# Ben Sca Redesign Wind Farm

## TA5.3: Outline Habitat Management Plan

### Ben Sca Wind Farm Limited

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# Basis of Report

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# Acronyms and Abbreviations

| | |
|---|---|
| CEMP | Construction Environmental Management Plan |
| CSM | Common Standards Monitoring |
| EIA | Environmental Impact Assessment |
| HAP | Habitat Action Plan |
| HMP | Habitat Management Plan |
| NVC | National Vegetation Classification |
| OHMP | Outline Habitat Management Plan |
| SEPA | Scottish Environment Protection Agency |
| SI | Supplementary Information |
| RSPB | Royal Society for the Protection of Birds |
| SNPP | Scotland's National Peatland Plan |
| THC | The Highland Council |

# 1.0 Introduction

## 1.1 Background

Ben Sca Wind Farm Limited (the Applicant) proposes to construct and operate a wind farm comprising of nine wind turbines with a maximum blade tip height of 149.9m and associated infrastructure known as the Ben Sca Redesign Wind Farm (the 'Proposed Development') in the northwest of the Isle of Skye. The site is located approximately 2.5km to the southwest of Edinbane and 7km to the east of Dunvegan. The location of the site is shown on **Figure 1.1**.

The Applicant was previously granted planning permission by the Highland Council (THC) on the same site for:

- Ben Sca Wind Farm (reference 20/00013/FUL) in December 2020. The approved development is for the construction and operation of up to seven wind turbines with a maximum blade tip height of up to 135m and associated infrastructure; and
- Ben Sca Wind Farm Extension (reference (21/05767/FUL) in April 2021. The approved development is for the construction and operation of two wind turbines with a maximum blade tip height of up to 149.9m and associated infrastructure.

For the purposes of this report, the consented Ben Sca Wind Farm and Ben Sca Wind Farm Extension is referred to as the 'consented development'.

Further details of the Proposed Development are provided in Environmental Impact Assessment (EIA) Report **Chapter 1: Introduction and Project Description** and shown on **Figure 1.6.** A plan showing the layout of the Proposed Development, compared with the consented development layout, is provided on **Figure 1.7**.

EIA Report **Chapter 4: Ornithology** and **Chapter 5: Ecology** presents an assessment of the potential ecological and ornithological impact of the Proposed Development.

Three previous Outline Habitat Management Plans (OHMP) were produced for the consented development comprising:

- Ben Sca Wind Farm EIA Report Technical Appendix 8.5 - OHMP (SLR, January 2020);
- Ben Sca Wind Farm Supplementary Information (SI) Report Technical Appendix 8.5 - OHMP (SLR, August 2020); and
- Ben Sca Wind Farm Extension EIA Report Technical Appendix C4 – OHMP (SLR, November 2021).

The OHMPs would be implemented via the agreed planning conditions.

This OHMP takes into consideration the previous consented OHMPs and proposes additional habitat restoration and management measures in relation to the Proposed Development, which would remain in place for the lifetime of the scheme. These measures are required to provide compensation for negative effects on important ecological features, notably blanket bog habitats, and to provide biodiversity enhancements, in accordance with planning policy requirements.

## 1.2 Scope

This OHMP has been prepared by SLR Consulting Limited on behalf of the Applicant. The OHMP is intended as a precursor to a more detailed Habitat Management Plan (HMP), which would be produced and agreed with THC, in consultation with NatureScot and

Scottish Environmental Protection Agency (SEPA) post consent, prior to the commencement of construction.

This OHMP has been prepared with reference to relevant HMP, peatland restoration and forestry guidance[1,2,3,4,5].

It is acknowledged that NatureScot published some new guidance on peatlands[6] in June 2023, although it is noted at time of writing of this OHMP that the peatland guidance is undergoing additional review to ensure that it is fit for purpose. Therefore, this OHMP follows the principles adopted and approved by THC and NatureScot in the consented OHMPs.

The aim of the OHMP is to establish the key objectives and principles by which parts of the site would be restored and managed to the benefit of biodiversity. These would then form the basis for the more detailed HMP, which would be developed with relevant consultees post consent. It is not the intention for this document to provide full details of proposed management, many of which cannot be determined fully at this stage.

The OHMP is intended to cover the restoration, management and monitoring of peatland habitats during the operational life of the wind farm. Issues relating specifically to the construction of the wind farm (e.g. control of water runoff, disturbance to birds and other protected species such as reptiles and otter *Lutra lutra*) are not considered here. Further information about ecological mitigation measures to be employed during the construction period is included in EIA Report **Chapters 4 and 5**. A draft Construction Environmental Management Plan (CEMP) is also included in **Technical Appendix 1.1** of the EIA Report.

The spatial scope of the OHMP is contained wholly within the option area for the wind farm (see **Figure 5.3.1**) and shows the full extent of land which has been identified as having restoration potential.

## 1.3 Priority Features for Management Action

The features which form the subject of the OHMP have been determined through consideration of the relative importance of ecological features present at the site, the extent to which they may be affected by the Proposed Development (as set out in **Chapter 4** of the EIA Report), and their potential to benefit from restoration or management.

Taking the above into consideration, the OHMP relates to the following key features:

- Blanket bog; and
- Heathland (dry and wet heath, upland).

The impact on birds has also been considered, with management goals in this report aimed at providing habitat for breeding and foraging waders, raptors and passerines. The key issues for consideration are raptor flight activity, particularly those of white-tailed eagle *Haliaeetus albicilla*, the potential for displacement from the Proposed Development to other adjacent areas, and the potential for collision. Therefore, it is important that any monitoring programme addresses the species that may be affected by the Proposed Development. It

[1] NatureScot (2023) *NatureScot pre-application guidance for onshore wind farms*.

[2] SNH (2016) *Planning for development: What to consider and include in Habitat Management Plans. Version 2*.

[3] SNH (2015) *Scotland's National Peatland Plan: Working for our future*.

[4] SEPA, SNH and FCS (2014) *Land Use Planning System SEPA Guidance Note LUPS-GU27. Use of Trees Cleared to Facilitate Development on Afforested Land*.

[5] Forestry Commission Scotland (2015) *Deciding future management options for afforested deep peatland*. Forestry Commission, Edinburgh.

[6] *Advising on peatland, carbon-rich soils and priority peatland habitats in development management* (NatureScot, June 2023)

should be recognised, however, that 'such monitoring should only be required where there is a gap in understanding or where the scale and extent of impact is uncertain' (SNH, 2009).

The post consent ornithological monitoring programmes for the adjacent operational Edinbane Wind Farm and Ben Aketil Wind Farm have produced a vast amount of information over a long period of time, and it is broadly understood how raptors respond to operational wind farms in this part of Skye. The operational monitoring data show that there is some displacement of flight activity away from the turbines, although this has not affected the long-term population trends for golden eagle, which remain stable, and white-tailed eagle, which have increased. What is not fully understood, however, is the potential cumulative effect of an increasing number of renewable energy developments in the future, on the populations of both eagle species on the Isle of Skye.

Taking the above into consideration, the OHMP relates primarily to blanket bog. Recommendations for ornithological monitoring have been considered in **Section 3.6.5**.

Other important ecological features are identified in **Technical Appendices 5.1 to 5.3** and **Chapter 4: Ornithology** of the EIA report and by the Ben Sca Wind Farm EIA Report (SLR 2020b, SLR 2020c) and Ben Sca Wind Farm Extension EIA Report (SLR, 2021), including otter, bat species, fish, flush and spring, acid grassland and running water. However, it was established through the impact assessment process that none of these are likely to be significantly affected by either the Proposed Development or the consented development (subject to the implementation of standard good practice mitigation measures during the construction phase) and therefore these receptors are not considered priorities for management action in the OHMP.

## 1.4 Aims

The broad principal aim of the OHMP is to restore and manage c. 64.73 ha of peatland habitat within the afforested area to the northwest corner of the site (the area targeted for restoration is shown on **Figure 5.3.1**). Further details, including specific objectives to meet the principal aim, are provided in **Section 3.0**.

Additional recommendations in relation to ornithological monitoring are discussed in **Section 3.6.5**.

# 2.0 Implementation

## 2.1 Roles and Responsibilities

As the developer, the Applicant is ultimately responsible for meeting the commitments made in this OHMP. The implementation of the final HMP would be implemented via planning condition, overseen by a suitably qualified person or persons, appointed by the Applicant.

All management tasks defined within the HMP would be carried out by suitably experienced contractors and all monitoring would be conducted by suitably qualified and experienced ecologists and/or hydrologists.

## 2.2 Monitoring and Review - Overview

This OHMP has been prepared in accordance with SNH guidance[2], which notes that appropriately timed monitoring is important to enable the success of HMP tasks to be determined and identify whether remedial measures are required, if objectives are not being met.

Proposed monitoring is outlined in Section 3.6. Any HMP should be a live document, which can be altered following monitoring results, unexpected events or evolving understanding and guidance. Therefore, each monitoring report would include a review of the performance

of the HMP and recommendations for changes to management prescriptions, as appropriate. Monitoring results would be reported on an annual basis (during years in which monitoring takes place), and monitoring reports would be submitted to THC, NatureScot and SEPA. Any changes to management prescriptions would be subject to their agreement.

## 2.3 Programme

An indicative programme showing the restoration, management and monitoring tasks specified in this OHMP, is provided in Section 0. A detailed programme would be provided in the detailed HMP.

# 3.0 Peatland Restoration

## 3.1 Background and Rationale

### 3.1.1 Rationale for Inclusion as a Priority Feature within the OHMP

Peatland is a general term for a wide range of peat soils and habitats that occupy more than 20% of Scotland's land area[7]. Scotland holds around 60% of the UK's peatlands soils[8]. Peatland has been identified as a national conservation priority within Scotland's National Peatland Plan (SNPP), for its importance for biodiversity, water quality, and as a carbon store[4]. The SNPP states that peatland restoration is one of the priority projects highlighted in the Scottish Biodiversity Strategy Route Map towards meeting the EU biodiversity target[9] of restoring at least 15% of degraded ecosystems. The most extensive and deepest peat soils occur under blanket bog and raised bogs. These habitats cover an area of around 1.9 million hectares in Scotland and are recognised as internationally important under the EU Habitats Directive (as a priority habitat included on Annex 1 of the Directive). Blanket bog is also listed on the Scottish Biodiversity List[10] and for Skye and Lochalsh[11] is subject to a Habitat Action Plan (HAP) (as part of the Mountain and Moorland HAP). Blanket bog is therefore considered to be a priority habitat for conservation both nationally and locally.

The EIA predicts that the construction of the Proposed Development would result in the loss (direct and indirect) of 11.16ha of blanket bog, and 2.49ha of heathland or heathland mosaic habitat (wet heath, upland and dry heath, upland), 13.65ha total loss of Annex 1 habitats. The consented development predicted a total loss of 10.58ha of Annex 1 habitats due to slightly less land take. Total habitat loss is therefore predicted to be 3.07ha greater for the Proposed Development than the consented development, including an increase in loss blanket bog of 1.98ha. The targeted restoration and management of peatland habitat proposed here is intended to compensate for these losses and provide a biodiversity enhancement.

### 3.1.2 Identification of Restoration and Management Area, and Consideration of Alternatives

SLR was commissioned by the Applicant to undertake a range of non-avian ecological surveys on the now consented Ben Sca Wind Farm in 2018 and on the now consented Ben Sca Wind Farm Extension in 2021. As part of this commission, Phase 1 habitat, UK Habitat

[7] SNH (2015) *Scotland's National Peatland Plan: Working for our future*.

[8] SEL (2009) Scottish Environment Link. *Peatlands Briefing May 2009*

[9] https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en [Accessed in November 2023]

[10] Scottish Government (2013) Scottish Government Scottish Biodiversity List SBL

[11] Skye and Lochalsh Biodiversity Group (2003) The Skye and Lochalsh Biodiversity Action Plan December 2003.

and National Vegetation Classification (NVC) surveys of the site were carried out in 2018, 2019 and 2021.

UK Habitat and NVC surveys were also carried out in 2023 to assess any changes in the habitat baseline throughout the site. One of the aims of these surveys was to inform an assessment of the site's potential to benefit from habitat restoration or management. The results of the surveys are provided in **Technical Appendix 5.1: Habitats and Vegetation Survey Report**.

Additional surveys were carried out by Crosscut Forestry in 2021 and 2023 to assess the potential of blocks of conifer plantation for forest to bog restoration. The 2023 survey is reported in **Technical Appendix 5.4: Forestry Report**.

During the surveys for the consented Ben Sca Wind Farm and Ben Sca Wind Farm Extension, areas measuring c. 23.6ha and c. 14.93ha respectively were identified as having good peatland restoration potential, totalling c. 38.53ha of peatland with restoration potential to replace the 10.58ha that will be lost. This area comprises the peatland restoration area for the consented Ben Sca Wind Farm and Ben Sca Wind Farm Extension.

In 2023, an additional 26.2ha (shown in **Technical Appendix 5.4**) adjacent to the existing peatland restoration areas for the consented development was identified as having potential for restoration. This increases the total peatland restoration area to 64.73ha for the Proposed Development. The increase in area assigned for peatland restoration therefore accounts for the increase in area of habitat loss associated with the Proposed Development and provides enhancement compared to the consented development HMP areas. The approximate boundary of this area is shown on **Figure 5.3.1**.

Note that the 64.73ha excludes the area which would be occupied by wind farm infrastructure. This area currently comprises coniferous plantation forest (including rides) with poor growth within the northwest corner of the site. The following factors have been considered in concluding that this area is the most appropriate option for peatland restoration:

- The area was densely planted with non-native Sitka spruce *Picea sitchensis* and Lodgepole pine *Pinus contorta* trees in 1990, but the growth rates are generally very poor and many of the trees are stunted, indicative of trees planted on wet, deep peat (see below and refer to **Technical Appendix 5.4** for further information);
- A peat depth survey (see**: Technical Appendix 6.1: Peat Management Plan**) indicates that of those areas surveyed within the proposed peatland restoration area (mostly comprising the rides), peat depth ranges from 0 - 2.5m, but is most frequently 0.5 – 1.5m;
- The rides between the forest coupes support blanket bog habitat. Coupled with this, the forested area lies adjacent to a large expanse of extant blanket bog habitat to the east and southeast, thereby suggesting that vegetation within the densely planted forest coupes originally supported similar blanket bog communities to those within forest rides;
- The area has been modified via drains to lower the water table and encourage tree growth, indicating that it has good restoration potential via tree felling and ditch blocking to raise the water table; and
- As noted above, the area lies adjacent to a large area of extant blanket bog to the east and southeast and further areas of blanket bog habitat are located within 1km to the west and south. Restoration of this area would therefore improve the functional connectivity of priority blanket bog habitat within the area.

**Forestry Considerations**

Inappropriate planting of trees on peat is known to degrade the peatland habitat, can reduce biodiversity, and cause release of greenhouse gases when tree growth is poor and peat soils are heavily drained and disturbed[12]. The fact that the forested area contains relatively deep peat and blanket bog is present within forest rides (and is the dominant habitat to the east and southeast of the forested area), provides strong evidence to indicate that the plantation area comprised blanket bog prior to conifer planting. It is therefore reasonable to assume that the planting of coniferous trees within the proposed peatland restoration area has significantly degraded blanket bog habitat present previously, to the extent where it is no longer peat-forming, and has lost its characteristic blanket bog vegetation. As such, the removal of the trees to facilitate the restoration of peatland habitats is considered appropriate in this situation.

The Scottish Government's Policy on Control of Woodland Removal[13] lists criteria where woodland removal, without a requirement for compensatory planting, is most likely to be appropriate. This includes criteria which are applicable to this OHMP, specifically '*where it would contribute significantly to enhancing priority habitats and their connectivity'*. As set out in this OHMP, the restoration proposed would contribute significantly to enhancing priority blanket bog habitats and their connectivity and it can therefore be concluded that the removal of the conifer trees for the purposes of restoring the peatland, without a requirement for compensatory planting, is appropriate in terms of aligning with Scottish Government Policy. Further details are provided in **Technical Appendix 5.4**.

White-tailed eagles are currently using the forestry area as a daytime roosting site. Any management undertaken should be preceded by ornithology surveys to avoid disturbance to protected species. Should protected species be present, mitigation as outlined in **Chapter 4: Ornithology** should be carried out.

The remainder of the site (i.e. the open areas, which are dominated by blanket bog and wet heath habitats) is considered to have limited restoration potential. This is because although much of the area was damaged by a fire in 2018, the habitats appear to be recovering to a more favourable status without intervention. Additionally, aside from the fire damage, these areas are relatively unmodified (e.g. they have not been drained and there is no evidence of over-grazing), and there is therefore limited restoration and management potential. A former borrow pit area from the construction of Ben Aketil Wind Farm) to the northwest of the proposed peatland restoration area is not considered to have restoration potential, as it has little soil with peatland restoration potential, and is considered largely unsuitable for tree planting. As such, the proposed peatland restoration area comprises the only area within the site which has good restoration potential.

## 3.2 Goals

The goals of the OHMP are to as far as reasonably practical:

- to create an 64.73ha area of wet heath/ blanket bog via forest to bog peatland restoration therefore making a significant contribution to the restoration of this habitat type at the local level; and
- within 30 years have created hydrological conditions suitable for the development and maintenance of carbon sequestering bog/ wet heath habitats that are largely self-sustaining.

[12] Forestry Commission Scotland (2015) *Deciding future management options for afforested deep peatland*. Forestry Commission, Edinburgh.

[13] Forestry Commission Scotland (2009) The Scottish Government's Policy on Control of Woodland Removal.

## 3.3 Specific Objectives

The following specific objectives are proposed for the peatland restoration area (see **Figure 5.3.1**):

- to fell trees within an 64.73ha area of conifer plantation within the site, and maintain the area free of trees;
- to increase the water table across the peatland restoration area, through ditch blocking and surface smoothing, in order to restore the underlying processes suitable for blanket bog restoration;
- to create conditions that should, in time, increase the abundance and distribution of bog plants, particularly peat forming *Sphagnum* mosses, and facilitate its recovery back to blanket bog habitat;
- to maintain the peatland restoration area free of trees/ conifer regeneration;
- to control threats to regenerating bog/ heath habitats such as grazing and fire;
- to monitor bog/ heath regeneration to assess if the necessary conditions have been created that should, in time, increase the abundance and distribution of bog plants, particularly peat forming *Sphagnum* mosses, and facilitate its recovery back to active peatland habitat; and
- to facilitate the monitoring and evaluation process by identifying areas of reference habitats within/ adjacent to the peatland restoration area against which regeneration progress can be measured and collecting baseline data within these and the proposed restoration locations.

## 3.4 Initial Restoration Proposals

The proposed restoration methods are based on published literature[14] and case studies where these approaches have been effective, such as within the RSPB Forsinard Flows Reserve[15]. A comparative analysis of 70 publications relating to peatland restoration projects in Scotland[13] found that the effectiveness of bog restoration techniques, including those proposed here, was deemed very high in terms of restoring the underlying processes (i.e. re-wetting). Another study of restoration techniques in Scotland[16] found that the combination of treatments proposed here was most successful at consistently recovering the water table, and that the vegetation composition had started reverting back towards open bog (via comparison with an open bog control site) over a study period of ten years. Based on these findings at other sites the methods proposed below are considered to have a high likelihood of success, initially in terms of restoring the water table, and in time the reversion of the area to blanket bog habitat.

The following restoration prescriptions are proposed (refer to Section 4.0 for indicative timescales).

[14] E.g. Artz, R. E., Faccioli, M., Roberts, MAnderson, R. (2018) *Peatland restoration – a comparative analysis of the costs and merits of different restoration methods*. The James Hutton Institute (on behalf of Climate Xchange), Dundee.

[15] SNH (2015) *Climate change adaptation case study #2: Making space for natural processes: forest to bog restoration at RSPB Forsinard Flows Reserve*. SNH, Inverness.

[16] Anderson, R. Peace, A (2017) Ten-year results of a comparison of methods for restoring afforested blanket bog. Mires and Peat 19: 1-23

### 3.4.1 Felling

All conifer trees within the peatland restoration area would be felled (i.e. an area of up to 64.73), to promote recovery of the bog habitat. The trees would either be felled using the whole timber harvesting method (whereby trees are severed at the stump and the whole trees are then extracted to roadside where they are chipped and delivered to the biomass market), or whole tree mulching (whereby the trees are reduced to smaller particles that are spread across the cleared site), or a mixture of the two methods, if feasible. Further details are contained within **Technical Appendix 5.4**. The final method of felling would be agreed prior to construction and confirmed within the detailed HMP. Any spreading of brash would need to be undertaken in strict accordance with SEPA guidance[4], involving spreading chipped material in a thin layer, allowing for 25% light penetration with brash 'particles' of between 5-30cm in length. Should tree mulching be undertaken, some of the brash would also be used to aid ground smoothing (e.g. within furrows) as detailed within Prescription 4. Tree felling would be conducted outside of the mid-March to August nesting bird season, or the area (and appropriate buffer) would be subject to nesting bird checks for any works required within the nesting season, as detailed within **Chapter 4** of the EIA Report. Tree felling would be undertaken in accordance with Forestry Commission good practice guidelines[17]. The guidelines state that the effects of tree harvesting on surface water acidity are difficult to discern when 20% or less of a catchment is felled within any three-year period. The proposed felling represents considerably less than 20% of the catchment and thus it can be expected that acidification of the watercourses would not occur as a consequence of tree felling.

### 3.4.2 Vegetation Monitoring

A botanical monitoring survey would be undertaken to establish an up-to-date baseline for the vegetation type present. The botanical survey, paired with drone monitoring (if possible), would then be used as a baseline for ongoing monitoring (see Section 3.5 for further details). Baseline botanical monitoring would be undertaken at the appropriate time of year, following tree felling but prior to ditch blocking. Reference areas of established target vegetation types would be identified against which restoration progress could be monitored.

### 3.4.3 Ditch Blocking Survey

A drain slope survey and mapping exercise would be undertaken across the proposed peatland restoration area. Taking levels of the drain water surface would allow for the creation of drain slope profiles across the restoration area. In general terms, the aim would be to insert a dam for each 10cm drop in level of the drain – this is intended to ensure that the water level across the restoration site is maintained within 10cm of the bog surface in order to allow for the growth of peat-forming plants. It would also have the incidental benefit of reducing the rate of runoff downstream from the HMP area. Depending on access to forestry, the drain slope survey would be undertaken either immediately before or after tree felling. The final schedule would be confirmed within the detailed HMP.

### 3.4.4 Ground Smoothing

In order to remove the stump/ridge furrow legacy of the conifer plantation, ground smoothing would be undertaken, subject to feasibility and the felling method adopted. Ground smoothing has been found to be successful in trials at improving water levels[13,18]. This would

[17] Forestry Commission (2011) Forests and water: UK Forestry Standard Guidelines. Forestry Commission, Edinburgh

[18] Short, R. and Robson, P. (2016) *An innovative approach to landscape-scale peatland restoration*. CIEEM In-Practice, Issue 93, September 2016.

involve un-ploughing the ground by overturning tree stumps into existing plough furrows. When combined with tracking by low-ground-pressure machinery, this results in a flattened surface providing protection from erosion. This method has also been shown to be effective in the control of regenerating trees, which were found to fail to survive the treatment, and in the absence of further sources of seed, long-term regeneration was expected to be limited within the trial. Strips of untreated land would be left at intervals within the treated area and at the periphery to act as buffers to help reduce sediment export. Literature[15] encourages undertaking ground smoothing in stages where large areas are involved, to minimise the risk of adverse effects on local water chemistry (particularly dissolved organic carbon, water colour and suspended solids). However, in this instance, due to the relatively small area involved, and the small proportion of the catchment affected, staging of ground smoothing is not considered necessary. To monitor the water chemistry downstream, a surface water monitoring point would be installed at a downstream location. A continuous logger would be installed, which would monitor for turbidity, dissolved oxygen, pH and electrical conductivity. The water chemistry would be monitored for a period before, during and after the tree felling and ground smoothing works in order to quickly identify and potential issues. In the unlikely event any downstream water quality issues were identified, remedial measures would be employed as appropriate. The location and schedule of the water monitoring and the nature of any remedial measures, if required, would be agreed as part of the detailed CEMP.

### 3.4.5 Ditch Blocking

Active drains would be dammed to raise the water level sufficiently to create conditions suitable for the growth of *Sphagnum* mosses. A decision on the type of dam to be used would be made once the profile of the restoration site has been ascertained. Peat turf dams are the preferred option to be used, which are most suitable for smaller drains. It is recommended that peat turves excavated for the wind farm development infrastructure are stored and used for ditch blocking in the restoration area in the first instance. Peat turves can be stored for up to 1 year. Providing restoration activities are commenced and peat turves are used within 1 year of construction, turves should retain their structure sufficiently for use in peat restoration. **Technical Appendix 6.1: Peat Management Plan** includes for some reuse of peat within the HMP area.

Consideration would also be given to the use of plastic or wooden dams on any larger drains, as these have also been demonstrated to have been used successfully in the UK over the last twenty years. Wallage (2007)[19] found that drain blocking can be highly effective for improving both carbon storage and upland water quality.

### 3.4.6 Re-vegetation

Following tree clearance and drain blocking, the area would be allowed to revegetate naturally as it is anticipated that there will be a sufficient seed bank available from the existing rides between the planted areas and the large expanse of blanket bog adjacent to the east and southeast. In addition, there are likely to be viable heather seeds (and seeds of other Ericoids) within the existing seedbank from before the area was planted with trees in 1990. Relatively large heather seed banks can survive beneath conifer plantations for 40 years and under some circumstances for more than 70 years[20]. Restoration projects on other afforested sites have had success without using re-seeding/re-vegetation methods[13], and re-seeding/re-vegetation is only reported to be necessary in restoration of bare peat

[19] Wallage, Z. (2007) *Dissolved organic carbon and colour dynamics in drained and restored blanket peat*. PhD thesis, University of Leeds.

[20] Pywell, R.F., Pakeman, R.J., Allchin, E.A., Bourn, N.A.D., Warman, E.A.., Walker, K.J (2002) The potential for lowland heath regeneration following plantation removal. *Biological Conservation*, Volume 108, Issue 2, pp247-258.

areas with significant erosion[13]. On the basis of the above, there is a high likelihood that the natural regeneration of bog and heathland vegetation would be successful. However, this would be monitored and in the unlikely event that the natural regeneration of bog and heathland vegetation does not take place within a reasonable timescale, remedial measures would be considered (see Section 3.6).

### 3.4.7 Fencing

It has been assumed that due to the lack of grazing pressure at this site, that fencing would not be required to protect the regenerating habitats within the HMP area from sheep. Should livestock grazing be proposed in this area at any point, the potential requirement should be reviewed.

## 3.5 Ongoing Management

### 3.5.1 Grazing Control

Control of grazing is proposed for the peatland restoration area in the form of livestock fencing and continued deer management. It is understood that crofters' sheep and cattle do move onto the site occasionally (unofficially), however this is at very low levels, and occurs in the southern portion of the site away from the peatland restoration area, therefore the need for stock fencing should be reviewed ahead of restoration works commencing. Grazing pressure at the peatland restoration area would be monitored as part of the botanical monitoring (see Section 3.6). The requirement for any future grazing control would be reviewed in light of the results of the botanical monitoring.

### 3.5.2 Conifer Regeneration Control

It is expected that following ground smoothing, conifer regeneration would be reduced. However, due to the presence of conifer plantation within areas adjacent to the peatland restoration area, some conifer regeneration is expected. Therefore, conifer regeneration would be monitored, and the removal of regenerating conifers carried out when required, to maintain open vegetation and avoid the area reverting back to forest. The frequency at which regenerating conifers would need to be removed would be subject to the speed of regeneration and would be determined following monitoring.

### 3.5.3 Peat Dam Maintenance

Research indicates that most peat dams remain intact for six years[14], but some show evidence of erosion. Therefore, peat dams would be checked every five years, to check for signs of erosion or other form of damage. Should the dams be eroded or otherwise damaged, or the dams found to not be functioning as intended, then corrective works would be undertaken as required.

## 3.6 Monitoring and Review

### 3.6.1 Aims

The purpose of the proposed monitoring of bog habitats is to determine whether the restoration project is on track to meeting its targets, goals, and objectives, or needs adjustment. Monitoring should reflect the key ecosystem attributes as summarised in **Table 3-1**.

**Table 3-1 Monitoring Requirements**

| Attribute | Relevance to Ben Sca Extension | Monitoring Requirement |
|---|---|---|
| Absence of threats | Potential threats include: conifer regeneration, grazing, construction work, fire. | Signs of conifer regeneration, fire, ground disturbance and grazing impacts should be recorded during vegetation monitoring. |
| Physical conditions | Regeneration of target of bog and heath will require removal of overshading conifers and management of water levels within the peat. | Confirm completion of felling, ground smoothing, stump flipping and ditch blocking.<br>Monitor water table levels in peat at both pre-felling and post-restoration stages. |
| Species composition | Species composition should be similar to areas of existing target habitats within or adjacent to the peatland restoration area. | Information on species composition and how reference and restored areas compare to each other in terms of blanket bog and heath condition should be made possible via vegetation monitoring. |
| Structural diversity | As re-establishing habitat matures, different canopy levels should develop (including moss and dwarf shrub layers).. | Information on vegetation structure should be recorded during vegetation monitoring. |
| Ecosystem function | The habitat should be self-perpetuating over time with little or no active management and should start to sequester carbon. | A record of management requirements should be kept, this could be used to illustrate declining intervention needs over time. Peat accumulation data or other measures of peatland productivity should be taken to assess if the habitat is healthy enough to sequester carbon. |
| External exchanges | The habitat should be connected to the wider habitat network. | This will have largely been achieved via choosing which locations to restore bog in. Immigration of plant species from the surrounding area will help to confirm habitat connectivity. |

### 3.6.2 Botanical Monitoring

The methods of botanical monitoring would be identified in the detailed HMP and are likely to be bespoke to allow for the specific monitoring against the HMP objectives, but are likely to be based on the Common Standards Monitoring (CSM) protocol for upland habitats[21], which assesses habitat condition. To assess if the goals and objectives of the HMP are being met, the criteria recorded should include: signs of fire, grazing or ground disturbance; vegetation structure; and vegetation species composition.

Botanical monitoring would be undertaken during the optimal survey period for plant species (May – August inclusive). The first year of botanical monitoring would be undertaken during the summer prior to tree felling, and then after tree felling but prior to other restoration measures, to provide a baseline. Further monitoring (to assess changes to the baseline) would then take place annually in the first three years following restoration, and then again in

[21] Joint Nature Conservation Committee (2005) *Common Standards Monitoring Guidance for Upland Habitats*. Version May 2005. Joint Nature Conservation Committee, Peterborough.

year five and ten post-restoration, with the need for further monitoring determined in year ten.

To permit accurate mapping of vegetation cover and change over time, aerial imagery of a suitable resolution should also be obtained, ideally for the same month but at least for the same season, in each monitoring year. Potential sources of imagery that could be obtained for specific times and locations include satellite data, and specially commissioned drone.

### 3.6.3 Monitoring of Water Table Height

Monitoring of water table height would take place by the installation and monitoring of dipwells within the restoration area. If feasible, dipwells would be installed prior to ditch blocking, in order to provide a baseline. The number and location of dipwells would be determined following ditch blocking but it is anticipated that dipwells would be installed at a density equivalent to approximately one per hectare. Dipwells would likely be monitored quarterly in each monitoring year (once in each season) in order to capture maximum seasonal variations. Details of water level monitoring should be reviewed ahead of restoration works commencing. Following ditch blocking, dipwell monitoring would be undertaken annually in the first three years following restoration, and then again in year five and ten post-restoration, with the need for further monitoring determined in year ten.

Rainfall monitoring from should accompany dipwell monitoring to monitor the impacts of rainfall on the drainage on site. Data should be obtained from a nearby SEPA weather station[22].

### 3.6.4 Peat Accumulation

A range of approaches to monitoring peatland productivity are available[23], for the purposes of this project it is considered that a rough measure of whether or not new peat and organic matter are accumulating would be a sufficient indicator of peatland restoration success. Methods that would be considered include:

- erosion pins, these are placed in the ground and the distance from the ground surface to the top of the pin is measured[24]; and
- sediment cores, here a core of the soil/ peat would be taken and the distance from the layer containing forestry debris (baseline) to the soil surface measured[25].

A combination of the above methods may provide the most reliable results. Measurements should be taken quarterly in each monitoring year, at the same times as water table monitoring to allow for contraction and expansion of peat through seasonal cycles.

### 3.6.5 Ornithology Monitoring

As set out in **Chapter 4: Ornithology** a programme of post consent monitoring is proposed. The requirements of the monitoring should be coordinated with the adjacent the adjacent consented Glen Ullinish Wind Farm and the proposed Balmeanach, Ben Aketil Repowering and Glen Ullinish II Wind Farms, if consented in due course. The exact scope of works would be confirmed after consultation but is likely to include collision monitoring, flight

[22] https://www2.sepa.org.uk/rainfall

[23] Short, R.,Robson, P. (2016) An innovative approach to landscape-scale peatland restoration. CIEEM In-Practice, Issue 93, September 2016

[24] Natural England (2011) A Review of Techniques for Monitoring the Success of Peatland Restoration. Natural England Commissioned Report NECR086.

[25] Lucchese, M., Waddington, J. M., Poulin, M., Pouliot, R., Rochefort, L., & Strack, M. (2010) Organic matter accumulation in a restored peatland: evaluating restoration success. Ecological Engineering 36. PP: 482-488.

activity surveys and breeding raptor surveys. It is important that any monitoring is designed to assess the actual versus predicted impacts on birds and to allow for a flexible monitoring plan to be undertaken during the post consent period.

It is proposed that ornithological monitoring should take place during and post-construction, in line with NatureScot guidance (SNH, 2009) as outlined below:

- year-round collision monitoring: carcass searches, carcass persistence trials and observer efficiency trials should be completed at least once per month throughout the first year, to determine whether actual bird collisions are in line with predicted values. Carcasses of all species found on site should be recorded;
- flight activity surveys should be undertaken from the same VP locations used during baseline surveys to monitor the flight activity of target species. This survey should be undertaken in Year 0, 1, 2, 3, 5, and 10, with a minimum of 3 hours of survey effort per VP location per month. Upon completion of surveys in Year 10, the need for further monitoring should be accessed. This would help establish any disturbance/displacement effects of the operational turbines on the resident bird species; and
- targeted raptor surveys should also be undertaken to monitor the status of nesting raptor species within the vicinity of the Proposed Development, in order to further determine the displacement effect. This survey should be undertaken in Year 0, 1, 2, 3, 5, and 10. Upon completion of surveys in Year 10, the need for further monitoring should be accessed.

Given the broad range of existing data a  flexible monitoring programme is recommended and should be undertaken at reasonable intervals throughout the lifespan of the Proposed Development. For example, the above monitoring can take place annually during construction, and after the Proposed Development becomes operational, during years 1-3, 5, 10 and 15, with the requirement for further surveys to be determined based on previous survey results.

Availability of carrion is a key aspect influencing eagle flight activity in a particular area. It is recommended that fallen stock / deer removal within 500m of each turbine is carried out and a plan for this is secured via planning condition.

Furthermore, it is proposed that a close collaboration with the HRSG is established in order to facilitate a research programme aimed at furthering understanding of white-tailed eagle and golden eagle population prospects in the light of an increasing number of renewable energy projects on the Isle of Skye. The overarching objective of this research programme would be the monitoring of the breeding populations of the two eagle species, and the effects of the wind farm developments in the northern part of Skye on these species. It is envisaged that GPS or suitable alternative technology could be used to understand eagle movement patterns and use of breeding and non-breeding areas. This approach would allow the exploration of their habitat use and home ranges across the annual cycle, and also to monitor any collisions and displacement effects that might occur as a result of the existing and proposed wind farm developments.

This research initiative would work best as a collaborative effort between a number of wind farm developers whose renewable energy assets are located in the northern part of Skye and the Applicant is committed to pursuing these discussions through the Skye Developer Forum[26].

[26] The Skye Developer Forum is a group of Wind Development companies set up by the Scottish Government in 2022 to create collaborative working across the Isle of Skye.

### 3.6.6 Report and Review

Monitoring results would be reported annually (in years when monitoring takes place) and recommendations made for changes to management prescriptions if objectives are not being met, as appropriate.

A reporting template, data collection form and database structure would be provided as part of the detailed HMP. This will facilitate a standardised approach to data collection, storage, analysis and reporting through the restoration project's lifespan, even if the people/ organisations working on the project change. The database should be updated every monitoring year and should be made available in an electronic format alongside reports.

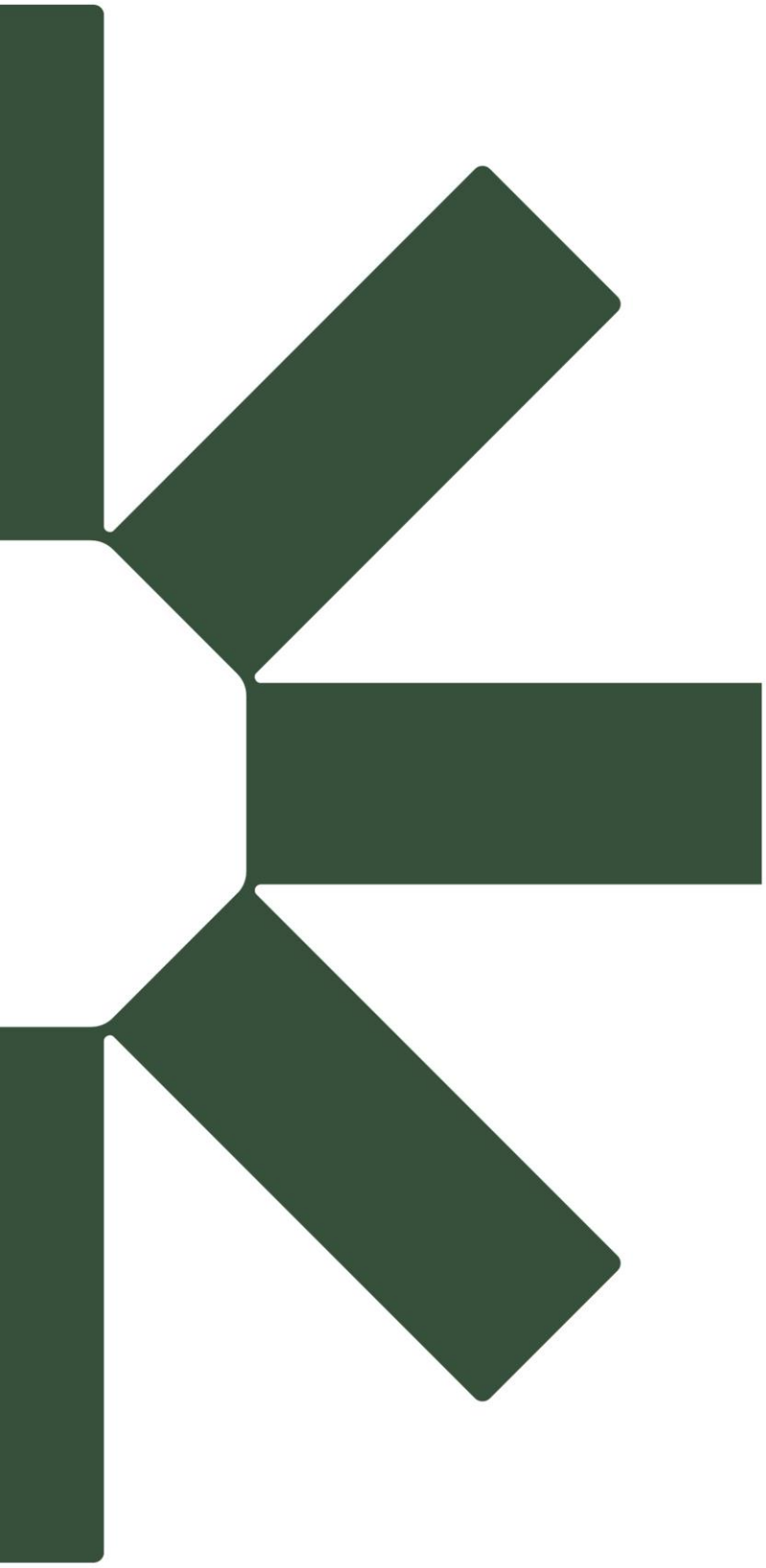
# 4.0 Indicative Programme

**Table 4-1** details the indicative timings of restoration and management tasks contained within this OHMP. These are indicative only and would be finalised within the detailed HMP and subject to review following ongoing monitoring.

Year 0 represents the year of implementation of the HMP, and Year 1 would be the first year following restoration. Implementation of the HMP would either begin during wind farm construction or within the year after the completion of construction.

**Table 4-1 Indicative Programme**

| Year/Activity | 0 | 1 | 2 | 3 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Surface water monitoring downstream of peatland restoration area (before, during and after tree felling/ground smoothing works) | X | | | | | | | | | | | |
| Tree felling | X | | | | | | | | | | | |
| Baseline monitoring: drone survey and botanical monitoring | X | | | | | | | | | | | |
| Ditch mapping/ slope surveys for dams | X | | | | | | | | | | | |
| Installation of dipwells and baseline dipwell monitoring (quarterly) | X | | | | | | | | | | | |
| Installation of peat dams within ditches | X | | | | | | | | | | | |
| Ground smoothing | X | | | | | | | | | | | |
| Post-restoration monitoring: drone survey, botanical monitoring, checking of peat dams, dipwell monitoring and reporting | | X | X | X | X | X | The need for further monitoring determined by monitoring results in Y10 | | | | | |
| Ongoing management: clearing of tree re-growth | Frequency determined by rate of re-growth and monitoring results | | | | | | | | | | | |
| Ornithological monitoring | X | X | X | X | X | X | The need for further monitoring/reporting determined by monitoring results in Y10 | | | | | |
| Ornithological Reporting and Review | X | X | X | X | X | X | | | | | | |



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