Forestry and Land Scotland
Coilltearachd agus Fearann Alba

Peatland Restoration Plan: Clashindarroch, Ski Trails

The forest-to-bog restoration at Ski Trails aligns with the following key Scottish Government and Scottish Forestry documents:

- Forestry Commission Scotland (2009). Scottish Government's policy on control of woodland removal: implementation guidance: Annex 3 woodland removal without the requirement for compensatory planting
- Forestry Commission Scotland (2015). Deciding future management operations for afforested deep peatland
- Forests and Peatland Habitats
- The UK Forestry Standard (5th Edition)
- Tackling the Nature Emergency - Scottish biodiversity strategy to 2045

Long-term vision

The long-term vision for the areas of peatland identified in Clashindarroch is to restore these afforested peat sites to UK Biodiversity Action Plan (BAP), Priority Habitat, Blanket Bog. Consequently, securing the carbon source and protecting existing areas of blanket bog. Key peat-forming species, such as sphagnum mosses and cotton grass, become the dominant ground flora, and wildlife thrives in this priority habitat. Areas of native woodland compliment this habitat and further increase the biodiversity value of the area.

Management objectives

1. Systematically restore deep peat areas to a functioning peatland system which will act as a long-term carbon store and increase its value for biodiversity and water quality.
2. Produce timber products from the current conifer crop while balancing this with the primary objective of peatland habitat restoration.
3. Protect the existing bog habitat, future peatland areas by the control of regeneration of non-native conifers.

Critical success factors

- Utilise appropriate harvesting techniques to minimise ground impacts and so protect to the carbon storage potential of the blanket bog habitat.
- Where practical realise the biomass potential of all scrub and harvesting waste, leaving as clean a site as possible to help facilitate peatland restoration.

- Minimise road or track construction and utilise low impact forwarding track methods to minimise surface damage.
- Apply current best practice and expertise in peatland restoration operations and use suitably experienced contractors with the appropriate machinery.
- Removal of re-generating non-native conifers.
- Maintain a level of deer browsing conducive to regeneration of native species.

Management of afforested deep peat

FLS approach to peatland management

FLS's approach to peatland management is different to the rest of the forest industry. FLS's objectives and legislative framework has an added dimension. Being a Scottish Government agency, FLS has an added 'Biodiversity Duty', as stated in the Nature Conservation Scotland Act (2004). Protection of conservation values is required as part of UKWAS certification and principles of sustainability are required under the UKFS. This means that for afforested peatlands restoration is considered before deciding if replanting is appropriate. This is set out in Deciding Future Management Options for Afforested Deep Peatland (forestry.gov.scot). This practice guide outlines how to manage afforested peatlands that are not going to be restored for biodiversity reasons. It states that replanting must be justified by considering if the crop will achieve YC 8 or more for Sitka Spruce. The default is to not replant unless there is evidence it will achieve a good growth rate of harvestable timber. If YC 8 or above is not achievable then restocking peatlands is unsustainable. A slow growing crop will not result in a profit, it will be acting as a carbon source thus contributing to climate change and so society would be disadvantaged or threatened based on current scientific information.

Restoration of blanket bogs and lowland raised bogs is a key action from the Scottish Biodiversity Strategy, both habitats are included on the Scottish Biodiversity List. Beyond its value as a carbon store, peatlands contain a huge diversity of organisms. Planting trees on peat leads to a fundamental change in the ecosystem[1].

Ski Trails

There are existing areas of Blanket Bog adjacent to Ski Trails, which have been identified through survey that are listed on the Scottish Biodiversity List and the UK BAP as Priority Habitats. Therefore, the sites are a priority for restoration on ecological grounds. Afforestation is listed as one of the key threats to Blanket Bog, having a significant impact on their conservation status at a national level (Forestry Commission Scotland (2009). Scottish Government's policy on control of woodland removal: implementation guidance: Annex 3 woodland removal without the requirement for compensatory planting). Restoration of Blanket Bog is a key action of the Scottish Biodiversity Strategy. FLS as a Scottish Government agency has a duty to further the

[1] Payne et al., 2018: The future of peatland forestry in Scotland: balancing economics, carbon and biodiversity. Scottish Forestry. pp. 34-40.

protection and enhancement of these habitats under the Nature Conservation Scotland Act (2004).

The Blanket Bog at Ski Trails forms part of a wider landscape of upland habitats (Hill of Towanreef SAC and SSSI) which provides connectivity with recently restored unforested peatland at Moss of Essie (NJ 4329 2791) and Moss of Fuie (NJ 4399 2741) carried out by FLS. Remnant bog vegetation is present on the rides and open areas within Ski Trails indicating that the site has good potential for successful restoration.

The current crop of Sitka Spruce on 10b soils (Scenario A peat type) and 8c (Scenario B peat type) is performing poorly with limited timber value. Slow growth, low stocking density, variable tree size and yellowing are all due to the peat soils. The degraded peat bog will be emitting more carbon than being stored due to the poorly performing crop. Recent advances in restoration techniques indicates that the site has very good potential for restoration thus turning this carbon source into a moderate carbon sink with long term secure carbon storage.

The Nordic Ski Trail, Tom's Lair begins at NJ 4265 2688 and runs through the centre of the proposed peatland restoration for approximately 300m, before crossing the Burn of Little Blackmiddens. If the Tom's Lair ski trail is damaged during harvesting, restoration or restock, it will be reinstated to ensure access post-restoration works. Water will still be able to pass underneath the trail, meaning both sides of the trail will be hydrologically connected.

The following tables present current and future management of afforested peatlands for Ski Trails. Set out in Deciding Future Management Options for Afforested Deep Peatland (forestry.gov.scot) are three Scenarios detailing peat types, characteristic habitat, and vegetation. For the purpose of the tables below, Scenario A peat types are considered as 'presumption to restore' peatlands and Scenario B and C peat types are considered as 'assessed peatlands'. Given that the 10b soils at Ski Trails are hydrologically connected to the 8c soils, the area to be restored will be treated as presumption to restore.

Table 1: summary of afforested deep peat.

Current management of peatlands in the LMP	Hectares (ha)	Comments
Afforested deep peatland	11.9	Total area size of afforested peatlands based on analysis of aerial images and site surveys.
Existing open habitat on deep peat	0.1	Total area of open peatland (ha).
TOTAL - All deep peat soils	12.0	Total area size (ha) of deep peat soils within the forest block area based on the soils data. Deep peat soils are defined as per the SF Practice Guide: Scenario A, B and C soils. Presence of peat soils confirmed via peat surveys.

Table 2: future management of afforested peatlands.

Future management of afforested peatlands	Hectares (ha)	Comments
'Presumption to restore' peatlands. Forest-to-bog restoration of afforested peatlands including the hydrological catchment	11.9	Only includes afforested peatlands which lie next to open existing peatlands, or Scenario A peatland types, as per the SF Practice Guide.
'Assessed' peatlands. Forest-to-bog restoration to secure carbon store and sequestration and maximize ecosystem services.	0	Only includes Scenario B and C peatland types, as per the SF Practice Guide. Total area of afforested peatlands that will be restored following an assessment of predicted growth (YC). This is where no evidence found to support the conclusion that the next rotation stand would grow Sitka spruce YC8 or more with minimal disturbance and low level of peatland modifications. The areas of the hydrological units are also included.
Peatland to be restocked	0	Total area of afforested peatlands that will be restocked because evidence was found to support the conclusion that the second rotation will clearly be YC8 or more with minimal disturbance and with a low level of peatland modifications.

Table 3: Presumption to Restore peatlands (Scenario A peat types) where deforestation would prevent the significant net release of greenhouse gases.

	Description	Location of described attribute
Description of any designated sites, priority peatland habitats which require protection and enhancement.	Hill of Towanreef SAC and SSSI adjacent to the proposed restoration.	Peatland and habitats map
Description of peat types present in the LMP forest block(s), and any characteristics of interest.	10b [Upland Sphagnum Bog] 8c [Juncus effusus Bog]	Presumption to restore map
Description of hydrological units, extent, relation to peatlands to be restored, and the topography.	The hydrological unit exists on a gentle west to east slope: - North: a watercourse, the Burn of Blackmiddens. - West: a mature confer plantation. - South: the Upland Sphagnum Bog transitions to a Typical Surface-Water Gley, Loamy and the Juncus effusus Bog transitions to Typical Brown Earth, Indurated. These transitions form the southern extent of the hydrological unit. - East: public road (A941).	Presumption to restore map

Table 4: restoration proposals. Describes the restoration techniques to be applied to the proposed restoration areas.

Attribute described	Description	Location of described attribute
Treatments used to restore the hydrology	• Where drains are present, they will be blocked or dammed to raise the water table. There are plough furrows present in some areas which will also require smoothing. • Any conifer regeneration present will be mulched and removed to prevent further drying of the restoration areas.	Ski Trails
Treatments used to restore the topography (remove afforestation modifications, and previously hagged sites)	• Ground smoothing, to remove the ridges and furrows on previously afforested sites, and to create a flatter topography like near natural peatlands. This aids re-wetting to produce conditions conducive to the recovery of peatland species. • The technique must, be used in conjunction with peat dams wherever peat depths allow, to ensure that water preferential pathways do not develop along the base and sides of the drains in the future.	Ski Trails
Treatments used to counter-act peat cracking or other modifications caused by the afforestation of the peatland	NA	Ski Trails