

**MONTANE  
SCRUB  
ACTION  
GROUP**



# Scrubbers' Bulletin 8



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**The Bulletin of the Montane Scrub Action Group,  
a partnership of individuals supported by their organisations.**

The current membership of the group is:

**Diana Gilbert**, The Macaulay Institute  
**Alison Hester**, The Macaulay Institute  
**John Holland**, Scottish Agricultural College  
**Phil Baarda**, Scottish Natural Heritage  
**Rob Soutar**, Forestry Commission Scotland  
**Billy Bodles**, Highland Birchwoods  
**Dan Watson**, The National Trust for Scotland

**Mick Drury**, Trees for Life  
**Philip Ashmole**, Borders Forest Trust  
**Keith Miller**, Mountaineering Council of  
Scotland  
**Deborah Long**, Plantlife  
**David Mardon**

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**Welcome to issue number 8 of the Scrubber's Bulletin**, compiled by David Mardon, Fagus, Manse Road, Killin, FK21 8UY, [dk.mardon@googlemail.com](mailto:dk.mardon@googlemail.com)  
Please note the change of address, due to my retirement from the NTS.  
We welcome Dan Watson of NTS as a new member of the group.

With my move from the Trust I was unable to retrieve the Bulletin email address list from the NTS system. If any reader knows of names that have been inadvertently lost, or anyone who would like to be included, please email me with details. DKM.

Earlier issues of the Bulletin may be read at [www.highlandbirchwoods.co.uk](http://www.highlandbirchwoods.co.uk)

We are most grateful to the authors for their contributions to this issue, as follows:

## Contents

<b>Richards, Mark.</b> <i>Dwarf birch survey and monitoring in Glen Moriston, 2008</i> .....	3
<b>Holland, J.P., A. Waterhouse, A. &amp; Morgan-Davies, C.</b> The Hill Sheep and Native Woodland Project – An Update on the Mountain Woodland .....	8
<b>Petr, Michal &amp; Smith, Mike.</b> Preliminary report on the identification of tree-line in Scotland .....	14
<b>Fleming, Suki.</b> Woolly willows planted in Corrie Fee National Nature Reserve .....	17
<b>Moore, Pete.</b> Coire Garbhlach; two years on, Cairngorms .....	19
<b>Bodles, Billy.</b> Action for mountain Woodlands update .....	23
<b>Savory, John.</b> Book review: The Carrifran Wildwood Story .....	25

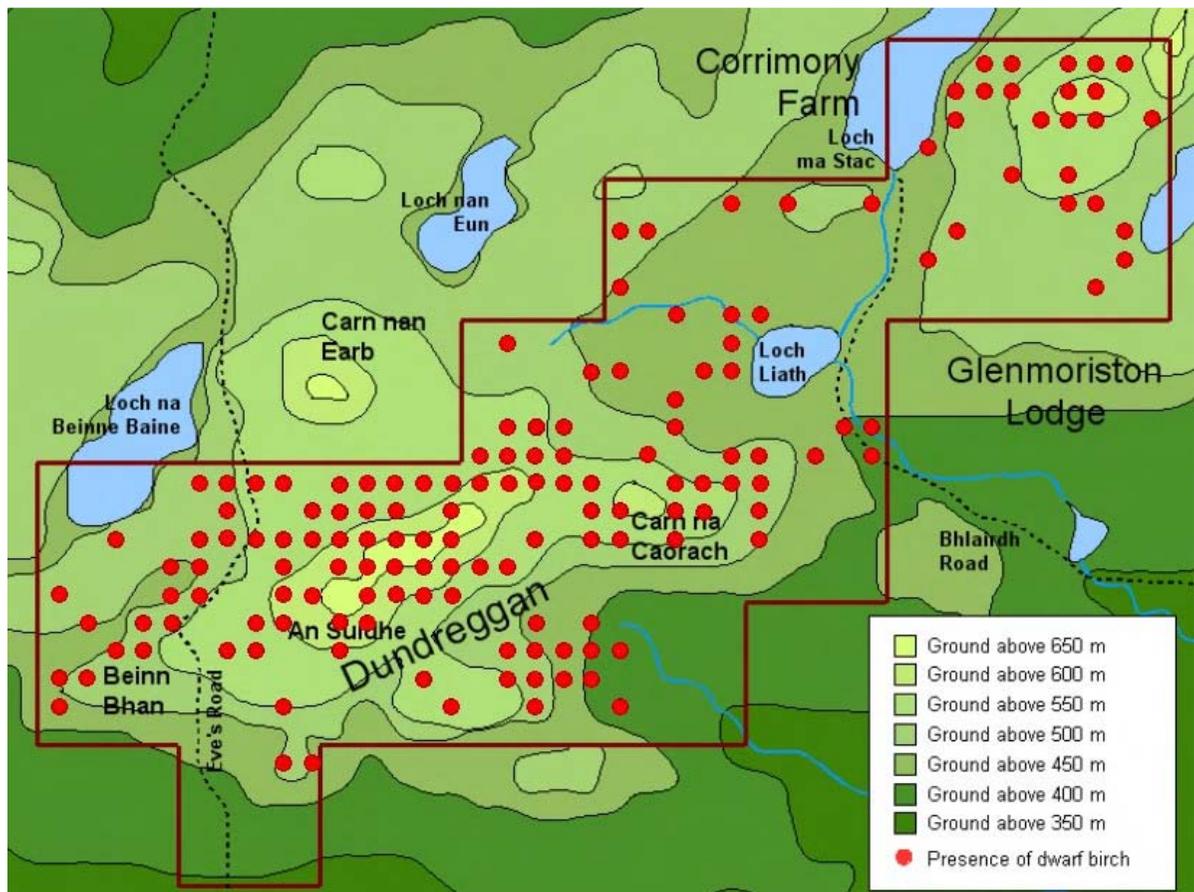
# Dwarf birch survey and monitoring in Glen Moriston, 2008

Mark Richards, email: [m.richards@abdn.ac.uk](mailto:m.richards@abdn.ac.uk)

Last summer, Trees for Life commissioned a dwarf birch (*Betula nana*) survey of a 21 km<sup>2</sup> area, focused primarily on the Dundreggan estate which they have recently acquired. The survey also included land on the neighbouring Corrimony Farm and Glenmoriston Lodge estates. The distribution of dwarf birch was mapped and individual plants were measured in order to learn more about their ecology and current condition. Monitoring work was also carried out in two exclosures. A full description of the survey and monitoring work is given in Richards (2008).

## Dwarf birch survey

The presence or absence of dwarf birch was recorded in 6 m radius circular plots, spaced 200 m apart across the survey area. Dwarf birch were found in 31% of the plots, with large continuous areas occurring above 500 m (see map). The largest areas of dwarf birch were found on the top and northern slopes of the ridge running from Beinn Bhan in the west to Carn na Caorach in the east. Between 450 and 500 m dwarf birch occurred as scattered, small patches though was virtually absent from the south-facing slopes at these altitudes. They were more or less absent below 430 m. Thirty one of the dwarf birch survey plots were established as permanent monitoring plots.



Measurements were also made of the size, catkin number and browsing damage of the 5 largest dwarf birch in each plot (577 dwarf birch in total). These data showed that dwarf birch on south-facing slopes were shorter and produced fewer catkins on average than those on north, east or west facing slopes or flat ground. Those on flat or very gently sloping sites (the wetter sites) produced the most catkins. Dwarf birch which were taller than the surrounding vegetation (usually by just a few cm) produced significantly more catkins than those which were level with or below the vegetation. Only 16% of the 5 tallest dwarf birch in each plot were taller than the surrounding vegetation due to repeated browsing. The average number of catkins produced per plant was 1.95.

Eared willow (*Salix aurita*), creeping willow (*Salix repens*) and juniper (*Juniperus communis* ssp. *communis*) were recorded as and when they were encountered because they were too infrequent to record using the plot method. In total, 84 eared willow, 24 creeping willow and 45 juniper were recorded. No other montane scrub species were found. One permanent juniper plot and two permanent willow plots were established in areas where these were particularly abundant.

### Monitoring work in the Balnacarn exclosure

In 1998 an exclosure was established on the Balnacarn estate. The exclosure is about 20 hectares and is located on a south-east facing slope, covering an altitude of 510-570 m. Shortly after the fence was erected a baseline vegetation survey was conducted along two transects within the exclosure (Matthews, 1998). This survey was repeated in early September 2008.

Considerably more dwarf birch were found along both transects in 2008 compared to 1998 (Fig. 1) suggesting the dwarf birch have spread over the 10 year period. The tallest dwarf birch in the quadrats of the 2008 survey were on average 10 cm taller than in 1998, having doubled in height. The height of the surrounding vegetation had also increased since 1998 and was approximately the same height as the taller dwarf birch.

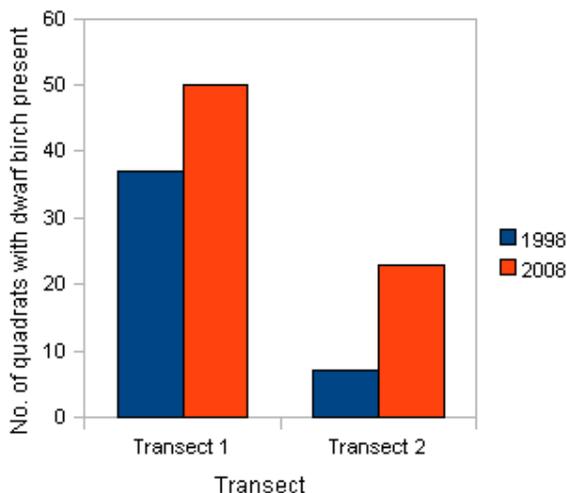


Fig. 1 Number of transect quadrats containing dwarf birch in 1998 and 2008.

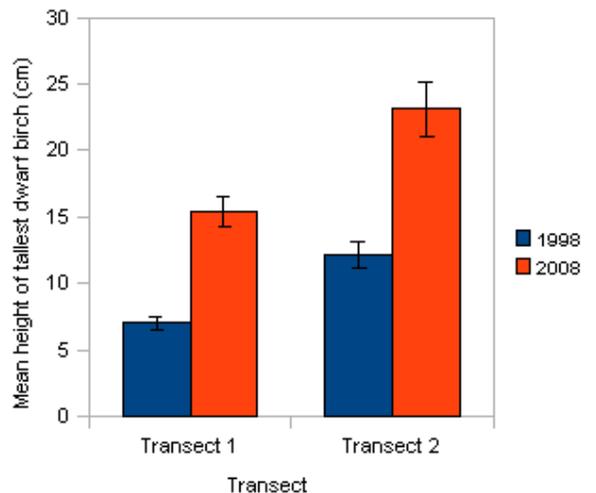


Fig. 2 Mean height of the tallest dwarf birch in quadrats along the two transects in 1998 and 2008.

## Monitoring work in the Dundreggan enclosure

In 2002 an enclosure was erected on the eastern edge of the Dundreggan estate. It covers an area of 10 hectares and is situated on relatively flat ground at an altitude of 440 m. Fourteen circular permanent plots of 6 m radius, spaced 75 m apart were established. As with the wide area survey described above, the 5 tallest dwarf birch in each plot were measured.

Half of the plots contained dwarf birch and on average, those within the enclosure were 12 cm taller than those outside (based on the wider survey results). The dwarf birch in this enclosure were also considerably taller than those in the Balnacarn enclosure, despite having been protected from browsing for a shorter time (see photo). There had been a significant shift in the relative heights of the dwarf birch and surrounding vegetation. A much higher proportion of the dwarf birch population were taller than the vegetation compared to those outside of the enclosure (Fig. 3). The exclusion of deer and sheep is allowing patches of dwarf birch to rapidly develop into a dominant scrub layer.



Dwarf birch pulling away from the surrounding vegetation in the Dundreggan enclosure.

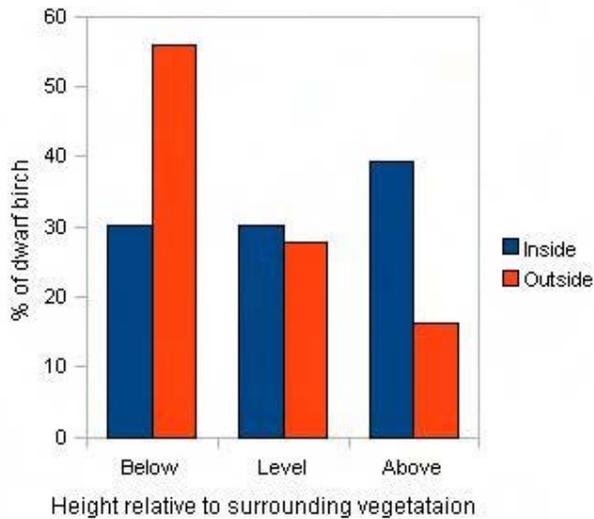


Fig. 3 Percentage of dwarf birch of different heights status, inside and outside of the Dundreggan enclosure. Data based on the 5 largest dwarf birch in each plot.

The most dramatic finding from the enclosure plots related to the number of catkins produced per plant. Catkin production was much greater inside the enclosure than outside, and this was the case regardless of whether the plants were shorter than, level with, or taller than the surrounding vegetation (Fig. 4). Overall, the average number of catkins per plant was 13 times greater inside the enclosure compared to outside (26.6 inside compared to 1.95 outside).

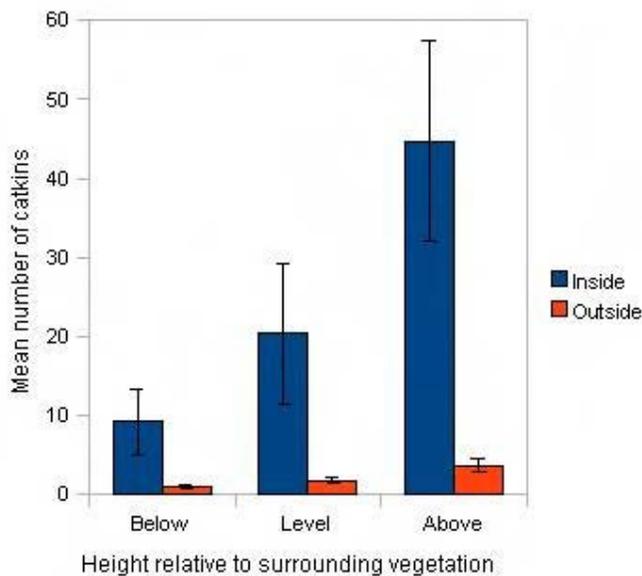


Fig. 4 Mean number of catkins per plant inside and outside of the Dundreggan enclosure, grouped by height status.

The enclosure is being steadily colonised by birch and to a lesser extent Scots pine. There are also small numbers of juniper, eared willow, rowan, and non-native conifers colonising the enclosure. The site is below the tree line so the invasion of birch and pine will probably result in a closed forest canopy, eventually shading out the montane scrub species. However, there is a shallow ridge that runs through the enclosure that has thin soil and is partly exposed to the prevailing westerly winds. These factors may restrict tree growth, allowing montane scrub species to prevail, perhaps forming a forest-scrub mosaic.

## **Swammerdamia passerella**

Larvae of the rare moth *Swammerdamia passerella* were found during August in two areas within Dundreggan, inside the enclosure and in a cluster of 3 survey plots just west of Loch Liath. The caterpillars are reported to feed exclusively on the leaves of dwarf birch and in Scotland have been found in only a few locations.

In both areas in which *S. passerella* was seen, the catkin production was much higher than average. Also, the catkins of plants bearing larvae often showed signs of damage. These two observations suggest that the larvae may feed on the catkins of dwarf birch as well as its leaves. If this is the case, increased catkin numbers resulting from the reduced browsing pressure could lead to an increase in *S. passerella* numbers. However, research would be required to determine if this is actually the case.

## **Conclusions**

The Dundreggan estate contains a large population of dwarf birch, with some large, more or less continuous areas. However, the vast majority of individuals are heavily browsed resulting in short plants with low reproductive rates. The results from the wider survey and the two enclosures suggest that dwarf birch performs less well on south facing slopes compared to other aspects. I am unaware if this is generally the case or a relationship specific to Dundreggan. The exclusion of deer and sheep has been successful in promoting the development of montane scrub habitat, resulting in increased numbers of dwarf birch, as well as an increase in their size and catkin production. The permanent monitoring plots established during this survey will enable the effects of Trees for Life's new management plan for Dundreggan to be assessed. The results of the survey are being used to identify the best locations for future enclosures and the survey is being extended onto new ground this year.

## **Acknowledgements**

I am grateful to the Corrimony Farm and Glenmoriston Lodge estates for granting permission to conduct part of the survey on their land.

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# The Hill Sheep and Native Woodland Project – An Update on the Mountain Woodland

J. P. Holland, A. Waterhouse and C. Morgan-Davies.

SAC Hill & Mountain Research Centre, Kirkton, Crianlarich, Perthshire,  
FK20 8RU.

## Introduction

The Hill Sheep and Native Woodland Project was conceived as a new approach to land management in the uplands, with the aim of improving the sustainability of upland farming, through the integration of an innovative sheep husbandry system with the establishment of native woodland within the same block of land (Hulbert *et al.*, 1999; Morgan-Davies *et al.*, 2000; Hulbert, 2002; Morgan-Davies *et al.*, 2002; Pollock *et al.*, 2005; Morgan-Davies *et al.*, 2008). The project was established at SAC's Hill and Mountain Research Centre in west Perthshire in 1998, and utilized 1438 hectares of hill land to test and demonstrate the management approach at a full systems scale. Two adjoining glens were used in the project; Caol Gleann (590 ha, rising from 230-818m) and Gleann a'Chlachain (848 ha, rising from 230-1025m). Caol Gleann was managed using a traditional sheep husbandry system with 800 breeding ewes retained on the site year-round and no trees; while Gleann a'Chlachain had 260 ha of planted woodland and 588 ha of hill land which carried 650 breeding ewes from March to October. As the woodland matured it was envisaged that there would be controlled re-introduction of grazing into the woodland. The initial planting was carried out in two phases in 1998 and 1999.

## Woodlands

### *Phase 1 - Allt Gleann a'Chlachain Gorge*

The first phase of planting was along the Allt Gleann a'Chlachain gorge. Forty three hectares of native woodland, enclosed within a stock-proof fence, were planted along the river gorge. The main purpose of this woodland was to act as a wildlife corridor linking an area of existing semi-natural Downy Birch, Rowan and Aspen woodland in the lower part of the gorge with the second phase of planting in the upper bowl of Gleann a'Chlachain. The gorge woodland was not intended to be grazed by sheep. Nearly fifty-two thousand trees were planted in the autumn of 1998 (Table 1). Tree growth and survival has been variable over the site. Trees planted in the lower section of the gorge, where the river runs due south, have established well, whereas those higher up the gorge (above 270 m), where the river flows in a south westerly direction, have been slow to establish and there have been considerable losses. Extensive refurbishment has been required with a further 41,600 trees planted between 1999 and 2009 in five refurbishment phases (Table 1). An off-set electric wire powered by a solar panel was installed along the eastern boundary of the gorge woodland in 2006 to reduce deer incursion.

**Table 1 - Phase 1 - Allt Gleann a'Chlachain Gorge (43 ha including open ground)**

Species	Initial Planting 1998	Beating-up 1999	Beating-up 2002	Beating-up 2003	Beating-up 2004	Beating-up 2009	Total	Percentage
<i>Betula pendula</i>	16000	4000	0	0	0	0	20000	21%
<i>Betula pubescens</i>	15000	0	4000	0	1500	1600	22100	24%
<i>Salix cinerea</i>	6000	0	3000	0	0	0	9000	10%
<i>Alnus glutinosa</i>	3500	1000	4000	0	0	0	8500	9%
<i>Sorbus aucuparia</i>	3500	1500	500	0	500	100	6100	7%
<i>Salix caprea</i>	2500	0	5000	0	0	0	7500	8%
<i>Pinus sylvestris</i>	2250	0	5000	0	0	300	7550	8%
<i>Fraxinus excelsior</i>	1500	50	2000	0	0	0	3550	4%
<i>Quercus petraea</i>	1500	50	6000	0	0	0	7550	8%
<i>Salix aurita</i>	0	250	0	0	0	0	250	0%
<i>Salix lapponum</i>	0	0	0	750	0	0	750	1%
<i>Populus tremula</i>	0	0	500	0	0	0	500	1%
Total	51750	6850	30000	750	2000	2000	93350	100%



**Figure 1 - Lower section of the Allt Gleann a'Chlachain gorge woodland (31/07/09)**

#### *Phase 2 (1999) - Gleann a'Chlachain Woodland*

The second phase of planting consisted of two stock-fenced blocks (181 ha and 36 ha) which were planted with native tree species in 1999. The main block of woodland was in the bowl of Gleann a'Chlachain (390-600m), while the smaller block was on the north-west facing, lower flank, of Ben Challum (360-610m). This smaller block was attached to the gorge woodland. There was a gap of approximately 200m between the two Phase 2 woodland blocks to allow sheep to be gathered off Ben Challum. Most of the ground to be planted was mounded using a mechanical mounding machine. Within the fenced area there were numerous archaeological sites and substantial areas of peatland and flush that were left un-mounded and unplanted. Over 230,000 trees were planted in the two blocks in 1999. A third of the trees were cell grown plants and two-thirds were bare rooted. Fertilizer was applied to the trees in 2000. In order to reduce the extent of browsing by red deer an off-set electric wire, powered by a windmill, was installed around the main woodland block in 2000 and around the smaller block in 2002. In addition to the off-set electric fence, more

pro-active deer control measures were initiated in 2005 with weekly visits to the woodlands by a deer controller, including night visits over the winter period.

In the first few years tree establishment was relatively poor over much of the site and losses were high, due to a number of factors including the high altitude, harsh climatic conditions, nutrient-poor and poorly drained soils, deer browsing and vole damage. Beating-up was carried out in 2000 and 2001 (Table 2). Monitoring of the trees in 2003 found that sapling height, the number of live trees, and the number of well established trees all declined with increasing altitude. Trees planted on east-facing slopes showed better growth and establishment than those planted on west-facing slopes. Above 500 metres, trees planted on south-facing slopes showed better growth and establishment than those planted on east or west-facing slopes. After four years more than 80% of the monitored plots contained fewer than 11 well established trees (i.e. below the equivalent of 1100 established trees/ha, as required under the WGS agreement). No plots above 515 m contained 11 or more well established trees. Plots containing trees with an estimated mean height of more than 60cm only occurred below 470 m. Almost 50 % of the trees showed some stem damage caused by voles, and 15% of trees showed some browsing damage. Since 2003 the trees have continued to struggle, however the off-set electric fence and pro-active deer control have considerably reduced the browsing damage. Further beating-up was carried out in 2004 and 2009. The refurbishment in spring 2009 was targeted at specific areas, in particular sheltered, well-drained slopes and along burn sides. The refurbishment involved mechanical mounding, remedial drainage works and the planting of 25,000 trees. The trees were grown from seed collected at high altitude sites in the local area and grown at a local Argyll nursery. The trees were protected by vole guards and were given fertilizer. In total an additional 157,000 trees have been planted since the original planting in 1999 (Table 2). The extensive woodland refurbishment that has been carried out since 1999 has been required in order to try and meet the conditions of the Woodland Grant Scheme under which the woodland was planted. It has proved very difficult to meet these conditions in the difficult mountain environment in which the trees were planted. It is hoped that the refurbishment carried out in 2009 will mean that no further beating-up will be required.

**Table 2 - Phase 2 - Gleann a 'Chlachain (217 ha including open ground)**

Species	Initial Planting 1999	Beating-up 2000	Beating-up 2001	Beating-up 2004	Beating-up 2009	Total	Percentage
<i>Betula pubescens</i>	116010	44000	12100	5500	20000	197610	50.5%
<i>Betula pendula</i>	29005	12000	2500	0	0	43505	11.1%
<i>Pinus sylvestris</i>	28000	4500	0	5500	3750	41750	10.7%
<i>Alnus glutinosa</i>	17015	10000	2750	5500	0	35265	9.0%
<i>Sorbus aucuparia</i>	16010	10000	2750	2000	1250	32010	8.2%
<i>Salix cinerea</i>	8000	4500	1750	0	0	14250	3.6%
<i>Salix</i> species	10005	0	0	0	0	10005	2.6%
<i>Salix aurita</i>	0	4750	1250	0	0	6000	1.5%
<i>Salix mysinifolia</i>	5010	0	0	0	0	5010	1.3%
<i>Corylus avellana</i>	3000	300	0	0	0	3300	0.8%
<i>Quercus petraea</i>	1000	300	0	0	0	1300	0.3%
<i>Populus tremula</i>	510	100	0	0	0	610	0.2%
<i>Fraxinus excelsior</i>	510	0	0	0	0	510	0.1%
Total	234075	90450	23100	18500	25000	391125	100%



**Figure 2 - Gleann a'Chlachain woodland (07/08/09)**

## **Sheep management**

An away-wintering sheep management system within Gleann a'Chlachain was carried out between 1999 and 2008. Under this system the animals were sent away to lowland farms in October and brought back to the farm at mid-pregnancy (March). Twin bearing ewes were kept on the inbye ground prior to lambing while single bearing ewes were put to the hill.

In order to assess the potential success of the combined woodland and livestock system, in terms of flock economics and local labour, comparisons were made between predictions from bio-economic modelling and actual monitored data over a five year period (2000 to 2005) (Morgan-Davies *et al.*, 2008). Participative research to assess benefits to the public and uptake by the industry was also carried out. The observed results exceeded the model predictions, especially for the combined system economics, where actual returns were 20% more than predicted (Morgan-Davies *et al.*, 2008). There was also support for the approach from both the public and industry (78% and 68% respectively). Results showed that under the new system in Gleann a'Chlachain, the fecundity and prolificity of the ewes improved significantly compared to the control flock in Caol Ghleann (Morgan-Davies *et al.*, 2008). There was also a considerable reduction in lamb and ewe mortality and significantly higher lamb birth-weights. The new system also produced significantly more kilograms of lamb per ewe than the control system (36.6 kg compared to 21.2 kg) (Morgan-Davies *et al.*, 2008). The new system resulted in higher quality and quantity of sheep outputs and improved animal welfare as well as benefits to the local economy and tourism (Morgan-Davies *et al.*, 2008). There were problems though with sheep gathering in the high mountain area, linked to both the changed shape of the grazing range, and the incursion of neighbouring sheep into the glen whilst the flock was away-wintered. Similar off-wintering and away-wintering exercises are now a common element of hill sheep systems across the country, but have a significant bio-security risk.

Unfortunately, due to an outbreak of enzootic abortion within the flocks in both Gleann a'Chlachain and Caol Gleann, the sheep were removed from both glens in the autumn of 2008. Although sheep will be returned to Caol Gleann in the near future, they are unlikely

to be returned fully to Gleann a'Chlachain in either the short or medium term. Our aspiration to allow controlled grazing within the main woodland block after 5 to 10 years has not been realized principally due to the very slow rate of growth and poor establishment of the trees. Achieving this goal in the future has been made more difficult by the removal of the sheep from Gleann a'Chlachain. However it is still our intention to enable the possibility of grazing within the woodland at some stage although this may be many years away.

## **Biodiversity**

The ground vegetation within the un-grazed woodland blocks has shown some rapid changes, with extensive growth of *Calluna vulgaris* and *Vaccinium myrtillus* dwarf shrub heath and *Molinia caerulea*. *Sphagnum* and other bryophytes have also increased. Tall herb species such as *Filipendula ulmaria*, *Geranium sylvaticum*, *Alchemilla glabra*, *Angelica sylvestris*, *Cirsium heterophyllum*, *Valeriana officinalis*, *Galium boreale* and *Solidago virgaurea* have started to flower and have become much more evident. Numerous, large patches of *Anemone nemorosa* have developed on well drained slopes producing a spectacular floral display in April and May. Within the gorge woodland, Scotch Argus butterflies have started to breed within the tall *Molinia* grassland that has developed and Small Pearl-bordered Fritillaries have also increased. Stonechat, Whinchat, Wren and Willow Warbler are breeding within the woodlands, and other species including Black Grouse, Merlin and Short-eared Owl have been seen regularly within the main woodland block.

## **Woodland Vision**

Although the trees have been slow to establish and with hindsight there are perhaps many things we would have done differently, we still believe that a mountain woodland of low growing trees and shrubs with extensive open areas will develop over the coming decades, creating a diverse and species-rich habitat that will enhance the landscape and be enjoyed by visitors for many decades to come. We will just have to be patient.

Since the start of the project in 1998 there have been significant changes to agricultural, forestry and climate change policy, and in the ways that farming and forestry are subsidized. The economics of hill sheep farming has changed markedly over this period which has in part led to a decline in the Scottish sheep flock of over 2.3 million between 1998 and 2007 (Renwick *et al.*, 2008). The drive to increase woodland cover to around 25% of Scotland's land area by the second half of this century (Forestry Commission Scotland, 2006) has just been given further impetus through the Climate Change (Scotland) Act 2009. In order to achieve this, the rate of new planting will need to increase from its recent low of less than 5,000 hectares to about 10,000 hectares per year (Forestry Commission Scotland, 2009). Food security, sustainability, animal welfare and carbon sequestration are currently important policy drivers, and in these changing times it would seem even more appropriate to recognise the role that silvopastoralism may have in delivering sustainable management systems for land managers in both the hills and lowlands. Despite EU Rural Development policy clearly acknowledging the economic, social and ecological value of agroforestry, the implementation of such systems is still relatively poor over much of Europe, and Scotland remains one of the countries in Europe that has no positive policy to support agroforestry. Proposed changes to the eligibility of forested land for Single Farm Payment in Scotland mean that starting today a new woodland scheme in Gleann a'Chlachain would retain Single Farm Payment for the afforested land, however there is still no mechanism to achieve fuller integration of woodlands and livestock grazing, as the planting must be done under an official

afforestation scheme which currently have set minimum planting densities. In truth not much has changed, except that there is still little incentive to retain food production from the hills, and there is a continued drive to increase woodland cover, probably just through higher levels of public support. Agriculture and woodland remain as polarised as ever.

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# Preliminary report on the identification of tree-line in Scotland

**Michal Petr and Mike Smith**

**CHES, Forest Research, Northern Research Station, Roslin, Midlothian, EH25 9SY**  
[Michal.Petr@forestry.gsi.gov.uk](mailto:Michal.Petr@forestry.gsi.gov.uk)

## **Introduction**

In montane regions zones of woodland and scrub are separated by a tree-line that represents the natural limit of tree regeneration. In Scotland the tree-line is largely unidentifiable, as most of the natural woodland was removed in past centuries. This project aims to find a method of predicting the tree-line, based on the site suitability for Scots pine and downy birch between the upper limit of commercial forests and below the biological limit of growth for each of the 2 species. The identification of a tree-line zone, in which we assume a transition from a woodland canopy to scrub vegetation, will represent the ecotone that provides ecological continuity between the native woodland types (defined by Habitat Action Plans - HAP) and montane scrub HAP. The montane scrub HAP type contributes to biodiversity in its own right, provide aesthetic landscape improvements beyond commercial forestry and would contribute to government carbon sequestration targets. The definition of the ecotone will provide a focus for management continuity between different HAP types.

## **Objective**

The aim of this project is to develop general tree-line model based on the growth sensitivity of Scots pine (SP) [*Pinus sylvestris* L.] and downy birch [*Betula pubescens* Ehrh.] in various conditions using a fuzzy approach. This model employs statistical techniques combining field data, climate and terrain variables, with predicted yield for the tree species obtained from Ecological Site Classification (ESC) (Pyatt et al 2001). The project uses data previously recorded for treeline woodlands in Scotland focusing on SP and DB in the Scotland Highlands (Hale et al 1998) and also data collected for the montane scrub database.

## **Method**

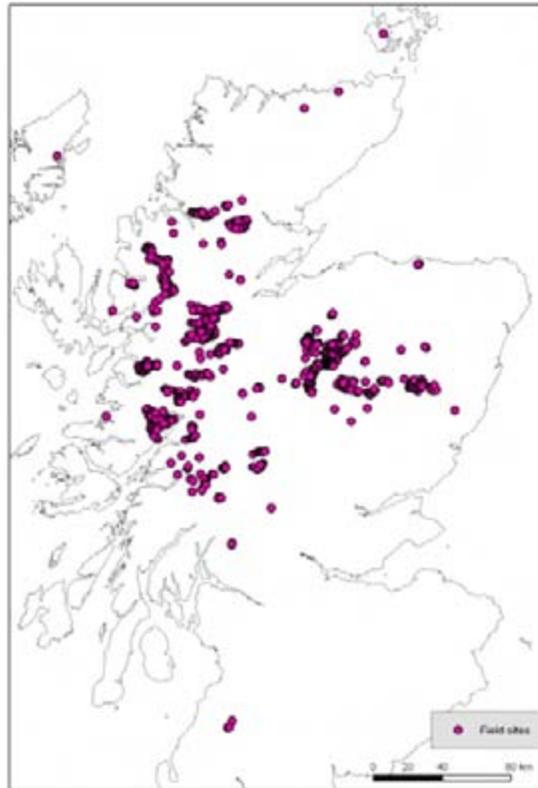
The tree-line model attempts to find a relationship between the predicted yield for SP and DB, and other climatic and topographic variables. Field survey data provide a method of calibrating the model. These data include information about the spatial extent of the tree-line across Scotland based at a resolution of 100m (see Figure 1).

Climatic variables, and elevation and predicted yield information were related to field data in the analysis. The climate variables used included: accumulated temperature (AT), moisture deficit (MD), continentality (CONT), and wind exposure (DAMS), and the height above sea level (ELEV). An initial classification into potential tree-line zones used yield values and expert knowledge with sensitivity analysis of yield linked to the field observations. The defined zones were:

1. very slow growth of trees – biological limits (yield  $0 - 0.5 \text{ m}^3 \text{ ha}^{-1} \text{ yr}^{-1}$ )

2. slow tree growth – tree-line zone (yield  $0.5 - 6 \text{ m}^3 \text{ ha}^{-1} \text{ yr}^{-1}$ )
3. fast tree growth - commercial forestry (above  $6 \text{ m}^3 \text{ ha}^{-1} \text{ yr}^{-1}$ ).

A discriminant statistical method was employed to develop a criterion to classify quantitative variables (AT, MD, CONT, DAMS, ELEV) into these three categories. Output of the analysis creates a treeline model that allows us to process and classify independent datasets into the three zones.



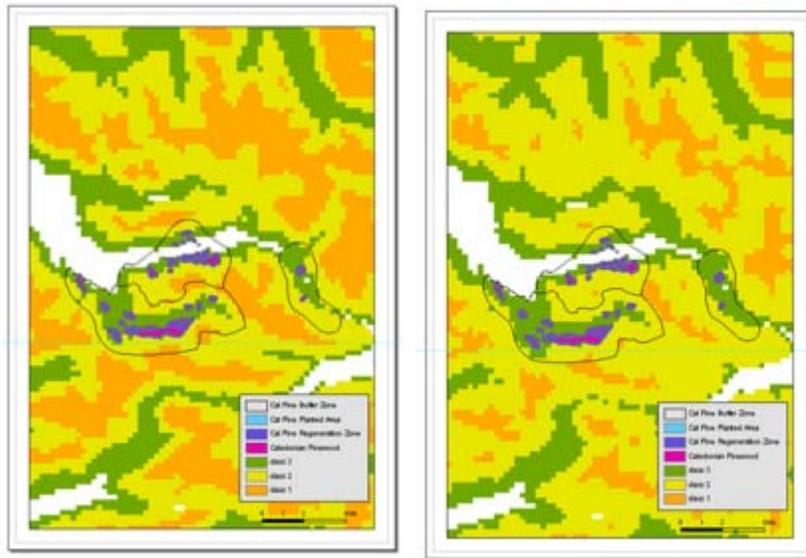
**Figure 1** Field survey data across Scotland

## Preliminary Results & Discussion

Results achieved with the tree-line model for SP and DB represents a good prediction of the tree-line zone in south-east Scotland. An example analysis is shown for SP and DB (Figure 2) in which the Caledonian Pinewood Inventory (CPI) is also shown as a validation dataset. The current extent of Caledonian pinewoods is within zone 3 (commercial forestry) for both species with buffer extending to the tree-line zone (Figure 2). Some minor variations between zones for species are apparent, especially the extent of zone 1 (biological growth limits). The validation process was conducted in other CPI sites with different level of accuracy. For example lower accuracy was achieved in Cairngorms National park.

A)

B)



**Figure 2** Classification zones in south-east Scotland shown with Caledonian Pinewood Inventory data (A – for SP, B – for DB)

## Conclusions

The tree-line model could be a useful method to plan the creation and management of tree-line ecotones at a national scale. This model is still under development and some adjustments are necessary to increase its reliability across Scotland. The tree-line model will be validated within local biogeographic zones and European biogeographic zones defined by Metzger (2005), which include the Scottish Highlands. The validation process should enable us to explore the variation in tree-line within different biogeographic zones, with a main emphasis on the east-west climate gradient in Scotland.

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# Woolly willows planted in Corrie Fee National Nature Reserve

**Suki Fleming, Area Officer - Angus and Dundee, Scottish Natural Heritage.**

In August of this year, over 800 young montane willow shrubs were planted in Corrie Fee National Nature Reserve (NNR) by Scottish Natural Heritage (SNH) and Royal Botanic Garden Edinburgh staff and volunteers. Species planted included the rare woolly willow *Salix lanata*, which is a UK Biodiversity Action Plan species and is one of those selected for additional support through the government and SNH's Species Action Framework (Scrubber's Bulletin No. 7: 16-18). The actions were agreed by the B.A.P. Steering Group.

Corrie Fee NNR hosts one of the largest remaining populations of montane willow scrub in the UK, including the second largest population of woolly willow. However, before the planting this year, the pockets of willow scrub growing on rock ledges and the steep corrie sides were small and isolated. They were growing and seeding but not regenerating. The aim of the project was to increase the size of the existing population, and to improve the conditions for natural regeneration to occur in the future, by planting native stock within the fenced enclosure in Corrie Sharroch, where most of the willows within Corrie Fee NNR are found. Seeds and cuttings of woolly willow and associated willow species were collected from Corrie Sharroch in 2007 and 2008 by the Royal Botanic Garden Edinburgh, as part of their Scottish Plants Project. These were grown into seedlings and were available for transplantation.



**photo 1 – Richard Marriott and Heather McHaffie**

A great deal of preparation was necessary before the actual planting took place, including three site visits during the spring and summer of 2009. The first visit was undertaken to identify broad areas for planting. The aim was to find sites away from the existing willow populations (so that the planted willows could be identified and monitored more easily), with deep snow cover and with appropriate ground conditions. The second visit involved a detailed assessment of the vegetation cover within the proposed planting areas. This was necessary as Corrie Sharroch forms part of Caenlochan Special Area of Conservation

(SAC) and therefore an assessment of the potential impact of the planting on other notified habitats within the SAC was required. The final visit was undertaken to mark the exact planting locations. Coloured flags were used to show exactly where each of the different species of willow were to be planted.



**photo 2 – Volunteers carrying plants**

Teams of volunteers were used to carry the young willow plants up to the planting sites, some of which were at the top of the corrie at about 700m altitude. Six willows were then planted within a 2m radius of each of the coloured flags. Prior to the planting day, Natacha Frachon and her colleagues from the Royal Botanic Garden Edinburgh had removed the young willows from their pots and made up bundles of six plants of a particular species. This made planting on the day extremely quick.



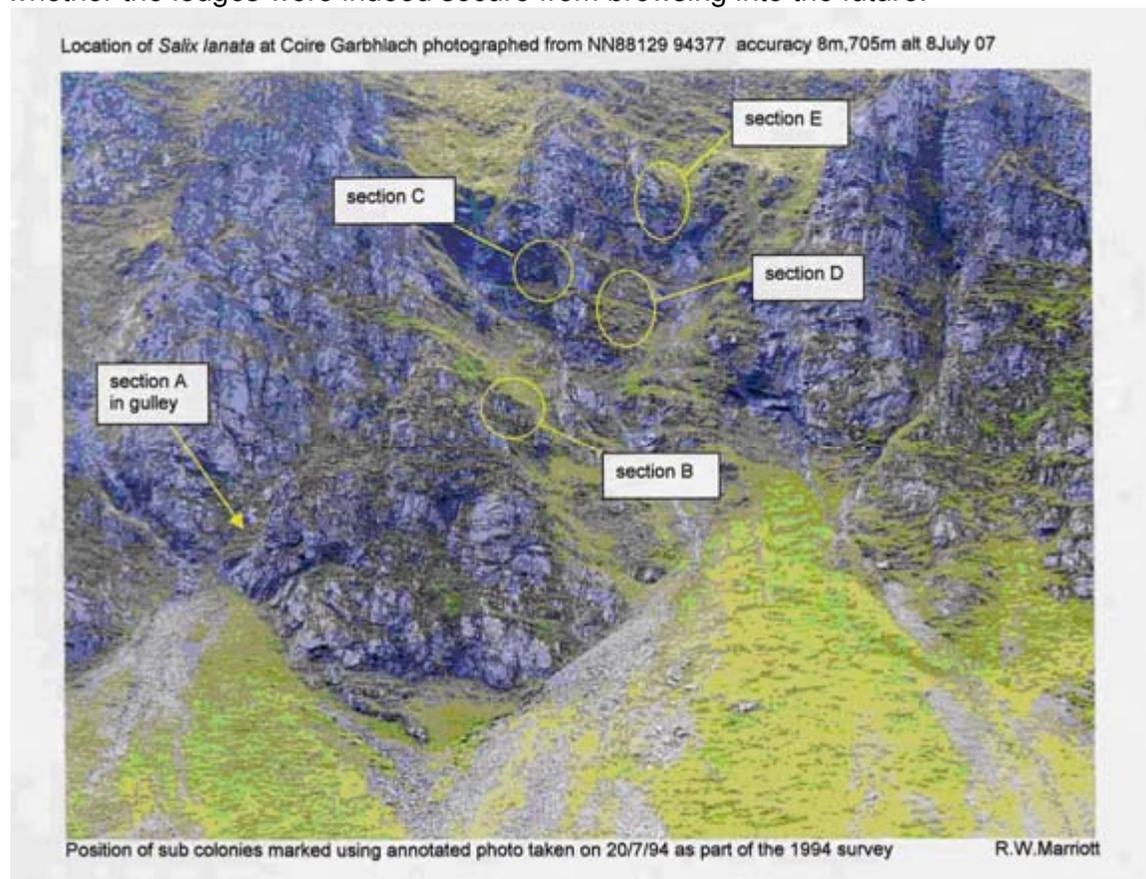
**photo 3 – Natacha Frachon from RBGE**

# Coire Garbhlach; two years on

Pete Moore, Area Officer – Cairngorms, Scottish Natural Heritage

Coire Garbhlach lies towards the north end of the Glen Feshie estate, a deep water-worn slash into the Cairngorm hills which is botanically rich and one of the thirteen remaining locations of *Salix lanata* in Scotland.

The site was surveyed comprehensively by Richard Marriott in 1994 and reported as having a population of 30 plants, restricted to steep gullies and cliff-bound grassy ledges. At that time grazing levels at Glen Feshie as a whole were ringing alarm bells. There was, under those conditions, no prospect for expansion and doubts must surely have been raised as to whether the ledges were indeed secure from browsing into the future.



In the last 15 years the estate has changed hands and, with the benefit of new policies in the last 5 years or so, supported by enlightened management, grazing levels are being brought under control and the glen is experiencing something of a renaissance of vegetation. All of which amounts to an optimistic setting for some proactive work on *Salix lanata* under SNH's Species Action Framework (SAF).

The delivery of this project – part of a wider, co-ordinated programme of work on *Salix lanata* - has been guided by the Woolly Willow Biodiversity Action Plan (BAP) Steering Group, comprising representatives from the National Trust for Scotland, the Royal Botanic Garden Edinburgh and Scottish Natural Heritage, as well as several expert, non-affiliated willow enthusiasts, who have given up their time and expertise to contribute to the project.

The SAF was launched in 2007, as described by Chris Sydes in SB7, and set out clear objectives for *Salix lanata* and another 31 species. As one of the remaining 13 identified colonies and hosting less than 50 plants, Coire Garbhlach is regarded as one of the smaller, and therefore vulnerable, populations. Encouraged and supported by the progressive land management which was taking place on the Estate, we were keen to undertake some initial survey work and develop a plan to undertake any necessary intervention to assist the species recovery.

The site was resurveyed in 2007 to detect whether there remained a viable (and potentially expanding) community on the ledges. Various casual observations indicated that the species was not thriving and might have been in decline. It was also decided to take the opportunity to collect seed and cuttings from the specimens at the earliest opportunity and to establish a cultivated population of Coire Garbhlach *Salix lanata* under nursery conditions. To begin with there was a general aspiration to retain genetic purity at the site, but this position was to change as described below.

Access to the Coire Garbhlach colonies is difficult and dangerous, the slopes steep and unstable. Richard Marriott and I went to recce the site in May 2008, and after a careful wander around the slopes at the foot of the cliffs, confirmed that SNH's Health and Safety policies combined with Richard's increasing discretion/advancing years (!) meant that some plants which he had surveyed himself in the past (1994), could not be revisited without some form of external assistance.

Richard reflected on the difficulty of access in his 2008 colony report and upon the likelihood of this affecting the accuracy of some survey records. With considerably fewer plants recorded in 2000, by another observer, there was some concern that the population had more than halved in recent years. The likelihood is that this is not the case and, as Richard points out, the records were all reflecting observations at a lower altitude and probably missed the more precarious colonies, higher up the cliffs, which are not easily seen if the weather is wet and the grey leaves do not show up. The unsubstantiated view was that the population remained small and stable but accordingly vulnerable. We made plans to collect seed (if possible) and cuttings from the remaining plants, as a matter of urgency and I made contact with SportScotland at the National Outdoor Centre, Glenmore Lodge, to 'buy in' some expertise to effect a safe working environment. Tim Walker, The Principal of The Lodge, at the time, agreed to come along to help us and, in July 2008, we took a vehicle up the hill track to the edge of the coire, and the three of us descended by rope down a steep gully, to the side of the colonies.

I was deposited in a safe vantage point to document the work and Richard collected samples, while belayed by Tim from various fairly close points. For expedience, Tim collected one or two specimens by taking himself into the more inaccessible areas as we looked on. As we reported last year; cuttings were taken from 12 plants following our 'cuttings protocol' of not removing more than 10% of shoots from any one plant. The work resulted in 30 cuttings, of which 24 rooted. It was only realised at the potting stage that one sample was a hybrid, (almost certainly with *S.myrsinites*) and thus, we ended up with 20 rooted cuttings from 10 parents. During that survey and collection visit, we saw no seed.

The visit drew attention to the rather struggling and isolated specimens of *lanata* within the known colonies at Coire Garbhlach and also to the unstable nature of the coire. In spite of Tim's technical assistance, we were still unable to sample and ground-truth from the highest of the subcolonies. Work at these upper subcolonies has been put aside for a future visit when specialist ground anchors and fully roped access will need to be arranged.

Debate followed late that summer and over winter. We had a very small number of cuttings. Our 'cuttings' protocol limited how much material we could take from the accessible plants in Coire Garbhloch. The willows did not appear to be exactly flourishing and the chances of capitalising on the anticipated recovery of vegetation through reduced grazing in the wider coire seemed slight. As no seed had been seen on the bushes in either 2007 or 2008, regeneration of the colony on its own, seemed unlikely.

It was clear that natural re-establishment – relying upon the existing remnant plants to set seed - or augmentation from the pure genetic stock, was going to be a very lengthy project. We had and have a willing landowner, who was keen to progress management options that would move the estate towards reforestation on a much bigger scale and this small amount of work fitted well with his aspirations ... and so we thought carefully about mixing the genotypes; bringing in known cultivated seedlings to help re-establish. The Steering Group were supportive of this proposal and, most importantly, there were accessions available from the nursery at RBGE which had been collected from Caenlochan, on the other side of the Cairngorms.

We got approval to make another visit to Coire Garbhloch in 2009, to undertake some planting work. We kept two provisos in mind; we would keep one colony - Richard's colony 'a' - which is slightly separated from the others as 'pure', restocking it in the future, with Garbhloch-originated cuttings as the opportunity arose. We would also, at the suggestion of the Estate, expose a proportion of the introduced plants to grazing – in other words, our replanting would not only be confined to the cliff-bound ledges where the willows were currently surviving, but we would also establish some colonies on what we judged to be suitable habitat below the cliffs, at the top of the grassy slopes.

It was a suggestion that we readily accepted, as the longer term goal for the species recovery was the re-establishment of willow scrub throughout the coire. This certainly offered the opportunity of a kick-start of the process and threw down a challenge to the land managers with respect to grazing control – a challenge which they have readily accepted.

In July 2009, Richard and I met with two Glenmore Lodge Instructors, Al Gilmour and Bill Strachan, at the estate to transfer gear and drive once again to the lip of the coire. Having divided up the two hundred and fifty plants into planting bags, we set off down a similar route to the foot of the cliffs and set up a central base to work from.

I left Richard to direct operations from this point and descended down to the burn and then up a short way on the other side of the coire to a prominent rock, which had previously provided us with a fixed point from which to photograph / view the willow areas and there I set up a tripod and camera to document the work

We kept in contact through 'walkie-talkie' radios which transmit from set to set (as opposed to through a radio mast), one side of the coire to the other and once Richard had identified the locations of the planting plots, Al and Bill climbed to these locations and marked the corners of the plots with fluorescent markers. I then photographed the plot locations, at a sufficient scale and resolution to be able to see the flags on the resulting images, and recorded the various details via the radio sets as work progressed.

We were blessed with a good day. The north facing cliffs of Coire Garbhloch offer a challenge to the photographer, casting deep shadows, but by and large the technology held up and the planters were able to distribute the plants as indicated in the figures. With the

steep unstable slopes and a desire not to cause undue damage, Al and Bill operated a 'one pass' system. Planting the flags at the base of the planting plots, climbing up through them, planting as they went and then marking the tops for photographic purposes. They would then recover the top flags, continue up and out the top of the coire to descend by the rope once more to recover the lower flags and begin again on another plot. Where these were cliff-bound and discrete, no flags were necessary and I have reflected the limits of planting in the graphic.

With a bit of luck we'll begin to see the scrub developing in Coire Garbhlach in a relatively short time. We intend to keep an eye particularly on the two plots on the lower slopes to see what browsing or grazing impacts there are, and what percentage of the restocking survives.

With Target 1 for the BAP Steering Group - 'Increase population size of *Salix lanata* to over 2000 plants by 2010' well within sight, attention will begin to turn to the other aspirant objectives to 'Ensure that populations are stable or increasing at all known sites by 2015, Increase the range of the species by ensuring that populations at four sites can expand by 2015. We hope that the work in Coire Garbhlach will contribute significantly to these objectives.

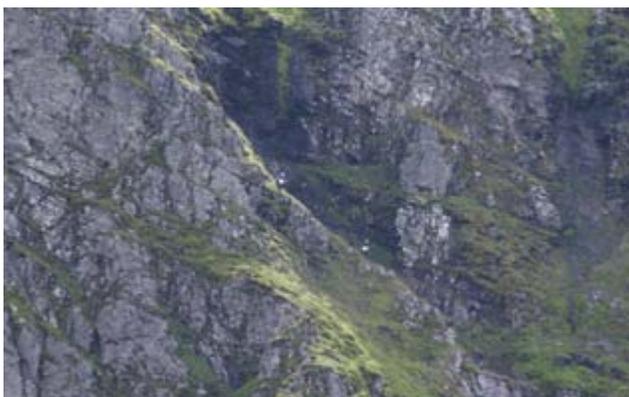
Thanks must go to: Thomas MacDonell at Glen Feshie Estate for his support for the work; to SNH for funding the specialist access arrangements through the Species Action Framework; to Glenmore Lodge staff Tim Walker, Nigel Williams, Bob Kinnaird, Al Gilmour and Bill Strachan; to the BAP Steering Group members, and in particular, Richard Marriott, who has invested much time, energy and expertise into willow recovery in general and has been key to taking this project forwards.



Preparation above the Coire, 2009



Rope work below the site, 2008



Working on the face, 2009



Working on the face, 2009

# ACTION FOR MOUNTAIN WOODLANDS UPDATE



## Billy Bodles, Highland Birchwoods

It's hard to believe we are now almost at the end of the second year of the project, where has the time gone? Since the last Scrubbers' Bulletin work on the AMWood project has started in earnest. The project identity is now well established with tee-shirts, pencils, leaflets and notepads and through numerous magazine articles we've been able to attract a lot of interest from the general public. Our website [www.mountainwoodlands.org](http://www.mountainwoodlands.org) was launched in spring 2008 and has an inbuilt scrub recording form through which we've had approx. 200 scrub reports from members of the hill going community. The scrub survey days were very successful, to date we've held 16 weekend survey events, using



Volunteer surveyors

volunteers, covering a range of areas from Dunnet Head to the Galloway hills. This has proven to be a very rewarding element of the project as we've now got a core of dedicated knowledgeable people who keep coming back despite the rain and midges! As part of the survey strategy a general scrub identification postcard was developed, 6 pictures on a postcard that the general public could use to record their sightings of scrub. So far, we've distributed 74,000 of these postcards through outdoor magazines and partners offices and shops. Perhaps the most pleasing element of the project has to be the involvement with primary schools, we've been able to provide a class visit by one of the project staff to speak to the children about montane scrub and an

education pack. The pack includes a Dwarf Birch plant that the kids pot up under supervision and look after for a further 6-9 months, we are then able to take the kids to one of the partner sites where they plant their tree on their local hillside. The level of interest this generates is simply amazing and throws up some tough questioning!

At the Glentroll site in Dumfries and Galloway lots of hard work has gone into preparing the treeline demonstration garden, 3.4 hectares of existing plantation around the Merrick hill path was cleared by a tractor mounted hammer flail and replanted with mountain woodlands species. They've also been working hard building the raised wall montane scrub garden at the Glentroll Visitor Centre; thank you to all the volunteers who so kindly gave up their time to help build the stone walls and shovel many many tonnes of soil.

At the Cample Burn site in the Clyde Muirshiel Regional Park staff and volunteers were very busy replanting some the juniper cuttings that were taken earlier in the project. We've also been able to expand their work programme and provide funding to establish a hen harrier nest site camera, within the enclosure created around the juniper replanting site. This will enable us to see how the harriers interact with the scrub habitat.

CairnGorm Mountain have had another busy summer with the Mountain Garden gardener, Slavomira doing lots of work planting out the willows kindly provided by the Royal Botanic

Garden Edinburgh and collecting and bringing on seeds she'd collected. Wind up audio units were installed at strategic points in the garden giving information on what the visitors can see and new plant information labels were developed. The link path that takes people up to the mid station through the garden and the hillside planting zone was complete in early summer 2009, and has proved to be a popular circular walk for the visitors. Once again the tree planting events with local primary schools were a great success. In 2009 Grantown, Deshar (Boat of Garten), Carrbridge, Aviemore, Gergask (Laggan) Dalwhinnie, Alvie, Kingussie Newtonmore and Tomatin all took part. These schools also received tree planting kits for the pupils in the year below to grow on and plant out on the mountain next year. Next year will concentrate on visitor interpretation, with the possibility of turning an old ski hut into a stumpery...so watch this space!



The non-native seedling removal work at the Glenmore site is now complete and the new visitor centre display/interpretation space for montane scrub is also complete. This interpretation includes an introductory DVD, a discovery tunnel, an educational montane scrub game and numerous interpretation panels highlighting the benefits of montane scrub and how it interacts with the rest of the environment.



Scots pine & juniper

The Interpretation work at Beinn Eighe is now well underway and we should see the ridge trail and the visitor centre having some nice new montane scrub information in place for the spring of 2010.

In an exciting new development we've been able to expand the project and bring in some new areas, so I'd like to take the opportunity to welcome Dundreggan Estate (Trees For Life) and Forsinard Flows (RSPB) to the project, work has yet to start on these sites but we'll be doing volunteer plantings and surveys and schools work at the sites along with some on site interpretation of existing montane scrub.



Eared willow



Dwarf birch



Woolly willow



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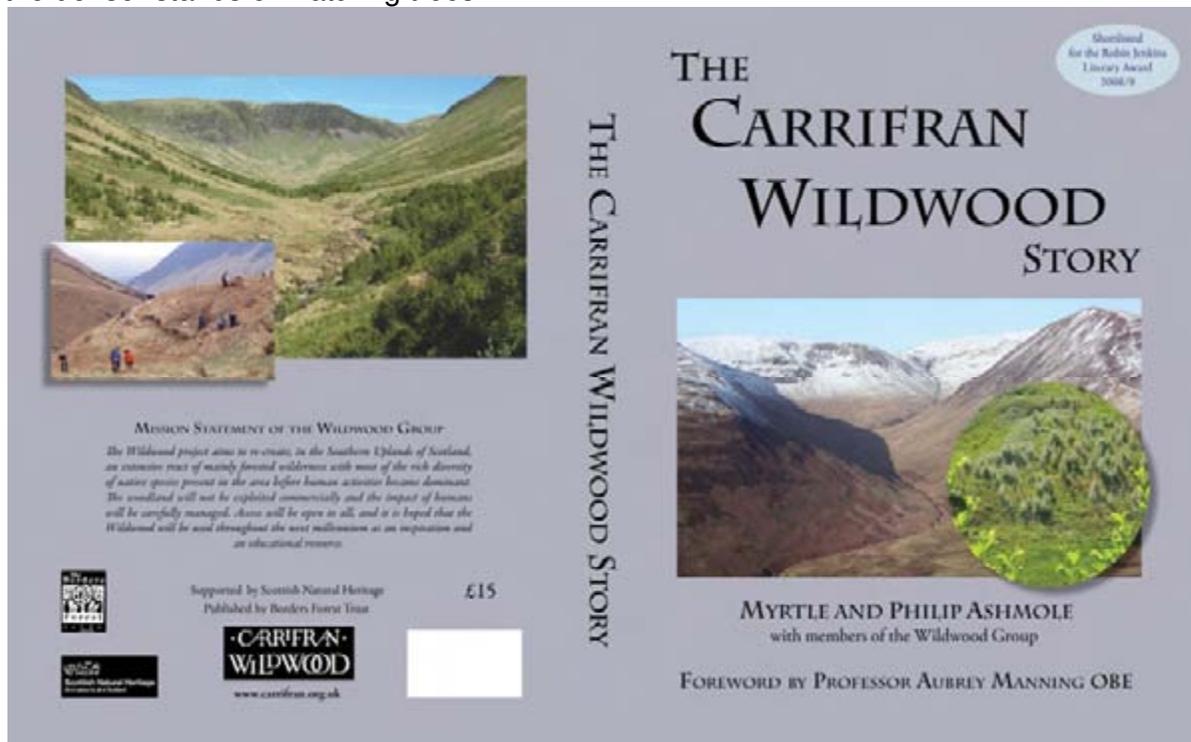


# The Carrifran Wildwood Story: book review

John Savory

This book is all about the realisation of a vision of native woodland restoration in Scottish Border country on a grand scale. It was written to celebrate 10 years' ownership of Carrifran, a spectacular glaciated valley in the Moffat Hills, and the planting there of roughly half a million locally derived trees and shrubs of more than 20 species. It is superbly illustrated, well organised, and contains numerous contributions from other authors, often in the form of "boxes" elaborating on particular points. It should be an inspiration to others contemplating similar ventures, and the authors deserve great credit, not only for the book, but also for being the main initiators of the project.

Apart from chapters dealing with the background, the search for a suitable site, local history, fundraising, planning, planting, volunteering, monitoring changes in fauna and flora, there is another entitled "going up high" which should be of special interest to "scrubbers". Although the vast majority of trees in the valley have been planted below the 450m contour, two higher areas between 550 and 750m were selected for planting treeline woodland and scrub, mainly juniper, birch, rowan and willows. This went ahead after consultation with SNH, because of the Moffat Hills' status as a SSSI, and involved several high level camps in wintry conditions by a team of hardy volunteers, and delivery of materials by helicopter on one occasion. Now, three years after the first planting there, a developing treeline scrub is thriving, and ten years after the first planting lower down, woodland birds are colonising the denser stands of maturing trees.



**The Carrifran Wildwood Story**  
Myrtle and Philip Ashmole  
Borders Forest Trust 2009  
ISBN 978-0-953446-4-0  
Softback

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