaves softening the harsh green of the pine. It seemed as though we were on the way back to mixed native woodland, with a wide range of age classes. Prior to this time there were few trees in Affric under 100 years old – did this perhaps coincide with the formation of the large deer forests of Victorian times.

Today when I look out across Benevian I see a changed landscape, a natural forest more pleasing visually, especially in the autumn and early winter. Then I ask the question … “Where do we go from here?”

Should we consider some timber production from the younger stands, now 40 to 50 feet tall, by thinning to retain good seed trees? Should we remove all fencing and accept an increase in deer and other wildlife, always with the hope that Highland deer forest numbers can be reduced from the present unhealthy state.

These are critical decisions for someone else to take.

One point is clear in mind – that regeneration can only be achieved through protection and careful assessment and manipulation of the areas to be controlled by highly skilled rangers using a variety of techniques, e.g. high stands rather than traditional stalking.
I well recall the beautiful Birchwood that occupied the side of Loch Ness from Dores to Foyers and my first visit there accompanied by a senior officer. It was remodelled in the early 50s to become a Norway spruce wood. That was the fashion at the time … But was it correct?

Sometimes my visits to the old stamping ground are partly sentimental – visiting former workers, now in their 90s. I took my first piping lessons away back in 1935 from Pipe Major Willie Ross of Glen Strathfarrar. After service in the Boer War and Great War he became the head of army piping in Edinburgh Castle. I had the honour to spearhead the building of a cairn to his memory in Glen Strathfarrar.

Glen Strathfarrar is, I believe, one of Scotland’s great natural glens, with its fine river, extensive pine / birch / alder mix with the open spaces. It has been managed by SNH very delicately.

The younger generation must give very deep thought without changing the character of the Highlands. The great natural areas cannot be replaced without changing their character beyond recognition – all this to the peril of our unique and beautiful countryside. The cost to the nation to safeguard, repair, expand our natural woodlands is miniscule in comparison to their conservation, wildlife and historical value.
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A REVIEW OF THE STEVEN & CARLISLE PINEWOODS

Clifton Bain

Introduction
In 1987 I was fortunate enough to be offered a short research contract, by the RSPB to review the management of the native pinewoods identified by Steven and Carlisle (1959). Whilst I did manage to visit all the sites, the review was largely desk-based using aerial photos and forest management records to identify the changes that had occurred in the thirty years since Jock Steven carried out his extensive fieldwork. The conclusions in the final report (Bain 1987, and see also Bain and Bainbridge 1988, Bain 1989) highlighted that from a habitat conservation perspective there had been considerable damage from timber felling, ploughing and planting of exotic conifers, and continued poor regeneration due to deer and sheep grazing. The study did identify some positive initiatives with the Forestry Commission and the Nature Conservancy Council together with private owners helping to conserve parts of this now internationally recognised habitat.

Twenty years later I decided to use my RSPB sabbatical leave to embark on another review of the native pinewoods. This time, in light of the growing awareness of the need to reduce our greenhouse gas emissions to address climate change threats, I took the challenge of visiting all the sites by sustainable means, walking, cycling, buses and trains. In the short time available, only a thumbnail sketch of each site could be provided, but it rapidly became clear that fifty years on from the work of Steven and Carlisle, considerable progress has been made in realising their vision to restore and expand this charismatic habitat. The report is still in production and should be available this year so what is offered here is a brief overview of the findings.

Changes in Conservation
The time of the first review saw much controversy and public anger around the damage being inflicted on native pinewoods. In response to massive clear felling proposals, the RSPB in 1988 managed to buy Abernethy Forest, through the overwhelming support of its members, in what was the largest land purchase in Europe by a voluntary conservation organisation.

In the last two decades the regulatory and financial support for native pinewood conservation has improved significantly with various grants being made available from the statutory bodies to support private landowners in undertaking restoration and expansion. In those pinewoods protected by statutory designation as Sites of Special Scientific Interest, there was a problem of no legal requirement to restore already damaged sites and those landowners who threatened damage were given financial compensation not to carry out their proposals. Changes in the law under the Nature Conservation (Scotland) Act 2004 brought about a major improvement with a focus on delivering conservation objectives and better support for landowners undertaking positive measures. At a European level the inclusion of Caledonian Forest as a priority habitat under the 1992 EU Habitats Directive brought about an extra tier of protection and additional European funding for conservation measures.

The 1990s also saw a step change in nature conservation with formal international commitments towards conserving biodiversity and in the UK, with the production of Habitat Action Plans including one for native pinewoods (UK Biodiversity Group 1988). With clear objectives, an agreed set of priorities and the ability to measure progress, the
action plan paved the way for a considerable investment in native pinewood conservation and restoration by the statutory bodies in partnership with the private sector. In the publicly owned forests, the Forestry Commission, as lead partner for the Native Pinewood Habitat Action Plan, undertook an extensive programme of habitat improvement including removing exotic trees.

Measuring the success of the action plan requires an understanding of any changes in the size of the pinewood resource and the different habitat conditions. As explained by Callander (1995) the Caledonian Pinewood Inventory undertaken in the 1990s (see also Jones 1999) utilised different survey criteria and measurements to that of my own work ten years earlier and therefore do not allow a direct comparison of changes in pinewood area or condition over time. My repeat work again focuses on highlighting the extent of management change rather than providing a definitive figure for the area of the habitat.

Before and After: a section of the pinewood at Coulin – Left taken in 1987 and Right in 2009 showing no regeneration in unfenced deer grazed area.

Access
Public access to the pinewoods is an important issue not simply as a tool in encouraging a wider audience to appreciate and value this important aspect of our natural heritage but as a matter of law. Changes in access legislation under the Land Reform (Scotland) Act 2003 aims to make it easier for people to enjoy the outdoors and to be clear about what they can and cannot do. Access provision is a condition of conservation management grants and many estates now offer welcome signs giving information about the pinewoods and their management. The Forestry Commission, in a number of sites has provided cycling and walking routes. Across Scotland, the cycle network has been greatly enhanced with several long-distance, safe, off road routes. Perhaps more controversially are the improved estate roads that have a tarmac surface enabling easy access to very remote areas; all a far cry from Jock Carlisle’s hazardous travel experiences in the 1950s. Whilst access has improved there is still more to be done to make visitors aware of the significance of the pinewoods. Those providing accommodation in the vicinity of the pinewoods may be unaware of the history or importance of the habitat. Trains travelling past, and in some cases through, the native pinewoods offer an excellent opportunity to inform a captive audience. On the negative side, it was clear that some visitors have little respect for the habitat as was evident from the rubbish discarded along the shores of Loch Arkaig.

Fencing
Fencing has long been employed as a solution to the major problem of excessive deer and stock grazing. There has been considerable effort in establishing deer exclosures to facilitate regeneration in the state and privately owned forests. These have generally seen some success with healthy regeneration of pine and other native tree species. Over the years there has been much debate about the merits of this management approach. In addition to concerns from a public access perspective, there is scientific evidence of a damaging impact of fences, in some locations, on populations of forest birds such as capercaillie and black grouse. In some situations, fencing has proven less successful as a result of rapid growth of ground flora inhibiting pine regeneration. In response to this problem the regeneration fences have been relocated on a frequent basis to permit light grazing at sites such as Beinn Eighe. One of the more controversial examples of the fencing debate can be seen at Alladale estate where high specification electric fencing has been erected over a large area, along with proposals to introduce potentially dangerous animals.
As well as concerns over the access and habitat damage implications arising from the installation and maintenance of such an intrusive structure there are questions over the long term viability of such a costly approach.

Fencing is therefore best regarded as an emergency measure that provides benefits over simply leaving the site to deteriorate further, whilst attempts are made to resolve the bigger problem of reducing deer numbers to appropriate levels at a landscape scale. Determining the right design, location and management of any fencing does however need to take into account wider biodiversity and access issues.

Despite the positive efforts towards regeneration in the private estates, many owners have only implemented conservation measures in a small portion of the site. The desire to provide deer shelter in the forest may be a competing objective or there may be funding limitations. It was noticeable that the extent of regeneration measures was limited particularly in the West coast where it is possible that the greater remoteness and difficult terrain make the cost of fencing prohibitive under current grant funding regimes. In view of the relatively small overall resource of native pinewood remaining in Scotland there is a strong argument for ensuring a high proportion of each site is included in conservation management. We are reaching the stage where some of these sites have seen little or no pine regeneration for almost 200 years and many of the older trees are coming to end of their life. Unless regeneration takes place soon we risk losing old tree structure as a component of the habitat for many decades and potentially losing some of the dependent associated species in the process.

On a positive note, it is clear that estate-scale deer management has been taking place particularly in Speyside with obvious regeneration over large areas at Abernethy, and Glenmore for example, and at Inshriach where stunted pine is extending up above 800m. Discussions are now taking place over the need to allow some grazing to ensure the right sward structure for retaining viable populations of a diverse range of typical species associated with native pinewood. In some sites grazing animals such as boar or cattle are being introduced to help maintain such diversity of structure.

Planting

There are numerous examples of planted pine of local provenance within and adjacent to the pinewood remnants, sometimes extending over considerable areas. A number of the planted areas are now over 20 years old and the question is what to do with these, since they were established often with a commercial purpose in mind.

Climate change

With the threat of climate change, there are now laws requiring all sectors of Government to respond with measures to help meet greenhouse gas reduction targets and adapt to the impacts of a changing climate. The recognition that forests provide carbon sequestration and storage benefits does bring some potential benefit for native pinewood conservation but care is needed to avoid the wide range of natural heritage and other benefits from being undermined by an over emphasis on carbon. In relation to climate change impacts, it has been observed that pinewoods cover a diverse range of climatic zones and therefore the habitat should be robust under global warming, particularly if the efforts of world leaders to keep below a 2 degree global rise are successful. However, climate change doesn’t just bring warmer weather, it also brings increased storms, flooding, and dry summers leading to higher fire risk. With such relatively small pinewood remnants we risk losing entire sites in single extreme events. Therefore a key
insurance policy under a changing climate is to expand the sites, and ensure they are in as robust a condition as possible by tackling those factors we can control such as grazing.

Modelling work on the possible future climate scenarios and the impact on trees needs to be used with caution. The future scenarios are not predictions and the models are still very limited. It would be folly to give up on native pinewood conservation and restoration in areas indicated as ‘not suitable’ under future climate scenarios. What is unsuitable for commercial timber production is very different to what is suitable for a pinewood habitat to persist. With such a long life cycle we have the chance for the pinewoods to persist, albeit at a low productive level, till we reach the point at which the climate can return to present levels provided we make the right effort to reduce atmospheric emissions for all our sakes.

Planning ahead
Having had a period of emergency effort to halt the losses and bring about recovery of the native pinewood, now is a good time to be considering long term future management planning. The native pinewood BAP recognised that commercial use of the native pinewoods is a legitimate part of the conservation of the habitat. Encouraging timber production and the ongoing supply of wood from native pinewoods can release funds to help secure and expand the habitat. With the renewed interest in wood for fuel and as a replacement for steel and concrete to help mitigate climate change there may be some interesting opportunities. At the same time thought will need to be given to encouraging the right markets to support the sustainable supply of material from the native pinewoods. Sustainable forestry standards and accreditation now exist which can help encourage sensitive management. In planning the future for our pinewoods, concepts can be applied such as zoning to provide areas of different management activity from high protection zones where conservation is the primary aim to zones under higher levels of cropping, albeit still with conservation in mind.

The very fact that we are in a position where we can think positively about the opportunities ahead for native pinewoods is a reflection of the considerable advances made in halting the declines and facilitating restoration. The job is not yet finished, and there is an urgent need to halt the deterioration in a number of sites, including some with statutory protection. Fifty years on from Steven and Carlisle’s work, it is a time to reflect on the gains made and to encourage renewed focus on finally securing the conservation of the last native pinewood remnants as well as looking to future opportunities for managing and expanding the habitat.

All Photos: Clifton Bain.

References
CURRENT MANAGEMENT OF THE NATIVE PINEWOOD REMNANTS
- PAST, PRESENT AND FUTURE INFLUENCES

Irvine Ross & Charlie Taylor

Past Influences

Private Sector
The native pinewoods of Scotland have a long history of exploitation for timber and grazing. In 1959, Steven & Carlisle stated in their review that most pinewoods were still grazed by deer and livestock. Certainly in the first half of last century deer stalking had priority over woodland management on most private estates. Even in the 1970s, many pinewoods were still unprotected and some still remain so.

One exception was Glen Tanar estate where a perimeter deer fence was erected in 1935. This was intended to protect grouse from ticks carried by red deer. It was only when the owner saw the effect of the reduced grazing on the forest that he became a convert to pinewood conservation. It is interesting to note that new deer fences for the same purpose have gone up recently on some estates in the Angus Glens and Glen Dye. Unfortunately, there are no native pinewoods on these sites to benefit from the reduced grazing pressure.

During the period of his field work Carlisle was obviously in contact with private estate owners and foresters, which probably had some influence on their attitudes to pinewood management but the impact of this is difficult to detect. It is notable however that within 10 years of the publication of “The Native Pinewoods of Scotland” many of the larger native pinewoods were declared as Sites of Special Scientific Interest.

In the 1970s, frustration grew in some quarters at the continued timber harvesting and the lack of conservation management in the native pinewoods. Bob Bunce, in his introduction to the report on the 1975 Aviemore symposium, wrote – “Despite the extensive knowledge of the forests and their acknowledged significance in scientific and amenity terms, the resource continued to be under threat because of its high commercial value”.

It was not difficult in that period to form the view that the resource was under threat. Shortly after one of the authors (Irvine Ross) took up the post of Forestry Manager at Glen Tanar Estate in 1977, a senior manager in one of the large forestry management companies advised that the only thing to be done with the native pinewood was to “Cut it all down and start again”.

The Aviemore symposium was organized by the Institute of Terrestrial Ecology and funded by the Natural Environmental Research Council. The Forestry Commission was a reluctant participant. There was a paper by Roy Faulkner on the conservation of the gene pool and a brief paper by Calvin Booth which illustrated the limited approach that the Forestry Commission of that time was taking to the conservation of the pinewoods under their care. Only in the Black Wood at Rannoch and in Glen Affric could they cite any positive management.

Any FC staff who requested permission to attend the symposium were told to stay away. The only two who attended, went without asking. They were Alastair Scott, who was District Officer at Moray and Graham Tuley, his assistant at the time. Both will appear later in this story, which we suggest is more than co-incidental.

Also more than co-incidental was the announcement of the first Native Pinewood planting grant in 1977. This was largely a genetic conservation measure as private foresters were expected to create Scots pine plantations using native origin plants. The concept of a mosaic of pine, broadleaves and open space was to arrive later. However, the grant did establish the practice of paying native Scots pine planting grant at the same rate as for broadleaves - which was to persist for almost three decades.

Around this time the Native Pinewood Discussion Group was formed by Bob Bunce. The group held annual excursions to various native pinewoods. The membership was largely composed of academics and practicing managers were notable for their absence. Because of the imbalance of the membership, the group was more interested in discussion than in finding practical answers. In the early 1980s the group widened their remit and became the Native Woodland Discussion Group.

Through the 1980s a slow change began to emerge in the spectrum of private sector native pinewood ownership. The RSPB bought Forest Lodge Estate, Abernethy in 1988 - although the pinewoods around Loch Garten had been purchased earlier.
The new Woodland Grant Scheme in 1988 continued the practice of paying broadleaf rate of planting grant for native Scots pine. The area eligible for this grant was confined to “pinewood localities identified by HM Steven and AC Carlisle”

A change in attitudes towards native pinewoods had been maturing through the late 1980s and the effect on national forestry policy became obvious in the early 1990s.

- In 1991 Graham Tuley and Peter Quelch were appointed by the FC to be Native Woodland Advisors to promote native woodland conservation to both Forest Enterprise and the private sector.

- 1993 saw the publication of the Caledonian Pinewood Inventory which was a review of the Steven and Carlisle sites with a few new ones added.

- In 1993 the Woodland Grant Scheme introduced the New Native Pinewood management scheme with the intention of creating new pinewoods similar in character to the native remnants but in new locations.

- The 1994 conference in Inverness named “Our Pinewood Heritage” was jointly organised by FC, RSPB and SNH. This time there was full and active FC participation.

Credit for these initiatives goes to many of the Forestry Commission staff but particularly to Alastair Scott who was by now based in FC headquarters with particular responsibility for native woodlands and also to David Foot, who was at that time the Commissioner with responsibility for administering private woodlands.

In 1991 the Native Pinewood Manager’s Group was formed, an idea promoted by the authors of this paper. This arose from the recognition that there was limited practical expertise left in organisations, such as ITE, SNH and Forest Research and that the Native Woodland Discussion Group was covering a very wide range of issues. This group has evolved into a self-help group with membership restricted to practicing managers of those woods on the Caledonian Pinewood Inventory. The intention was, and still is, to provide a network of support for managers of these nationally important sites, especially those who were relatively new to native pinewood management.

**Public Sector**

Public sector ownership of native pinewoods only started in the 1920s with the purchase of areas like Glenmore, Glen Garry and Achnashellach. This stimulated considerable debate amongst senior management about what to do with the remnants that were acquired. From this debate came the early declaration of “reserves” e.g. Black Wood of Rannoch where a Conservation zone of over 200ha was set aside in 1948. In these early years, much of the FC’s work in the core areas was directed towards an interventionist and experimental approach to regeneration – not entirely surprising, given the degraded nature of these woodlands at the time.

This focus on the core areas of the remnants carried on with the acquisition of one of the most iconic pinewoods, Glen Affric, in 1951. Here the core areas had a focus on sustaining pine, with sympathetic harvesting and re-planting treatments. This was influenced by Professor Steven’s address on “Native Pinewoods and their Management” to the 1959 excursion of the Society of Foresters. For many years, this was the “showcase” pinewood for the FC – none more able at this than Finlay MacRae during his tenure as local manager.

By 1959, FC had acquired an interest in all, or part, of ten of the pinewood remnants recognised by Steven and Carlisle. However, under the prevailing policy drivers of the time, pinewood margins and open spaces were seen as “fair game” and planted up - often with Sitka spruce and lodgepole pine, neither of which are native species. As a result the structure of the woodlands became more uniform, potential areas for Scots pine regeneration were lost and, in time, isolated mature native trees became suppressed by the dense shade cast by the enveloping Sitka spruce. This style of management prevailed through to the early 1980s.

During the decade of the 1980s, however, the legislative background to public sector woodland management was changing. The Nature Conservation Acts and amendment to the Forestry Act brought conservation up the agenda for the FC. Through the 1980s it became increasingly important to consider all aspects of forest management (timber production, landscape, recreation & conservation). However, apart from the “core” areas there was initially a limited impact on the management of the native pinewood remnants.
However, in the late 1980s a growing recognition emerged of the need to take a fundamental review of the pinewood remnants managed by FC. An internal review conducted in 1991 (led by Alan Stevenson, Charlie Taylor and Graham Tuley) recommended remedial work to remove introduced trees from the remnants and allow room for significant expansion. Steven and Carlisle’s work and maps were used as the benchmark to assess how the condition of these native pinewoods had changed over the intervening 32 years. The conclusions of this review were endorsed by David Foot, then Chief Executive of Forest Enterprise (the management arm of the FC created back in 1984).

In 1992 commitments were made in the publication “A Future for Forest Enterprise Native Pinewoods” to put the recommendations into practice. This also coincided with the commissioning of the Caledonian Pinewood Inventory. A series of Caledonian Forest Reserves were established and long-term management plans were put in place for all remnants under FC management. An overall target was set - to double the existing core area of 3000ha by creating regeneration zones over a further 3000ha.

As a result of these commitments, there was a significant re-allocation of funding within FC to provide adequate resources. Internal workshops were organised and local managers were encouraged, and became active members of the Native Pinewood Managers Group. It also sparked a subsequent review of native broadleaves managed by FC. These initiatives created a surge of enthusiasm with programme targets being met and exceeded. Eminent forest ecologist, George Peterken was moved to remark in 2004 that the burgeoning restoration programme was "a massive, almost heroic, enterprise”.

Current influences

The current influences on native pinewood management are:

- **The Scottish Forestry Strategy** – The Strategy does not set specific targets for native pinewoods, or indeed for anything else. Instead the focus is on Biodiversity Action Plans, Habitat Action Plans and Species Action Plans (BAPs HAPs &SAPs) all of which set targets and objectives for native pinewoods
- **The publication of Managing the Pinewoods of Scotland** – This handbook was long in the gestation but now we have fulfilled the need for a reference manual for pinewood managers. The content of the book extends beyond the management of the remnants to include new native woodlands and the re-structuring of pinewood plantations
- **The Caledonian Pinewood Inventory** – This remains the criteria for eligibility for targeted pinewoods grants for the private sector and identifying the priority areas for pinewoods on the national forest estate.
- **Red Deer** – They remain a problem in some areas. Deer stalking is still a priority for some land owners and some pinewoods are still heavily grazed. In other areas the formation of deer management groups has fostered cooperative deer management across ownership boundaries.
- **Diversity of Private ownership** – The range of private owners has spread to include Non Government Organisations including the RSPB, the National Trust for Scotland and, more recently, Trees for Life. The diversity of owners’ objectives will ensure that there is a diversity of approach within national policy/legislative constraints which may well prove advantageous in the longer term.
- **Public ownership** – The current drive for Forestry Commission Scotland to create exemplar management practices on the national forest estate means that the current focus is on biodiversity benefits. Some key sites e.g. Glenmore and Glen Affric; are used as “honeypot” sites to tell visitors about the value of our native pinewoods. The 1992 targets for expansion have been exceeded and active management is being sustained.
- **The Native Pinewood Manager’s Group** – Still going strong after 17 years and the numbers turning out for our annual excursion shows that pinewood managers still find the group to be a valuable forum.
- **Steven & Carlisle** – Their book remains a benchmark for progress in the restoration of the native pinewood remnants.

Future influences

We foresee that the future influences on native pinewood management are likely to be:

- **The Scottish Forestry Strategy** – Historically we have had UK forestry strategy and UK focussed grant incentives. However since devolution we now have a Scottish focus which opens the way to policies and incentives which are more targeted to meet Scottish priorities.
- **Rural Development Contracts** – For more than two years since the closure of the Scottish Forestry Grant Scheme we have been without any private sector forestry grant schemes. Now, until 2013, we will have the Scottish Rural Development Programme. Already criticized for its difficult application system, the response
from woodland owners has been slow in developing. It is disappointing to find that the planting grant offered for Native Woods is £875/ha compared to the planting grant for Conifer Woodland (Low Cost) at £840/ha

- **National Parks** – The Cairngorms National Park Authority has now issued its Cairngorms Forest and Woodland Framework which outlines its policies on woodland expansion. These will doubtless influence the targeting of areas for new woodland establishment grants.

- **Demand for timber** – We are likely to see a move to sustainable timber harvesting in native pinewoods with a few selected sites (FCS, NGOs) where minimal intervention is practiced and monitoring provides a benchmark for comparison with other management practices.

- **Pressure for expansion of native woodlands** – The Native Woodland Survey is currently in progress and due for completion in 2012. We expect that the publication of this report will trigger new demands for native woodland expansion in strategic locations.

- **Forest habitat networks** – Much recent work has been done on mapping forest habitat networks and identifying gaps in the chain. Bridging these gaps will be an objective of the SRDP and will influence the awarding of grants. We suggest the native pinewood remnants will provide core reservoirs of species for the re-population of landscape-scale networks in the Beauly catchment, Strathspey and Deeside. These may provide resilience against impact of climate change by allowing migration of species.

- **Restructuring of SP plantations** – Restructured plantations will in future contribute to the habitat networks and blur the boundaries between planted and regenerated pinewoods.

- **Native Pinewood Manager’s Group** – Will still be going strong and providing a rational and robust forum to allow managers (particularly new ones) to network ideas and influence future developments.

- **Site condition monitoring** – Many native pinewood remnants are SAC’s or SSSI’s and the Scottish Government has set targets of achieving 80% in favourable or unfavourable recovering condition by 2008 and 95% by 2010.

- **Red deer** – They will always be with us and conflicts between browsing and regeneration and between deer fencing and woodland grouse will continue into the foreseeable future. These will still have to be resolved on an individual case basis taking into account the specific circumstances applying to each location.