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East Schiehallion Mountain Woodland Project Consultation

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Introduction

The John Muir Trust is seeking to deliver an exciting mountain woodland project on the property it manages at East Schiehallion, Perthshire. This document sets out the rationale and method we hope to use. We would be delighted to hear your thoughts by 6th February.

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1.0 Background

1.1 What is mountain woodland?

Mountain woodland is a term used to describe a wide habitat that links low-level woodland to the alpine zone. It extends across the treeline zone, forming open canopy woodland and scrub from around 400m elevation right up to the alpine zone where trees and even scrub will struggle to grow. At lower elevations, tree species such as downy birch, Scots pine and aspen will be dominant. At higher altitudes where environmental conditions are harsher, montane scrub will prevail, which include species such as dwarf juniper, dwarf birch and montane willows.

In Scotland, this habitat is missing in all but a few locations and today is largely confined to inaccessible cliffs and ledges due to herbivore grazing pressures. It is thought that there are only two existing examples of a natural treeline in Scotland (both in the Cairngorms) (Mountain Woodland Action Group, 2020).

For a useful diagram of altitudinal zones, see page 5 in a [NatureScot handbook](#) about montane scrub (NatureScot 2002).



Above: Creag Fhiaclach, one of the two remaining treelines in Scotland. This photo is taken at around 650m (the altitudinal limit of the pine / birch woodland which you can see in the left of the image), at the elevation where scrub species and montane specialists take over (juniper is the species succeeding best here which you can see on the right). Credit: I Filor.

Other members of the Heart of Scotland Forest Partnership are at various stages in planning, implementing or managing mountain woodland establishment on their respective sites. Our project at Schiehallion will play a part in our shared vision to link up this important habitat through landscape-scale management.



Above: Schiehallion from Dùn Coillich, where a young woodland has been planted by Highland Perthshire Communities Land Trust. Our project at East Schiehallion will link with HPCLT planting to join this existing woodland. Credit: D Clark.

There are potentially significant carbon benefits of woodland expansion. In the case of mountain woodland, where growth rates are slower and diverse broadleaf species are predominant, carbon sequestration rates are lower and slower. In the long-term the potential benefits of establishing naturally regenerating mountain woodland where at present there is heath, are likely to be significant.

Landslides and peat erosion are becoming an increasing issue with climate driven changes in precipitation. Heavy summer rainfall, winter storms and snowmelt can all result in erosion of mountain slopes and further loss of carbon from peat and mountain soils. The interception of heavy rainfall by trees and taller vegetation can reduce overland flow of water, reducing velocity of flow into burns and rivers, while the binding of soil by deep tree roots increases soil stability. There is an area of substantial peatland degradation on the northern slopes of East Schiehallion, which we aim to address alongside our mountain woodland project.

Increased woodland cover in the treeline zone has additional aesthetic benefits – reducing the harsh boundary often seen in Scotland between commercial forestry and upland heath. For hill walkers, the greater diversity in the landscape can provide increased benefit, with more shade from tree cover and an increased diversity of wildlife in these areas.

1.3 Other mountain woodland restoration projects across Scotland

Carrifran: Managed by the Borders Forest Trust, Carrifran Wildwood has been the site of a large ecological restoration project since 2000. Over the past 20 years, over 500,000 trees have been planted on the site, which was previously used for upland sheep farming. Since 2007, efforts have been focussed on higher altitudes, where a variety of montane willows and juniper have been planted, forming the beginning of a treeline habitat. This has demonstrated an increase in bird diversity following planting, particularly in woodland species (Savory, 2016).

Creag Meagaidh: In public ownership since 1985, Creag Meagaidh has been the site of one of the first projects to reduce deer pressure without fencing. The success of the project can be seen from the young woodland regenerating to higher altitudes on the site.

Ben Lawers: National Trust for Scotland have been pioneering the restoration of mountain woodland for more than 30 years. A remnant montane willow population has been supplementary planted and pioneering work continues to this day propagating and planting mountain woodland and scrub species on the site behind high-altitude fences. Academic research is ongoing into the success of natural regeneration of montane willows on the site.



Above: montane willow planting on Creag an Lochain, Ben Lawers. Credit: I Filor.

Mar Lodge: Another site managed by National Trust for Scotland, Mar Lodge has used small amounts of strategic fencing and a reduction of deer on the site to establish hundreds of hectares of natural regeneration of remnant Caledonian pinewoods. At altitude, thousands of montane willows and junipers have been planted following extensive research into these fragile populations.

1.4 Evidence of past woodland at Schiehallion

The fragments of woodland and scrub that exist on the site evidence the viability for a variety of species. Over the last 150 years, regeneration has been suppressed due to previous management objectives for sporting reasons – (there is evidence of historical burning for game shooting on the site, with high deer and sheep densities to this day).

Existing ecological records for the site give good evidence for supplementary planting of several species. There are records for downy and silver birch, wych elm, hazel, alder, eared and goat willow, juniper, holly, hawthorn and rowan on the site. There is a historical record for dwarf birch in Glen Mor from 1980, although none has been found on the East Schiehallion site.

A handful of montane willows have been found on the site: mountain, net-leaved, whortle-leaved, dwarf, dark-leaved and tea-leaved willows. These are all found on accessible wet flushes on the northern side of the hill and are all growing in prostrate form, heavily grazed by herbivores.

An NVC survey for the site suggested that: ‘the natural woodland vegetation of this part of Scotland would be of pine and birch on the acid soils, with oak, elm and birch on the more fertile soils (Birks, 1988). Woodland might have extended up the slopes to about 700m, probably becoming low, scrubby and open at higher elevations’ (Averis and Averis, 2000).

Two areas of ancient Caledonian pinewood are nearby at the Black Wood of Rannoch approximately 15km west of Schiehallion and Meggernie in Glen Lyon approximately 20km to the south-west. Small areas of ancient woodland exist nearby, some of the most extensive of which are found at the Scottish Wildlife Trust’s Keltneyburn Reserve, where hazel, sessile oak, wych elm, downy birch and ash dominate.

Several pollen analysis studies from areas across the Highland Perthshire region are available, providing a general ecological record for the region (Lowe and Walker, 1981; Tipping, 1995; Tipping et al., 1993). Although throughout the last century the landscape has been dominated by heather moorland and plantation forestry, pollen records depict a dynamic vegetation history across the area.

Following glacial retreat, early open moraine habitat was colonised by crowberry, juniper, and birch; and in some areas, montane willow scrub (Tipping, 1995). In lowland areas, these pioneers were eventually outcompeted by broadleaf woodland species expanding northwards, including elm, sessile oak and hazel. This formed the climax woodland community following re-establishment after the last glacial maximum. The montane scrub community of downy birch, juniper and montane willows may have persisted at higher elevations, where soils and conditions were unsuitable for the larger, more demanding tree species (Lowe and Walker, 1981).

2.0 How are we going to restore mountain woodland?

The main barriers to the establishment of mountain woodland on East Schiehallion are high grazing impacts and scarce seed source. To achieve the Trust's objectives for the site, we will need to employ a range of management tools: fencing, increased deer management and active shepherding of any encroachment of sheep to ensure that grazing levels are low enough to sustain natural regeneration and planting young trees.

Other management options were considered before finalising the preferred way forward set out below. We explored employing a no-fence approach, which would not exclude encroaching sheep from the site. A second option of installing smaller fenced exclosures to nullify grazing pressure would not allow us to address the ongoing issues of overgrazing across the site and would not allow us to restore a functioning mountain woodland habitat.

2.1 Fencing

To reduce grazing across the site we are proposing to erect two separate offset electric fences – both linking with an existing fence that is powered by electricity from neighbouring Braes of Foss farm. The fence will not be a full enclosure, but open across the ridge to reduce visual impacts and minimise impacts for hillwalker access. Termination points for both fences on the western boundary of the property will be confirmed following discussion with fencing professionals.



Above: existing offset electric fencing at East Schiehallion. Credit: L Auty.

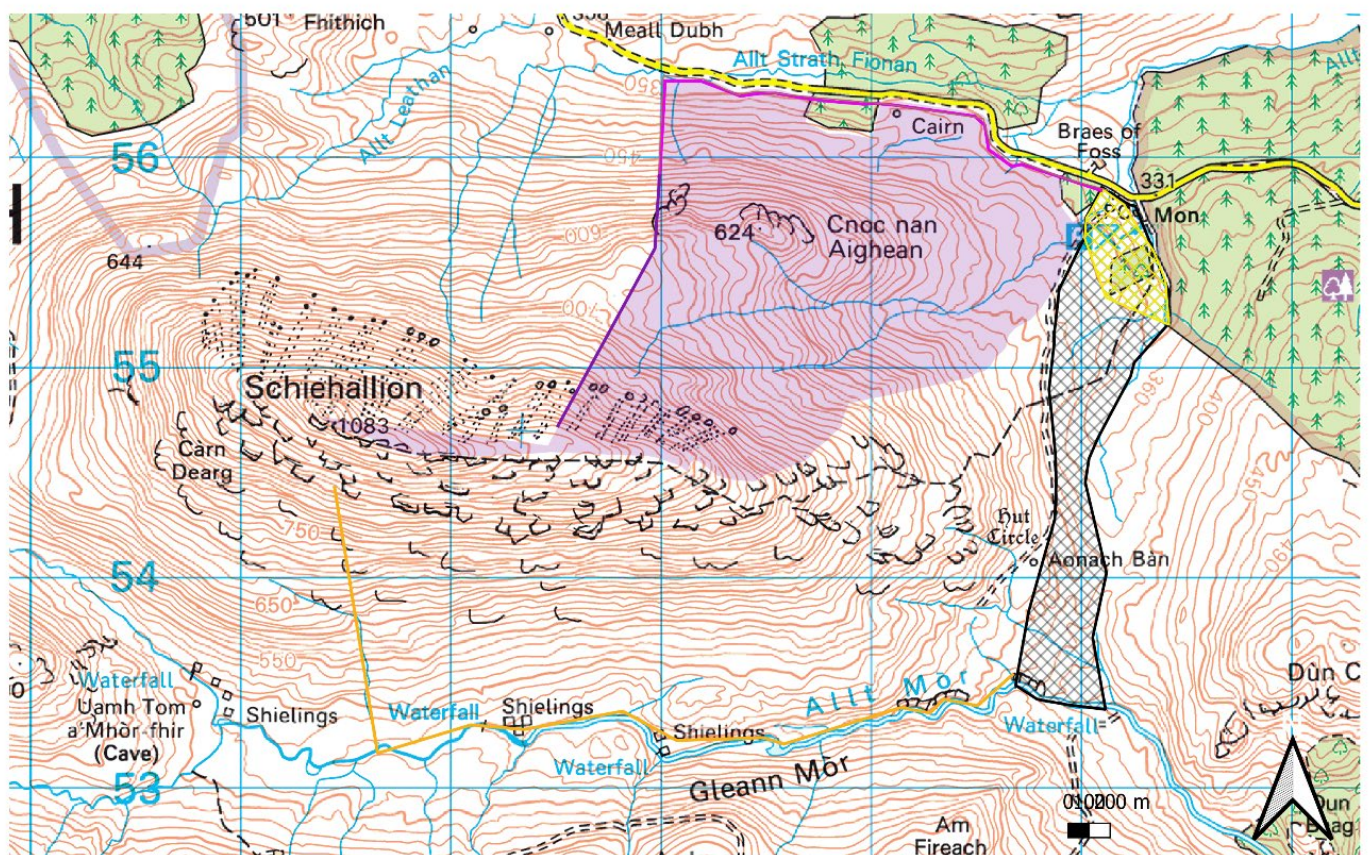
In total, we anticipate that approximately 5km of new fencing will be required along our southern boundary (orange line on below map), and around 1.5km of new fencing on our northern boundary (dark purple line). Approximately 3km of existing stock fencing will need to be upgraded on our northern road boundary (pink line on below map).

The chosen fence design is an offset-electric fence and is only slightly higher than a stock-height fence to reduce this visual impact. We anticipate fencing will be removed once woodland has been established and grazing levels can be controlled at a low level.

This fence design has already been successfully used for a smaller area of the site since 2018. The offset fence design specifically allows any deer inside the fence to easily jump out of the fenced area. We will also install several deer leaps to aid this.

Fencing is purposely strategic and will not be a full enclosure. This reduces impacts on walkers using the main path up Schiehallion who will not have to navigate gates / stiles to walk up the mountain. Mountaineering Scotland have advised suitable crossing points on the fence and signage to point walkers towards the nearest gate / stile. Strava heatmaps will be used to identify key walking and cycling routes on the hill and where these will intersect with fencing.

Visitor interpretation will be installed to explain the need for fencing on the site and information on the Trust’s website will aim to give visitors as much information and interpretation ahead of their visit as possible.



**East Schiehallion
Proposed Fencing**

- Existing Fencing on SSSI
- New Fencing on SSSI
- New Fencing on Southern Boundary
- Existing Deer Fenced Area
- Existing Electric Fenced Area

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2.2 Grazing management

Grazing on East Schiehallion has been monitored since 2008 by dwarf shrub heath monitoring and marked tree seedling monitoring (see below for graphs). Both methods show static tree growth over the 12 years of data and minimal heath growth. During that period there has been consistently intense grazing pressure on the site.

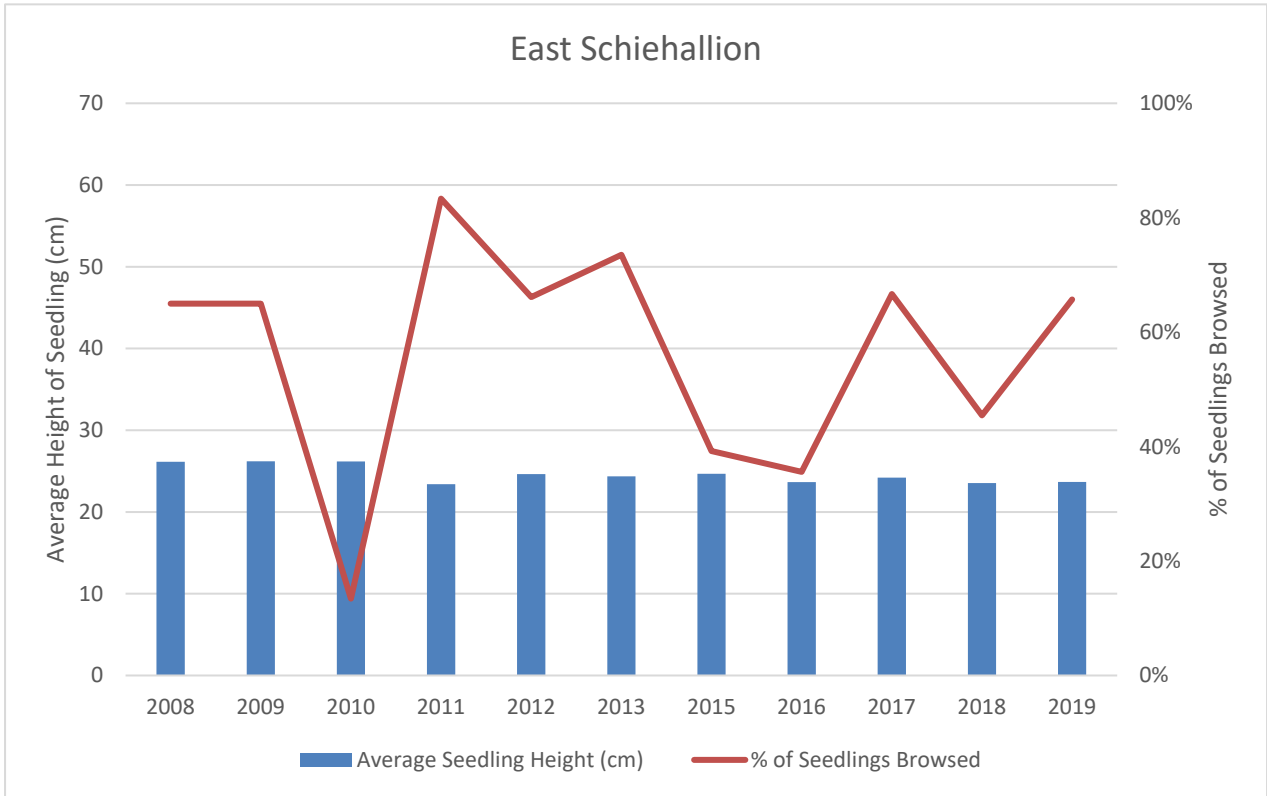
An initial reduction cull to reducing grazing pressure by deer on the site will be required. The success of our culling activity will be determined by the habitat response from our ongoing monitoring plan (see appendix x). We are currently in discussions with members of the Heart of Scotland Forest Partnership to develop a deer control group, which will facilitate long-term deer management objectives.

As proposed fencing will be strategic and not a fully closed area, it is possible that herbivores may make their way onto the site, but this would involve navigating scree, boulders and steep slopes. Ongoing management and monitoring of grazing will continue after the fence has been erected to ensure the establishment of woodland.

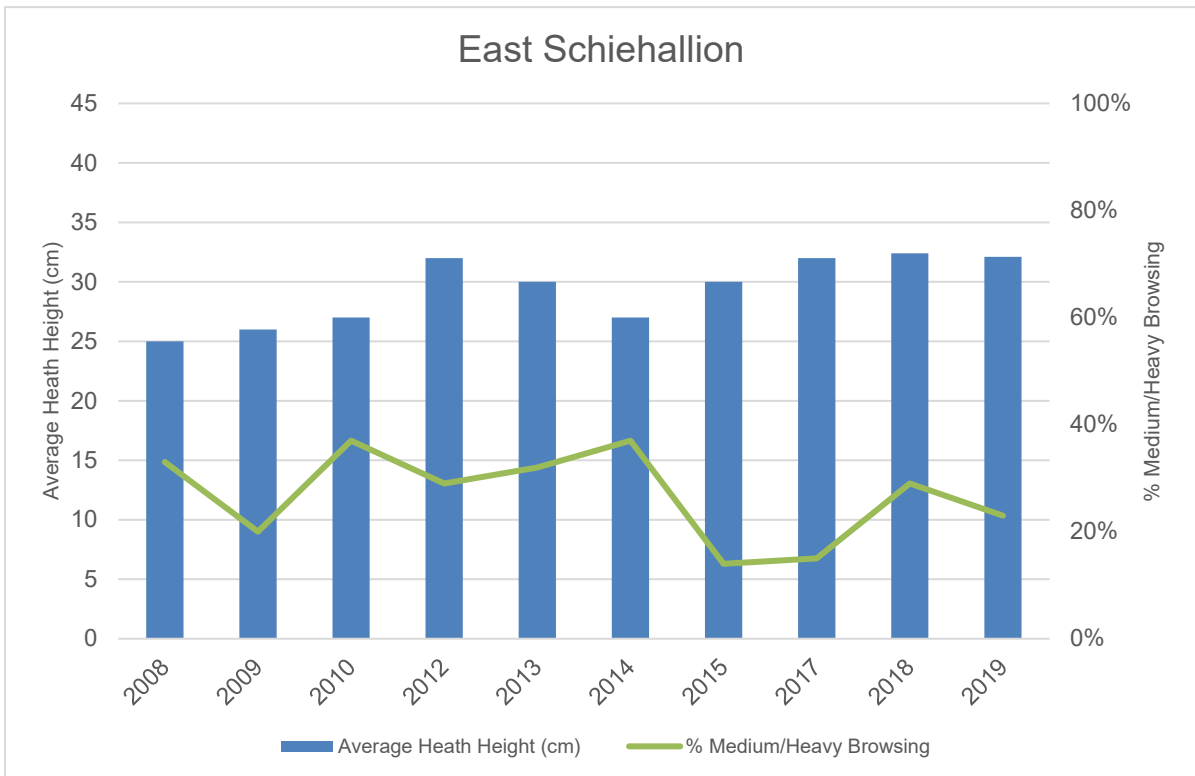
Deer are currently controlled by contract stalkers on the site, with cull targets informed by ongoing habitat monitoring. In 2021, deer cull targets will increase in line with targets to increase natural regeneration. Trust staff continue to undertake yearly habitat monitoring, in the form of heath plots and marked tree seedlings. Alongside trials to count deer via drone thermal imagery, we plan to closely monitor deer movements and impacts on the site.

There are approximately 150-200 sheep encroaching on the north side of the site and 25-50 on the south side. This is playing a role in causing significant grazing damage to the site and is stifling natural regeneration.

We will use a programme of active shepherding to remove any sheep that encroach after fencing. This will involve regularly gathering any encroaching sheep to a pen and informing the owners to collect them.



Graph 1: data from marked tree seedling monitoring at East Schiehallion (2008-2019).



Graph 2: data from dwarf shrub heath monitoring at East Schiehallion (2008-2019).

2.3 Tree planting

After grazing has been reduced across the site, we plan to plant specific tree species that would struggle to return to the site or would regenerate very slowly. As we aim to establish a mountain woodland, a habitat lost across much of the Scottish Highlands, specialist tree and montane scrub species will be planted at higher altitudes and at low densities. We aim to involve members of the local community, volunteers, youth groups, John Muir Award Groups, schools and local contractors to help with tree planting.

Tree planting will undoubtedly benefit biodiversity on the site, where there are few examples of species such as aspen, juniper, wych elm, sessile oak and Scots pine. Without planting, these species will take decades to naturally regenerate (or may never return to the site).

There are small areas of existing woodland at Schiehallion, although most is patchy and mainly confined along burns, gorges and steep crags or cliffs due to overgrazing. The most abundant species are downy birch, rowan, eared and goat willows. It may be beneficial to supplementary plant these species at higher altitudes where they currently do not grow, however most planting will focus on species that grow locally, but which are not currently found on the site.



Above: Willow regenerating at East Schiehallion. Credit: L Auty.

A small remnant population of montane willows was discovered on the site by the Mountain Woodland Action Group in 2017. Since then, further surveys by Trust staff and a local ecologist Oliver Moore have added to these records.

The majority of plants are within the Schiehallion Site of Special Scientific Interest, all are growing in prostrate form and are poor examples of montane willows, being heavily grazed by herbivores. A few are producing catkins although none have been seen to produce seed. Supplementary planting will be necessary to ensure this is a viable population in the future, and that protection from grazing alone will not be enough as the size of the population is so small.

Our planting plan for this project is informed by the historic data summarised above in addition to current habitat data from an NVC survey and ground-truthing to ensure that areas most suitable for certain species are used.

In 2018 we began tree planting at lower levels on the site, through a Woodland Grant Scheme-funded project and through additional unfunded planting. To date, we have planted around 12,000 trees at low altitudes and a variety of species, with a focus on those which will struggle to naturally regenerate on the site including sessile oak, Scots pine, aspen, bird cherry, silver birch and alder.

In general, at lower elevations tree species such as downy birch, Scots pine and aspen will be the main species planted. Scots pine will be focussed in heath habitats, birch and aspen in grassland and sessile oak in areas of quality soils. At lower altitudes we also plan to plant scrub species which will form an important part of a diverse woodland understorey, such as hazel, hawthorn, holly, blackthorn, dwarf birch and juniper.

At altitudes above 500m, we will focus on planting downy birch, which is hardy enough to thrive in more exposed conditions. Although this species is relatively common in patches of existing woodland, there is very little seed source at higher altitudes. Species such as aspen will also do well at these altitudes, in addition to more specialist montane species (dwarf birch, juniper and montane willows) which we will plant at even higher altitudes where soil depths permit (MWAG 2022).

Planting will be at very low densities, of 500 stems / hectare or lower. When compared to Woodland Grant Scheme projects which generally require around 1600 stems / hectare, the result will be a bright, open woodland which does not block the surrounding views and landscape.

The timescales of re-establishing a mountain woodland will necessarily be long. Initial planting will be planned over a ten-year period, however we appreciate that the management of a mountain woodland will likely extend beyond our lifetimes.

As we are employing fencing as a short-term tool to establish young trees, we feel it is justified to plant a significant number of trees as the lifetime of high-altitude fencing may be only 20-30 years before significant maintenance is required. While this is ample time for newly planted trees to establish, it is likely too short to see significant natural regeneration where there is minimal small seed source.

Any planting taking place on the site will be done with minimal ground disturbance through slit planting (or similar). Care will be taken that planting takes place in soils with minimal organic content and avoids areas of peat. A detailed soil study of the site will inform any planting that takes place (see appendix y).

2.4 Seed source

Tree seed for the project will be sourced from as close to the site as possible. For Scots pine, we anticipate this will be from the Black Wood of Rannoch or Glen Lyon. Partners within the Heart of Scotland Forest Partnership have already kindly allowed us to collect seed from their estates.

For specialist montane species it is much more difficult to source seed from a local provenance due to the scarcity and accessibility of some of the montane willow species. Where possible, montane willow seed will be sourced from sites as close to Schiehallion as possible.

The majority of seed will be grown in a trusted nursery, we hope most trees will be moved to raised beds in situ at Schiehallion to form part of a 'hardening off' process and to reduce likelihood of planting trees carrying disease.

We will involve local schools and volunteers through our 'Seed to Tree' project, which will enlist the help of local growers to care for trees to be planted at Schiehallion.

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