TECHNICAL APPENDIX 8.5: OUTLINE HABITAT MANAGEMENT PLAN

Uisenis Wind Farm

Prepared for: Uisenis Power Ltd.

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1.0 INTRODUCTION

SLR Consulting Ltd (SLR) was commissioned by Uisenis Power Ltd ('the applicant') to produce an Outline Habitat Management Plan (OHMP) for the proposed Uisenis Wind Farm (proposed development), situated on the Isle of Lewis, Outer Hebrides, to accompany the Environmental Impact Assessment (EIA) Report for the proposed development. This report forms the OHMP.

1.1 Site Description

'The Site' refers to all land within the application boundary, the area displayed in **Figure 8.5.1** shows only turbine area as now habitat management is planned along the access track section of the Site, however habitat loss calculations referenced in this technical appendix include all infrastructure including the access track.

The Site is situated approximately 20km south east of Stornoway and lies within the administrative boundary of Comhairle nan Eilean Siar (CnES), Western Isles Council. The Site is positioned in the north of the Park (Pairc) peninsula. The peninsula is defined by two long and narrow sea lochs, Loch Erisort (Eireasort) to the north, and Loch Seaforth (Shiophoirt) to the south, the latter forming part of the boundary between Lewis and Harris.

The topography of the Site is undulating, ranging from approximately 10 metres (m) Above Ordnance Datum (AOD) at the shore of Loch Sealg, to approximately 270m AOD in the north west. The Site is characterised primarily by blanket mire and heath habitat, with small stands of acid grassland and linear flush habitat also recorded throughout. Multiple lochans are scattered throughout the Site, connected by a series of watercourses. The largest connected lochan is Loch Eisgein, connecting with Loch Feoir and Loch na Beirighe to the west of the Site via the Abhainn Cheothadail. Much of the Site is open and exposed, with the only recorded areas of woodland around Eishken Lodge.

1.2 Details of the Proposed Development

The proposed development consists of up to 25 wind turbines (comprising 22 turbines at 200m to blade tip; and 3 turbines at 180m to blade tip) and associated infrastructure with a total installed capacity of approximately 165 MW. The proposed development represents a re-design of the consented 45 turbines of Muaitheabhal Wind Farm (including its south and east extensions).

1.3 Purpose and Scope of this Report

This OHMP outlines proposed habitat restoration and management measures in relation to the proposed development, which would remain in place for the lifetime of the scheme. It details the habitat management and monitoring that is proposed to compensate for the direct and indirect loss of sensitive natural/semi-natural habitats, notably blanket bog and wet heath, as a result of construction of the wind farm and to provide biodiversity enhancements, in accordance with planning policy requirements.

The OHMP is intended as a precursor to a more detailed Habitat Management Plan (HMP), which would be produced and agreed with CnES prior to the commencement of construction.

1.4 Evidence of Technical Competence and Experience

The OHMP has been written by Dr Kirstie Hazelwood, Senior Ecologist at SLR Consulting Ltd with support from Hannah Rowding, Senior Ecologist at SLR Consulting Ltd.

Kirstie Hazelwood, MSc, PhD, ACIEEM

Kirstie is a Senior Ecologist with nine years' experience in ecology, within consultancy, NGOs and research. She is an associate member of the Chartered Institute for Ecology and Environmental Management (CIEEM) and holds a PhD in tree community ecology. She has worked on over 30 upland and lowland sites in Scotland including numerous large development sites. She has trained in the recently developed UK Habitat Classification (UKHab) methods and has carried out extensive National Vegetation Classification (NVC) and habitat assessment work. She has a particular interest in plant communities, habitat quality monitoring and habitat restoration.

Hannah Rowding

Hannah is a Senior Ecologist with seven years' experience in ecological consultancy. She is an Associate member of CIEEM and holds a MSc in Environmental Protection and Management. As an experienced field surveyor, Hannah has worked on a range of upland sites throughout Scotland and maintains proficiency in habitat and vegetation surveys (including Phase 1 habitat survey, UKHab and NVC). Hannah is also adept in ecological data management and analysis and communicating key information through technical reporting.

2.0 METHODOLOGY

This OHMP has been prepared with reference to relevant HMP and peatland restoration guidance (NatureScot, 2016; Gilbert & Anderson, 1998) including the International standards for Habitat Restoration (Society for Ecological Restoration, 2019). The proposals set out in this OHMP were developed prior to the publication of the NatureScot guidance 'Advising on peatland, carbon-rich soils and priority peatland habitats in development management' (June, 2023) as this Chapter was largely complete at time of publishing.

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, which would then form the basis for the more detailed HMP, 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.

2.1 Hierarchy of Terms for Restoration Planning

The following terms (Society for Ecological Restoration, 2019), have been used to structure this OHMP:

- the **Scope** is the broad geographic or thematic focus of the project;
- the **Vision** is a general summary of the desired condition one is trying to achieve through the work of the project;
- the **Targets** identify the native ecosystems to be restored at the Site as informed by the reference model, along with any social outcomes or constraints expected of the project;
- **Goals** are formal statements of the medium to long-term desired ecological or social condition, including the level of recovery sought. Goals must be clearly linked to targets, measurable, time-limited, and specific; and
- **Objectives** are formal statements of the interim outcomes along the trajectory of recovery. Objectives must be clearly linked to targets and goals, and be measurable, time-limited, and specific.

2.2 Baseline Data Collection

This OHMP has been informed by baseline data collected for the Ecology desk-study and habitat and mammal surveys, carried out as part of the EIA. More detail on these is provided below and in the relevant chapters and appendices to the EIA Report including:

- **Technical Appendix 8.1: UK Habitat Classification (UKHab) and National Vegetation Classification (NVC) Report**;
- **Technical Appendix 8.2: Otter Survey Report**;
- **Technical Appendix 8.3: Bat Survey Report**;
- **Technical Appendix 8.4: Fish Habitat Survey Report**;
- **Chapter 8: Ecology**; and
- **Chapter 9: Ornithology**.

2.2.1 Desk Study

Sources of desk study data included:

- Land Use Consultants (2004). *Muaitheabhal Wind Farm: Environmental Statement (ES)*;
- Land Use Consultants (2006). *Muaitheabhal Wind Farm: Supplementary Environmental Information (SEI)*;
- Land Use Consultants (2009). *Muaitheabhal Wind Farm: SEI*;

- Land Use Consultants (2011). *Muaitheabhal Wind Farm East Extension: ES;*
- Land Use Consultants (2011). *Muaitheabhal Wind Farm East Extension: SEI;*
- Land Use Consultants (2013). *Muaitheabhal Wind Farm South Extension: ES;*
- Protected and notable species records from the Outer Hebrides Biological Recording Group (OHBR);
- Multi-Agency Geographic Information for the Countryside (MAGIC): Information relating to statutory designated nature conservation; and
- Scotland's Carbon and Peatland Map (Scottish Government, 2016).

2.2.2 Field Survey(s)

Protected Mammal Surveys

Protected mammal surveys were undertaken for all areas within the Site boundary and a 250m buffer. Surveys were carried out between June and November 2022. A bat transect survey was conducted in July 2022 and further surveys using static detectors were carried out in August 2022.

Surveys focused on habitats most likely to support protected mammals (specifically otter *Lutra lutra* and bat species), including riparian corridors, waterbodies, buildings and woodland or scrub areas. Surveys followed standard guidance as detailed in the **Technical Appendix 8.2: Otter Survey Report** and the **Technical Appendix 8.3: Bat Survey Report**. Incidental field signs relating to other protected or notable species were also recorded as target notes.

Fish Habitat Surveys

Fish habitat surveys were conducted from 31 October to 01 November 2022 by Gavia Environmental and the Outer Hebrides Fisheries Trust (OHFT). The study incorporated five survey locations on watercourses within the Site and one survey location just outside the Site boundary in the watercourse that flows into Loch Sealg. Methods developed by the Scottish Fisheries Coordination Centre (Scottish Fisheries Co-ordination Centre, 2007) were adopted. During the field survey each watercourse and surrounding habitats were characterised. For more detail, see **Technical Appendix 8.4: Fish Habitat Survey Report.**

Habitat and Vegetation Surveys

The vegetation and habitat survey area included all land within the Site boundary plus a 250m buffer, with the exception of the minor road running from the A859 to the Eishken Lodge (Eishken Road), which was surveyed to a 100m buffer, in accordance with SEPA guidance on groundwater dependent terrestrial ecosystems (GWDTEs) (SEPA, 2017). Surveys were carried out between 20 and 23 June 2022, 04 and 08 July 2022, and 08 and 14 November 2022. The OHMP areas are within the main turbine area and the access track area is not shown in Figure 8.5.1.

Surveys included UK Habitat Classification (UKHab) (Butcher, Carey, Edmonds, & Treweek, 2020) and National Vegetation Classification (NVC) survey (Rodwell, 2006). These were carried out in enough detail to allow the identification of European Nature Information System (EUNIS) habitat types, habitats listed on Annex 1 of the EC Habitats Directive, and potential GWDTEs. For full details, please refer to **Technical Appendix 8.1: UKHab and NVC Report**.

Ornithology Surveys

Ornithology surveys were carried out in 2021 and 2022. Full details of the surveys can be found in **Chapter 9: Ornithology** of the EIA Report. The assessment focuses on the Site and appropriate study areas, based on NatureScot survey and assessment guidance (SNH 2016a; 2017; SNH 2018a,b,c) (see **Technical Appendix 9.1** for further details). Surveys included: flight activity surveys, breeding divers and greenshank surveys and breeding bird surveys. A search was undertaken for ornithological designated sites within 20km of the Site

and scarce breeding birds[1] (Schedule 1, Annex I raptor species, excluding eagles) within a 2km buffer around the Site.

[1] Scarce breeding birds are those listed on Annex 1 of the EU Birds Directive or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and in the case of the proposed development consists of any raptor, diver, wader or owl species listed on either Annex 1 or Schedule 1.

3.0 Baseline Data Summary

The baseline data summarised in this section focuses on information of particular relevance to the design of the OHMP. Full details can be found in the EIA Report **Chapter 8: Ecology** and **Chapter 9: Ornithology**, and associated technical appendices, as referenced in Section 2 of this report.

3.1 Survey Data

3.1.1 Designated Sites

The closest statutory designated site is the Lewis Peatland RAMSAR and SPA, located approximately 954m to the northwest of the Site at its nearest point and approximately 7.2km north west of the proposed turbines (Turbine Developable Area). The RAMSAR/SPA has been designated for supporting blanket bog, oligotrophic and dystrophic lochs, lochans and pools, wet heath, and breeding black-throated diver *Gavia arctica*, dunlin *Calidris alpina schinzii*, golden eagle *Aquila chrysaetos*, golden plover *Pluvialis apricaria*, greenshank *Tringa nebularia*, merlin *Falco columbarius* and red-throated diver *Gavia stellata*.

The Inner Hebrides and Minches Special Area of Conservation (SAC) is approximately 5.5km to the southeast of the Site at its closest point and approximately 11.5km to the south east of the Turbine Developable Area. This SAC is designated for harbour porpoise and is hydrologically connected to Loch Sealg, situated adjacent to the southern boundary of the Site.

Shiant Isles SPA (underpinned by the Shiant Islands SSSI) is approximately 10.1km to the south east of the Site at its nearest point and approximately 10.8km to the south east of the Turbine Developable Area. The SPA is designated for breeding fulmar *Fulmarus glacialis*, guillemot *Uria aalge*, kittiwake *Rissa tridactyla*, puffin *Fratercula arctica*, razorbill *Alca torda*, shag *Phalacrocorax aristotelis*, breeding seabird assemblage and non-breeding Greenland barnacle goose *Branta leucopsis*.

North Harris Mountains SPA is approximately 13km to the west of the Site at its nearest point and designated for golden eagle.

West Coast of the Outer Hebrides marine SPA (mSPA) is approximately 16km to the south west of the Site at its nearest point and designated for non-breeding black-throated diver, eider *Somateria mollissima*, great northern diver *Gavia immer*, long-tailed duck *Clangula hyemalis*, red-breasted merganser *Mergus serrator*, Slavonian grebe *Podiceps auritus* and breeding red-throated diver.

3.1.2 Protected Species

Otter field signs, in the form of spraints, were identified on the shores of the larger waterbodies within the Site, including Loch Eishkein, Loch Seaforth, Loch na Muilne and Loch ab Eilein Liatha. A confirmed otter holt and otter signs, in the form of spraints, were also recorded on the banks of Loch Sealg. Some waterbodies and watercourses across the Site were considered to be of high ecological value for supporting otter. For full details, please refer to **Technical Appendix 8.2: Otter Survey Report**.

Bat activity surveys carried out in August 2022 recorded bats in flight around Eishkein Lodge. Bat presence (common pipistrelle *Pipistrellus pipistrellus* was confirmed (see **Technical Appendix 8.3** for full details) and bats were observed foraging around the buildings and woodland. Other than the woodland habitat around Eishken Lodge, there is limited habitat for bat roosting or foraging features within the rest of the Site.

Static bat detector surveys recorded a total of 13 bat passes of common pipistrelle over a total of 15 nights of recording during August 2022. Due to the small number of recorded passes at locations closest to Eishken Lodge during this period, it is considered likely that bat activity further away from the suitable habitat of Eishken Lodge, in similarly low value habitats is likely to be even lower. Given that the habitat present is of

low suitability for bats, and the fact that the project is of 'medium' size under the BCT guidelines (2021), the Site constitutes as 'low risk' bat habitat.

Fish

Fish habitat quality was assessed as moderate to high in all survey locations, with the highest habitat quality recorded on the watercourse between Loch Beirighe and Loch Eishken. Salmonoid spawning potential was assessed as optimal in one location near Loch Eishken and sub-optimal or not suitable in all other locations surveyed.

European eel *Anguilla Anguilla*, Atlantic Salmon *Salmo salar* and brown/sea trout *Salmo trutta* have been recorded utilising the site according to surveys that were conducted to support previous applications.

3.1.3 Habitat and Vegetation Surveys

The vegetation surveys illustrated that the majority of the Site consists of bog and wet heath, with some dry heath, grassland, flush and freshwater habitats. See **Table 3-1** for details.

Table 3-1: Summary of Habitats on Site

Broad Habitat Type	UKHab Classification	NVC Community	Annex I Habitat	SBL Priority Habitat	Western Isles BAP
Grassland	g1b6 Other upland acid grassland	U4 *Festuca ovina – Agrostis capillaris – Galium saxatile* grassland	N/A	N/A	N/A
		U6 Juncus squarrosus – Festuca ovina grassland	N/A	Acid Grassland	N/A
	g3c Other neutral grassland	N/A	N/A	N/A	N/A
Woodland	w1h5 Other Woodland, Mixed; Mainly broadleaved	N/A	N/A	N/A	N/A
	w2c Other Coniferous Woodland	N/A	N/A	N/A	N/A
Heathland and scrub	h1b5 Dry heaths; upland	H9 *Calluna vulgaris – Deschampsia flexuosa* heath	H4030	Upland heathland	Upland and moorland
		H10 Calluna vulgaris – *Erica cinerea* heath			
		H12 Calluna vulgaris – *Vaccinium myrtillus* heath			
		H21 Calluna vulgaris – *Vaccinium myrtillus – Sphagnum capillifolium* heath			
	h1b6 Wet heaths; upland	M15 *Trichophorum germanicum – Erica tetralix* wet heath	H4010	Upland heathland	Upland and moorland
	h3e Gorse scrub	W23 *Ulex europeaus -Rubus fruiticosus* scrub	N/A	N/A	N/A
	h3g Rhododendron scrub	N/A	N/A	N/A	Invasive non-native species

Broad Habitat Type	UKHab Classification	NVC Community	Annex I Habitat	SBL Priority Habitat	Western Isles BAP
	h3h Mixed scrub	N/A	N/A	N/A	N/A
Wetland	f1a5 Blanket bog	M1 *Sphagnum denticulatum* bog pool community	H7130	Blanket bog	Peatland and wetland
		M2 *Sphagnum cuspidatum/fallax* bog pool community			
		M3 *Eriophorum angustifolium* bog bool community			
		M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire	H7130	Blanket bog	Peatland and wetland
		M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire			
	f1a6 Degraded blanket bog	M15* *Trichophorum germanicum* – Erica tetralix wet heath	N/A	N/A	Peatland and wetland
Fen, marsh and swamp	f2b Purple moor grass and rush pasture	M23 *Juncus effusus/ acutiflorus – Galium palustre* rush pasture	N/A	N/A	N/A
		M25 *Molinia caerulea – Potentilla erecta* mire	N/A	N/A	N/A
	f2c Upland flushes, fens and swamps	M6 *Carex echinata – Sphagnum fallax/ denticulatum* mire	N/A	N/A	N/A
		M10 *Carex dioica – Pinguicula vulgaris* mire			
		M29 *Hypericum elodes – Potamogeton polygonifolius* soakaway			
Urban	u1b5 Buildings	N/A	N/A	N/A	N/A
	u1e Built linear features	N/A	N/A	N/A	N/A

Broad Habitat Type	UKHab Classification	NVC Community	Annex I Habitat	SBL Priority Habitat	Western Isles BAP
Rivers and lakes	r1c7 Acid peat-stained lakes and ponds		3160 Natural dystrophic lakes and ponds	Freshwater: rivers, burns and lochs	Ponds
	r2a Rivers	N/A	N/A	Freshwater: rivers, burns and lochs	Rivers

3.1.4 Ornithology Surveys

Important ornithological species recorded on Site were black-throated diver, golden eagle, white-tailed eagle, merlin, greenshank, golden plover and dunlin. Predicted impacts of construction activities due to the proposed development include displacement and disruption of breeding, foraging or roosting birds as a result of noise and general disturbance over a short-term period, and temporary and permanent loss of habitat. This has the potential to impact on breeding or foraging individuals.

Predicted impacts during the operational stage of the Wind Farm are: displacement of birds around operational turbines and other infrastructure, collisions with turbines and operational lighting of turbines.

4.0 HMP Working Group and Review

Should the proposed development receive consent, a group of key stakeholders would be invited to form a HMP working group, their role would be to provide input into and comment on the detailed HMP and subsequent revisions to the HMP during the lifetime of the wind farm.

We envisage that the working group would include the following stakeholders:

- The wind farm operator and their ecologist(s);
- The landowner;
- CnES;
- SEPA; and
- NatureScot.

Further details, including terms of reference for the HMP working group, would be provided in the detailed HMP, post consent.

The HMP would be reviewed and amended appropriately after five years to enable assessment of progress toward achieving goals and objectives and to inform active management.

5.0 Outline Habitat Management Plan

5.1 Vision

To enhance the extent and condition of target habitats and species within the proposed Habitat Management Areas (HMAs).

5.2 Targets

This section details the species and habitats (features) that would be the targets of the HMP. The main focus is features for which compensation is required due to potential impacts from the proposed development (e.g., habitat loss). However, consideration is also given to habitat enhancement for features with particularly high conservation value that occur on Site, especially where declines may be anticipated in the absence of the HMP, if no habitat management is undertaken. Species for which monitoring is recommended in the EIA are also included to allow for adaptive management and mitigation.

Table 5-1 includes all the target habitats and species for management and monitoring detailed in the EIA to allow for understanding of any impacts and adaptive management and mitigation. Associated objectives, outlined in **Table 5-3**, are included for reference.

Table 5-1: HMP Targets

Feature	Rationale	Management Prescriptions	Relevant Objectives (Table 5-3)
Blanket Bog	Compensation required for direct and indirect loss of blanket bog due to wind farm construction. Enhancement is also appropriate as this is an Annex 1 protected habitat (Wildlife and Countryside Act 1981) and an SBL priority habitat.	Reinstatement of peat that is disturbed during construction, ditch and drain blocking, and reduction in grazing pressure.	1.2, 2.1 and 2.2
Wet Heath	Compensation required for direct and indirect loss of wet heath due to wind farm construction. Enhancement is also appropriate as this is an Annex 1 protected habitat (Wildlife and Countryside Act 1981) and an SBL priority habitat.	Restoration of borrow pits where wet heath is damaged in the creation, reduction in grazing pressure in wet heath areas in the winter.	1.1 and 2.2
Fish	Priority fish species have been recorded on Site, with good spawning habitat for Atlantic Salmon present and enhancement is therefore appropriate. Some disturbance/displacement of fish and fish habitat is possible during wind farm construction in association with installation of watercourse crossing points and compensation is required.	Reduction in grazing pressure and broadleaf tree planting in riparian habitat. Enhancement of riparian habitat through tree planting that will reduce erosion and improve spawning and parr habitat.	2.2 and 3.1
Otter	Otter is a priority species under Highland Nature 2021- 2026 and is present on Site and enhancement is therefore appropriate. Some disturbance/displacement of otter is possible during wind farm construction in association with installation of watercourse crossing points and compensation is required.	Reduction in grazing pressure and broadleaf tree planting in riparian habitat will improve habitat and foraging for otters using the watercourses on Site.	2.2 and 3.1

Feature	Rationale	Management Prescriptions	Relevant Objectives (Table 5-3)
Eagles	Golden and white-tailed eagles are protected under Schedule 1 of the Wildlife and Countryside Act and are known to be present on Site. Some disturbance/displacement of eagles is possible during wind farm construction and operation, plus a risk of collision with turbines during wind farm operation and mitigation is therefore proposed.	Removal of carcasses and gralloch from inside the turbine area will reduce collision risk for eagle species.	2.2, 4.1 and 4.2
Raptors	Raptor species protected under Schedule 1 of the Wildlife and Countryside Act are present on Site (see Chapter 9: Ornithology for details) and habitat enhancement is therefore appropriate.	Removal of carcasses and gralloch from inside the turbine area will reduce collision risk for eagle species. Reduction in grazing pressure will improve heath and bog habitat and will thereby improve foraging opportunities for upland breeding raptors, with the increase in breeding prey species utilising the area.	2.2
Upland Waders	Breeding upland waders protected under the Annex 1 of the Wildlife and Countryside Act and listed as Birds of Conservation Concern (BoCC) are present on Site and habitat enhancement is therefore appropriate.	Reinstatement of blanket bog that is disturbed during construction, ditch and drain blocking, and reduction in grazing pressure will enhance wet heath and blanket bog habitat improving breeding conditions for waders.	1.2, 2.1 and 2.2
Divers	Breeding divers protected under Schedule 1 of the Wildlife and Countryside Act and listed as BoCC are present on Site and habitat enhancement is therefore appropriate.	Provision of nesting rafts on lochans outside the turbine area will improve breeding conditions for divers.	4.3

5.2.1 Size of Area to be Restored

The estimated total loss of habitat as a result of the proposed development, including direct and indirect loss, would be 88.22ha, including loss of blanket bog and wet and dry heath Annex 1 habitats (see **Table 5-2**). Restoration areas recommended in this OHMP include 50ha of blanket bog through active bog restoration methods, 537ha of wet heath through managed grazing methods and approximately 5ha of riparian tree planting.

Table 5-2: Habitat Loss Areas

UKHab	Direct Loss (ha)	Indirect Loss (ha)	Total Loss (ha)
Blanket Bog (f1a5) – Annex 1 (H7130)	14.36	25.42	39.78
Degraded Blanket Bog (f1a6)	1.92	6.28	8.19
Purple moor grass and rush pasture (f2b)	0.35	1.24	1.59
Upland Acid Grassland (g1b6)	0.73	0.28	1.02
Neutral Grassland (g3c)	0.03	0.29	0.32
Upland Dry Heath (h1b5) – Annex 1 (H4030)	0.02	2.99	3.01
Upland Wet Heath (h1b6) – Annex 1 (H4010)	21.99	12.05	34.04
Rhododendron scrub (h3g)	<0.01	0.01	0.02
Mixed scrub (h3h)	0.04	0.2	0.24
Mixed woodland, mainly broadleaved (w1h5)	0	<0.01	<0.01
All	**39.45**	**48.78**	**88.22**

Direct Habitat Loss

Where existing habitat would be replaced by proposed infrastructure, it would be permanently lost from the Site at least for the operational lifetime of the wind farm.

Indirect and Temporary Habitat Loss (e.g. drying)

Where bog is close to proposed infrastructure it is likely that changes in hydrological conditions, in particular drainage, will lead to permanent change to the existing habitat. A precautionary approach has been taken which assumes that habitat change of this type would effectively result in the loss of the affected peatland habitats. For the purposes of habitat loss calculations, we have considered the effect to extend 10m beyond infrastructure[2]. For other habitats an allowance for temporary loss of 5m is included to allow for possible temporary loss due to damage during construction.

For the purposes of assessment, a precautionary approach has been taken which assumes that direct habitat loss (all habitats) and indirect loss of bog habitats, e.g. blanket bog and wet modified bog, represents a permanent, irreversible negative effect, although in practice some areas indirectly affected may be able to be restored, e.g. during reinstatement following construction. Temporary loss of heath habitat caused during construction, for example by vehicles driving around the construction footprint and storage of materials, is anticipated to recover following reinstatement works within 5 years (Gilbert & Anderson, 1998).

5.3 Goals and Objectives

The management goals and objectives of the OHMP are summarised in **Table 5-3,** with further details provided thereafter. Monitoring goals and objectives are set out in **Table 5-4**.

[2] This figure is in line with similar assessments for other projects, and although arbitrary, is considered precautionary based on experience at other sites.

Table 5-3: OHMP Management Goals and Objectives

Goal	Goal Description	Objective	Objective Description	Targets	Location	Timescales	Indicators
1	Restore habitats disturbed during construction	1.1	Restore borrow pits	Wet Heath	Borrow pits	Implementation within two years of completion of wind farm	Habitat condition monitoring: Common Standards Monitoring (CSM), (JNCC, 2004))
		1.2	Reinstate any peat that is disturbed during construction in accordance with the Peat Management Plan (SLR Consulting, 2023)	Blanket bog, upland waders and raptors	Areas of blanket bog disturbed during construction	Implementation within two years of completion of wind farm construction	Habitat condition monitoring: CSM, hydrological monitoring of the water table within blanket bog habitat
2	Enhance upland habitat condition	2.1	Carry out artificial ditch blocking work to encourage rewetting and improve bog habitat condition from moderate to good	Blanket bog, upland waders and raptors	Bog restoration areas (see **Figure 8.5.1**)	Implementation within two years of completion of wind farm construction	Habitat condition monitoring: CSM, hydrological monitoring, ditch blocking, breeding raptor monitoring, upland breeding wader monitoring
		2.2	Grazing management regime to exclude grazers from steep ground between October and March.	Wet heath, upland waders, eagles and other raptors, fish and otter	Wet heath restoration areas (see **Figure 8.5.1**)	Implementation within two years of completion of wind farm construction	Habitat condition monitoring: Common Standards Monitoring (CSM), grazing monitoring, breeding raptor monitoring, upland breeding wader monitoring

Goal	Goal Description	Objective	Objective Description	Targets	Location	Timescales	Indicators
3	Enhance riparian habitat	3.1	Native tree planting in riparian areas	Otter and fish species	Upstream of spawning and juvenile fish habitats on shallow peat or mineral soil only, where native tree planting is appropriate, further surveys to confirm locations (see **Figure 8.5.1**)	Implementation within two years of completion of wind farm construction	Woodland planting monitoring and management, otter monitoring, electro-fishing, macro-invertebrate monitoring
4	Protect and enhance habitat for ornithological species	4.1	Remove carcasses and gralloch from the turbine area to discourage foraging in the turbine area and therefore reduce collision risk.	Eagles	Within 200m of each turbine (see **Figure 8.5.1**)	Year round throughout the lifespan of the project	Eagle and other raptor monitoring
		4.2	Low intervention area - no disturbing activities within 1 km of eagle nests during the sensitive breeding season (February to August)	Eagles	Within 1 km of eagle nesting areas	During the breeding season throughout the lifespan of the project	Eagle monitoring
		4.3	Provide nesting platforms for divers on appropriate lochans	Divers	In appropriate lochans outside the turbine area.	Implementation within two years of completion of wind farm construction	Diver monitoring

5.4 Outline Habitat Creation/ Restoration Methods

All management tasks carried out under the HMP would be conducted by suitably experienced contractors, under the supervision (where required) of suitably qualified and experienced ecologists.

5.4.1 Post-Construction Habitat Restoration

Borrow Pits

Borrow pits created on Site during the construction of the wind farm would be restored to their original habitat post-construction. Potential borrow pit sites have been chosen in areas that avoid deep peat and sensitive habitats such as dry heath on rocky outcrops as far as possible. Borrow pits will directly and indirectly cause a loss of 4.7ha of wet heath, 2.7ha of blanket bog and 0.6ha of acid grassland, this loss is included in habitat loss calculations above (**Table 5-2**), however a proportion of this will be restored under borrow pit restoration management.

Restoration plans would be put in place before the creation of borrow pits, with plans to reinstate the original habitat in moderate condition. Methods would include the storage and reinstatement of peat turves (SLR Consulting, 2023), dressing steep slopes with a thin layer of peat, leaving rock exposed and allowing to regenerate as wet or dry heath. Reseeding from surrounding habitats, cutting heather and spreading the brash or translocating turves removed during construction would also be considered as an option for speeding up this process. For details on peat management during construction please see **Technical Appendix 10.2: Peat Management Plan.**

Reinstatement of peat

Where peatland habitat is disturbed during construction, peat 18would be reinstated where possible. This retains the natural peat layers and prevents loss of valuable peat where possible. For full details please see **Technical Appendix 10.2: Peat Management Plan**.

5.4.2 Enhance Upland Habitat

Blanket Bog Restoration

There are several areas of degraded blanket bog on Site that have drains dug through the peat. This type of drainage exposes the bare peat for drying and erosion and lowers the water table, thereby degrading the peatland (see **Photographs 5-1**). There are five areas outlined to be targeted for blanket bog restoration, covering 50ha in total, including several areas close to the north of Eishken Lodge, and an area along the waterway that connects Loch na Beirighe and Loch Eishken (see **Figure 8.5.1**). Other blanket bog areas within the site are in good condition with a high water table and good species diversity with presence of blanket bog indicator species, and are therefore not suitable for restoration.

The vegetation remains intact between the drainage ditches in all five areas, therefore there is a good opportunity for restoration to a good quality blanket bog. Blanket bog restoration would improve the peatlands in this area, a natural carbon store, improve habitat for breeding birds and invertebrates, and reduce sedimentation in adjacent watercourses, with positive implications for fish and otters on site.

Ditch blocking is likely to be the best management technique for restoring these areas, however given the extent of the drainage, the areas would be assessed in detail during preparation of the detailed HMP and other restoration techniques should also be considered, such as wave damming and ground smoothing. This assessment would be underpinned by assessments carried out previously on this Site in a previous HMP (Arcus Renewable Energy Consulting Ltd., 2012), however due to developments in peatland restoration methods in recent years, a full blanket bog restoration assessment would be undertaken across all five areas and the best techniques recommended.


Photographs 5-1: Blanket bog area with drainage ditches suitable for blanket bog restoration

Reduction of Grazing

Current grazing pressure on site has caused erosion of wet heath habitat, particularly on steeper slopes and on the higher parts of the Site where the soil is naturally thin. These areas show patches of exposed bare ground and hummocking (see **Photographs 5-2**). Erosion also causes entrainment of particulates in waterways, which degrades habitats that fish for spawning. Grazing on the Site is by domestic sheep and horses, and by wild deer using the Site.

A grazing plan on Site would target both domestic and wild grazers. Low level domestic grazing in the spring and summer is preferred, this should reduce the dominant *Molinia caerulea* cover and create a more varied vegetation structure, that benefits a variety of wildlife, including upland waders and raptors. Light or no grazing would take place in the autumn and winter, as this is when habitats on steep slopes are vulnerable to erosion. Fencing around steep slope and higher ground areas would remove grazing livestock and any wild grazers (e.g. red deer) in the autumn and winter, but allow low level grazing (by livestock) in the spring and summer. Deer would be excluded from the grazing area year-round. the fenced area would cover 537ha of wet heath, an indicative fence line is shown in **Figure 8.5.1**, incorporating steep sloping ground and higher ground where there are rocky areas are vulnerable to erosion. A detailed grazing plan would be agreed as part of the final HMP.

Wet heath restoration through grazing reduction would improve habitat for upland waders, and provide foraging for eagles and other raptors. Reduction in erosion damage on site would protect the wet heath and reduce erosion in waterways, improving fish habitat.



Photographs 5-2: Areas of erosion within wet heath areas suitable for habitat restoration

5.4.3 Enhance Riparian Habitat

There is habitat for spawning and juvenile fish and confirmed breeding otter on Site. Native woodland planting in riparian zones can benefit fish and otter species. Woodland planting stabilises soils, reducing erosion and sedimentation downstream of the planting, and improves invertebrate diversity in the planted area, providing increased food diversity for fish.

Indicative areas are shown in **Figure 8.5.1**, where riparian zones are located in wet heath on shallow peat. The indicative areas cover approximately 5ha, this would need to be surveyed for suitability and an indicative planting plan would be drawn up. Areas to be planted would be carefully selected, avoiding blanket bog and the higher altitude thinner soils, and planting would aim to be upstream of spawning and juvenile habitats. A surveyor would assess suggested tree planting areas for their appropriateness for tree planting. Recommendations were made in a previous Habitat Management Plan for this site (Arcus Renewable Energy Consulting Ltd., 2012), planting recommendations and locations from this report would be considered in the detailed Habitat Management Plan, taking previous and proposed electrofishing data and current fish and habitat data into consideration.

Tree species used would be native to Scotland and from seed of regional providence. The tree planting would tie in with locally relevant tree conservation initiatives. Full details of the species mix to be planted would be provided in the detailed HMP. Protection of trees from browsing animals would be required, the nature of this would be agreed with the landowner and local stakeholders with details provided in the detailed HMP. During the establishment phase, weeding, watering and beating up may all be required, this would be informed by monitoring and would be carried out throughout the first ten years after planting when required.

5.4.4 Protect and Enhance Habitat for Important Bird Species

Carrion Removal

Availability of carrion is a key aspect influencing eagle flight activity in a particular area. It is recommended that fallen stock / deer removal within 200m of each turbine is carried out. All fallen stock / deer found on Site would be removed to dissuade eagles from foraging inside the area around the proposed turbines. The area within 200m of each turbine would be searched by a ranger or keeper regularly and any fallen stock / deer found on Site would be removed.

Additionally, any carrion or gralloch on Site, due to stalking activities, would be removed.

Low Intervention Area

There are currently two golden eagle pairs breeding close to the Site. There would be no activities that might cause disturbance to the breeding pairs within 1km of the breeding sites during the sensitive breeding season (February to August). This includes any maintenance works on the wind farm or land management practices carried out by the client (e.g. peat restoration) or the land users (e.g. muirburn or shooting). Implementation of the low intervention areas would be based on ongoing ornithology monitoring, indicating where eagles are breeding within 1km of the Site and adapting low intervention areas accordingly.

Diver Nesting Platforms

Nesting divers have been recorded on a loch within the northeast of the Site. Divers benefit from the provision of man-made nesting platforms that cannot be accessed from the shore as this protects nests from predation from foxes and stoats and protects against fluctuations in water levels that can flood nests (Broad, 2018; P. Nummu, 2013). A diver platform would be targeted at the loch where divers have been recorded breeding (see EIA Report **Chapter 9: Ornithology** for details). Additional diver platforms would be sited on other suitable lochs on site outside the turbine envelope to reduce the risk of collision.

5.5 Monitoring

All monitoring would be conducted by suitably qualified and experienced ecologists.

Table 5-3 describes the monitoring methods that are referenced in **Table 5-2**, each in response to one or more objective. See **Table 5-4** for a timetable of monitoring activities.

Depending on the results of these surveys, additional monitoring approaches may be required to assess progress toward objectives and inform management. Any such measures would be agreed with the HMP Working Group as part of the HMP review process.

Vegetation surveys, grazing assessments and hydrological monitoring would commence one year prior to construction to provide an updated baseline.

5.5.1 Common Standards Monitoring Vegetation Condition Quadrats

Common Standards Monitoring (CSM) provides a detailed insight into the changes in vegetation and some abiotic factors that pick-up trends in vegetation changes that are valuable to understanding the progress of habitat restoration and management works and informing further management. CSM is designed to assess whether features (e.g. habitats) are in favourable or unfavourable condition and whether condition is being maintained, recovering or declining over time. The assessment is based on habitat-specific criteria involving key indicator species and vegetation structure. These surveys would provide data in relation to bog and wet heath habitats.

Control sites would be chosen outside the blanket bog restoration areas that are in good condition and indicative of blanket bog in the wider area, this area would be used as an indication of the progress of blanket bog recovery after restoration works have taken place. CSM would be undertaken in the bog restoration areas (see **Figure 8.5.1**) and bog restoration control sites to assess the progress of restoration techniques implemented. CSM would also be undertaken in the grazing management areas (see Figure **8.5.1**), to monitor the change in habitat condition driven by the change in grazing regime.

Methods

CSM relies on a series of guidance documents, each relating to a broad habitat category e.g. JNCC 2009: 'Common Standards Monitoring Guidance for Upland Habitats' (JNCC, 2009). The thresholds in CSM that delineate habitats in favourable condition from those in unfavourable condition were designed to more or less equate to the minimum standard for SSSI site selection (JNCC, 2004). The objective of this HMP is to maintain or improve habitat condition compared to baseline condition, not the minimum standard for SSSI site selection. The

threshold conditions would therefore be adjusted accordingly following the first round of CSM data collection. CSM targets will then be updated for this Site in the detailed HMP.

CSM transect lines would be set up in bog restoration areas to give coverage of each restoration area. A sample of transects would also be set up throughout the non-restored bog and wet heath habitats on Site to give an idea of the habitat variation across the Site. A grid reference would be recorded for the north west corner of each transect to allow re-location on return monitoring visits. Quadrat sampling would use 2m x 2m quadrats.

The criteria used to assess the data from each quadrat would depend on the vegetation community within the quadrat. CSM guidance provides a list of which NVC communities compose each of the broader habitat types that CSM relates to. Therefore, the surveyor would record the NVC community for each quadrat to make sure that it is assessed using the correct criteria.

5.5.2 Grazing Assessment

A grazing assessment would monitor the impacts of grazing within the steep areas and higher ground on the Site that are fenced off from grazing in the autumn and winter (see **Figure 8.5.1**). The grazing assessment would follow methods outlined by SNH (Scottish Natural Heritage, 1998), and would be undertaken at the baseline pre-construction stage and post-construction to assess whether the change in grazing regime in the grazing management areas has improved the quality of the wet heath. The assessment would be undertaken at representative sample locations across the grazing management areas. A grazing assessment would be undertaken within each CSM quadrat, and within the area surrounding each CSM quadrat where the assessment calls for a larger sample area.

5.5.3 Hydrological monitoring

Hydrological monitoring is an important aspect of any blanket bog restoration plan. It is implemented through installation of a network of dipwells to monitor water table levels over time and informs the requirement for remedial measures. Dipwells would be installed within the bog restoration areas (see **Figure 8.5.1**) during baseline monitoring before blanket bog restoration is undertaken, and then after restoration has taken place. Dipwell locations would provide representative coverage of the bog restoration area and control area, a minimum of ten monitoring locations is recommended per blanket bog restoration area. The locations of these monitoring sites would coincide with some of the CSM quadrat locations to improve the interpretability of the CSM data set. The grid reference for each monitoring location would be recorded to allow relocation. Full details of monitoring locations would be provided in the detailed HMP.

Unless the water table monitoring method selected allows for continuous data logging at set intervals, quarterly monitoring of dipwells would be undertaken in each monitoring year, to measure water levels and assess if they are high enough to promote bog vegetation growth.

Dipwells show the highest water level and lowest water level experienced since the last time the data was recorded. There are two foam balls which are moved by the water level, when a high level is recorded the top foam ball moves up and stays there unless the water level exceeds this measurement, similarly the other foam piece shows the lowest water level recorded. When taking water level data from a dipwell the difference between the distance from the top of the tubes to ground level and the distance from the top of the tubes to water level is calculated to determine the below ground water level.

Climatic data would be recorded alongside hydrological monitoring to evaluate local weather conditions against water table fluctuations. This will either be using a weather station on Site or using the nearest SEPA rainfall data gauge. This will provide additional information about general weather patterns that effect water levels in addition to the impacts of peatland management.

5.5.4 Ditch Blocking Checks

For the bog restoration to be successful the drainage dams installed during the restoration process need to remain effective. During drain blocking, all of the dam locations would be recorded. In the first two monitoring years, all of the dam locations would be checked for signs of effectiveness, damage and requirements for maintenance. In subsequent monitoring years, especially if dam performance has been good with little maintenance requirement, it may be appropriate to spot check only a proportion of dam locations.

5.5.5 Woodland Planting Monitoring

Areas of riparian woodland creation would be inspected at regular intervals following planting to assess tree condition and survival and any factors likely to limit success, such as grazing or excessive weeds in tree tubes. Further management actions would be decided following the visit, including potentially beating up, replacement of tree tubes and weeding of tree tubes.

5.5.6 Ornithology Surveys

Post-construction ornithology surveys are described in **Chapter 9: Ornithology**. Outline monitoring for ornithology is included here for completeness, however not all monitoring relates directly to habitat management outlined in this report.

Lochan Diver Surveys

Lochs with artificial nest rafts will be surveyed on a yearly basis, to assess the efficacy of the rafts and the success of breeding divers in these lochans. Rafts will be inspected for damage outside the breeding season and repaired when necessary.

Lochs with suitability for breeding divers within 1km of the Site will be surveyed (as per the 2021 surveys) in order to confirm presence/absence of divers, and to determine the outcome of any breeding attempts. Survey methods will follow those outlined in Gilbert *et al.* (Gilbert G. G., 1998), as per current NS guidance (NatureScot, 2017).

Breeding Eagle Surveys

To monitor golden eagle and white-tailed eagle activity in the operational phase of the wind farm, it is proposed to consult with the Eagle Conservation Fund, who have committed to undertake surveys, on an annual basis to establish the status of these species within 6km of the development (10km for white-tailed eagle). Where nesting eagles are found to be nesting close to the site, low intervention areas will be set up within 1km of any nest sites (see Section 5.4.5 for detail).

Breeding Wader Surveys

To allow for meaningful comparison of data, surveys methods should reflect those used in the baseline surveys for EIA including the survey area used for the 2022 surveys. Surveys would focus on areas of habitat management on the Site, including blanket bog and wet heath habitat across the Site (see **Figure 8.5.1**).

Surveys would follow the current guidance (NatureScot, 2017) which includes recommendations set out in Calladine *et al.* (Calladine, 2009), requiring an adapted Brown & Shepherd (Brown, 1993) method with four survey visits at least seven days apart between mid-April and early July .

5.5.7 Monitoring Timetable

The monitoring timetable for the first ten years after construction is shown in **Table 5-4**. By year ten the HMP would be reviewed and an updated HMP would be written, recommending further monitoring and management as appropriate.

Table 5-4: OHMP Monitoring Timetable

Survey Type	Monitoring Year										
	Pre-works	1	2	3	4	5	6	7	8	9	10
Common Standards Monitoring (CSM)	X	X		X		X					X
Grazing assessment	X	X		X		X					X
Hydrological monitoring	X	X		X		X					X
Ditch blocking monitoring		X	X	X		X					X
Woodland planting monitoring		X	X	X	X	X					X
Carcass searches		X	X	X	X	X	X	X	X	X	X
Breeding eagle surveys		X	X	X	X	X	X	X	X	X	X
Upland breeding wader surveys		X	X	X		X					X
Lochan diver surveys		X	X	X		X					X
Maintenance of diver rafts		X	X	X	X	X	X	X	X	X	X
HMP review and re-write											X

5.6 External Factors

It is important to note that external factors such as climate change can influence habitat restoration success. Over the lifetime of the wind farm it is possible that climate change will affect the habitats on Site and in the surrounding area. This should be taken into account during monitoring and reporting and is another reason why a control site in relation to bog restoration is important.

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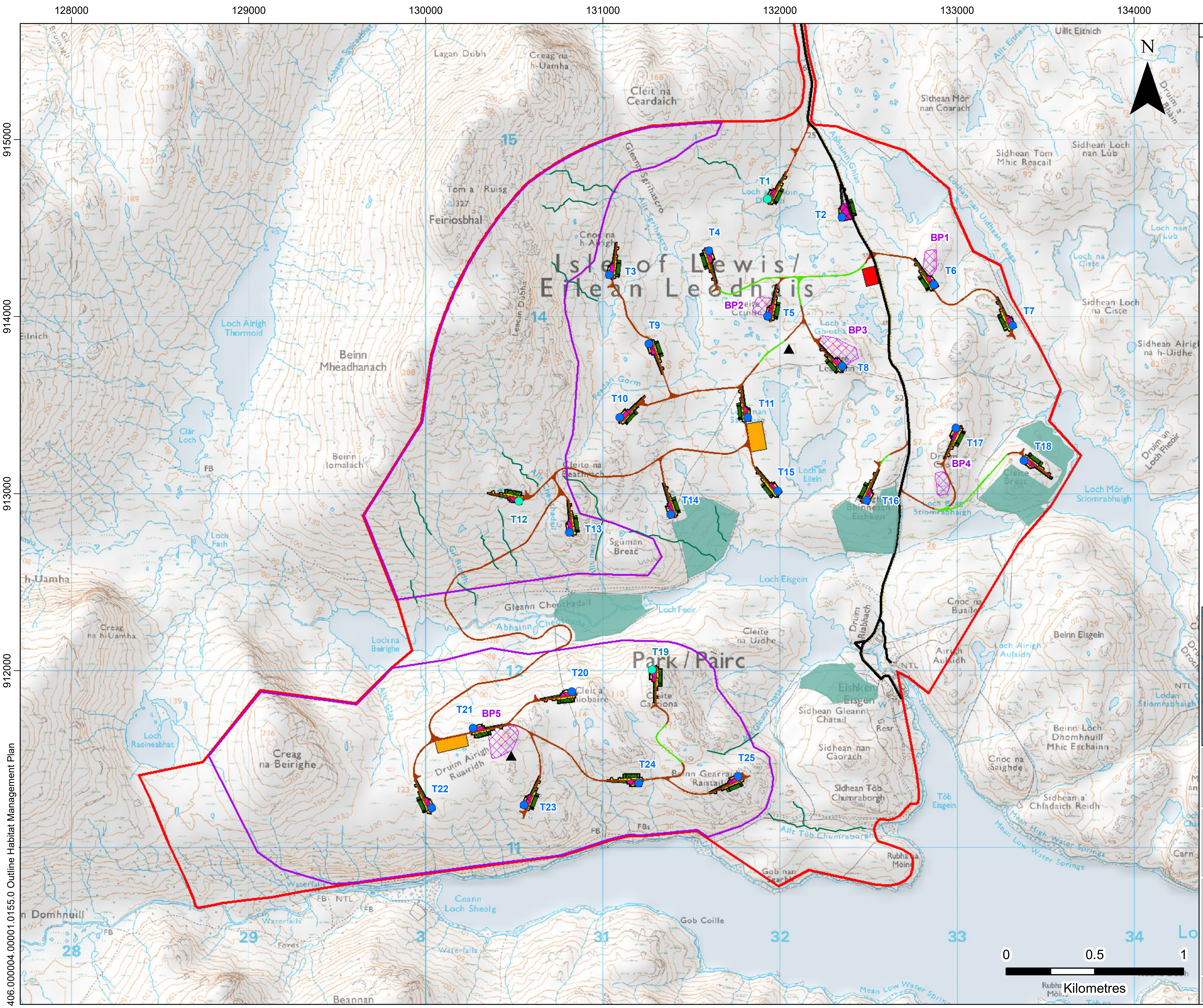
FIGURES

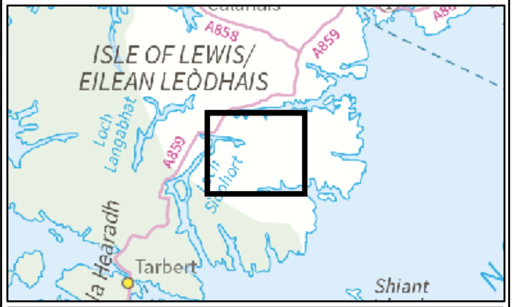


LEGEND

- Application Boundary
- Proposed Turbine Location (180 m Blade Tip Height)
- Proposed Turbine Location (200 m Blade Tip Height)
- Proposed Permanent Met Mast
- Proposed Bespoke Hardstanding Envelope
- Proposed Permanent Substation
- Proposed Permanent Hardstanding
- Proposed Temporary Hardstanding
- Proposed Temporary Construction Compound
- Proposed Clearance Area
- Proposed Access Track / Turning Head
- Proposed Floating Access Track
- Potential Borrow Pit
- Existing Road (To Be Upgraded)

Habitat Management Areas

- Peat Restoration Area
- Wet Heath Restoration Area
- Riparian Planting Area



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UISENIS WIND FARM - EIA

OUTLINE HABITAT MANAGEMENT PLAN

PEAT RESTORATION AREAS

FIGURE 8.5.1

Scale	Date
1:20,000 @ A3	AUGUST 2023

406.000004.00001.0155.0 Outline Habitat Management Plan

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TECHNICAL APPENDIX 8.6: CONSULTATION

Uisenis Wind Farm

Prepared for: Uisenis Power Limited

SLR Ref: 405.64341.00001
Version No: 1
August 2023

BASIS OF REPORT

This document has been prepared by SLR with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Uisenis Power Limited. (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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CONTENTS

1.0 OHFT

From: [redacted]
Sent: 11 July 2022 11:33
To: Colin [redacted]
Subject: RE: Uisenis Wind Farm

Hi Colin,

Sorry for the delayed response.

Please see attached site layout, this may be subject to some minor change in the future. As outlined it is our intention to conduct a Fish Habitat Survey, with the understanding that the requirement for electrofishing and aquatic invertebrate surveys would be determined via scoping, and are likely to be a pre-construction requirement. If you could provide costs for both of these at this stage that would be much appreciated, though I do appreciate that scope of electrofishing may not be known until the fish habitat survey has been conducted.

Please also let me know if you are not in agreement with the course of action outlined. It is our intention to engage with both Marine Science Scotland and NatureScot once we have this finalised/agreed.

Kind Regards,

Sara

[redacted]
o [redacted]
m [redacted]
e [redacted]
[redacted]

From: Colin [redacted]
Sent: 05 July 2022 15:09

To: [redacted]
Subject: RE: Uisenis Wind Farm

Hello Sarah,

Many thanks for your email and apologies for the delay in replying but I'm out of the office most days at the moment and our admin role is currently vacant so this email address is not being checked regularly. The course of action you outlined seems sensible to me although I would need to know the footprint or see a map of the wind farm before I could advise on the surveys needed and associated costs. I should also add that this is our busiest time of year so we'd be unable to complete any work before September. As the fisheries trust biologist I advise the Western Isles District Salmon Fishery Board who are a statutory consultee to planning consultations. In order to avoid any conflict of interest and maintain the integrity of the trust we would also look to have a third party wright up any reports for electrofishing/habitat surveys. We have taken this approach to similar wind farm developments and having another organisation interpret the data gathered by us has always worked well. If what I've outlined would be ok with yourself /SLR and you can provide details of the area the development will cover then I will be able to provide costs etc.

Kind regards,

Paul

| Paul [redacted]
Outer Hebrides Fisheries Trust | The Sawmill | Marybank | Isle of Lewis | HS2 0DD
[redacted]

From: [redacted]
Sent: 16 June 2022 11:55
To: Colin [redacted]
Subject: Uisenis Wind Farm
Importance: High

Good Afternoon,

I am writing on behalf of my Client Eurowind, regarding the proposed Uisenis Wind Farm, Isle of Lewis. SLR have been instructed to conduct all relevant ecology surveys (including fish) to input into the project Scoping Report and subsequent Environmental Impact Assessment and would be extremely grateful if you could advise us on our proposed scope and provide costs for relevant works.

The proposed scope at this stage is to conduct a Fish Habitat Survey, with the understanding that the requirement for electrofishing and aquatic invertebrate surveys would be determined via scoping, and are likely to be a pre-construction requirement. I would be extremely grateful if you could advise as to whether you think this is the correct course of action, and, if possible, provide costs for conducting the habitat survey, and also the electrofishing/aquatic invert surveys (for info).

If you require any further information or would like to discuss further, please don't hesitate to contact me.

Kind Regards,

[redacted]

SLR

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

2.0 NatureScot

31 July 2023

Mark [redacted]
NatureScot
[redacted]

Our Ref: 406.000004.00001

Dear Mark

RE: UISENIS WIND FARM – BAT SURVEYS

I am writing in reference to the Uisenis Wind Farm project, as discussed during our phone conversation on the 12th May 2022.

As you are aware, Eurowind Energy are in the early stages of redesigning the Uisenis Wind Farm (previously 3 consents associated with Muaitheabhaul Wind Farm), proposed to comprise of up to 26 turbines in the Eishken Estate on the Isle of Lewis. We are currently assisting with the planning and coordination of the suite of ecology surveys required to inform the EIA.

As noted during our conversation, in terms of bats on Lewis, the only confirmed colonies on Lewis are situated in Stornoway and the surrounding area, with bats outside this area considered transitory. Given this and the fact that there are likely to be very few features on the proposed development site that would have bat roosting potential we propose to scope out formal bat surveys at this stage. Having said this, we do acknowledge there may be some limited potential for bat roosts at the Eishken Estate, and therefore we propose to carry out a transect survey in July 2022.

Many thanks for your time discussing this issue and please let me know if the above is not in line with your understanding of what was agreed.

Yours sincerely
SLR Consulting Limited

[redacted]

From: [redacted]
Sent: Monday, 21 November 2022 15:45
To: [redacted]
Cc: [redacted]
Subject: Uisenis Wind Farm - Bats
Attachments: 405.64341.00001 Uisenis WF_Bat Report_SLR_Issue.pdf

Hi Mark,

I hope this email finds you well.

As previously discussed, although we initially proposed to scope out bat surveys for the Uisenis Wind Farm project, due to the confirmation of the presence of bats around the Eishken Lodge, we conducted further surveys using static detectors. The results of this survey are detailed in the attached report.

If you have any queries or would like to discuss anything further, please don't hesitate to get in contact.

Kind Regards,

[redacted]

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2	Updated	R. Dewar	29/06/2023

Uisenis Wind Farm

Ornithology

Technical Appendix 9.1

Date: 10 August 2023

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CONTENTS

1 INTRODUCTION

MacArthur Green was commissioned by Eurowind Energy Ltd. to complete ornithological surveys at the proposed Uisenis Wind Farm, Eishken estate in Isle of Lewis (hereafter referred to as 'the proposed development'). The surveys were conducted between March 2022 and February 2023 to inform an assessment of the potential ornithological effects of the proposed development on the species assemblage present.

This technical report summarises the methods employed and the results of the field surveys and is supported by the following Annexes.

- **Annex A:** Ornithological Legal Protection;
- **Annex B:** Ornithological Survey Methodologies;
- **Annex C:** Ornithological Survey Effort and General Information;
- **Annex D:** Ornithological Survey Results; and
- **Annex E:** Collision Risk Assessments.

Confidential information relating to species listed on Annex 1 of the EU Birds Directive or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) is detailed in **Confidential Technical Appendix 9.2**.

A range of surveys were employed to accurately record baseline conditions within the proposed development and appropriate survey areas (detailed in **Annex B**). In this Technical Appendix, associated **Annexes A – E, Confidential Technical Appendix 9.2** and **Chapter 9 (Ornithology)** of the Environmental Impact Assessment Report. Terms referred to are as follows:

- 'the Site' refers to the area within the application boundary, e.g. **Figure 9.2**;
- 'survey area' is defined as the area covered by each survey type for the proposed development; and
- 'study area' is defined as the area of consideration of effects on each species at the time of assessment (**Figure 9.2**).

2 LEGAL PROTECTION

With limited exceptions, all wild birds and their eggs are protected by law. Specific levels of protection are determined by a species' inclusion on certain lists. **Annex A** to this report details the various levels of legal protection afforded to UK bird species.

3 FIELD SURVEY METHODS

The following surveys were undertaken at the Site between March 2022 and February 2023:

- Flight activity surveys (one breeding season and one non-breeding season), from five vantage points (VPs) (**Figure 9.1**);
- Breeding bird surveys (one breeding season), 500m survey buffer of preliminary (larger) turbine area;
- Winter walkover surveys (one non-breeding season), 500m survey buffer;
- Scarce breeding bird surveys (one breeding season), 2km survey buffer; and
- Black grouse surveys (one breeding season), 1.5km survey buffer.

Survey methods followed the recommended NatureScot (SNH 2017[i]) guidelines and methods are described in detail within **Annex B**. Where possible, each survey was carried out beyond the Site within a buffer distance specific to that method (e.g., 2km buffer for the scarce breeding bird surveys) and these are detailed within **Annex B**.

The relative importance of the data collected was determined by the specific level of protection assigned to those species recorded, coupled with their perceived susceptibility to potential effects resulting from the proposed development. The resulting 'target species' and 'secondary species' lists are a standard assessment tool for wind farm ornithological studies (see **Annex B**).

4 FIELD SURVEY RESULTS

All valid surveys were undertaken during suitable weather conditions (as described within **Annex B**). Where weather conditions deteriorated below acceptable conditions (see definitions in **Annex B**), surveys were either suspended or additional surveys were undertaken. In the case of flight activity surveys, any time where the visibility was <1km was excluded from total survey effort and subsequent analysis (further detail in **section 4.1**). Schedule 1/Annex 1 surveys were carried out by appropriately licensed surveyors. All survey data were reviewed, inputted, and analysed by MacArthur Green.

A total 57 bird species were recorded within, or adjacent to, the Site during the various ornithological surveys conducted. Survey effort and results of the field surveys are detailed within **Annexe C** and **Annex D**. The following sections summarise the results from each survey undertaken.

4.1 Flight Activity

The flight activity surveys recorded all target species' flight activity within the Site and beyond. These data have been used in the collision risk modelling. The flights used included those within the 'Collision Risk Analysis Area' (CRAA) (i.e., the area to be occupied by operational turbines, together with a 500m buffer).

Flight activity surveys across the 2022 breeding and 2022/2023 non-breeding seasons were undertaken across up to five VPs. Valid survey effort[1] is detailed in **Table 9-1-1** and full details of flight activity surveys are contained in **Annex C** with methodology in **Annex B**.

Table 9-1-1 Summary of total hours of valid survey per VP in each season

Period	VP1	VP2	VP3	VP4	VP5
2022 breeding season	36	36	36	36	36
2022/2023 non-breeding season	36	36	36	36	36

A total of 12 target species were recorded during the flight activity surveys (further details are provided in **Annex D**). For each species across the whole flight activity survey period, **Table 9-1-2** shows the total number of flights recorded and the total number of birds recorded[2]. The bird seconds are calculated for each observation as the product of flight duration and number of individuals. This is then summed per species to give the total bird seconds recorded across the entire surveyed period.

Table 9-1-2 Target species recorded and total number of flights recorded during flight activity surveys, 2022-2023

Species	Total number of flightlines recorded	Total number of birds recorded	Total bird seconds recorded
Curlew	1	1	46
Dunlin	1	2	70
Golden eagle	76	96	17661
Golden plover	26	38	2180
Greenshank	15	20	1094
Greylag goose	1	55	6600
Hen harrier	6	6	409
Herring gull	5	7	696
Merlin	9	9	492
Peregrine falcon	1	1	73
Red-throated diver	12	15	936
White-tailed eagle	83	106	19121

4.1.1 Flightlines Used in Collision Risk Modelling

Only flightlines identified to be within the CRAA and recorded within the 2km viewshed of the associated VP were considered in the collision risk modelling and **Annex E** provides details of the bird seconds from flights identified to be 'at- risk'.

- 'At-risk' is defined as – a flight having at least part of its duration (i) at Potential Collision Height (PCH)[3]; (ii) within the CRAA; and (iii) recorded within the 2km viewshed of the associated VP.
- PCH is defined as – the altitude between the minimum and maximum blade height[4] (taken to be from 55m – 200m (22 turbines) or 35m – 180m (3 turbines) for the proposed development).

Curlew, dunlin, golden plover, greylag goose and hen harrier were recorded during flight activity surveys but no flights were considered to be 'at-risk'[5]. Full survey results detailing the findings from each survey visit (including target species' flightlines considered not 'at-risk' and secondary species information) can be found within **Annex D**. Only bird seconds for observations identified as within the CRAA and associated viewshed are considered in the following discussions. Full target species results are detailed within **Annex D** and the collision risk calculations are detailed in **Annex E**.

4.1.2 Collision Risk Model Outputs

The bird seconds for target species flights within the CRAA at PCH were then input into a Collision Risk Model (CRM) to calculate the predicted collision rates per season. It should be noted that due to the layout of the proposed development, separate collision modelling was undertaken for the north and south turbine arrays (see **Figure 9.1)** with the results then combined to provide a total collision estimate per species per season. The CRM calculations for each species (split into north and south turbine arrays) can be found in **Annex E**. **Table 9-1-3** and **Table 9-1-4** provide the estimated collision rates and number of seasons per collision for each species.

Table 9-1-3 Estimated collision rates

Species	2022 breeding season	2022/2023 non-breeding season	Annual
Golden eagle	0.112	0.189	0.301
Greenshank	0.0004	0	0.0004
Herring gull	0.036	0	0.036
Merlin	0	0.014	0.014
Peregrine falcon	0.002	0	0.002
Red-throated diver	0.008	0	0.008
White-tailed eagle	1.180	1.350	2.530

Table 9-1-4 Estimated number of seasons per collision

Species	2022 breeding season	2022/2023 non-breeding season	Annual
Golden eagle	8.9	5.3	3.3
Greenshank	2851.0	-	2851
Herring gull	27.9	-	28
Merlin	-	73.5	73
Peregrine falcon	559.7	-	560
Red-throated diver	119.4	-	119
White-tailed eagle	0.8	0.7	0.40

[1] Hours where visibility was >1km are not considered valid for use in collision risk modelling as less than half the 2km viewshed can be seen.
[2] This includes flights that would not technically be 'at-risk' of collision (e.g. recorded outwith the CRAA and/or not at rotor height).
[3] In some cases, only part of a total flight duration was recorded at PCH, and it is assumed that this proportion is applicable for that part of the flight within the CRAA and 2km viewshed area.
[4] Where the actual rotor blade altitude differs from the pre-defined survey height bands, the collision risk model accounts for this difference on the assumption of an even flight distribution within each particular survey height band, and an adjustment can be made to estimate total flight duration at actual rotor blade altitude.
[5] i.e. the flights were either not within the CRAA and associated viewshed or were only recorded flying above 150m.

4.2 Breeding Birds

One complete breeding bird season (comprising of four visits) was surveyed in 2022 (April to July). Surveys recorded seven wader species, of which six were considered to be breeding (**Table 9-1-5**). Ringed plover was also recorded but were not considered to be breeding. Full details of the breeding bird surveys are provided within **Annex C** and **Annex D** and survey methodology is provided within **Annex B**.

Table 9-1-5 Breeding wader territories, 2022. Number of territories within the 500m study area shown in parentheses.

Species	Number of territories 2022
Common sandpiper	4 (3)
Dunlin	2-6 (2-4)
Golden plover	16-34 (9-11)
Greenshank	7-13 (6-8)
Oystercatcher	0-1 (0)
Snipe	6-8 (3)

4.3 Winter Walkover

Winter walkover surveys were conducted during the 2022/2023 non-breeding season. Surveys recorded 22 species of which four are considered to be target species (**Table 9-1-6**). Full details of the winter walkover surveys are provided within **Annex C** and **Annex D** and survey methodology is provided within **Annex B**.

Table 9-1-6 Winter walkover: target species records, 2022/2023

Species	2022/2023 non-breeding season Number of records	Total number of birds
Golden eagle	23	26
Golden plover	2	2
White-tailed eagle	15	22
Woodcock	6	4

[i] Scottish Natural Heritage (2014; updated 2017) Recommended Bird Survey Methods to inform impact assessment of Onshore Windfarms.

4.4 Scarce Breeding Birds

Scarce breeding bird surveys were conducted during the 2022 (April to July) breeding season.

Black-throated diver, golden eagle, merlin and white-tailed eagle were all confirmed to be breeding within the survey area and breeding activity is summarised in **Table 9-1-7**. **Confidential Technical Appendix 9.2** contains the full details of all breeding activity. Hen harrier, peregrine falcon and red-throated diver were also recorded during surveys but were not considered to be breeding/no breeding attempts were located. Winter surveys also identified two additional areas (i.e., not at any known nest sites) where golden eagles were roosting and three additional areas where white-tailed eagles were roosting. Winter walkover surveys in early 2023 also identified early evidence of a second breeding location (i.e., different to the location identified during the 2022 breeding season surveys) for white-tailed eagle.

Table 9-1-7 Scarce breeding bird summary 2022

Species	Breeding evidence
Black-throated diver	One unsuccessful breeding attempt.
Golden eagle	Two confirmed territories with breeding attempts, success unknown. Two additional historic territories checked with no evidence of occupation.
Merlin	Confirmed breeding at one location, four juveniles successfully fledged.
White-tailed eagle	Confirmed breeding at one location, success unknown.

Buzzard (secondary raptor species) was also recorded across the survey area and are likely to have bred within the wider area.

Full details of the scarce breeding bird surveys are provided within **Annex C** and **Annex D** and **Confidential Technical Appendix 9.2** and survey methodology is provided within **Annex B**.

ANNEX A. ORNITHOLOGICAL LEGAL PROTECTION

In Scotland, all wild birds are protected under the Wildlife and Countryside Act 1981 (the 'Act'), as amended by the Nature Conservation (Scotland) Act 2004. This protection also extends to their eggs and nests, with it being an offence to intentionally or recklessly[1]:

- Kill, injure or take any wild bird[2];
- Take, damage, destroy or otherwise interfere with the nest of any wild bird while it is being built or is in use[3];
- At any other time take, damage, destroy or otherwise interfere with any nest habitually used by any wild bird included in Schedule A1 (Protected Nests and Nest Sites for Birds: white-tailed eagle and golden eagle)[4];
- Obstruct or prevent any wild bird from using its nest[5]; or
- Take or destroy an egg of any wild bird[6].

It is also an offence to have in possession or control any live or dead wild bird or any part thereof; or any egg or part of an egg of any wild bird[7].

Further special protection under this legislation is afforded to those species listed on Schedule 1 of the Act. For these species, it is an offence to:

- Intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building, or is in, on or near a nest containing eggs or young, or disturb the dependent young of such a bird[8];
- Intentionally or recklessly disturb any wild birds included on Schedule 1 which leks, while it is doing so[9] (capercaillie is the only bird this offence applies to in Scotland);
- Intentionally or recklessly harass any wild bird included in Schedule 1A[10]. Section 1, subsection 5B states, '*Subject to the provisions of this Part, any person who intentionally or recklessly harasses any wild bird included in Schedule 1A shall be guilty of an offence*'. At this time, Schedule 1A includes golden eagle, hen harrier, red kite and white-tailed eagle. This updated legislation was introduced on 16 March 2013; or
- Intentionally or recklessly take, damage, destroy or otherwise interfere with any nest and/or nest site habitually used by any bird on Schedule A1 at any time. At this time, Schedule 1A includes golden eagle and white-tailed eagle[11];

It is also an offence to knowingly cause or permit to be done an act which is made unlawful by any of the above provisions.

Further protection is described under the EU Birds Directive which requires member states to maintain wild bird species in favourable conservation status[12] and promote the conservation of bird species listed within Annex 1 of the Birds Directive through the protection of their habitat. This is achieved via the designation of Special Protection Areas (SPAs).

Red List bird species are those deemed to be globally threatened and to be suffering population declines within the UK. Although not legally enforceable, the conservation of Red List bird species represents a material consideration, in planning terms.

[1] Exceptions to these offences exist under various circumstances (e.g. controlling pest species; taking birds during specific season; and killing sick or injured birds etc.).
[2] Wildlife and Countryside Act 1981, Section 1(1)(a)
[3] Wildlife and Countryside Act 1981, Section 1(1)(b)
[4] Wildlife and Countryside Act 1981, Section 1(1)(ba)
[5] Wildlife and Countryside Act 1981, Section 1(1)(bb)
[6] Wildlife and Countryside Act 1981, Section 1(1)(c)
[7] Wildlife and Countryside Act 1981, Section 1(2)
[8] Wildlife and Countryside Act 1981, Section 1(5)
[9] Wildlife and Countryside Act 1981, Section 1(5A)
[10] Wildlife and Countryside Act 1981, Section 1(5B)
[11] This reflects the changes introduced by the Wildlife and Countryside Act 1981 (as amended by: Variation of Schedules A1 and 1A (Scotland) Order 2013.
[12] While the term 'favourable conservation status' is not used in the Birds Directive, EU court cases over recent years have progressively interpreted the concept as meaningful in a Birds Directive context (SNH, 2006).

ANNEX B. ORNITHOLOGICAL SURVEY METHODOLOGY

A range of ornithological surveys have been conducted for the proposed Uisenis Wind Farm ('the proposed development'). The methodologies used in these surveys are summarised in the sections below; more detailed descriptions are provided in the NatureScot guidance (2017[i]) on which these surveys are based.

Survey Areas

Surveys were undertaken during the 2022 breeding and 2022/2023 non-breeding seasons. All surveys were buffered from a preliminary (larger) turbine layout provided by Eurowind Energy Ltd.

B.1 Flight Activity Surveys

The aims of the flight activity (vantage point) surveys are: (1) to record flight activity within the vicinity of the proposed development in order to identify areas of importance to birds; and (2) to quantify flight activity within 500m of the proposed turbine locations in order to estimate the likelihood of collision (SNH 2017[i], P.14-19).

Timing

- A survey period of 36 hours is recommended as the minimum level of sampling intensity at each VP for each season (breeding, non-breeding, migratory) (SNH 2017[i], P.17);
- Watches were spread as evenly throughout the year as possible to ensure that temporally representative data are collected (see **Annex C**). Specific consideration was given to the period around dawn and twilight for breeding waders and to changing raptor behaviour across seasons (SNH 2017[i], P.17);
- Watches were suspended and resumed to take account of changes in visibility (e.g., fluctuations in cloud base). Watches were undertaken in conditions of good ground visibility when the cloud base was higher than the most elevated ground being observed; and
- Watches were conducted in a range of weather conditions and were spread throughout the day (see **Annex C** and **Annex D**).

Field Methods

- Viewshed analysis was conducted using Arc GIS to confirm suitable Vantage Point (VP) locations and their associated visible areas at 20m above ground level[1];
- Reconnaissance surveys were undertaken to refine VP locations;
- The VP locations and associated viewsheds are shown in **Figure 9.1**;
- Care was taken to maximize the area visible whilst minimising disturbance to birds;
- The final five VP locations were selected with the aim of achieving coverage of all the proposed turbine locations such that no turbine was more than 2km from a VP;
- A maximum 180° view arc was scanned by surveyors. This rule did not however apply when tracking migratory waterfowl, raptors or divers across the Site;
- Each watch lasted a maximum of three hours but was suspended and then resumed to take account of changes in visibility (e.g., fluctuations in the cloud base).

For each target and secondary species, the following data were recorded (SNH 2017[i], P.17-18):

- The flightlines by individuals or flocks of birds;
- The time the target bird was detected, and the duration (seconds) spent flying over a defined survey area (the viewshed);
- The birds' flight heights, defined into six prescribed height bands (0-20m, 21-40m, 41-100m, 101-150m, 151-200m and >201m) were recorded at the point of detection and at 15 second intervals thereafter. From this the proportion of time spent flying below, within (referred to as Potential Collision Height (PCH)) and above approximate rotor height could be estimated. The actual planned rotor height is 55m – 200m (22 turbines) or 35m – 180m (three turbines) above ground level. This difference is accounted for within the collision risk models on the assumption of even flight distribution within each height band;
- The route followed was plotted in the field onto 1:25,000 scale maps;
- Observations of target species took priority over recording secondary species if both species were present simultaneously;
- The number of birds recorded were the minimum number of individuals that could account for the activity observed; and
- Observers only recorded perched birds and birds on waterbodies once only on arrival at the VP. Thereafter only flying birds and newly noticed perched/swimming birds were included in the activity summaries.

B.2 Moorland Breeding Bird Survey

Upland breeding bird survey methodology was employed as detailed within NatureScot guidance (SNH 2017[i], P.11). In summary, surveys involved the following:

- Open upland (including hedgerows, scrub, isolated trees and copses) was surveyed using an intensive version of the Brown and Shepherd (1993[ii]) method for upland bird survey;
- The objectives were to map the distribution of breeding bird territories within 500m of the Site and estimate the approximate size of breeding bird populations;
- After each survey visit one overview map was then produced showing all target species. The maps from all four survey visits from that year were then compared, enabling the estimation of numbers of breeding territories. This was done by grouping the observations into territories using the methodology described by Bibby *et al*. (2000[iii]). Due to the cryptic nature of many breeding birds and the necessary assumptions made when plotting territories, a minimum and maximum number of territories was identified for each target species;
- The survey covered all areas within 500m of the Site; and
- All upland wader species were recorded during the breeding bird survey.

[1] The viewsheds are based on a 5m DTM to provide a representation of visibility from the observer locations; this is confirmed and refined through field site visits.

Timing

- As recommended in Calladine *et al.* (2009[iv]), four survey visits were undertaken between April and July;
- Fieldwork was undertaken between sunrise and 1800hrs; and
- Fieldwork was not undertaken in conditions considered likely to affect bird detection rates, for example in winds greater than Beaufort Scale Force 4, persistent precipitation, poor visibility (less than 300m), or in unusually hot weather.

Field Methods

- Walk-routes which optimised ground visibility were used;
- Surveyors paused at appropriate vantage and listening points;
- Isolated trees, copses and patches of scrub were approached and examined;
- Streams, ditches and hedgerows were walked;
- All other areas were approached to within 100m; and
- Registrations were mapped at the first location that behaviour indicative of breeding was observed; and
- Standard British Trust for Ornithology (BTO) activity codes were used.

B.3 Winter Walkover

Winter walkovers were performed in the non-breeding seasons to map wintering populations of birds within 500m of the Site.

- The area was surveyed three times during each non-breeding season;
- These surveys involved following a route that optimised ground coverage, such that observers walked within 250m of every point; and
- Observers periodically stopped at appropriate viewing and listening points along the route and longer vantage point watches were included within the walkover to allow potentially important areas to be monitored in greater detail.

B.4 Scarce Breeding Bird Survey

The aim of the scarce breeding bird surveys was to determine the distribution of occupied nests/territories for target raptor, owl and diver species within 2km of the Site and record breeding success. Secondary species such as buzzard, sparrowhawk and kestrel were also noted but location of their nests was not the key focus of the surveys. Surveys were undertaken by experienced and licensed[2] field ornithologists. Extreme care was taken to avoid unnecessary disturbance to breeding birds.

Guidance from NatureScot (SNH 2017[i], P.11-14), '*Bird Monitoring Methods*' (Gilbert *et al.* 1998[v]) and '*Raptors: a field guide to survey and monitoring*' (Hardey *et al.* 2013[vi]) were all consulted to inform survey methodology and are referenced where appropriate in the species methodologies below.

Black-Throated Diver

Methodology outlined in Gilbert *et al.* (1998[v]), as mentioned in NatureScot guidance (SNH 2017[i], P.12), was used as guidance. Extreme care was taken not to disturb potential nests especially around the time of year when females were likely to be laying or incubating.

- All suitable habitats within 1km of the application boundary were searched, including areas of water, lochs and/or any shorelines where present;
- Searches carried out between April and July were focussed on locating summer territories and sitting, brooding or prospecting/nest-building birds as well as numbers of non-breeding adults;
- By observing from a distance, disturbance to nesting or incubating birds was kept to a minimum;
- Where pairs without eggs or young were present, a subsequent visit was made to confirm nest occupancy;
- Where breeding was confirmed, no subsequent visits were made (Gilbert *et al.* 1998[v]); and
- Where present, numbers of non-breeding divers were also assessed (SNH 2017[i], P.34).

Golden Eagle

Methodology outlined in Hardey *et al.* (2013[vi]) was used as guidance. Extreme care was taken not to disturb potential nests, especially where nesting was confirmed or during periods of extremely wet, hot or cold conditions (Hardey *et al.* 2013[vi]).

- All habitats within 2km of the application boundary with the potential to accommodate golden eagle were searched including; Caledonian pine woodland, montane areas, heather moorland, open and unimproved habitat, and where present, seacliffs;
- Searches carried out between January and March focussed on watching for territorial displays and nest building activities. Occupancy of the home range was confirmed by seeing two adult birds together, or by seeing one bird incubating in the later months (Hardey *et al.* 2013[vi]);
- When searches of a nesting site were carried out, they were done so from a distance, so as to not cause disturbance to any displaying, nesting or incubating birds; and
- Where breeding was confirmed, scans of the nests were carried out in June, to check for the presence of young. Further scans were carried out in late July to search for fledged young.

[2] All surveyors hold SNH Schedule 1 Licences.

Hen Harrier

Methodology outlined in Hardey *et al*. (2013[vi]) was used as guidance for the surveying of areas for potential hen harrier breeding. Extreme care was taken not to disturb potential nests especially around the time of year when females were likely to be laying or in cold/wet weather when females were likely to be incubating or brooding. Areas of suitable habitat[3] were visited during four time periods across the breeding season to:

- Check for territory occupancy (between March and mid-April) – this consisted of watching over suitable habitat from a good vantage point for displaying males (and females) and checking all areas of suitable habitat to within 25m (watching out for signs of kills);
- Locate incubating females (between mid-April and late May) by listening for female begging calls and watching for food passes between the male and female – surveyors watched for at least four hours as Hardey *et al.* (2013[vi]) notes that when the female is incubating it can be up to six hours between feeding visits from the male, but on average it is less than every four hours. Surveys were undertaken between 06:00 to 12:00 or 16:00 to 20:00;
- Check for young or breeding evidence (between late May and late June) again by listening for female begging calls and watching for food passes between male and female when the female is brooding and watching for the male and female provisioning the nest with food once brooding has ended– surveyors should watch for at least two hours as Hardey *et al.* (2013[vi]) notes that an adult bird will visit the nest every 1-2 hours. Surveyors should also watch for display behaviour which could indicate a failed breeding attempt; and
- Check for fledged young (between late June and late August).

Merlin

Methodology outlined in Hardey *et al.* (2013[vi]) was used as guidance for the surveying of areas for potential merlin breeding.

- Areas of suitable nesting habitat (including forest edge where trees are >5m high) were closely observed between 20th March and 30th April;
- Boulders, fence lines, isolated posts, stone dykes, grouse butts, hummocks, stream banks, crags, trees and recently burnt areas of heather were checked for signs of occupation (e.g. plucked prey, moulted feathers, pellets and faeces);
- If merlin were observed, or signs found, areas were visited at least twice to verify occupation of the territory; and
- Potential nest areas were watched for 4-6 hours if necessary.

Peregrine Falcon

- Potential nest sites were visited and checked for evidence of occupation between March and April;
- Sites checked included crags and steep banks identified from OS maps and searches of the survey area;
- Surveyors checked for signs of occupation (e.g. faecal splash, fresh plucked prey);
- If occupied sites were found they were re-visited to verify incubation; and
- Searches were made for eyries. Where this was not possible sites were watched from a suitable vantage point for 3-4 hours or until a nest was located.

Red-Throated Diver

Methodology outlined in Gilbert *et al.* (1998[v]), as mentioned in NatureScot guidance (SNH 2017[i], P.12), was used as guidance for the surveying of areas for potential red-throated diver breeding. Extreme care was taken not to disturb potential nests especially around the time of year when females were likely to be laying or incubating and by observing from a distance, disturbance to nesting or incubating birds was kept to a minimum.

- All suitable habitats within 1km of the application boundary were searched, including all areas of standing water (small pools and lochans in open moorland and forested areas) and shorelines where present;
- Searches carried out between late May and July focussed on locating breeding pairs, incubating adult birds and non-breeding adults; and
- Surveyors recorded the number of breeding pairs (including incubating birds seen or young, eggshell fragments or dead chicks) and the maximum number of non-breeding adults.

Short-Eared Owl

- At least two visits between early April and the end of May were carried out;
- Suitable habitat was visited and checked for evidence of hunting males, territorial activity and other signs of presence; and
- If breeding was confirmed, a further visit was be made in June to watch birds, locate nest-sites and confirm breeding behaviour wherever possible.

White-Tailed Eagle

Methodology outlined in Hardey *et al.* (2013[vi]), as mentioned in NatureScot guidance (SNH 2017[i], P.12) was used as guidance for the surveying of areas for potential white-tailed eagle breeding. Active nests were observed from a distance so as to minimise disturbance.

- All suitable habitats (including open coastal or fresh water, large and small crags and suitable trees) within a 2km radius were checked for signs of nest sites, breeding territories or communal roosts;
- Surveys within nesting ranges were carried out between November and mid-February, focussing on locating refurbished nest sites;
- Surveys between mid-March and August focussed on locating active nests and young; and
- All suitable crags and trees within nesting ranges were checked for signs of roosts. These include droppings, down, feathers and pellets.

[3] Unsuitable habitat areas include: land above 600m; improved pasture and arable land; extensive areas of degraded land with no heather cover and low vegetation; the vicinity of cliffs, rocky outcrops, boulder fields and scree; areas within 100m of hill farms and occupied dwellings.

[i] Scottish Natural Heritage (2017) Recommended bird survey methods to inform impact assessment of onshore windfarms.
[ii] Brown, A. F. and Shepherd, K. B. (1993) A method for censusing upland breeding waders. Bird Study, 40: 189-195.
[iii] Bibby, C. J., Neil D. Burgess, David A. Hill and Simon H. Mustoe (2000) Bird Census Techniques, 2nd Edition, London, Academic Press.
[iv] Calladine. J., Garner, G., Wernham, C., & Thiel, A. (2009) The influence of survey frequency on population estimates of moorland breeding birds. Bird Study, 56: 3, 381-388.
[v] Gilbert, G., Gibbons, D. W. and Evans, J. (1998) Bird Monitoring Methods. RSPB, Sandy.
[vi] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013) Raptors: a field guide for surveys and monitoring (3rd edition). The Stationery Office, Edinburgh.

ANNEX C. ORNITHOLOGICAL SURVEY EFFORT & GENERAL INFORMATION

Table C-1 shows the system used for recording weather conditions on all the surveys (sections **C.1** to **C.4** below).

Table C-1 Key to meteorological conditions recorded during all surveys

Wind speed				Rain		Cloud cover		Cloud height	
Calm	0	Moderate gale	7	None	0	In eighths		<150m	0
Light air	1	Fresh gale	8	Drizzle/Mist	1	*e.g.*	3/8	150-500m	1
Light breeze	2	Strong gale	9	Light showers	2			>500m	2
Gentle breeze	3	Whole gale	10	Heavy showers	3				
Moderate breeze	4	Storm	11	Heavy rain	4				
Fresh breeze	5	Hurricane	12	**Snow**		**Frost**		**Visibility**	
Strong breeze	6			None	0	None	0	Poor (<1km)	0
				On site	1	Ground	1	Moderate (1-2km)	1
				High ground	2	All day	2	Good (>2km)	2

C.1 Flight Activity Surveys

Flight activity surveys were undertaken during the 2022 breeding seasons and 2022/2023 non-breeding seasons. Details of the flight activity surveys undertaken across each Vantage Point (VP) location are supplied in **Table C-2** (survey hours per VP per season are summarised in **Technical Appendix 9.1 Table 9-1**) and the associated weather data recorded is detailed in **Table C-3.** Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-2 Summary of flight activity surveys undertaken at Uisenis Wind Farm (sorted chronologically)

Date	Season	Observer	VP	Survey start time	Survey finish time	No. hours[1] surveyed
25/03/2022	2022 BR	AB	4	0700	1000	3
25/03/2022	2022 BR	AB	4	1030	1330	3
25/03/2022	2022 BR	AB	2	1400	1700	3
26/03/2022	2022 BR	AB	2	0630	0930	3
26/03/2022	2022 BR	AB	3	1010	1310	3
26/03/2022	2022 BR	AB	3	1340	1640	3
27/03/2022	2022 BR	AB	1	0650	0950	3
27/03/2022	2022 BR	AB	1	1020	1320	3
15/04/2022	2022 BR	CT	2	1430	1730	3
15/04/2022	2022 BR	MM	4	1430	1730	3
16/04/2022	2022 BR	CT	2	1030	1330	3
16/04/2022	2022 BR	MM	4	1030	1330	3
18/04/2022	2022 BR	MM	1	1130	1430	3
18/04/2022	2022 BR	CT	3	1145	1445	3
19/04/2022	2022 BR	MM	3	0930	1230	3
19/04/2022	2022 BR	CT	5	1130	1430	3
19/04/2022	2022 BR	CT	5	1500	1800	3
19/04/2022	2022 BR	MM	1	1530	1830	3
04/05/2022	2022 BR	RM	5	1235	1535	3
05/05/2022	2022 BR	RM	1	0830	1130	3
06/05/2022	2022 BR	RM	2	0725	1025	3
07/05/2022	2022 BR	RM	4	0900	1200	3
07/05/2022	2022 BR	RM	4	1230	1530	3
10/05/2022	2022 BR	RM	3	0931	1231	3
10/05/2022	2022 BR	RM	3	1302	1602	3
14/05/2022	2022 BR	RM	2	1100	1400	3
18/05/2022	2022 BR	RM	1	0900	1200	3
19/05/2022	2022 BR	RM	5	1002	1302	3
24/05/2022	2022 BR	DS	5	0900	1200	3
24/05/2022	2022 BR	DS	5	1230	1530	3
02/06/2022	2022 BR	CT	4	1430	1730	3
02/06/2022	2022 BR	MM	3	1500	1800	3
02/06/2022	2022 BR	MM	3	1800	2100	3
02/06/2022	2022 BR	CT	4	1800	2100	3
06/06/2022	2022 BR	MM	1	0500	0800	3
06/06/2022	2022 BR	CT	5	0530	0830	3
06/06/2022	2022 BR	MM	1	0830	1130	3
06/06/2022	2022 BR	CT	5	0900	1200	3
08/06/2022	2022 BR	CT	2	1500	1800	3
08/06/2022	2022 BR	MM	2	1800	2100	3
01/07/2022	2022 BR	DS	1	1000	1300	3
01/07/2022	2022 BR	DS	1	1330	1630	3
05/07/2022	2022 BR	DS	2	1000	1300	3
05/07/2022	2022 BR	DS	2	1330	1630	3
08/07/2022	2022 BR	DS	5	1030	1330	3
08/07/2022	2022 BR	DS	5	1400	1700	3
14/07/2022	2022 BR	DS	3	1000	1300	3
14/07/2022	2022 BR	DS	3	1330	1630	3
20/07/2022	2022 BR	DS	4	1200	1500	3
20/07/2022	2022 BR	DS	4	1530	1830	3
04/08/2022	2022 BR	JD	2	1400	1700	3
04/08/2022	2022 BR	PS	1	1410	1710	3
04/08/2022	2022 BR	JD	2	1730	2030	3
04/08/2022	2022 BR	PS	1	1740	2040	3
05/08/2022	2022 BR	JD	4	1200	1500	3
05/08/2022	2022 BR	PS	5	1300	1600	3
05/08/2022	2022 BR	JD	4	1530	1830	3
05/08/2022	2022 BR	PS	5	1630	1930	3
08/08/2022	2022 BR	PS	3	1100	1400	3
08/08/2022	2022 BR	PS	3	1430	1730	3
10/09/2022	2022/2023 NBR	DL	5	1100	1400	3
10/09/2022	2022/2023 NBR	DL	5	1430	1730	3
13/09/2022	2022/2023 NBR	AW	1	1010	1310	3
13/09/2022	2022/2023 NBR	AW	1	1340	1640	3
14/09/2022	2022/2023 NBR	AW	3	0815	1115	3
14/09/2022	2022/2023 NBR	AW	3	1145	1445	3
15/09/2022	2022/2023 NBR	AW	2	0730	1030	3
15/09/2022	2022/2023 NBR	AW	2	1100	1400	3
16/09/2022	2022/2023 NBR	AW	4	0720	1020	3
16/09/2022	2022/2023 NBR	AW	4	1050	1350	3
13/10/2022	2022/2023 NBR	DL	3	1145	1445	3
13/10/2022	2022/2023 NBR	DL	3	1515	1815	3
14/10/2022	2022/2023 NBR	DL	5	0910	1210	3
14/10/2022	2022/2023 NBR	DL	5	1240	1540	3

[1] Note: only valid hours (i.e. where visibility was at least 1km) are presented in this column.

Date	Season	Observer	VP	Survey start time	Survey finish time	No. hours[1] surveyed
19/10/2022	2022/2023 NBR	AW	2	0745	1045	3
19/10/2022	2022/2023 NBR	AW	1	1135	1435	3
19/10/2022	2022/2023 NBR	AW	1	1505	1805	3
20/10/2022	2022/2023 NBR	AW	4	0750	1050	3
20/10/2022	2022/2023 NBR	AW	4	1120	1420	3
20/10/2022	2022/2023 NBR	AW	2	1500	1800	3
16/11/2022	2022/2023 NBR	AW	1	0830	1130	3
16/11/2022	2022/2023 NBR	AW	1	1200	1500	3
17/11/2022	2022/2023 NBR	AW	2	0800	1100	3
17/11/2022	2022/2023 NBR	AW	2	1130	1430	3
18/11/2022	2022/2023 NBR	AW	4	0820	1120	3
18/11/2022	2022/2023 NBR	AW	4	1150	1450	3
23/11/2022	2022/2023 NBR	DL	3	1005	1305	3
23/11/2022	2022/2023 NBR	DL	3	1335	1435	1
24/11/2022	2022/2023 NBR	DL	3	1035	1235	2
24/11/2022	2022/2023 NBR	DL	5	1350	1550	2
25/11/2022	2022/2023 NBR	DL	5	0840	1040	2
25/11/2022	2022/2023 NBR	DL	5	1110	1310	2
05/12/2022	2022/2023 NBR	AW	1	0840	1140	3
05/12/2022	2022/2023 NBR	AW	1	1210	1510	3
06/12/2022	2022/2023 NBR	AW	2	0900	1200	3
06/12/2022	2022/2023 NBR	AW	2	1230	1530	3
07/12/2022	2022/2023 NBR	AW	4	0850	1150	3
07/12/2022	2022/2023 NBR	AW	4	1220	1520	3
19/12/2022	2022/2023 NBR	BJ	5	1000	1200	2
19/12/2022	2022/2023 NBR	DS	3	1030	1330	3
19/12/2022	2022/2023 NBR	BJ	5	1230	1430	2
19/12/2022	2022/2023 NBR	DS	3	1400	1500	1
23/01/2023	2022/2023 NBR	AW	4	0920	1220	3
23/01/2023	2022/2023 NBR	AW	4	1250	1550	3
24/01/2023	2022/2023 NBR	AW	2	0900	1200	3
24/01/2023	2022/2023 NBR	AW	2	1230	1530	3
26/01/2023	2022/2023 NBR	AW	1	0825	1125	3
26/01/2023	2022/2023 NBR	AW	1	1155	1455	3
28/01/2023	2022/2023 NBR	DL	5	0825	1125	3
28/01/2023	2022/2023 NBR	DL	5	1155	1455	3
29/01/2023	2022/2023 NBR	DL	3	1300	1600	3
29/01/2023	2022/2023 NBR	DL	3	1630	1700	0.5
30/01/2023	2022/2023 NBR	DL	3	0750	1050	3
30/01/2023	2022/2023 NBR	DL	3	1120	1250	1.5
30/01/2023	2022/2023 NBR	DL	5	1420	1620	2
12/02/2023	2022/2023 NBR	DL	5	0750	1050	3
12/02/2023	2022/2023 NBR	DL	5	1400	1700	3
13/02/2023	2022/2023 NBR	DL	3	0805	1105	3
13/02/2023	2022/2023 NBR	DL	3	1135	1435	3
23/02/2023	2022/2023 NBR	AW	4	0935	1235	3
23/02/2023	2022/2023 NBR	AW	4	1305	1605	3
24/02/2023	2022/2023 NBR	AW	1	0805	1105	3
24/02/2023	2022/2023 NBR	AW	1	1135	1435	3
25/02/2023	2022/2023 NBR	AW	2	0755	1055	3
25/02/2023	2022/2023 NBR	AW	2	1125	1425	3

Table C-3 Meteorological conditions during flight activity surveys at Uisenis Wind Farm (sorted chronologically)

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
25/03/2022	2022 BR	AB	4	0700	1000	1	3	S	0	7	1	2	0
25/03/2022	2022 BR	AB	4	0700	1000	2	3	S	0	6	1	2	0
25/03/2022	2022 BR	AB	4	0700	1000	3	4	S	0	7	2	2	0
25/03/2022	2022 BR	AB	4	1030	1330	1	3	S	0	1	2	2	0
25/03/2022	2022 BR	AB	4	1030	1330	2	3	S	0	1	2	2	0
25/03/2022	2022 BR	AB	4	1030	1330	3	3	S	0	2	2	2	0
25/03/2022	2022 BR	AB	2	1400	1700	1	4	S	0	6	2	2	0
25/03/2022	2022 BR	AB	2	1400	1700	2	3	S	0	6	2	2	0
25/03/2022	2022 BR	AB	2	1400	1700	3	5	S	0	7	2	2	0
26/03/2022	2022 BR	AB	2	0630	0930	1	1	S	0	5	2	2	0
26/03/2022	2022 BR	AB	2	0630	0930	2	1	S	0	5	2	2	0
26/03/2022	2022 BR	AB	2	0630	0930	3	1	S	0	3	2	2	0
26/03/2022	2022 BR	AB	3	1010	1310	1	1	S	0	7	2	2	0
26/03/2022	2022 BR	AB	3	1010	1310	2	1	S	0	8	2	2	0
26/03/2022	2022 BR	AB	3	1010	1310	3	1	S	1	8	1	2	0
26/03/2022	2022 BR	AB	3	1340	1640	1	1	S	0	7	2	2	0
26/03/2022	2022 BR	AB	3	1340	1640	2	1	S	0	8	2	2	0
26/03/2022	2022 BR	AB	3	1340	1640	3	2	S	0	7	2	2	0
27/03/2022	2022 BR	AB	1	0650	0950	1	0	-	0	3	2	2	1
27/03/2022	2022 BR	AB	1	0650	0950	2	1	S	0	0	2	2	1
27/03/2022	2022 BR	AB	1	0650	0950	3	1	S	0	0	2	2	0
27/03/2022	2022 BR	AB	1	1020	1320	1	1	S	0	0	2	2	0
27/03/2022	2022 BR	AB	1	1020	1320	2	2	S	0	0	2	2	0
27/03/2022	2022 BR	AB	1	1020	1320	3	2	S	0	0	2	2	0
15/04/2022	2022 BR	CT	2	1430	1730	1	3	S	0	6	2	2	0
15/04/2022	2022 BR	CT	2	1430	1730	2	1	S	0	6	2	2	0
15/04/2022	2022 BR	CT	2	1430	1730	3	1	S	1	8	1	1	0
15/04/2022	2022 BR	MM	4	1430	1730	1	2	SSE	0	8	2	2	0
15/04/2022	2022 BR	MM	4	1430	1730	2	2	SSE	0	8	2	2	0
15/04/2022	2022 BR	MM	4	1430	1730	3	2	SSE	0	8	2	2	0
16/04/2022	2022 BR	CT	2	1030	1330	1	3	SW	0	5	2	2	0
16/04/2022	2022 BR	CT	2	1030	1330	2	3	SW	0	6	2	2	0
16/04/2022	2022 BR	CT	2	1030	1330	3	3	SW	0	6	2	2	0
16/04/2022	2022 BR	MM	4	1030	1330	1	3	S	0	5	2	2	0
16/04/2022	2022 BR	MM	4	1030	1330	2	3	S	0	6	2	2	0
16/04/2022	2022 BR	MM	4	1030	1330	3	3	S	0	7	2	2	0
18/04/2022	2022 BR	MM	1	1130	1430	1	5	S	1	8	2	2	0
18/04/2022	2022 BR	MM	1	1130	1430	2	5	S	2	6	2	2	0
18/04/2022	2022 BR	MM	1	1130	1430	3	5	S	1	7	2	2	0
18/04/2022	2022 BR	CT	3	1145	1445	1	3	SW	0	4	2	2	0
18/04/2022	2022 BR	CT	3	1145	1445	2	3	SW	0	5	2	2	0
18/04/2022	2022 BR	CT	3	1145	1445	3	4	SW	0	4	2	2	0
19/04/2022	2022 BR	MM	3	0930	1230	1	2	SW	0	7	2	2	0
19/04/2022	2022 BR	MM	3	0930	1230	2	2	W	0	7	2	2	0
19/04/2022	2022 BR	MM	3	0930	1230	3	2	NW	0	7	2	2	0
19/04/2022	2022 BR	CT	5	1130	1430	1	2	SW	0	5	2	2	0
19/04/2022	2022 BR	CT	5	1130	1430	2	1	SW	0	4	2	2	0
19/04/2022	2022 BR	CT	5	1130	1430	3	1	SW	0	6	2	2	0
19/04/2022	2022 BR	CT	5	1500	1800	1	1	SW	0	6	2	2	0
19/04/2022	2022 BR	CT	5	1500	1800	2	1	SW	0	6	2	2	0
19/04/2022	2022 BR	CT	5	1500	1800	3	2	SW	0	7	2	2	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
19/04/2022	2022 BR	MM	1	1530	1830	1	2	W	0	8	2	2	0
19/04/2022	2022 BR	MM	1	1530	1830	2	3	W	0	6	2	2	0
19/04/2022	2022 BR	MM	1	1530	1830	3	3	SW	0	7	2	2	0
04/05/2022	2022 BR	RM	5	1235	1535	1	4	W	0	7	2	2	0
04/05/2022	2022 BR	RM	5	1235	1535	2	5	WNW	0	8	2	2	0
04/05/2022	2022 BR	RM	5	1235	1535	3	5	WNW	0	7	2	2	0
05/05/2022	2022 BR	RM	1	0830	1130	1	5	W	0	7	2	2	0
05/05/2022	2022 BR	RM	1	0830	1130	2	4	W	0	7	2	2	0
05/05/2022	2022 BR	RM	1	0830	1130	3	4	WSW	2	7	2	2	0
06/05/2022	2022 BR	RM	2	0725	1025	1	3	W	0	6	2	2	0
06/05/2022	2022 BR	RM	2	0725	1025	2	3	W	2	7	2	2	0
06/05/2022	2022 BR	RM	2	0725	1025	3	3	W	0	5	2	2	0
07/05/2022	2022 BR	RM	4	0900	1200	1	2	ESE	0	2	2	2	0
07/05/2022	2022 BR	RM	4	0900	1200	2	3	SE	0	2	2	2	0
07/05/2022	2022 BR	RM	4	0900	1200	3	3	SE	0	2	2	2	0
07/05/2022	2022 BR	RM	4	1230	1530	1	3	SE	0	2	2	2	0
07/05/2022	2022 BR	RM	4	1230	1530	2	3	SE	0	2	2	2	0
07/05/2022	2022 BR	RM	4	1230	1530	3	3	SE	0	1	2	2	0
10/05/2022	2022 BR	RM	3	0931	1231	1	4	SW	3	8	2	2	0
10/05/2022	2022 BR	RM	3	0931	1231	2	4	SW	3	8	2	2	0
10/05/2022	2022 BR	RM	3	0931	1231	3	4	SW	2	8	2	2	0
10/05/2022	2022 BR	RM	3	1302	1602	1	4	SW	2	8	2	2	0
10/05/2022	2022 BR	RM	3	1302	1602	2	3	SW	0	7	2	2	0
10/05/2022	2022 BR	RM	3	1302	1602	3	3	SW	0	7	2	2	0
14/05/2022	2022 BR	RM	2	1100	1400	1	3	SW	0	8	2	2	0
14/05/2022	2022 BR	RM	2	1100	1400	2	3	SW	0	8	2	2	0
14/05/2022	2022 BR	RM	2	1100	1400	3	3	SW	0	7	2	2	0
18/05/2022	2022 BR	RM	1	0900	1200	1	4	SW	2	8	2	2	0
18/05/2022	2022 BR	RM	1	0900	1200	2	4	SSW	2	8	2	2	0
18/05/2022	2022 BR	RM	1	0900	1200	3	4	SSW	0	7	2	2	0
19/05/2022	2022 BR	RM	5	1002	1302	1	4	SSE	0	8	2	2	0
19/05/2022	2022 BR	RM	5	1002	1302	2	4	S	0	8	2	2	0
19/05/2022	2022 BR	RM	5	1002	1302	3	4	S	2	8	2	2	0
24/05/2022	2022 BR	DS	5	0900	1200	1	1	SSE	0	6	2	2	0
24/05/2022	2022 BR	DS	5	0900	1200	2	2	VAR	2	8	1	1	0
24/05/2022	2022 BR	DS	5	0900	1200	3	3	VAR	3	8	1	1	0
24/05/2022	2022 BR	DS	5	1230	1530	1	2	SE	2	7	2	2	0
24/05/2022	2022 BR	DS	5	1230	1530	2	4	VAR	4	8	1	1	0
24/05/2022	2022 BR	DS	5	1230	1530	3	2	SSE	2	7	2	2	0
02/06/2022	2022 BR	CT	4	1430	1730	1	3	NE	0	3	2	2	0
02/06/2022	2022 BR	CT	4	1430	1730	2	4	N	0	2	2	2	0
02/06/2022	2022 BR	CT	4	1430	1730	3	3	NE	0	3	2	2	0
02/06/2022	2022 BR	MM	3	1500	1800	1	1	NE	0	1	2	2	0
02/06/2022	2022 BR	MM	3	1500	1800	2	1	NE	0	1	2	2	0
02/06/2022	2022 BR	MM	3	1500	1800	3	1	NE	0	1	2	2	0
02/06/2022	2022 BR	MM	3	1800	2100	1	1	E	0	1	2	2	0
02/06/2022	2022 BR	MM	3	1800	2100	2	2	E	0	1	2	2	0
02/06/2022	2022 BR	MM	3	1800	2100	3	2	E	0	2	2	2	0
02/06/2022	2022 BR	CT	4	1800	2100	1	3	NE	0	3	2	2	0
02/06/2022	2022 BR	CT	4	1800	2100	2	3	NE	0	2	2	2	0
02/06/2022	2022 BR	CT	4	1800	2100	3	3	NE	0	2	2	2	0
06/06/2022	2022 BR	MM	1	0500	0800	1	2	WNW	0	8	1	1	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
06/06/2022	2022 BR	MM	1	0500	0800	2	2	NW	0	8	1	1	0
06/06/2022	2022 BR	MM	1	0500	0800	3	1	NW	0	8	2	2	0
06/06/2022	2022 BR	CT	5	0530	0830	1	2	SW	0	4	1	1	0
06/06/2022	2022 BR	CT	5	0530	0830	2	2	SW	0	4	2	2	0
06/06/2022	2022 BR	CT	5	0530	0830	3	1	SW	0	2	2	2	0
06/06/2022	2022 BR	MM	1	0830	1130	1	1	NW	0	8	2	2	0
06/06/2022	2022 BR	MM	1	0830	1130	2	1	NW	0	2	2	2	0
06/06/2022	2022 BR	MM	1	0830	1130	3	1	NNE	0	1	2	2	0
06/06/2022	2022 BR	CT	5	0900	1200	1	1	SW	0	2	2	2	0
06/06/2022	2022 BR	CT	5	0900	1200	2	2	SW	0	1	2	2	0
06/06/2022	2022 BR	CT	5	0900	1200	3	1	SW	0	1	2	2	0
08/06/2022	2022 BR	CT	2	1500	1800	1	3	NE	0	5	2	2	0
08/06/2022	2022 BR	CT	2	1500	1800	2	2	NE	0	5	2	2	0
08/06/2022	2022 BR	CT	2	1500	1800	3	2	NE	0	6	2	2	0
08/06/2022	2022 BR	MM	2	1800	2100	1	2	NE	0	5	2	2	0
08/06/2022	2022 BR	MM	2	1800	2100	2	2	NE	0	7	2	2	0
08/06/2022	2022 BR	MM	2	1800	2100	3	2	NE	0	6	2	2	0
01/07/2022	2022 BR	DS	1	1000	1300	1	2	S	0	7	2	2	0
01/07/2022	2022 BR	DS	1	1000	1300	2	3	SE	0	7	2	2	0
01/07/2022	2022 BR	DS	1	1000	1300	3	3	SE	0	7	2	2	0
01/07/2022	2022 BR	DS	1	1330	1630	1	3	S	0	7	2	2	0
01/07/2022	2022 BR	DS	1	1330	1630	2	3	S	0	7	2	2	0
01/07/2022	2022 BR	DS	1	1330	1630	3	3	S	0	7	2	2	0
05/07/2022	2022 BR	DS	2	1000	1300	1	3	W	0	6	2	2	0
05/07/2022	2022 BR	DS	2	1000	1300	2	2	W	0	6	2	2	0
05/07/2022	2022 BR	DS	2	1000	1300	3	3	WSW	0	7	2	2	0
05/07/2022	2022 BR	DS	2	1330	1630	1	3	WSW	0	7	2	2	0
05/07/2022	2022 BR	DS	2	1330	1630	2	4	WSW	0	8	2	2	0
05/07/2022	2022 BR	DS	2	1330	1630	3	4	SW	0	8	2	2	0
08/07/2022	2022 BR	DS	5	1030	1330	1	3	W	0	7	2	2	0
08/07/2022	2022 BR	DS	5	1030	1330	2	3	W	0	7	2	2	0
08/07/2022	2022 BR	DS	5	1030	1330	3	4	W	0	7	2	2	0
08/07/2022	2022 BR	DS	5	1400	1700	1	4	W	0	7	2	2	0
08/07/2022	2022 BR	DS	5	1400	1700	2	4	W	0	7	2	2	0
08/07/2022	2022 BR	DS	5	1400	1700	3	4	W	0	7	2	2	0
14/07/2022	2022 BR	DS	3	1000	1300	1	3	W	0	7	2	2	0
14/07/2022	2022 BR	DS	3	1000	1300	2	4	W	0	8	2	2	0
14/07/2022	2022 BR	DS	3	1000	1300	3	4	W	1	8	1	1	0
14/07/2022	2022 BR	DS	3	1330	1630	1	4	W	1	8	2	2	0
14/07/2022	2022 BR	DS	3	1330	1630	2	4	W	0	8	2	2	0
14/07/2022	2022 BR	DS	3	1330	1630	3	3	W	0	7	2	2	0
20/07/2022	2022 BR	DS	4	1200	1500	1	3	W	0	5	2	2	0
20/07/2022	2022 BR	DS	4	1200	1500	2	3	W	0	5	2	2	0
20/07/2022	2022 BR	DS	4	1200	1500	3	4	W	2	6	2	2	0
20/07/2022	2022 BR	DS	4	1530	1830	1	4	W	0	6	2	2	0
20/07/2022	2022 BR	DS	4	1530	1830	2	5	W	0	6	2	2	0
20/07/2022	2022 BR	DS	4	1530	1830	3	5	W	2	6	2	2	0
04/08/2022	2022 BR	JD	2	1400	1700	1	2	SW	0	7	2	2	0
04/08/2022	2022 BR	JD	2	1400	1700	2	3	SW	0	6	2	2	0
04/08/2022	2022 BR	JD	2	1400	1700	3	3	SW	0	7	2	2	0
04/08/2022	2022 BR	PS	1	1410	1710	1	2	SW	0	5	2	2	0
04/08/2022	2022 BR	PS	1	1410	1710	2	3	SW	0	4	2	2	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
04/08/2022	2022 BR	PS	1	1410	1710	3	3	SW	0	6	2	2	0
04/08/2022	2022 BR	JD	2	1730	2030	1	3	SW	2	6	2	2	0
04/08/2022	2022 BR	JD	2	1730	2030	2	3	SW	2	7	2	2	0
04/08/2022	2022 BR	JD	2	1730	2030	3	2	SW	0	6	2	2	0
04/08/2022	2022 BR	PS	1	1740	2040	1	3	SW	2	5	2	2	0
04/08/2022	2022 BR	PS	1	1740	2040	2	3	SW	0	6	2	2	0
04/08/2022	2022 BR	PS	1	1740	2040	3	3	SW	0	5	2	2	0
05/08/2022	2022 BR	JD	4	1200	1500	1	3	NW	0	7	2	2	0
05/08/2022	2022 BR	JD	4	1200	1500	2	3	NW	2	8	2	2	0
05/08/2022	2022 BR	JD	4	1200	1500	3	4	NW	2	8	2	2	0
05/08/2022	2022 BR	PS	5	1300	1600	1	4	NW	0	7	2	2	0
05/08/2022	2022 BR	PS	5	1300	1600	2	4	NW	0	7	2	2	0
05/08/2022	2022 BR	PS	5	1300	1600	3	3	NW	0	8	2	2	0
05/08/2022	2022 BR	JD	4	1530	1830	1	4	NW	0	8	2	2	0
05/08/2022	2022 BR	JD	4	1530	1830	2	4	NW	0	8	2	2	0
05/08/2022	2022 BR	JD	4	1530	1830	3	4	NW	0	8	2	2	0
05/08/2022	2022 BR	PS	5	1630	1930	1	3	NW	0	8	2	2	0
05/08/2022	2022 BR	PS	5	1630	1930	2	3	NW	0	8	2	2	0
05/08/2022	2022 BR	PS	5	1630	1930	3	3	NW	0	8	2	2	0
08/08/2022	2022 BR	PS	3	1100	1400	1	2	SW	2	8	2	2	0
08/08/2022	2022 BR	PS	3	1100	1400	2	2	SW	2	8	2	2	0
08/08/2022	2022 BR	PS	3	1100	1400	3	2	SW	0	8	2	2	0
08/08/2022	2022 BR	PS	3	1430	1730	1	3	SW	0	7	2	2	0
08/08/2022	2022 BR	PS	3	1430	1730	2	3	SW	2	8	2	2	0
08/08/2022	2022 BR	PS	3	1430	1730	3	3	SW	1	8	2	2	0
08/08/2022	2022 BR	PS	3	1430	1730	2	3	SW	2	8	2	2	0
08/08/2022	2022 BR	PS	3	1430	1730	3	3	SW	1	8	2	2	0
10/09/2022	2022/2023 NBR	DL	5	1100	1400	1	1	S	0	0	2	2	0
10/09/2022	2022/2023 NBR	DL	5	1100	1400	2	1	S	0	0	2	2	0
10/09/2022	2022/2023 NBR	DL	5	1100	1400	3	2	S	0	0	2	2	0
10/09/2022	2022/2023 NBR	DL	5	1430	1730	1	3	S	0	1	2	2	0
10/09/2022	2022/2023 NBR	DL	5	1430	1730	2	3	S	0	1	2	2	0
10/09/2022	2022/2023 NBR	DL	5	1430	1730	3	3	S	0	1	2	2	0
13/09/2022	2022/2023 NBR	AW	1	1010	1310	1	3	W	0	7	2	2	0
13/09/2022	2022/2023 NBR	AW	1	1010	1310	2	3	W	0	8	2	2	0
13/09/2022	2022/2023 NBR	AW	1	1010	1310	3	4	W	1	8	1	2	0
13/09/2022	2022/2023 NBR	AW	1	1340	1640	1	3	W	0	8	1	2	0
13/09/2022	2022/2023 NBR	AW	1	1340	1640	2	3	W	1	8	1	2	0
13/09/2022	2022/2023 NBR	AW	1	1340	1640	3	3	W	0	8	1	2	0
14/09/2022	2022/2023 NBR	AW	3	0815	1115	1	3	NW	0	8	1	2	0
14/09/2022	2022/2023 NBR	AW	3	0815	1115	2	4	NW	2	7	1	2	0
14/09/2022	2022/2023 NBR	AW	3	0815	1115	3	4	NW	0	7	1	2	0
14/09/2022	2022/2023 NBR	AW	3	1145	1445	1	4	NW	2	8	1	2	0
14/09/2022	2022/2023 NBR	AW	3	1145	1445	2	3	NW	0	8	1	2	0
14/09/2022	2022/2023 NBR	AW	3	1145	1445	3	4	NW	2	8	1	2	0
15/09/2022	2022/2023 NBR	AW	2	0730	1030	1	3	NW	0	5	2	2	0
15/09/2022	2022/2023 NBR	AW	2	0730	1030	2	3	NW	0	5	2	2	0
15/09/2022	2022/2023 NBR	AW	2	0730	1030	3	4	NW	2	4	2	2	0
15/09/2022	2022/2023 NBR	AW	2	1100	1400	1	4	NW	0	4	2	2	0
15/09/2022	2022/2023 NBR	AW	2	1100	1400	2	4	NW	2	6	1	2	0
15/09/2022	2022/2023 NBR	AW	2	1100	1400	3	4	NW	2	7	1	2	0
16/09/2022	2022/2023 NBR	AW	4	0720	1020	1	3	NW	0	7	1	2	0
16/09/2022	2022/2023 NBR	AW	4	0720	1020	2	4	NW	2	7	1	2	0
16/09/2022	2022/2023 NBR	AW	4	0720	1020	3	3	NW	2	8	1	2	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
16/09/2022	2022/2023 NBR	AW	4	1050	1350	1	4	NW	3	7	1	2	0
16/09/2022	2022/2023 NBR	AW	4	1050	1350	2	4	NW	0	7	1	2	0
16/09/2022	2022/2023 NBR	AW	4	1050	1350	3	4	NW	3	6	2	2	0
13/10/2022	2022/2023 NBR	DL	3	1145	1445	1	5	S	3	8	2	2	0
13/10/2022	2022/2023 NBR	DL	3	1145	1445	1	5	S	2	8	2	2	0
13/10/2022	2022/2023 NBR	DL	3	1145	1445	2	4	S	3	8	2	2	0
13/10/2022	2022/2023 NBR	DL	3	1145	1445	2	5	S	0	7	2	2	0
13/10/2022	2022/2023 NBR	DL	3	1145	1445	3	5	S	0	8	2	2	0
13/10/2022	2022/2023 NBR	DL	3	1145	1445	3	4	S	0	7	2	2	0
14/10/2022	2022/2023 NBR	DL	5	0910	1210	1	4	S	0	6	2	2	0
14/10/2022	2022/2023 NBR	DL	5	0910	1210	2	4	S	0	6	2	2	0
14/10/2022	2022/2023 NBR	DL	5	0910	1210	3	3	S	2	5	2	2	0
14/10/2022	2022/2023 NBR	DL	5	1240	1540	1	3	S	0	7	2	2	0
14/10/2022	2022/2023 NBR	DL	5	1240	1540	2	4	S	3	8	2	2	0
14/10/2022	2022/2023 NBR	DL	5	1240	1540	3	5	S	3	8	2	2	0
19/10/2022	2022/2023 NBR	AW	2	0745	1045	1	3	NE	3	2	2	2	0
19/10/2022	2022/2023 NBR	AW	2	0745	1045	2	3	E	3	3	2	2	0
19/10/2022	2022/2023 NBR	AW	2	0745	1045	3	3	E	3	4	2	2	0
19/10/2022	2022/2023 NBR	AW	1	1135	1435	1	4	E	0	3	2	2	0
19/10/2022	2022/2023 NBR	AW	1	1135	1435	2	4	E	0	3	2	2	0
19/10/2022	2022/2023 NBR	AW	1	1135	1435	3	3	E	0	3	2	2	0
19/10/2022	2022/2023 NBR	AW	1	1505	1805	1	3	E	0	4	2	2	0
19/10/2022	2022/2023 NBR	AW	1	1505	1805	2	4	E	0	4	2	2	0
19/10/2022	2022/2023 NBR	AW	1	1505	1805	3	4	E	0	4	2	2	0
20/10/2022	2022/2023 NBR	AW	4	0750	1050	1	0	-	0	5	2	2	0
20/10/2022	2022/2023 NBR	AW	4	0750	1050	2	1	VAR	0	8	2	2	0
20/10/2022	2022/2023 NBR	AW	4	0750	1050	3	0	-	0	8	2	2	0
20/10/2022	2022/2023 NBR	AW	4	1120	1420	1	0	-	0	8	2	2	0
20/10/2022	2022/2023 NBR	AW	4	1120	1420	2	1	SE	0	8	2	2	0
20/10/2022	2022/2023 NBR	AW	4	1120	1420	3	2	SE	0	8	2	2	0
20/10/2022	2022/2023 NBR	AW	2	1500	1800	1	1	SE	0	8	2	2	0
20/10/2022	2022/2023 NBR	AW	2	1500	1800	2	2	SE	0	8	2	2	0
20/10/2022	2022/2023 NBR	AW	2	1500	1800	3	2	SE	0	8	2	2	0
16/11/2022	2022/2023 NBR	AW	1	0830	1130	1	3	SE	0	5	2	2	0
16/11/2022	2022/2023 NBR	AW	1	0830	1130	2	3	SE	0	4	2	2	0
16/11/2022	2022/2023 NBR	AW	1	0830	1130	3	3	SE	0	3	2	2	0
16/11/2022	2022/2023 NBR	AW	1	1200	1500	1	3	SE	0	3	2	2	0
16/11/2022	2022/2023 NBR	AW	1	1200	1500	2	4	SE	0	4	2	2	0
16/11/2022	2022/2023 NBR	AW	1	1200	1500	3	3	SE	0	5	2	2	0
17/11/2022	2022/2023 NBR	AW	2	0800	1100	1	0	-	0	3	2	2	0
17/11/2022	2022/2023 NBR	AW	2	0800	1100	2	0	-	0	4	2	2	0
17/11/2022	2022/2023 NBR	AW	2	0800	1100	3	0	-	0	3	2	2	0
17/11/2022	2022/2023 NBR	AW	2	1130	1430	1	1	SE	0	4	2	2	0
17/11/2022	2022/2023 NBR	AW	2	1130	1430	2	2	SE	1	7	2	2	0
17/11/2022	2022/2023 NBR	AW	2	1130	1430	3	3	SE	1	8	1	2	0
18/11/2022	2022/2023 NBR	AW	4	0820	1120	1	2	E	2	8	1	2	0
18/11/2022	2022/2023 NBR	AW	4	0820	1120	2	2	SE	1	7	1	2	0
18/11/2022	2022/2023 NBR	AW	4	0820	1120	3	2	SW	2	8	1	2	0
18/11/2022	2022/2023 NBR	AW	4	1150	1450	1	2	S	1	8	1	2	0
18/11/2022	2022/2023 NBR	AW	4	1150	1450	2	2	SE	2	8	1	2	0
18/11/2022	2022/2023 NBR	AW	4	1150	1450	3	3	SE	2	8	1	2	0
23/11/2022	2022/2023 NBR	DL	3	1005	1305	1	2	SE	0	7	2	2	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
23/11/2022	2022/2023 NBR	DL	3	1005	1305	2	2	SE	0	8	2	2	0
23/11/2022	2022/2023 NBR	DL	3	1005	1305	3	2	SE	1	8	2	2	0
23/11/2022	2022/2023 NBR	DL	3	1335	1435	1	3	SE	3	8	2	2	0
24/11/2022	2022/2023 NBR	DL	3	1035	1235	1	5	SE	0	7	2	2	0
24/11/2022	2022/2023 NBR	DL	3	1035	1235	2	4	SE	0	7	2	2	0
24/11/2022	2022/2023 NBR	DL	5	1350	1550	1	4	SE	0	8	2	2	0
24/11/2022	2022/2023 NBR	DL	5	1350	1550	2	3	SE	2	8	2	2	0
25/11/2022	2022/2023 NBR	DL	5	0840	1040	1	5	SW	3	8	2	2	0
25/11/2022	2022/2023 NBR	DL	5	0840	1040	2	4	SW	3	8	2	2	0
25/11/2022	2022/2023 NBR	DL	5	1110	1310	1	4	SW	3	8	2	2	0
25/11/2022	2022/2023 NBR	DL	5	1110	1310	2	3	SW	0	7	2	2	0
05/12/2022	2022/2023 NBR	AW	1	0840	1140	1	0	-	0	1	2	2	1
05/12/2022	2022/2023 NBR	AW	1	0840	1140	2	0	-	0	2	2	2	1
05/12/2022	2022/2023 NBR	AW	1	0840	1140	3	1	E	0	3	2	2	0
05/12/2022	2022/2023 NBR	AW	1	1210	1510	1	2	E	0	4	2	2	0
05/12/2022	2022/2023 NBR	AW	1	1210	1510	2	2	E	0	6	2	2	0
05/12/2022	2022/2023 NBR	AW	1	1210	1510	3	3	E	1	8	2	2	0
06/12/2022	2022/2023 NBR	AW	2	0900	1200	1	3	N	2	8	2	2	0
06/12/2022	2022/2023 NBR	AW	2	0900	1200	2	4	N	0	7	2	2	0
06/12/2022	2022/2023 NBR	AW	2	0900	1200	3	4	N	0	6	2	2	0
06/12/2022	2022/2023 NBR	AW	2	1230	1530	1	4	N	0	6	2	2	0
06/12/2022	2022/2023 NBR	AW	2	1230	1530	2	4	N	2	7	1	2	0
06/12/2022	2022/2023 NBR	AW	2	1230	1530	3	4	N	2	8	1	2	0
07/12/2022	2022/2023 NBR	AW	4	0850	1150	1	3	N	2	6	1	2	0
07/12/2022	2022/2023 NBR	AW	4	0850	1150	2	3	N	2	7	1	2	0
07/12/2022	2022/2023 NBR	AW	4	0850	1150	3	3	N	0	5	1	2	0
07/12/2022	2022/2023 NBR	AW	4	1220	1520	1	3	N	2	7	1	2	0
07/12/2022	2022/2023 NBR	AW	4	1220	1520	2	2	N	0	8	1	2	0
07/12/2022	2022/2023 NBR	AW	4	1220	1520	3	2	N	2	7	1	2	0
19/12/2022	2022/2023 NBR	BJ	5	1000	1200	1	6	SW	0	8	1	2	0
19/12/2022	2022/2023 NBR	BJ	5	1000	1200	2	5	SW	2	8	1	1	0
19/12/2022	2022/2023 NBR	DS	3	1030	1330	1	4	SSW	2	8	1	2	0
19/12/2022	2022/2023 NBR	DS	3	1030	1330	2	5	SSW	2	8	1	2	0
19/12/2022	2022/2023 NBR	DS	3	1030	1330	3	6	SSW	3	8	1	1	0
19/12/2022	2022/2023 NBR	BJ	5	1230	1430	1	6	SSW	2	8	1	2	0
19/12/2022	2022/2023 NBR	BJ	5	1230	1430	2	6	SW	3	8	1	1	0
19/12/2022	2022/2023 NBR	DS	3	1400	1500	1	5	SSW	3	8	1	1	0
23/01/2023	2022/2023 NBR	AW	4	0920	1220	1	5	SSE	1	8	1	2	0
23/01/2023	2022/2023 NBR	AW	4	0920	1220	2	4	SSE	2	8	1	2	0
23/01/2023	2022/2023 NBR	AW	4	0920	1220	3	5	SSE	2	8	1	2	0
23/01/2023	2022/2023 NBR	AW	4	1250	1550	1	4	SSE	2	8	1	2	0
23/01/2023	2022/2023 NBR	AW	4	1250	1550	2	4	SSE	2	8	1	2	0
23/01/2023	2022/2023 NBR	AW	4	1250	1550	3	4	SSE	1	8	1	1	0
24/01/2023	2022/2023 NBR	AW	2	0900	1200	1	4	SW	1	8	1	2	0
24/01/2023	2022/2023 NBR	AW	2	0900	1200	2	4	SW	1	8	1	2	0
24/01/2023	2022/2023 NBR	AW	2	0900	1200	3	4	SW	1	8	1	2	0
24/01/2023	2022/2023 NBR	AW	2	1230	1530	1	4	SW	1	8	1	2	0
24/01/2023	2022/2023 NBR	AW	2	1230	1530	2	4	SW	1	8	1	2	0
24/01/2023	2022/2023 NBR	AW	2	1230	1530	3	4	SW	1	8	1	2	0
26/01/2023	2022/2023 NBR	AW	1	0825	1125	1	2	NNW	0	3	2	2	0
26/01/2023	2022/2023 NBR	AW	1	0825	1125	2	1	NNW	0	3	2	2	0
26/01/2023	2022/2023 NBR	AW	1	0825	1125	3	1	NNW	2	5	1	2	0

Date	VP	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
26/01/2023	2022/2023 NBR	AW	1	1155	1455	1	1	NW	0	2	2	2	0
26/01/2023	2022/2023 NBR	AW	1	1155	1455	2	1	N	0	2	2	2	0
26/01/2023	2022/2023 NBR	AW	1	1155	1455	3	1	N	0	2	2	2	0
28/01/2023	2022/2023 NBR	DL	5	0825	1125	1	3	SW	0	5	2	2	0
28/01/2023	2022/2023 NBR	DL	5	0825	1125	2	3	SW	0	5	2	2	0
28/01/2023	2022/2023 NBR	DL	5	0825	1125	3	3	SW	0	6	2	2	0
28/01/2023	2022/2023 NBR	DL	5	1155	1455	1	4	W	2	7	2	2	0
28/01/2023	2022/2023 NBR	DL	5	1155	1455	2	3	W	2	6	2	2	0
28/01/2023	2022/2023 NBR	DL	5	1155	1455	3	4	W	2	7	2	2	0
29/01/2023	2022/2023 NBR	DL	3	1300	1600	1	4	W	0	5	2	2	0
29/01/2023	2022/2023 NBR	DL	3	1300	1600	2	4	W	2	5	2	2	0
29/01/2023	2022/2023 NBR	DL	3	1300	1600	3	4	W	2	6	2	2	0
29/01/2023	2022/2023 NBR	DL	3	1630	1700	1	4	W	2	6	2	2	0
30/01/2023	2022/2023 NBR	DL	3	0750	1050	1	4	W	0	7	2	2	0
30/01/2023	2022/2023 NBR	DL	3	0750	1050	2	4	W	3	8	2	2	0
30/01/2023	2022/2023 NBR	DL	3	0750	1050	3	4	W	0	6	2	2	0
30/01/2023	2022/2023 NBR	DL	3	1120	1250	1	4	W	3	7	1	2	0
30/01/2023	2022/2023 NBR	DL	3	1120	1250	2	4	W	3	8	1	2	0
30/01/2023	2022/2023 NBR	DL	5	1420	1620	1	4	W	0	7	2	2	0
30/01/2023	2022/2023 NBR	DL	5	1420	1620	2	4	W	3	7	1	1	0
12/02/2023	2022/2023 NBR	DL	5	0750	1050	1	5	S	3	8	2	2	0
12/02/2023	2022/2023 NBR	DL	5	0750	1050	2	5	S	3	8	2	2	0
12/02/2023	2022/2023 NBR	DL	5	0750	1050	3	5	S	3	8	2	2	0
12/02/2023	2022/2023 NBR	DL	5	1400	1700	1	4	S	0	7	2	2	0
12/02/2023	2022/2023 NBR	DL	5	1400	1700	2	4	S	0	8	2	2	0
12/02/2023	2022/2023 NBR	DL	5	1400	1700	3	4	S	0	7	2	2	0
13/02/2023	2022/2023 NBR	DL	3	0805	1105	1	5	S	0	8	2	2	0
13/02/2023	2022/2023 NBR	DL	3	0805	1105	2	6	S	0	8	2	2	0
13/02/2023	2022/2023 NBR	DL	3	0805	1105	3	5	S	0	7	2	2	0
13/02/2023	2022/2023 NBR	DL	3	1135	1435	1	5	S	0	8	2	2	0
13/02/2023	2022/2023 NBR	DL	3	1135	1435	2	5	S	0	7	2	2	0
13/02/2023	2022/2023 NBR	DL	3	1135	1435	3	5	S	0	7	2	2	0
23/02/2023	2022/2023 NBR	AW	4	0935	1235	1	4	WSW	2	8	1	2	0
23/02/2023	2022/2023 NBR	AW	4	0935	1235	2	4	WSW	2	8	1	2	0
23/02/2023	2022/2023 NBR	AW	4	0935	1235	3	4	SW	2	8	1	2	0
23/02/2023	2022/2023 NBR	AW	4	1305	1605	1	4	SW	2	8	1	2	0
23/02/2023	2022/2023 NBR	AW	4	1305	1605	2	4	SW	2	8	1	2	0
23/02/2023	2022/2023 NBR	AW	4	1305	1605	3	5	W	3	8	1	2	0
24/02/2023	2022/2023 NBR	AW	1	0805	1105	1	4	NW	0	2	2	2	0
24/02/2023	2022/2023 NBR	AW	1	0805	1105	2	3	WNW	0	4	2	2	0
24/02/2023	2022/2023 NBR	AW	1	0805	1105	3	4	NW	2	8	2	2	0
24/02/2023	2022/2023 NBR	AW	1	1135	1435	1	4	NW	0	6	2	2	0
24/02/2023	2022/2023 NBR	AW	1	1135	1435	2	4	NW	0	5	2	2	0
24/02/2023	2022/2023 NBR	AW	1	1135	1435	3	4	NW	0	4	1	2	0
25/02/2023	2022/2023 NBR	AW	2	0755	1055	1	3	NW	2	7	1	2	0
25/02/2023	2022/2023 NBR	AW	2	0755	1055	2	4	NW	0	6	1	2	0
25/02/2023	2022/2023 NBR	AW	2	0755	1055	3	4	NW	0	7	1	2	0
25/02/2023	2022/2023 NBR	AW	2	1125	1425	1	4	NW	0	7	1	2	0
25/02/2023	2022/2023 NBR	AW	2	1125	1425	2	4	NW	0	7	1	2	0
25/02/2023	2022/2023 NBR	AW	2	1125	1425	3	4	NW	0	7	1	2	0

C.2 Moorland Breeding Bird Surveys

Moorland breeding bird surveys were undertaken during the 2022 breeding season. **Table C-4** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-4 Meteorological conditions during breeding bird surveys at Uisenis Wind Farm (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
16/04/2022	1	CT	1330	1930	1	3	SE	0	8	2	2	0	0
16/04/2022	1	MM	1330	1930	1	4	SE	0	8	2	2	0	0
16/04/2022	1	CT	1330	1930	2	3	SE	0	7	2	2	0	0
16/04/2022	1	MM	1330	1930	2	4	S	0	7	2	2	0	0
16/04/2022	1	CT	1330	1930	3	3	S	0	8	2	2	0	0
16/04/2022	1	MM	1330	1930	3	3	S	0	6	2	2	0	0
16/04/2022	1	CT	1330	1930	4	3	S	0	6	2	2	0	0
16/04/2022	1	MM	1330	1930	4	4	S	0	7	2	2	0	0
16/04/2022	1	CT	1330	1930	5	3	S	0	8	2	2	0	0
16/04/2022	1	MM	1330	1930	5	5	S	0	8	2	2	0	0
16/04/2022	1	CT	1330	1930	6	3	S	0	8	2	2	0	0
16/04/2022	1	MM	1330	1930	6	5	S	0	8	2	2	0	0
17/04/2022	1	CT	1100	1400	1	3	SW	0	7	2	2	0	0
17/04/2022	1	MM	1100	1400	1	3	S	2	8	2	1	0	0
17/04/2022	1	CT	1100	1400	2	3	SW	1	8	2	2	0	0
17/04/2022	1	MM	1100	1400	2	3	S	1	8	1	1	0	0
17/04/2022	1	CT	1100	1400	3	3	SW	1	8	1	1	0	0
17/04/2022	1	MM	1100	1400	3	3	S	0	8	1	1	0	0
06/05/2022	2	RM	1025	1525	1	3	W	0	6	2	2	0	0
06/05/2022	2	RM	1025	1525	2	3	W	0	6	2	2	0	0
06/05/2022	2	RM	1025	1525	3	2	W	2	7	2	2	0	0
06/05/2022	2	RM	1025	1525	4	2	W	2	8	2	2	0	0
06/05/2022	2	RM	1025	1525	5	3	W	2	8	2	2	0	0
10/05/2022	2	RM	0831	0931	1	4	SW	3	8	2	2	0	0
10/05/2022	2	RM	1602	1802	1	4	SW	2	7	2	2	0	0
10/05/2022	2	RM	1602	1802	2	4	SW	2	7	2	2	0	0
14/05/2022	2	RM	1015	1100	1	3	SW	0	8	2	2	0	0
14/05/2022	2	RM	1400	1615	1	3	SW	0	5	2	2	0	0
14/05/2022	2	RM	1400	1615	2	2	SW	0	3	2	2	0	0
18/05/2022	2	RM	0830	0900	1	4	SW	2	8	2	2	0	0
18/05/2022	2	RM	1200	1430	2	4	SSW	0	3	2	2	0	0
18/05/2022	2	RM	1200	1430	3	4	SSW	0	3	2	2	0	0
23/05/2022	2	RM	1045	1445	1	2	WSW	0	4	2	2	0	0
23/05/2022	2	RM	1045	1445	2	2	WSW	3	7	2	2	0	0
23/05/2022	2	RM	1045	1445	3	2	WSW	2	7	2	2	0	0
23/05/2022	2	RM	1045	1445	4	2	WSW	0	4	2	2	0	0
01/06/2022	3	MM	1500	1800	1	1	SW	0	2	2	2	0	0
01/06/2022	3	MM	1500	1800	2	1	SW	0	4	2	2	0	0
01/06/2022	3	MM	1500	1800	3	1	SW	0	5	2	2	0	0
01/06/2022	3	CT	1510	1810	1	2	SW	0	4	2	2	0	0
01/06/2022	3	CT	1510	1810	2	2	SW	0	3	2	2	0	0
01/06/2022	3	CT	1510	1810	3	2	SW	0	3	2	2	0	0
03/06/2022	3	MM	1300	1900	1	3	ENE	0	1	2	2	0	0
03/06/2022	3	MM	1300	1900	2	3	E	0	1	2	2	0	0
03/06/2022	3	MM	1300	1900	3	3	ESE	0	1	2	2	0	0
03/06/2022	3	MM	1300	1900	4	2	E	0	1	2	2	0	0
03/06/2022	3	MM	1300	1900	5	2	ENE	0	1	2	2	0	0
03/06/2022	3	MM	1300	1900	6	2	NE	0	1	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
03/06/2022	3	CT	1400	2000	1	2	NE	0	1	2	2	0	0
03/06/2022	3	CT	1400	2000	2	2	NE	0	0	2	2	0	0
03/06/2022	3	CT	1400	2000	3	2	NE	0	1	2	2	0	0
01/07/2022	4	DS	0830	1000	1	2	S	0	7	2	2	0	0
01/07/2022	4	DS	0830	1000	2	2	S	0	7	2	2	0	0
01/07/2022	4	DS	1630	1800	1	3	S	0	7	2	2	0	0
05/07/2022	4	DS	0830	1000	1	2	W	0	5	2	2	0	0
05/07/2022	4	DS	0830	1000	2	2	W	0	5	2	2	0	0
05/07/2022	4	DS	1630	1800	1	4	SW	0	8	2	2	0	0
07/07/2022	4	DS	0930	1530	1	3	SW	0	8	2	2	0	0
07/07/2022	4	DS	0930	1530	2	3	SW	1	8	1	1	0	0
07/07/2022	4	DS	0930	1530	3	3	SW	1	8	1	1	0	0
07/07/2022	4	DS	0930	1530	4	3	SW	1	8	1	1	0	0
07/07/2022	4	DS	0930	1530	5	3	SW	0	8	2	2	0	0
07/07/2022	4	DS	0930	1530	6	3	SW	0	8	2	2	0	0
08/07/2022	4	DS	0900	1030	1	2	W	0	7	2	2	0	0
08/07/2022	4	DS	1700	1830	1	3	W	0	7	2	2	0	0
08/07/2022	4	DS	1700	1830	2	3	W	0	7	2	2	0	0
14/07/2022	4	DS	0830	1000	1	3	W	0	7	2	2	0	0
14/07/2022	4	DS	1630	1800	1	3	W	0	7	2	2	0	0
14/07/2022	4	DS	1630	1800	2	3	W	0	6	2	2	0	0

C.3 Winter Walkover Surveys

Winter walkover surveys were undertaken during the 2022/2023 non-breeding season. **Table C-5** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-5 Meteorological conditions during winter walkover surveys at Uisenis Wind Farm (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
17/11/2022	1	RR	0845	1515	1	0	-	0	2	2	2	0	0
17/11/2022	1	RR	0845	1515	2	0	-	0	2	2	2	0	0
17/11/2022	1	RR	0845	1515	3	2	SE	2	4	2	2	0	0
17/11/2022	1	RR	0845	1515	4	3	SE	1	6	2	2	0	0
17/11/2022	1	RR	0845	1515	5	3	SE	1	7	2	2	0	0
17/11/2022	1	RR	0845	1515	6	2	SE	1	8	1	2	0	0
17/11/2022	1	RR	0845	1515	7	2	SE	0	8	1	2	0	0
23/11/2022	1	DL	0755	0955	1	2	SE	0	7	2	2	0	0
23/11/2022	1	DL	0755	0955	2	2	SE	0	7	2	2	0	0
23/11/2022	1	DL	1440	1540	3	3	SE	4	8	1	1	0	0
24/11/2022	1	DL	1235	1345	1	4	SE	0	8	2	2	0	0
24/11/2022	1	DL	1555	1655	2	4	SE	0	7	2	2	0	0
25/11/2022	1	DL	0735	835	1	5	SW	4	8	2	2	0	0
13/12/2022	2	RR	0940	1300	1	4	NNW	0	2	2	2	2	2
13/12/2022	2	RR	0940	1300	2	2	N	2	6	1	1	2	1
13/12/2022	2	RR	0940	1300	3	2	N	0	3	2	2	2	1
19/12/2022	2	BJ	0900	1000	1	6	SW	0	8	1	2	0	0
19/12/2022	2	DS	0910	1030	1	4	SSW	2	8	1	2	0	0
19/12/2022	2	BJ	1445	1615	1	6	SW	2	8	1	1	0	0
19/12/2022	2	BJ	1445	1615	2	6	SSW	3	8	1	1	0	0
19/12/2022	2	DS	1500	1620	1	6	SSW	4	8	1	1	0	0
19/12/2022	2	DS	1500	1620	2	6	SSW	4	8	1	1	0	0
09/01/2023	3	RR	0830	1430	1	3	SW	2	4	1	1	0	0
09/01/2023	3	RR	0830	1430	2	4	SW	0	7	2	2	0	0
09/01/2023	3	RR	0830	1430	3	5	SW	2	5	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
09/01/2023	3	RR	0830	1430	4	5	SW	2	4	2	2	0	0
09/01/2023	3	RR	0830	1430	5	5	SW	0	4	2	2	0	0
09/01/2023	3	RR	0830	1430	6	4	SW	0	6	2	2	0	0
28/01/2023	3	DL	1500	1800	1	3	W	0	6	2	2	0	0
28/01/2023	3	DL	1500	1800	2	3	W	0	5	2	2	0	0
28/01/2023	3	DL	1500	1800	3	2	W	0	4	2	2	0	0
29/01/2023	3	DL	1100	1300	1	4	W	2	6	2	2	0	0
29/01/2023	3	DL	1100	1300	2	4	W	0	6	2	2	0	0
30/01/2023	3	DL	1255	1420	1	3	W	0	7	2	2	0	0
30/01/2023	3	DL	1255	1420	2	3	W	2	7	2	2	0	0
12/02/2023	4	DL	1100	1400	1	5	S	0	8	2	2	0	0
12/02/2023	4	DL	1100	1400	2	5	S	0	8	2	2	0	0
12/02/2023	4	DL	1100	1400	3	5	S	0	8	2	2	0	0
13/02/2023	4	DL	1455	1810	1	5	S	0	7	2	2	0	0
13/02/2023	4	DL	1455	1810	2	4	S	0	5	2	2	0	0
13/02/2023	4	DL	1455	1810	3	3	S	0	4	2	2	0	0
13/02/2023	4	DL	1455	1810	4	3	S	0	4	2	2	0	0
20/02/2023	4	RR	0940	1615	1	5	SW	0	5	2	2	0	0
20/02/2023	4	RR	0940	1615	2	6	W	0	4	2	2	0	0
20/02/2023	4	RR	0940	1615	3	6	W	0	4	2	2	0	0
20/02/2023	4	RR	0940	1615	4	6	W	0	7	2	2	0	0
20/02/2023	4	RR	0940	1615	5	5	W	0	6	2	2	0	0
20/02/2023	4	RR	0940	1615	6	4	W	0	3	2	2	0	0
20/02/2023	4	RR	0940	1615	7	4	W	0	3	2	2	0	0
27/02/2023	4	RR	0910	1510	1	2	NE	0	5	2	2	0	0
27/02/2023	4	RR	0910	1510	2	3	NE	0	7	2	2	0	0
27/02/2023	4	RR	0910	1510	3	3	E	0	4	2	2	0	0
27/02/2023	4	RR	0910	1510	4	2	E	0	4	2	2	0	0
27/02/2023	4	RR	0910	1510	5	2	E	0	3	2	2	0	0
27/02/2023	4	RR	0910	1510	6	2	E	0	4	2	2	0	0

C.4 Scarce Breeding Bird Surveys

Scarce breeding bird surveys were undertaken during the 2022 breeding season. **Table C-6** details survey dates and weather data recorded. Refer to **Annex B** for survey methodology and **Annex D** for survey results.

Table C-6 Meteorological conditions during scarce breeding bird surveys at Uisenis Wind Farm (sorted chronologically)

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
18/04/2022	1	MM	0830	1130	1	4	SE	0	8	2	2	0	0
18/04/2022	1	MM	0830	1130	2	5	SE	1	8	2	2	0	0
18/04/2022	1	MM	0830	1130	3	5	SE	2	6	2	2	0	0
18/04/2022	1	CT	0845	1145	1	3	SW	0	5	2	2	0	0
18/04/2022	1	CT	0845	1145	2	4	SW	0	6	2	2	0	0
18/04/2022	1	CT	0845	1145	3	3	SW	0	6	2	2	0	0
19/04/2022	1	CT	0830	1130	1	2	SW	0	6	2	2	0	0
19/04/2022	1	CT	0830	1130	2	2	SW	1	6	2	2	0	0
19/04/2022	1	CT	0830	1130	3	2	SW	0	8	2	2	0	0
19/04/2022	1	MM	1230	1530	1	2	NW	0	7	2	2	0	0
19/04/2022	1	MM	1230	1530	2	2	W	0	6	2	2	0	0
19/04/2022	1	MM	1230	1530	3	2	W	0	8	2	2	0	0
20/04/2022	1	MM	0800	1100	1	2	SW	0	8	2	2	0	0
20/04/2022	1	MM	0800	1100	2	2	SW	0	7	2	2	0	0
20/04/2022	1	MM	0800	1100	3	2	S	0	6	2	2	0	0
20/04/2022	1	CT	0810	1110	1	3	SW	0	4	2	2	0	0

Date	Survey visit	Observer	Survey start time	Survey finish time	Survey hour	Wind speed	Wind direction	Rain	Cloud cover	Cloud height	Visibility	Frost	Snow
20/04/2022	1	CT	0810	1110	2	1	SW	0	2	2	2	0	0
20/04/2022	1	CT	0810	1110	3	3	SW	0	2	2	2	0	0
04/05/2022	2	RM	1035	1235	1	4	W	0	7	2	2	0	0
04/05/2022	2	RM	1035	1235	2	4	W	0	7	2	2	0	0
04/05/2022	2	RM	1535	1735	1	5	WSW	0	7	2	2	0	0
04/05/2022	2	RM	1535	1735	2	4	WSW	0	7	2	2	0	0
09/05/2022	2	RM	1130	1530	1	4	S	4	8	2	2	0	0
09/05/2022	2	RM	1130	1530	2	4	SSW	4	8	2	2	0	0
09/05/2022	2	RM	1130	1530	3	4	SSW	4	8	2	2	0	0
09/05/2022	2	RM	1130	1530	4	4	SSW	4	8	2	2	0	0
11/05/2022	2	RM	0830	1530	1	3	W	2	7	2	2	0	0
11/05/2022	2	RM	0830	1530	2	3	W	0	6	2	2	0	0
11/05/2022	2	RM	0830	1530	3	3	W	0	5	2	2	0	0
11/05/2022	2	RM	0830	1530	4	3	WNW	0	4	2	2	0	0
11/05/2022	2	RM	0830	1530	5	3	WNW	0	5	2	2	0	0
11/05/2022	2	RM	0830	1530	6	3	WNW	0	5	2	2	0	0
11/05/2022	2	RM	0830	1530	7	3	WNW	0	4	2	2	0	0
16/05/2022	2	RM	0830	0900	1	3	NE	0	0	2	2	0	0
16/05/2022	2	RM	1200	1430	1	3	ESE	2	8	2	2	0	0
16/05/2022	2	RM	1200	1430	2	4	E	2	8	2	2	0	0
02/06/2022	3	CT	1130	1430	1	4	S	0	3	2	2	0	0
02/06/2022	3	CT	1130	1430	2	3	SW	0	3	2	2	0	0
02/06/2022	3	CT	1130	1430	3	3	SW	0	3	2	2	0	0
02/06/2022	3	MM	1200	1500	1	2	NE	0	1	2	2	0	0
02/06/2022	3	MM	1200	1500	2	1	NE	0	1	2	2	0	0
02/06/2022	3	MM	1200	1500	3	1	NE	0	2	2	2	0	0
03/06/2022	3	CT	1200	1500	1	2	N	0	4	1	1	0	0
03/06/2022	3	CT	1200	1500	2	2	NE	0	5	2	2	0	0
03/06/2022	3	CT	1200	1500	3	1	NE	0	4	2	2	0	0
08/06/2022	3	MM	1200	1800	1	4	NE	0	6	2	2	0	0
08/06/2022	3	MM	1200	1800	2	4	NE	0	6	2	2	0	0
08/06/2022	3	MM	1200	1800	3	3	NE	0	6	2	2	0	0
08/06/2022	3	MM	1200	1800	4	3	NE	0	6	2	2	0	0
08/06/2022	3	MM	1200	1800	5	3	NE	0	8	2	2	0	0
08/06/2022	3	MM	1200	1800	6	3	NE	0	6	2	2	0	0
08/06/2022	3	CT	1810	2110	1	2	NE	0	3	2	2	0	0
08/06/2022	3	CT	1810	2110	2	2	NE	0	3	2	2	0	0
08/06/2022	3	CT	1810	2110	3	2	NE	1	4	2	2	0	0
06/07/2022	4	DS	1000	1600	1	5	W	2	8	2	1	0	0
06/07/2022	4	DS	1000	1600	2	5	W	2	8	2	1	0	0
06/07/2022	4	DS	1000	1600	3	5	W	2	8	2	1	0	0
06/07/2022	4	DS	1000	1600	4	5	W	2	8	2	1	0	0
06/07/2022	4	DS	1000	1600	5	5	W	2	8	2	1	0	0
06/07/2022	4	DS	1000	1600	6	5	W	2	8	2	1	0	0
11/07/2022	4	DS	0930	1530	1	4	S	0	8	1	2	0	0
11/07/2022	4	DS	0930	1530	2	4	S	0	8	1	2	0	0
11/07/2022	4	DS	0930	1530	3	4	S	0	8	1	2	0	0
11/07/2022	4	DS	0930	1530	4	4	S	0	8	1	2	0	0
11/07/2022	4	DS	0930	1530	5	4	S	0	8	1	2	0	0
11/07/2022	4	DS	0930	1530	6	4	S	0	8	1	2	0	0

ANNEX D. ORNITHOLOGICAL SURVEY RESULTS

D.1 Flight Activity Records: Target Species

In accordance with NatureScot guidance (SNH 2017), target species are those which may be considered to be at risk from the potential effects of wind farms. All flights of target species within the turbine area and the surrounding area were mapped and are detailed in **Table D-1** and

Table D-2.

Table D-1 Details of target species recorded during flight activity surveys (sorted by species) – north array CRAA seconds

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20m	21-40m	41-100m	101150m	151-200m	>201m	0-20m	21-40m	41-100m	101150m	151-200m	>201m
06/06/2022	1	MM	0746	Curlew	1	46	6.51	3.15	0.00	0.00	0.00	0.00	24.49	11.85	0.00	0.00	0.00	0.00
08/06/2022	2	CT	1758	Dunlin	2	35	35.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25/03/2022	4	AB	1110	Golden eagle	1	100	0.00	0.00	27.76	0.00	0.00	0.00	0.00	0.00	72.24	0.00	0.00	0.00
25/03/2022	4	AB	1140	Golden eagle	1	420	11.67	23.34	81.69	46.68	0.00	0.00	18.33	36.66	128.31	73.32	0.00	0.00
25/03/2022	4	AB	1156	Golden eagle	2	60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	0.00	0.00	0.00
25/03/2022	4	AB	1227	Golden eagle	1	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	60.00	0.00	0.00	0.00
25/03/2022	4	AB	1227	Golden eagle	1	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.00	0.00
26/03/2022	2	AB	0631	Golden eagle	1	130	4.92	7.38	51.66	0.00	0.00	0.00	5.08	7.62	53.34	0.00	0.00	0.00
26/03/2022	3	AB	1459	Golden eagle	1	540	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	135.00	375.00	0.00	0.00
27/03/2022	1	AB	1240	Golden eagle	1	90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	0.00	0.00
15/04/2022	4	MM	1621	Golden eagle	1	216	0.00	0.00	0.00	0.00	0.00	0.00	81.00	105.00	30.00	0.00	0.00	0.00
15/04/2022	4	MM	1627	Golden eagle	2	165	0.00	0.00	0.00	0.00	0.00	0.00	120.00	45.00	0.00	0.00	0.00	0.00
15/04/2022	4	MM	1635	Golden eagle	1	516	0.00	0.00	0.00	0.00	0.00	0.00	291.00	120.00	105.00	0.00	0.00	0.00
16/04/2022	4	MM	1120	Golden eagle	2	240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	135.00	105.00	0.00	0.00	0.00
19/04/2022	5	CT	1329	Golden eagle	1	161	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	101.00	0.00	0.00	0.00
19/04/2022	5	CT	1352	Golden eagle	2	112	0.00	0.00	0.00	0.00	0.00	0.00	67.00	45.00	0.00	0.00	0.00	0.00
19/04/2022	5	CT	1357	Golden eagle	1	192	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	102.00	0.00	0.00	0.00
19/04/2022	5	CT	1701	Golden eagle	1	203	0.00	0.00	0.00	0.00	0.00	0.00	0.00	105.00	98.00	0.00	0.00	0.00
04/05/2022	5	RM	1444	Golden eagle	1	32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00	0.00	0.00	0.00	0.00
07/05/2022	4	RM	1239	Golden eagle	1	594	0.00	5.80	6.77	1.93	23.79	0.00	0.00	84.20	98.23	28.07	345.21	0.00
10/05/2022	3	RM	1124	Golden eagle	1	57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	57.00	0.00
10/05/2022	3	RM	1124	Golden eagle	1	242	0.00	0.00	0.00	0.00	6.81	0.00	0.00	0.00	0.00	0.00	235.19	0.00
10/05/2022	3	RM	1209	Golden eagle	1	34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.00	0.00
10/05/2022	3	RM	1209	Golden eagle	1	62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.00	0.00
10/05/2022	3	RM	1541	Golden eagle	1	21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.00	0.00	0.00	0.00
14/05/2022	2	RM	1259	Golden eagle	1	81	0.00	9.35	3.12	4.37	0.00	0.00	0.00	35.65	11.88	16.63	0.00	0.00
18/05/2022	1	RM	1051	Golden eagle	1	176	0.00	7.15	1.47	0.00	0.00	0.00	0.00	138.85	28.53	0.00	0.00	0.00
02/06/2022	4	CT	1506	Golden eagle	1	127	0.00	0.00	0.00	0.00	0.00	0.00	90.00	37.00	0.00	0.00	0.00	0.00
02/06/2022	4	CT	2002	Golden eagle	1	161	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	71.00	0.00	0.00	0.00
06/06/2022	5	CT	1017	Golden eagle	1	148	0.00	0.00	0.00	0.00	0.00	0.00	15.00	90.00	43.00	0.00	0.00	0.00
05/07/2022	2	DS	1200	Golden eagle	2	410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.00	335.00	0.00
05/07/2022	2	DS	1240	Golden eagle	1	72	0.00	0.00	0.00	5.36	0.00	0.00	0.00	0.00	0.00	66.64	0.00	0.00
08/07/2022	5	DS	1155	Golden eagle	1	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	36.00	0.00	0.00
08/07/2022	5	DS	1205	Golden eagle	1	540	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	360.00	180.00	0.00
08/07/2022	5	DS	1225	Golden eagle	2	240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	180.00	60.00	0.00
08/07/2022	5	DS	1325	Golden eagle	1	315	0.00	0.00	0.00	0.00	0.00	0.00	60.00	75.00	180.00	0.00	0.00	0.00
08/07/2022	5	DS	1425	Golden eagle	1	125	0.00	0.00	0.00	0.00	0.00	0.00	65.00	30.00	30.00	0.00	0.00	0.00
08/07/2022	5	DS	1625	Golden eagle	1	175	0.00	0.00	0.00	0.00	0.00	0.00	85.00	60.00	30.00	0.00	0.00	0.00
08/07/2022	5	DS	1630	Golden eagle	2	235	0.00	0.00	0.00	0.00	0.00	0.00	160.00	15.00	60.00	0.00	0.00	0.00
14/07/2022	3	DS	1630	Golden eagle	1	30	0.00	0.00	0.00	0.00	0.00	0.00	15.00	15.00	0.00	0.00	0.00	0.00
20/07/2022	4	DS	1400	Golden eagle	1	84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	84.00	0.00	0.00
20/07/2022	4	DS	1555	Golden eagle	1	310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	165.00	145.00	0.00
04/08/2022	1	PS	1702	Golden eagle	1	146	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	146.00	0.00	0.00	0.00
05/08/2022	5	PS	1539	Golden eagle	1	68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	68.00	0.00	0.00	0.00	0.00
08/08/2022	3	PS	1308	Golden eagle	1	79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	79.00	0.00	0.00	0.00
08/08/2022	3	PS	1614	Golden eagle	1	35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00
15/09/2022	2	AW	0922	Golden eagle	1	47	47.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16/09/2022	2	AW	0917	Golden eagle	1	83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	83.00	0.00	0.00	0.00

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20m	21-40m	41-100m	101150m	151-200m	>201m	0-20m	21-40m	41-100m	101150m	151-200m	>201m
16/09/2022	4	AW	1217	Golden eagle	1	72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.00	30.00	0.00	0.00
19/10/2022	2	AW	0844	Golden eagle	2	346	40.82	20.41	20.41	71.43	82.32	0.00	19.18	9.59	9.59	33.57	38.68	0.00
19/10/2022	2	AW	0942	Golden eagle	1	489	0.00	9.73	19.46	77.85	210.19	0.00	0.00	5.27	10.54	42.15	113.81	0.00
16/11/2022	1	AW	1217	Golden eagle	2	172	0.00	0.00	95.58	51.20	0.00	0.00	0.00	0.00	16.42	8.80	0.00	0.00
23/11/2022	3	DL	1141	Golden eagle	1	39	0.00	0.00	0.00	17.53	0.00	0.00	0.00	0.00	0.00	21.47	0.00	0.00
24/11/2022	5	DL	1354	Golden eagle	1	71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	71.00	0.00	0.00
24/11/2022	5	DL	1359	Golden eagle	1	85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85.00	0.00
24/11/2022	5	DL	1547	Golden eagle	1	48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	18.00	0.00
25/11/2022	5	DL	0901	Golden eagle	1	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00	20.00	0.00
25/11/2022	5	DL	1026	Golden eagle	1	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.00	45.00	15.00	0.00	0.00
19/12/2022	3	DS	1055	Golden eagle	1	235	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.00	165.00	0.00	0.00	0.00
19/12/2022	3	DS	1135	Golden eagle	3	195	0.00	17.37	95.54	0.00	0.00	0.00	0.00	12.63	69.46	0.00	0.00	0.00
19/12/2022	3	DS	1150	Golden eagle	1	152	0.00	0.00	23.30	10.43	0.00	0.00	0.00	0.00	81.70	36.57	0.00	0.00
19/12/2022	3	DS	1154	Golden eagle	2	310	0.00	6.42	59.91	0.00	0.00	0.00	0.00	23.58	220.09	0.00	0.00	0.00
19/12/2022	3	DS	1228	Golden eagle	1	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.00	15.00	0.00	0.00	0.00
19/12/2022	3	DS	1310	Golden eagle	2	512	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	240.00	212.00	0.00	0.00
19/12/2022	3	DS	1425	Golden eagle	1	40	0.00	0.00	16.84	0.00	0.00	0.00	0.00	0.00	23.16	0.00	0.00	0.00
19/12/2022	5	BJ	1049	Golden eagle	2	195	0.00	0.00	0.00	0.00	0.00	0.00	15.00	60.00	120.00	0.00	0.00	0.00
29/01/2023	3	DL	1407	Golden eagle	1	68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.00	45.00	0.00
30/01/2023	3	DL	0849	Golden eagle	1	128	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	45.00	75.00	0.00
12/02/2023	5	DL	1457	Golden eagle	1	31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	30.00	0.00	0.00	0.00
13/02/2023	3	DL	0811	Golden eagle	2	167	0.00	0.00	85.77	0.00	0.00	0.00	0.00	0.00	81.23	0.00	0.00	0.00
13/02/2023	3	DL	1015	Golden eagle	2	245	0.00	22.76	128.98	34.14	0.00	0.00	0.00	7.24	41.02	10.86	0.00	0.00
13/02/2023	3	DL	1034	Golden eagle	1	159	0.00	1.39	4.99	2.77	2.77	2.77	0.00	13.61	49.01	27.23	27.23	27.23
13/02/2023	3	DL	1048	Golden eagle	2	204	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	204.00
13/02/2023	3	DL	1148	Golden eagle	1	51	0.00	35.86	4.78	0.00	0.00	0.00	0.00	9.14	1.22	0.00	0.00	0.00
13/02/2023	3	DL	1315	Golden eagle	2	352	0.00	0.00	142.73	0.00	0.00	0.00	0.00	0.00	209.27	0.00	0.00	0.00
13/02/2023	3	DL	1347	Golden eagle	2	129	0.00	0.00	29.18	19.46	0.00	35.02	0.00	0.00	15.82	10.54	0.00	18.98
25/02/2023	2	AW	1147	Golden eagle	2	109	0.00	59.94	0.00	0.00	0.00	0.00	0.00	49.06	0.00	0.00	0.00	0.00
25/02/2023	2	AW	1206	Golden eagle	1	68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.00	45.00	0.00	0.00	0.00
26/03/2022	2	AB	0755	Golden plover	4	190	21.40	51.35	89.86	0.00	0.00	0.00	3.60	8.65	15.14	0.00	0.00	0.00
26/03/2022	2	AB	0816	Golden plover	3	70	0.00	52.76	14.39	0.00	0.00	0.00	0.00	2.24	0.61	0.00	0.00	0.00
26/03/2022	2	AB	0816	Golden plover	1	10	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26/03/2022	2	AB	0828	Golden plover	2	15	0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26/03/2022	3	AB	1534	Golden plover	1	60	5.17	10.34	5.17	0.00	0.00	0.00	9.83	19.66	9.83	0.00	0.00	0.00
27/03/2022	1	AB	0817	Golden plover	1	20	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27/03/2022	1	AB	0834	Golden plover	3	45	41.34	0.00	0.00	0.00	0.00	0.00	3.66	0.00	0.00	0.00	0.00	0.00
04/05/2022	5	RM	1306	Golden plover	1	10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00
04/05/2022	5	RM	1411	Golden plover	1	12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00	0.00	0.00	0.00	0.00
04/05/2022	5	RM	1446	Golden plover	1	341	0.00	0.00	0.00	0.00	0.00	0.00	341.00	0.00	0.00	0.00	0.00	0.00
06/05/2022	2	RM	0902	Golden plover	1	9	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07/05/2022	4	RM	0912	Golden plover	1	4	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00
06/06/2022	1	MM	0923	Golden plover	1	10	6.17	0.00	0.00	0.00	0.00	0.00	3.83	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	CT	1507	Golden plover	1	32	32.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	MM	1902	Golden plover	1	10	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	MM	1948	Golden plover	1	12	10.88	0.00	0.00	0.00	0.00	0.00	1.12	0.00	0.00	0.00	0.00	0.00
01/07/2022	1	DS	1022	Golden plover	1	7	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
01/07/2022	1	DS	1118	Golden plover	1	11	11.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
05/07/2022	2	DS	1003	Golden plover	2	6	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04/08/2022	1	PS	1649	Golden plover	1	18	13.22	0.00	0.00	0.00	0.00	0.00	4.78	0.00	0.00	0.00	0.00	0.00
04/08/2022	2	JD	1551	Golden plover	1	75	60.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20m	21-40m	41-100m	101150m	151-200m	>201m	0-20m	21-40m	41-100m	101150m	151-200m	>201m
04/08/2022	2	JD	1559	Golden plover	1	45	45.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04/08/2022	2	JD	1604	Golden plover	2	60	30.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04/08/2022	2	JD	1640	Golden plover	2	90	45.00	45.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08/08/2022	3	PS	1115	Golden plover	1	21	11.24	0.00	0.00	0.00	0.00	0.00	9.76	0.00	0.00	0.00	0.00	0.00
24/02/2023	1	AW	1306	Golden plover	2	13	13.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15/04/2022	4	MM	1507	Greenshank	1	36	0.00	0.00	0.00	0.00	0.00	0.00	36.00	0.00	0.00	0.00	0.00	0.00
18/04/2022	3	CT	1217	Greenshank	1	78	0.00	0.00	0.00	0.00	0.00	0.00	78.00	0.00	0.00	0.00	0.00	0.00
19/04/2022	3	MM	1158	Greenshank	3	67	0.00	0.00	0.00	0.00	0.00	0.00	15.00	22.00	30.00	0.00	0.00	0.00
05/05/2022	1	RM	1003	Greenshank	2	49	0.00	17.19	0.00	0.00	0.00	0.00	0.00	31.81	0.00	0.00	0.00	0.00
06/05/2022	2	RM	0731	Greenshank	1	12	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14/05/2022	2	RM	1230	Greenshank	1	3	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18/05/2022	1	RM	1021	Greenshank	1	38	2.93	2.93	1.56	0.00	0.00	0.00	12.07	12.07	6.44	0.00	0.00	0.00
06/06/2022	1	MM	0536	Greenshank	1	32	32.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/06/2022	5	CT	0652	Greenshank	2	83	0.00	0.00	0.00	0.00	0.00	0.00	83.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	CT	1502	Greenshank	2	77	77.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	CT	1528	Greenshank	1	61	40.09	0.00	0.00	0.00	0.00	0.00	20.91	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	CT	1650	Greenshank	1	122	22.64	0.00	0.00	0.00	0.00	0.00	99.36	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	MM	1842	Greenshank	1	15	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04/08/2022	1	PS	1618	Greenshank	1	34	20.74	0.00	0.00	0.00	0.00	0.00	13.26	0.00	0.00	0.00	0.00	0.00
04/08/2022	2	JD	1612	Greenshank	1	44	14.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26/03/2022	3	AB	1050	Greylag goose	55	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.00	0.00
26/03/2022	3	AB	1527	Hen harrier	1	150	117.98	0.00	0.00	0.00	0.00	0.00	32.02	0.00	0.00	0.00	0.00	0.00
26/03/2022	3	AB	1534	Hen harrier	1	30	6.23	0.00	0.00	0.00	0.00	0.00	23.77	0.00	0.00	0.00	0.00	0.00
08/08/2022	3	PS	1521	Hen harrier	1	37	7.40	0.00	0.00	0.00	0.00	0.00	29.60	0.00	0.00	0.00	0.00	0.00
19/10/2022	1	AW	1147	Hen harrier	1	88	57.04	0.00	0.00	0.00	0.00	0.00	30.96	0.00	0.00	0.00	0.00	0.00
19/10/2022	1	AW	1537	Hen harrier	1	87	87.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28/01/2023	5	DL	1204	Hen harrier	1	17	0.00	0.00	0.00	0.00	0.00	0.00	17.00	0.00	0.00	0.00	0.00	0.00
07/05/2022	4	RM	1050	Herring gull	1	51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51.00	0.00	0.00	0.00
07/05/2022	4	RM	1453	Herring gull	1	73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	73.00	0.00	0.00	0.00	0.00
01/07/2022	1	DS	1405	Herring gull	2	144	0.00	74.13	52.95	0.00	0.00	0.00	0.00	9.87	7.05	0.00	0.00	0.00
08/07/2022	5	DS	1600	Herring gull	1	170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	110.00	0.00	0.00	0.00
05/08/2022	5	PS	1647	Herring gull	2	57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	57.00	0.00	0.00	0.00	0.00
16/04/2022	4	MM	1135	Merlin	1	38	0.00	0.00	0.00	0.00	0.00	0.00	38.00	0.00	0.00	0.00	0.00	0.00
02/06/2022	4	CT	1507	Merlin	1	68	0.00	0.00	0.00	0.00	0.00	0.00	68.00	0.00	0.00	0.00	0.00	0.00
05/08/2022	4	JD	1431	Merlin	1	73	0.00	0.00	0.00	0.00	0.00	0.00	43.00	30.00	0.00	0.00	0.00	0.00
05/08/2022	4	JD	1754	Merlin	1	42	0.00	0.00	0.00	0.00	0.00	0.00	42.00	0.00	0.00	0.00	0.00	0.00
13/09/2022	1	AW	1417	Merlin	1	31	29.67	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.00
19/10/2022	2	AW	0849	Merlin	1	102	0.00	0.00	0.00	0.00	102.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20/10/2022	2	AW	1516	Merlin	1	44	44.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/12/2022	2	AW	1342	Merlin	1	33	33.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24/02/2023	1	AW	1306	Merlin	1	61	61.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14/07/2022	3	DS	1155	Peregrine falcon	1	73	0.00	0.00	8.51	0.00	0.00	0.00	0.00	0.00	64.49	0.00	0.00	0.00
06/06/2022	1	MM	0755	Red-throated diver	1	15	15.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/06/2022	5	CT	0658	Red-throated diver	1	97	0.00	0.00	0.00	0.00	0.00	0.00	30.00	67.00	0.00	0.00	0.00	0.00
06/06/2022	5	CT	0737	Red-throated diver	1	101	0.00	0.00	0.00	0.00	0.00	0.00	45.00	56.00	0.00	0.00	0.00	0.00
06/06/2022	5	CT	0809	Red-throated diver	2	47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.00	0.00	0.00	0.00	0.00
06/06/2022	5	CT	1056	Red-throated diver	2	56	0.00	0.00	0.00	0.00	0.00	0.00	56.00	0.00	0.00	0.00	0.00	0.00
01/07/2022	1	DS	1255	Red-throated diver	1	95	0.00	0.00	49.50	0.00	0.00	0.00	0.00	0.00	45.50	0.00	0.00	0.00
20/07/2022	4	DS	1635	Red-throated diver	1	35	0.00	0.00	0.00	0.00	0.00	0.00	5.00	30.00	0.00	0.00	0.00	0.00
05/08/2022	4	JD	1302	Red-throated diver	1	85	0.00	0.00	13.90	7.58	0.00	0.00	0.00	0.00	41.10	22.42	0.00	0.00
05/08/2022	4	JD	1646	Red-throated diver	1	82	0.00	1.99	17.06	4.26	0.00	0.00	0.00	5.01	42.94	10.74	0.00	0.00

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20m	21-40m	41-100m	101150m	151-200m	>201m	0-20m	21-40m	41-100m	101150m	151-200m	>201m
05/08/2022	5	PS	1356	Red-throated diver	2	51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51.00	0.00	0.00	0.00	0.00
05/08/2022	5	PS	1749	Red-throated diver	1	53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00	0.00
05/08/2022	5	PS	1854	Red-throated diver	1	65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.00	0.00	0.00	0.00
25/03/2022	4	AB	0725	White-tailed eagle	2	230	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	185.00	45.00	0.00	0.00
27/03/2022	1	AB	0712	White-tailed eagle	1	75	27.42	0.00	0.00	0.00	0.00	0.00	47.58	0.00	0.00	0.00	0.00	0.00
27/03/2022	1	AB	0840	White-tailed eagle	2	75	5.81	23.24	0.00	0.00	0.00	0.00	9.19	36.76	0.00	0.00	0.00	0.00
27/03/2022	1	AB	1034	White-tailed eagle	3	15	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00
27/03/2022	1	AB	1044	White-tailed eagle	1	180	66.17	0.00	0.00	0.00	0.00	0.00	113.83	0.00	0.00	0.00	0.00	0.00
27/03/2022	1	AB	1129	White-tailed eagle	2	30	0.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00	0.00	0.00
15/04/2022	2	CT	1603	White-tailed eagle	1	182	0.00	0.00	0.00	0.00	0.00	0.00	0.00	77.00	105.00	0.00	0.00	0.00
15/04/2022	4	MM	1557	White-tailed eagle	1	667	0.00	0.00	0.00	0.00	0.00	0.00	262.00	180.00	225.00	0.00	0.00	0.00
15/04/2022	4	MM	1624	White-tailed eagle	1	156	0.00	0.00	0.00	0.00	0.00	0.00	60.00	96.00	0.00	0.00	0.00	0.00
15/04/2022	4	MM	1630	White-tailed eagle	1	98	0.00	0.00	0.00	0.00	0.00	0.00	38.00	60.00	0.00	0.00	0.00	0.00
16/04/2022	4	MM	1132	White-tailed eagle	2	540	0.00	0.00	0.00	0.00	0.00	0.00	105.00	255.00	180.00	0.00	0.00	0.00
16/04/2022	4	MM	1134	White-tailed eagle	1	118	0.00	0.00	0.00	0.00	0.00	0.00	28.00	45.00	45.00	0.00	0.00	0.00
16/04/2022	4	MM	1223	White-tailed eagle	2	336	0.00	0.00	78.42	22.54	0.00	0.00	0.00	0.00	182.58	52.46	0.00	0.00
19/04/2022	5	CT	1227	White-tailed eagle	1	23	0.00	0.00	0.00	0.00	0.00	0.00	23.00	0.00	0.00	0.00	0.00	0.00
19/04/2022	5	CT	1233	White-tailed eagle	1	9	0.00	0.00	0.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00	0.00	0.00
19/04/2022	5	CT	1241	White-tailed eagle	1	13	0.00	0.00	0.00	0.00	0.00	0.00	13.00	0.00	0.00	0.00	0.00	0.00
19/04/2022	5	CT	1317	White-tailed eagle	1	143	0.00	0.00	0.00	0.00	0.00	0.00	15.00	128.00	0.00	0.00	0.00	0.00
19/04/2022	5	CT	1506	White-tailed eagle	2	422	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.00	302.00	0.00	0.00	0.00
04/05/2022	5	RM	1436	White-tailed eagle	1	549	0.00	0.00	0.00	0.00	0.00	0.00	0.00	504.00	45.00	0.00	0.00	0.00
05/05/2022	1	RM	0936	White-tailed eagle	2	192	0.00	0.00	62.55	0.00	0.00	0.00	0.00	0.00	129.45	0.00	0.00	0.00
06/05/2022	2	RM	0822	White-tailed eagle	1	232	0.00	0.21	0.21	0.08	0.15	0.00	0.00	74.79	74.79	29.92	51.85	0.00
06/05/2022	2	RM	0854	White-tailed eagle	1	13	13.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/05/2022	2	RM	0912	White-tailed eagle	1	54	13.50	13.50	13.50	8.10	0.00	0.00	1.50	1.50	1.50	0.90	0.00	0.00
06/05/2022	2	RM	0954	White-tailed eagle	1	151	0.00	103.55	0.00	0.00	0.00	0.00	0.00	47.45	0.00	0.00	0.00	0.00
07/05/2022	4	RM	1239	White-tailed eagle	2	346	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	45.00	45.00	211.00	0.00
07/05/2022	4	RM	1249	White-tailed eagle	1	61	0.00	0.00	0.00	0.00	0.00	0.00	61.00	0.00	0.00	0.00	0.00	0.00
07/05/2022	4	RM	1304	White-tailed eagle	1	218	0.00	0.00	0.00	37.27	0.00	0.00	0.00	0.00	0.00	180.73	0.00	0.00
07/05/2022	4	RM	1309	White-tailed eagle	1	167	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	45.00	60.00	2.00	0.00
10/05/2022	3	RM	1215	White-tailed eagle	1	21	0.00	0.00	0.00	0.00	2.53	0.00	0.00	0.00	0.00	0.00	18.47	0.00
10/05/2022	3	RM	1402	White-tailed eagle	1	131	0.00	19.85	14.89	8.60	0.00	0.00	0.00	40.15	30.11	17.40	0.00	0.00
10/05/2022	3	RM	1432	White-tailed eagle	1	96	0.00	0.00	8.91	5.35	0.00	0.00	0.00	0.00	51.09	30.65	0.00	0.00
18/05/2022	1	RM	0944	White-tailed eagle	1	63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	63.00	0.00	0.00	0.00	0.00
18/05/2022	1	RM	0948	White-tailed eagle	1	67	0.00	3.05	0.00	0.00	0.00	0.00	0.00	63.95	0.00	0.00	0.00	0.00
18/05/2022	1	RM	1041	White-tailed eagle	2	119	0.00	45.00	15.17	0.00	0.00	0.00	0.00	44.00	14.83	0.00	0.00	0.00
18/05/2022	1	RM	1155	White-tailed eagle	1	17	0.00	0.00	0.00	0.00	0.00	0.00	2.00	15.00	0.00	0.00	0.00	0.00
19/05/2022	5	RM	1002	White-tailed eagle	1	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.00	0.00	0.00	0.00	0.00
19/05/2022	5	RM	1012	White-tailed eagle	2	58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	58.00	0.00
02/06/2022	3	MM	1844	White-tailed eagle	1	210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	105.00	105.00	0.00	0.00	0.00
02/06/2022	3	MM	1844	White-tailed eagle	1	210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	105.00	105.00	0.00	0.00	0.00
02/06/2022	4	CT	1454	White-tailed eagle	1	88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	88.00	0.00	0.00	0.00	0.00
06/06/2022	1	MM	1117	White-tailed eagle	1	244	0.00	5.68	17.43	0.00	0.00	0.00	0.00	54.32	166.57	0.00	0.00	0.00
06/06/2022	1	MM	1123	White-tailed eagle	2	141	0.00	0.00	0.00	0.00	0.00	0.00	96.00	45.00	0.00	0.00	0.00	0.00
06/06/2022	1	MM	1126	White-tailed eagle	4	270	0.00	7.26	18.15	39.93	0.00	0.00	0.00	22.74	56.85	125.07	0.00	0.00
08/07/2022	5	DS	1250	White-tailed eagle	1	440	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	440.00	0.00	0.00
08/07/2022	5	DS	1620	White-tailed eagle	1	240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	135.00	105.00	0.00
14/07/2022	3	DS	1000	White-tailed eagle	1	255	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	60.00	135.00
14/07/2022	3	DS	1045	White-tailed eagle	1	291	0.00	0.00	0.00	4.54	4.54	12.93	0.00	0.00	0.00	55.46	55.46	158.07
14/07/2022	3	DS	1055	White-tailed eagle	1	245	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	90.00	110.00	0.00

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20m	21-40m	41-100m	101150m	151-200m	>201m	0-20m	21-40m	41-100m	101150m	151-200m	>201m
14/07/2022	3	DS	1630	White-tailed eagle	1	40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.00	0.00	0.00	0.00	0.00
14/07/2022	3	DS	1630	White-tailed eagle	1	214	0.00	0.00	105.19	44.88	0.00	0.00	0.00	0.00	44.81	19.12	0.00	0.00
14/07/2022	3	DS	1630	White-tailed eagle	1	45	0.00	0.00	28.06	0.00	0.00	0.00	0.00	0.00	16.94	0.00	0.00	0.00
05/08/2022	5	PS	1326	White-tailed eagle	1	43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.00	0.00	0.00	0.00	0.00
05/08/2022	5	PS	1337	White-tailed eagle	1	228	0.00	0.00	0.00	0.00	0.00	0.00	15.00	30.00	183.00	0.00	0.00	0.00
05/08/2022	5	PS	1723	White-tailed eagle	1	107	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	107.00	0.00	0.00	0.00
10/09/2022	5	DL	1106	White-tailed eagle	1	202	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	150.00	52.00	0.00
10/09/2022	5	DL	1334	White-tailed eagle	1	623	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	45.00	488.00	0.00
10/09/2022	5	DL	1344	White-tailed eagle	2	64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64.00	0.00
10/09/2022	5	DL	1351	White-tailed eagle	2	603	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	150.00	363.00	0.00
10/09/2022	5	DL	1439	White-tailed eagle	1	190	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	150.00	30.00	0.00	0.00
14/09/2022	3	AW	1103	White-tailed eagle	1	68	0.00	0.00	0.00	0.00	0.00	0.00	15.00	15.00	38.00	0.00	0.00	0.00
15/09/2022	2	AW	0817	White-tailed eagle	1	53	0.00	0.00	0.00	0.00	0.00	0.00	8.00	15.00	30.00	0.00	0.00	0.00
13/10/2022	3	DL	1341	White-tailed eagle	1	87	0.00	0.00	0.00	1.09	6.80	0.00	0.00	0.00	0.00	10.91	68.20	0.00
14/10/2022	5	DL	1248	White-tailed eagle	1	39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.00	0.00	0.00	0.00
23/11/2022	3	DL	1039	White-tailed eagle	1	21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.00	0.00	0.00	0.00
24/11/2022	5	DL	1356	White-tailed eagle	1	158	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	45.00	15.00	53.00
24/11/2022	5	DL	1358	White-tailed eagle	2	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	30.00	50.00
25/11/2022	5	DL	0856	White-tailed eagle	3	322	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	277.00	45.00	0.00	0.00
25/11/2022	5	DL	1204	White-tailed eagle	1	102	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.00
19/12/2022	3	DS	1040	White-tailed eagle	1	110	0.00	0.00	0.00	17.62	0.00	0.00	0.00	0.00	0.00	92.38	0.00	0.00
19/12/2022	3	DS	1225	White-tailed eagle	1	345	0.00	0.00	14.74	41.78	0.00	0.00	0.00	0.00	75.26	213.22	0.00	0.00
19/12/2022	5	BJ	1000	White-tailed eagle	1	411	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	411.00	0.00	0.00	0.00
23/01/2023	4	AW	1314	White-tailed eagle	1	88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.00	60.00	0.00	0.00	0.00
24/01/2023	2	AW	0918	White-tailed eagle	1	58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	58.00	0.00	0.00	0.00	0.00
24/01/2023	2	AW	1117	White-tailed eagle	1	64	0.00	0.00	63.77	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00
28/01/2023	5	DL	0837	White-tailed eagle	1	116	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	115.00	1.00	0.00	0.00
12/02/2023	5	DL	0821	White-tailed eagle	1	139	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.00	64.00	0.00	0.00	0.00
12/02/2023	5	DL	0946	White-tailed eagle	2	165	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	165.00	0.00
13/02/2023	3	DL	0811	White-tailed eagle	1	112	0.00	0.00	2.68	0.00	0.00	0.00	0.00	0.00	109.32	0.00	0.00	0.00
13/02/2023	3	DL	1049	White-tailed eagle	1	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.00
13/02/2023	3	DL	1102	White-tailed eagle	1	150	0.00	0.00	21.93	3.65	7.31	3.65	0.00	0.00	68.07	11.35	22.69	11.35
13/02/2023	3	DL	1406	White-tailed eagle	2	158	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.00	15.00	68.00
23/02/2023	4	AW	1007	White-tailed eagle	1	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	27.00	60.00	0.00	0.00	0.00
23/02/2023	4	AW	1031	White-tailed eagle	1	104	0.00	0.00	0.00	0.00	0.00	0.00	0.00	74.00	30.00	0.00	0.00	0.00

Table D-2 Details of target species recorded during flight activity surveys (sorted by species) – south array CRAA seconds

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20m	21-40m	41-100m	101150m	151-200m	>201m	0-20m	21-40m	41-100m	101150m	151-200m	>201m
06/06/2022	1	MM	0746	Curlew	1	46	0.00	0.00	0.00	0.00	0.00	0.00	31.00	15.00	0.00	0.00	0.00	0.00
08/06/2022	2	CT	1758	Dunlin	2	35	0.00	0.00	0.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00	0.00	0.00
25/03/2022	4	AB	1110	Golden eagle	1	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00
25/03/2022	4	AB	1140	Golden eagle	1	420	2.22	4.44	15.54	8.88	0.00	0.00	27.78	55.56	194.46	111.12	0.00	0.00
25/03/2022	4	AB	1156	Golden eagle	2	60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	0.00	0.00	0.00
25/03/2022	4	AB	1227	Golden eagle	1	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	60.00	0.00	0.00	0.00
25/03/2022	4	AB	1227	Golden eagle	1	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.00	0.00
26/03/2022	2	AB	0631	Golden eagle	1	130	0.00	0.00	0.00	0.00	0.00	0.00	10.00	15.00	105.00	0.00	0.00	0.00
26/03/2022	3	AB	1459	Golden eagle	1	540	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	135.00	375.00	0.00	0.00
27/03/2022	1	AB	1240	Golden eagle	1	90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	0.00	0.00
15/04/2022	4	MM	1621	Golden eagle	1	216	76.84	99.61	28.46	0.00	0.00	0.00	4.16	5.39	1.54	0.00	0.00	0.00
15/04/2022	4	MM	1627	Golden eagle	2	165	67.34	25.25	0.00	0.00	0.00	0.00	52.66	19.75	0.00	0.00	0.00	0.00
15/04/2022	4	MM	1635	Golden eagle	1	516	0.00	0.00	0.00	0.00	0.00	0.00	291.00	120.00	105.00	0.00	0.00	0.00
16/04/2022	4	MM	1120	Golden eagle	2	240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	135.00	105.00	0.00	0.00	0.00
19/04/2022	5	CT	1329	Golden eagle	1	161	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	101.00	0.00	0.00	0.00
19/04/2022	5	CT	1352	Golden eagle	2	112	0.00	0.00	0.00	0.00	0.00	0.00	67.00	45.00	0.00	0.00	0.00	0.00
19/04/2022	5	CT	1357	Golden eagle	1	192	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	102.00	0.00	0.00	0.00
19/04/2022	5	CT	1701	Golden eagle	1	203	0.00	79.85	74.52	0.00	0.00	0.00	0.00	25.15	23.48	0.00	0.00	0.00
04/05/2022	5	RM	1444	Golden eagle	1	32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	32.00	0.00	0.00	0.00	0.00
07/05/2022	4	RM	1239	Golden eagle	1	594	0.00	4.07	4.75	1.36	16.68	0.00	0.00	85.93	100.25	28.64	352.32	0.00
10/05/2022	3	RM	1124	Golden eagle	1	57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	57.00	0.00
10/05/2022	3	RM	1124	Golden eagle	1	242	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	242.00	0.00
10/05/2022	3	RM	1209	Golden eagle	1	34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.00	0.00
10/05/2022	3	RM	1209	Golden eagle	1	62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	62.00	0.00
10/05/2022	3	RM	1541	Golden eagle	1	21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.00	0.00	0.00	0.00
14/05/2022	2	RM	1259	Golden eagle	1	81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	15.00	21.00	0.00	0.00
18/05/2022	1	RM	1051	Golden eagle	1	176	0.00	0.00	0.00	0.00	0.00	0.00	0.00	146.00	30.00	0.00	0.00	0.00
02/06/2022	4	CT	1506	Golden eagle	1	127	90.00	37.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
02/06/2022	4	CT	2002	Golden eagle	1	161	0.00	90.00	71.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/06/2022	5	CT	1017	Golden eagle	1	148	0.00	0.00	0.00	0.00	0.00	0.00	15.00	90.00	43.00	0.00	0.00	0.00
05/07/2022	2	DS	1200	Golden eagle	2	410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.00	335.00	0.00
05/07/2022	2	DS	1240	Golden eagle	1	72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.00	0.00	0.00
08/07/2022	5	DS	1155	Golden eagle	1	96	0.00	0.00	39.35	23.61	0.00	0.00	0.00	0.00	20.65	12.39	0.00	0.00
08/07/2022	5	DS	1205	Golden eagle	1	540	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	360.00	180.00	0.00
08/07/2022	5	DS	1225	Golden eagle	2	240	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	180.00	60.00	0.00
08/07/2022	5	DS	1325	Golden eagle	1	315	36.18	45.23	108.55	0.00	0.00	0.00	23.82	29.77	71.45	0.00	0.00	0.00
08/07/2022	5	DS	1425	Golden eagle	1	125	23.40	10.80	10.80	0.00	0.00	0.00	41.60	19.20	19.20	0.00	0.00	0.00
08/07/2022	5	DS	1625	Golden eagle	1	175	0.00	0.00	0.00	0.00	0.00	0.00	85.00	60.00	30.00	0.00	0.00	0.00
08/07/2022	5	DS	1630	Golden eagle	2	235	25.16	2.36	9.43	0.00	0.00	0.00	134.84	12.64	50.57	0.00	0.00	0.00
14/07/2022	3	DS	1630	Golden eagle	1	30	0.00	0.00	0.00	0.00	0.00	0.00	15.00	15.00	0.00	0.00	0.00	0.00
20/07/2022	4	DS	1400	Golden eagle	1	84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	84.00	0.00	0.00
20/07/2022	4	DS	1555	Golden eagle	1	310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	165.00	145.00	0.00
04/08/2022	1	PS	1702	Golden eagle	1	146	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	146.00	0.00	0.00	0.00
05/08/2022	5	PS	1539	Golden eagle	1	68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	68.00	0.00	0.00	0.00	0.00
08/08/2022	3	PS	1308	Golden eagle	1	79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	79.00	0.00	0.00	0.00
08/08/2022	3	PS	1614	Golden eagle	1	35	0.00	0.00	35.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15/09/2022	2	AW	0922	Golden eagle	1	47	0.00	0.00	0.00	0.00	0.00	0.00	47.00	0.00	0.00	0.00	0.00	0.00
16/09/2022	2	AW	0917	Golden eagle	1	83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	83.00	0.00	0.00	0.00
16/09/2022	4	AW	1217	Golden eagle	1	72	0.00	0.00	25.20	18.00	0.00	0.00	0.00	0.00	16.80	12.00	0.00	0.00
19/10/2022	2	AW	0844	Golden eagle	2	346	0.00	0.00	0.00	0.00	0.00	0.00	60.00	30.00	30.00	105.00	121.00	0.00

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20m	21-40m	41-100m	101150m	151-200m	>201m	0-20m	21-40m	41-100m	101150m	151-200m	>201m
19/10/2022	2	AW	0942	Golden eagle	1	489	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	30.00	120.00	324.00	0.00
16/11/2022	1	AW	1217	Golden eagle	2	172	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	112.00	60.00	0.00	0.00
23/11/2022	3	DL	1141	Golden eagle	1	39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.00	0.00	0.00
24/11/2022	5	DL	1354	Golden eagle	1	71	0.00	0.00	0.00	24.48	0.00	0.00	0.00	0.00	0.00	46.52	0.00	0.00
24/11/2022	5	DL	1359	Golden eagle	1	85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85.00	0.00
24/11/2022	5	DL	1547	Golden eagle	1	48	0.00	0.00	0.00	17.59	10.55	0.00	0.00	0.00	0.00	12.41	7.45	0.00
25/11/2022	5	DL	0901	Golden eagle	1	50	0.00	0.00	19.93	0.00	13.28	0.00	0.00	0.00	10.07	0.00	6.72	0.00
25/11/2022	5	DL	1026	Golden eagle	1	96	0.00	8.52	10.65	3.55	0.00	0.00	0.00	27.48	34.35	11.45	0.00	0.00
19/12/2022	3	DS	1055	Golden eagle	1	235	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.00	165.00	0.00	0.00	0.00
19/12/2022	3	DS	1135	Golden eagle	3	195	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	165.00	0.00	0.00	0.00
19/12/2022	3	DS	1150	Golden eagle	1	152	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	105.00	47.00	0.00	0.00
19/12/2022	3	DS	1154	Golden eagle	2	310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	280.00	0.00	0.00	0.00
19/12/2022	3	DS	1228	Golden eagle	1	50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.00	15.00	0.00	0.00	0.00
19/12/2022	3	DS	1310	Golden eagle	2	512	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	240.00	212.00	0.00	0.00
19/12/2022	3	DS	1425	Golden eagle	1	40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.00	0.00	0.00	0.00
19/12/2022	5	BJ	1049	Golden eagle	2	195	0.46	1.86	3.72	0.00	0.00	0.00	14.54	58.14	116.28	0.00	0.00	0.00
29/01/2023	3	DL	1407	Golden eagle	1	68	0.00	0.00	0.00	9.06	17.74	0.00	0.00	0.00	0.00	13.94	27.26	0.00
30/01/2023	3	DL	0849	Golden eagle	1	128	0.00	0.00	2.40	13.47	22.46	0.00	0.00	0.00	5.60	31.53	52.54	0.00
12/02/2023	5	DL	1457	Golden eagle	1	31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	30.00	0.00	0.00	0.00
13/02/2023	3	DL	0811	Golden eagle	2	167	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	167.00	0.00	0.00	0.00
13/02/2023	3	DL	1015	Golden eagle	2	245	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	170.00	45.00	0.00	0.00
13/02/2023	3	DL	1034	Golden eagle	1	159	0.00	7.59	27.31	15.17	15.17	15.17	0.00	7.41	26.69	14.83	14.83	14.83
13/02/2023	3	DL	1048	Golden eagle	2	204	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	204.00
13/02/2023	3	DL	1148	Golden eagle	1	51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	6.00	0.00	0.00	0.00
13/02/2023	3	DL	1315	Golden eagle	2	352	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	352.00	0.00	0.00	0.00
13/02/2023	3	DL	1347	Golden eagle	2	129	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	30.00	0.00	54.00
25/02/2023	2	AW	1147	Golden eagle	2	109	0.00	0.00	0.00	0.00	0.00	0.00	0.00	109.00	0.00	0.00	0.00	0.00
25/02/2023	2	AW	1206	Golden eagle	1	68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.00	45.00	0.00	0.00	0.00
26/03/2022	2	AB	0755	Golden plover	4	190	0.00	0.00	0.00	0.00	0.00	0.00	25.00	60.00	105.00	0.00	0.00	0.00
26/03/2022	2	AB	0816	Golden plover	3	70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55.00	15.00	0.00	0.00	0.00
26/03/2022	2	AB	0816	Golden plover	1	10	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
26/03/2022	2	AB	0828	Golden plover	2	15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00
26/03/2022	3	AB	1534	Golden plover	1	60	0.00	0.00	0.00	0.00	0.00	0.00	15.00	30.00	15.00	0.00	0.00	0.00
27/03/2022	1	AB	0817	Golden plover	1	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00
27/03/2022	1	AB	0834	Golden plover	3	45	0.00	0.00	0.00	0.00	0.00	0.00	45.00	0.00	0.00	0.00	0.00	0.00
04/05/2022	5	RM	1306	Golden plover	1	10	0.00	9.57	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.00	0.00	0.00
04/05/2022	5	RM	1411	Golden plover	1	12	0.00	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
04/05/2022	5	RM	1446	Golden plover	1	341	341.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/05/2022	2	RM	0902	Golden plover	1	9	0.00	0.00	0.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00	0.00	0.00
07/05/2022	4	RM	0912	Golden plover	1	4	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/06/2022	1	MM	0923	Golden plover	1	10	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	CT	1507	Golden plover	1	32	0.00	0.00	0.00	0.00	0.00	0.00	32.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	MM	1902	Golden plover	1	10	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	MM	1948	Golden plover	1	12	0.00	0.00	0.00	0.00	0.00	0.00	12.00	0.00	0.00	0.00	0.00	0.00
01/07/2022	1	DS	1022	Golden plover	1	7	0.00	0.00	0.00	0.00	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00
01/07/2022	1	DS	1118	Golden plover	1	11	0.00	0.00	0.00	0.00	0.00	0.00	11.00	0.00	0.00	0.00	0.00	0.00
05/07/2022	2	DS	1003	Golden plover	2	6	0.00	0.00	0.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00
04/08/2022	1	PS	1649	Golden plover	1	18	0.00	0.00	0.00	0.00	0.00	0.00	18.00	0.00	0.00	0.00	0.00	0.00
04/08/2022	2	JD	1551	Golden plover	1	75	0.00	0.00	0.00	0.00	0.00	0.00	60.00	15.00	0.00	0.00	0.00	0.00
04/08/2022	2	JD	1559	Golden plover	1	45	0.00	0.00	0.00	0.00	0.00	0.00	45.00	0.00	0.00	0.00	0.00	0.00
04/08/2022	2	JD	1604	Golden plover	2	60	0.00	0.00	0.00	0.00	0.00	0.00	30.00	30.00	0.00	0.00	0.00	0.00

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20m	21-40m	41-100m	101150m	151-200m	>201m	0-20m	21-40m	41-100m	101150m	151-200m	>201m
04/08/2022	2	JD	1640	Golden plover	2	90	0.00	0.00	0.00	0.00	0.00	0.00	45.00	45.00	0.00	0.00	0.00	0.00
08/08/2022	3	PS	1115	Golden plover	1	21	0.00	0.00	0.00	0.00	0.00	0.00	21.00	0.00	0.00	0.00	0.00	0.00
24/02/2023	1	AW	1306	Golden plover	2	13	0.00	0.00	0.00	0.00	0.00	0.00	13.00	0.00	0.00	0.00	0.00	0.00
15/04/2022	4	MM	1507	Greenshank	1	36	30.19	0.00	0.00	0.00	0.00	0.00	5.81	0.00	0.00	0.00	0.00	0.00
18/04/2022	3	CT	1217	Greenshank	1	78	30.24	0.00	0.00	0.00	0.00	0.00	47.76	0.00	0.00	0.00	0.00	0.00
19/04/2022	3	MM	1158	Greenshank	3	67	0.00	0.00	0.00	0.00	0.00	0.00	15.00	22.00	30.00	0.00	0.00	0.00
05/05/2022	1	RM	1003	Greenshank	2	49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49.00	0.00	0.00	0.00	0.00
06/05/2022	2	RM	0731	Greenshank	1	12	0.00	0.00	0.00	0.00	0.00	0.00	12.00	0.00	0.00	0.00	0.00	0.00
14/05/2022	2	RM	1230	Greenshank	1	3	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
18/05/2022	1	RM	1021	Greenshank	1	38	0.00	0.00	0.00	0.00	0.00	0.00	15.00	15.00	8.00	0.00	0.00	0.00
06/06/2022	1	MM	0536	Greenshank	1	32	0.00	0.00	0.00	0.00	0.00	0.00	32.00	0.00	0.00	0.00	0.00	0.00
06/06/2022	5	CT	0652	Greenshank	2	83	83.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	CT	1502	Greenshank	2	77	0.00	0.00	0.00	0.00	0.00	0.00	77.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	CT	1528	Greenshank	1	61	0.00	0.00	0.00	0.00	0.00	0.00	61.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	CT	1650	Greenshank	1	122	0.00	0.00	0.00	0.00	0.00	0.00	122.00	0.00	0.00	0.00	0.00	0.00
08/06/2022	2	MM	1842	Greenshank	1	15	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00
04/08/2022	1	PS	1618	Greenshank	1	34	0.00	0.00	0.00	0.00	0.00	0.00	34.00	0.00	0.00	0.00	0.00	0.00
04/08/2022	2	JD	1612	Greenshank	1	44	0.00	0.00	0.00	0.00	0.00	0.00	14.00	30.00	0.00	0.00	0.00	0.00
26/03/2022	3	AB	1050	Greylag goose	55	120	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.00	0.00
26/03/2022	3	AB	1527	Hen harrier	1	150	0.00	0.00	0.00	0.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00
26/03/2022	3	AB	1534	Hen harrier	1	30	0.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00	0.00	0.00
08/08/2022	3	PS	1521	Hen harrier	1	37	5.76	0.00	0.00	0.00	0.00	0.00	31.24	0.00	0.00	0.00	0.00	0.00
19/10/2022	1	AW	1147	Hen harrier	1	88	0.00	0.00	0.00	0.00	0.00	0.00	88.00	0.00	0.00	0.00	0.00	0.00
19/10/2022	1	AW	1537	Hen harrier	1	87	0.00	0.00	0.00	0.00	0.00	0.00	87.00	0.00	0.00	0.00	0.00	0.00
28/01/2023	5	DL	1204	Hen harrier	1	17	17.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
07/05/2022	4	RM	1050	Herring gull	1	51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51.00	0.00	0.00	0.00
07/05/2022	4	RM	1453	Herring gull	1	73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	73.00	0.00	0.00	0.00	0.00
01/07/2022	1	DS	1405	Herring gull	2	144	0.00	0.00	0.00	0.00	0.00	0.00	0.00	84.00	60.00	0.00	0.00	0.00
08/07/2022	5	DS	1600	Herring gull	1	170	0.00	23.87	43.76	0.00	0.00	0.00	0.00	36.13	66.24	0.00	0.00	0.00
05/08/2022	5	PS	1647	Herring gull	2	57	0.00	23.58	0.00	0.00	0.00	0.00	0.00	33.42	0.00	0.00	0.00	0.00
16/04/2022	4	MM	1135	Merlin	1	38	32.02	0.00	0.00	0.00	0.00	0.00	5.98	0.00	0.00	0.00	0.00	0.00
02/06/2022	4	CT	1507	Merlin	1	68	68.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
05/08/2022	4	JD	1431	Merlin	1	73	0.00	0.00	0.00	0.00	0.00	0.00	43.00	30.00	0.00	0.00	0.00	0.00
05/08/2022	4	JD	1754	Merlin	1	42	0.00	0.00	0.00	0.00	0.00	0.00	42.00	0.00	0.00	0.00	0.00	0.00
13/09/2022	1	AW	1417	Merlin	1	31	0.00	0.00	0.00	0.00	0.00	0.00	31.00	0.00	0.00	0.00	0.00	0.00
19/10/2022	2	AW	0849	Merlin	1	102	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.00	0.00
20/10/2022	2	AW	1516	Merlin	1	44	0.00	0.00	0.00	0.00	0.00	0.00	44.00	0.00	0.00	0.00	0.00	0.00
06/12/2022	2	AW	1342	Merlin	1	33	0.00	0.00	0.00	0.00	0.00	0.00	33.00	0.00	0.00	0.00	0.00	0.00
24/02/2023	1	AW	1306	Merlin	1	61	0.00	0.00	0.00	0.00	0.00	0.00	61.00	0.00	0.00	0.00	0.00	0.00
14/07/2022	3	DS	1155	Peregrine falcon	1	73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	73.00	0.00	0.00	0.00
06/06/2022	1	MM	0755	Red-throated diver	1	15	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00
06/06/2022	5	CT	0658	Red-throated diver	1	97	0.00	0.00	0.00	0.00	0.00	0.00	30.00	67.00	0.00	0.00	0.00	0.00
06/06/2022	5	CT	0737	Red-throated diver	1	101	20.26	25.21	0.00	0.00	0.00	0.00	24.74	30.79	0.00	0.00	0.00	0.00
06/06/2022	5	CT	0809	Red-throated diver	2	47	0.00	19.63	0.00	0.00	0.00	0.00	0.00	27.37	0.00	0.00	0.00	0.00
06/06/2022	5	CT	1056	Red-throated diver	2	56	0.00	0.00	0.00	0.00	0.00	0.00	56.00	0.00	0.00	0.00	0.00	0.00
01/07/2022	1	DS	1255	Red-throated diver	1	95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	95.00	0.00	0.00	0.00
20/07/2022	4	DS	1635	Red-throated diver	1	35	3.55	21.33	0.00	0.00	0.00	0.00	1.45	8.67	0.00	0.00	0.00	0.00
05/08/2022	4	JD	1302	Red-throated diver	1	85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55.00	30.00	0.00	0.00
05/08/2022	4	JD	1646	Red-throated diver	1	82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00	60.00	15.00	0.00	0.00
05/08/2022	5	PS	1356	Red-throated diver	2	51	0.00	1.80	0.00	0.00	0.00	0.00	0.00	49.20	0.00	0.00	0.00	0.00
05/08/2022	5	PS	1749	Red-throated diver	1	53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.00	0.00	0.00	0.00	0.00

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20m	21-40m	41-100m	101150m	151-200m	>201m	0-20m	21-40m	41-100m	101150m	151-200m	>201m
05/08/2022	5	PS	1854	Red-throated diver	1	65	0.00	0.00	19.59	0.00	0.00	0.00	0.00	0.00	45.41	0.00	0.00	0.00
25/03/2022	4	AB	0725	White-tailed eagle	2	230	0.00	0.00	9.50	2.31	0.00	0.00	0.00	0.00	175.50	42.69	0.00	0.00
27/03/2022	1	AB	0712	White-tailed eagle	1	75	0.00	0.00	0.00	0.00	0.00	0.00	75.00	0.00	0.00	0.00	0.00	0.00
27/03/2022	1	AB	0840	White-tailed eagle	2	75	0.00	0.00	0.00	0.00	0.00	0.00	15.00	60.00	0.00	0.00	0.00	0.00
27/03/2022	1	AB	1034	White-tailed eagle	3	15	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00
27/03/2022	1	AB	1044	White-tailed eagle	1	180	0.00	0.00	0.00	0.00	0.00	0.00	180.00	0.00	0.00	0.00	0.00	0.00
27/03/2022	1	AB	1129	White-tailed eagle	2	30	0.00	0.00	0.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00	0.00	0.00
15/04/2022	2	CT	1603	White-tailed eagle	1	182	0.00	58.77	80.14	0.00	0.00	0.00	0.00	18.23	24.86	0.00	0.00	0.00
15/04/2022	4	MM	1557	White-tailed eagle	1	667	178.24	122.45	153.07	0.00	0.00	0.00	83.76	57.55	71.93	0.00	0.00	0.00
15/04/2022	4	MM	1624	White-tailed eagle	1	156	46.77	74.82	0.00	0.00	0.00	0.00	13.23	21.18	0.00	0.00	0.00	0.00
15/04/2022	4	MM	1630	White-tailed eagle	1	98	32.89	51.93	0.00	0.00	0.00	0.00	5.11	8.07	0.00	0.00	0.00	0.00
16/04/2022	4	MM	1132	White-tailed eagle	2	540	10.92	26.52	18.72	0.00	0.00	0.00	94.08	228.48	161.28	0.00	0.00	0.00
16/04/2022	4	MM	1134	White-tailed eagle	1	118	10.06	16.17	16.17	0.00	0.00	0.00	17.94	28.83	28.83	0.00	0.00	0.00
16/04/2022	4	MM	1223	White-tailed eagle	2	336	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	261.00	75.00	0.00	0.00
19/04/2022	5	CT	1227	White-tailed eagle	1	23	0.00	0.00	0.00	0.00	0.00	0.00	23.00	0.00	0.00	0.00	0.00	0.00
19/04/2022	5	CT	1233	White-tailed eagle	1	9	0.00	0.00	0.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00	0.00	0.00
19/04/2022	5	CT	1241	White-tailed eagle	1	13	0.00	0.00	0.00	0.00	0.00	0.00	13.00	0.00	0.00	0.00	0.00	0.00
19/04/2022	5	CT	1317	White-tailed eagle	1	143	0.00	0.00	0.00	0.00	0.00	0.00	15.00	128.00	0.00	0.00	0.00	0.00
19/04/2022	5	CT	1506	White-tailed eagle	2	422	0.00	32.00	80.53	0.00	0.00	0.00	0.00	88.00	221.47	0.00	0.00	0.00
04/05/2022	5	RM	1436	White-tailed eagle	1	549	0.00	0.00	0.00	0.00	0.00	0.00	0.00	504.00	45.00	0.00	0.00	0.00
05/05/2022	1	RM	0936	White-tailed eagle	2	192	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	192.00	0.00	0.00	0.00
06/05/2022	2	RM	0822	White-tailed eagle	1	232	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.00	75.00	30.00	52.00	0.00
06/05/2022	2	RM	0854	White-tailed eagle	1	13	0.00	0.00	0.00	0.00	0.00	0.00	13.00	0.00	0.00	0.00	0.00	0.00
06/05/2022	2	RM	0912	White-tailed eagle	1	54	0.00	0.00	0.00	0.00	0.00	0.00	15.00	15.00	15.00	9.00	0.00	0.00
06/05/2022	2	RM	0954	White-tailed eagle	1	151	0.00	0.00	0.00	0.00	0.00	0.00	0.00	151.00	0.00	0.00	0.00	0.00
07/05/2022	4	RM	1239	White-tailed eagle	2	346	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	45.00	45.00	211.00	0.00
07/05/2022	4	RM	1249	White-tailed eagle	1	61	0.00	0.00	0.00	0.00	0.00	0.00	61.00	0.00	0.00	0.00	0.00	0.00
07/05/2022	4	RM	1304	White-tailed eagle	1	218	0.00	0.00	0.00	16.57	0.00	0.00	0.00	0.00	0.00	201.43	0.00	0.00
07/05/2022	4	RM	1309	White-tailed eagle	1	167	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	45.00	60.00	2.00	0.00
10/05/2022	3	RM	1215	White-tailed eagle	1	21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.00	0.00
10/05/2022	3	RM	1402	White-tailed eagle	1	131	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	45.00	26.00	0.00	0.00
10/05/2022	3	RM	1432	White-tailed eagle	1	96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	36.00	0.00	0.00
18/05/2022	1	RM	0944	White-tailed eagle	1	63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	63.00	0.00	0.00	0.00	0.00
18/05/2022	1	RM	0948	White-tailed eagle	1	67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	67.00	0.00	0.00	0.00	0.00
18/05/2022	1	RM	1041	White-tailed eagle	2	119	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.00	30.00	0.00	0.00	0.00
18/05/2022	1	RM	1155	White-tailed eagle	1	17	0.00	0.00	0.00	0.00	0.00	0.00	2.00	15.00	0.00	0.00	0.00	0.00
19/05/2022	5	RM	1002	White-tailed eagle	1	11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.00	0.00	0.00	0.00	0.00
19/05/2022	5	RM	1012	White-tailed eagle	2	58	0.00	0.00	0.00	0.00	20.38	0.00	0.00	0.00	0.00	0.00	37.62	0.00
02/06/2022	3	MM	1844	White-tailed eagle	1	210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	105.00	105.00	0.00	0.00	0.00
02/06/2022	3	MM	1844	White-tailed eagle	1	210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	105.00	105.00	0.00	0.00	0.00
02/06/2022	4	CT	1454	White-tailed eagle	1	88	0.00	88.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
06/06/2022	1	MM	1117	White-tailed eagle	1	244	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	184.00	0.00	0.00	0.00
06/06/2022	1	MM	1123	White-tailed eagle	2	141	0.00	0.00	0.00	0.00	0.00	0.00	96.00	45.00	0.00	0.00	0.00	0.00
06/06/2022	1	MM	1126	White-tailed eagle	4	270	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	75.00	165.00	0.00	0.00
08/07/2022	5	DS	1250	White-tailed eagle	1	440	0.00	0.00	0.00	39.62	0.00	0.00	0.00	0.00	0.00	400.38	0.00	0.00
08/07/2022	5	DS	1620	White-tailed eagle	1	240	0.00	0.00	0.00	0.13	0.10	0.00	0.00	0.00	0.00	134.87	104.90	0.00
14/07/2022	3	DS	1000	White-tailed eagle	1	255	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	60.00	135.00
14/07/2022	3	DS	1045	White-tailed eagle	1	291	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.00	60.00	171.00
14/07/2022	3	DS	1055	White-tailed eagle	1	245	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	90.00	110.00	0.00
14/07/2022	3	DS	1630	White-tailed eagle	1	40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.00	0.00	0.00	0.00	0.00
14/07/2022	3	DS	1630	White-tailed eagle	1	214	0.00	0.00	14.28	6.09	0.00	0.00	0.00	0.00	135.72	57.91	0.00	0.00

Date	VP	Observer	Flight start time	Species	No. of birds	Duration (s)	Inside CRAA (seconds)						Outside CRAA (seconds)					
							0-20m	21-40m	41-100m	101150m	151-200m	>201m	0-20m	21-40m	41-100m	101150m	151-200m	>201m
14/07/2022	3	DS	1630	White-tailed eagle	1	45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00	0.00	0.00	0.00
05/08/2022	5	PS	1326	White-tailed eagle	1	43	0.00	33.38	0.00	0.00	0.00	0.00	0.00	9.62	0.00	0.00	0.00	0.00
05/08/2022	5	PS	1337	White-tailed eagle	1	228	1.16	2.31	14.11	0.00	0.00	0.00	13.84	27.69	168.89	0.00	0.00	0.00
05/08/2022	5	PS	1723	White-tailed eagle	1	107	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	107.00	0.00	0.00	0.00
10/09/2022	5	DL	1106	White-tailed eagle	1	202	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	150.00	52.00	0.00
10/09/2022	5	DL	1334	White-tailed eagle	1	623	0.00	0.00	31.86	15.93	172.74	0.00	0.00	0.00	58.14	29.07	315.26	0.00
10/09/2022	5	DL	1344	White-tailed eagle	2	64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64.00	0.00
10/09/2022	5	DL	1351	White-tailed eagle	2	603	0.00	0.00	63.04	105.07	254.26	0.00	0.00	0.00	26.96	44.93	108.74	0.00
10/09/2022	5	DL	1439	White-tailed eagle	1	190	0.00	2.70	40.53	8.11	0.00	0.00	0.00	7.30	109.47	21.89	0.00	0.00
14/09/2022	3	AW	1103	White-tailed eagle	1	68	0.00	0.00	0.00	0.00	0.00	0.00	15.00	15.00	38.00	0.00	0.00	0.00
15/09/2022	2	AW	0817	White-tailed eagle	1	53	0.00	0.00	0.00	0.00	0.00	0.00	8.00	15.00	30.00	0.00	0.00	0.00
13/10/2022	3	DL	1341	White-tailed eagle	1	87	0.00	0.00	0.00	0.32	1.99	0.00	0.00	0.00	0.00	11.68	73.01	0.00
14/10/2022	5	DL	1248	White-tailed eagle	1	39	0.00	0.00	3.41	0.00	0.00	0.00	0.00	0.00	35.59	0.00	0.00	0.00
23/11/2022	3	DL	1039	White-tailed eagle	1	21	0.00	0.00	6.82	0.00	0.00	0.00	0.00	0.00	14.18	0.00	0.00	0.00
24/11/2022	5	DL	1356	White-tailed eagle	1	158	0.00	0.00	9.40	9.40	3.13	11.07	0.00	0.00	35.60	35.60	11.87	41.93
24/11/2022	5	DL	1358	White-tailed eagle	2	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00	30.00	50.00
25/11/2022	5	DL	0856	White-tailed eagle	3	322	0.00	0.00	223.72	36.34	0.00	0.00	0.00	0.00	53.28	8.66	0.00	0.00
25/11/2022	5	DL	1204	White-tailed eagle	1	102	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.00
19/12/2022	3	DS	1040	White-tailed eagle	1	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.00	0.00	0.00
19/12/2022	3	DS	1225	White-tailed eagle	1	345	0.00	0.00	15.57	44.12	0.00	0.00	0.00	0.00	74.43	210.88	0.00	0.00
19/12/2022	5	BJ	1000	White-tailed eagle	1	411	0.00	0.00	245.53	0.00	0.00	0.00	0.00	0.00	165.47	0.00	0.00	0.00
23/01/2023	4	AW	1314	White-tailed eagle	1	88	0.00	8.47	18.15	0.00	0.00	0.00	0.00	19.53	41.85	0.00	0.00	0.00
24/01/2023	2	AW	0918	White-tailed eagle	1	58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	58.00	0.00	0.00	0.00	0.00
24/01/2023	2	AW	1117	White-tailed eagle	1	64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64.00	0.00	0.00	0.00
28/01/2023	5	DL	0837	White-tailed eagle	1	116	0.00	0.00	25.88	0.23	0.00	0.00	0.00	0.00	89.12	0.77	0.00	0.00
12/02/2023	5	DL	0821	White-tailed eagle	1	139	0.00	35.12	29.97	0.00	0.00	0.00	0.00	39.88	34.03	0.00	0.00	0.00
12/02/2023	5	DL	0946	White-tailed eagle	2	165	0.00	0.00	0.00	0.00	131.82	0.00	0.00	0.00	0.00	0.00	33.18	0.00
13/02/2023	3	DL	0811	White-tailed eagle	1	112	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	112.00	0.00	0.00	0.00
13/02/2023	3	DL	1049	White-tailed eagle	1	110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	110.00
13/02/2023	3	DL	1102	White-tailed eagle	1	150	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	15.00	30.00	15.00
13/02/2023	3	DL	1406	White-tailed eagle	2	158	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.00	15.00	68.00
23/02/2023	4	AW	1007	White-tailed eagle	1	87	0.00	27.00	60.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
23/02/2023	4	AW	1031	White-tailed eagle	1	104	0.00	18.84	7.64	0.00	0.00	0.00	0.00	55.16	22.36	0.00	0.00	0.00

D.2 Moorland Breeding Bird Records

Moorland breeding bird surveys were undertaken during the 2022 breeding seasons and focussed on recording activity of upland wader species within the survey area (**Table D-3**). Survey methodology is detailed in **Annex B** and survey timing/weather conditions in **Annex C**.

Table D-3 Wader activity recorded during 2022 breeding season (sorted by species then chronologically)

Date	Survey visit	Observer	Species	Number recorded	Notes
07/05/2022	1	RM	Common sandpiper	1	
09/05/2022	1	RM	Common sandpiper	1	Calling.
09/05/2022	1	RM	Common sandpiper	1	
09/05/2022	1	RM	Common sandpiper	2	Pair; singing.
09/05/2022	2	RM	Common sandpiper	1	
09/05/2022	2	RM	Common sandpiper	1	
09/05/2022	2	RM	Common sandpiper	1	
10/05/2022	2	RM	Common sandpiper	1	Calling.
14/05/2022	2	RM	Common sandpiper	1	Singing.
16/05/2022	2	RM	Common sandpiper	2	Pair.
01/06/2022	3	MM	Common sandpiper	1	
06/07/2022	4	DS	Common sandpiper	1	Calling.
06/05/2022	2	RM	Dunlin	1	Calling.
06/05/2022	2	RM	Dunlin	1	Calling.
16/05/2022	2	RM	Dunlin	1	Calling.
25/05/2022	1	RM	Dunlin	1	Calling.
01/06/2022	3	MM	Dunlin	1	Singing.
01/06/2022	3	MM	Dunlin	1	Singing.
08/06/2022	3	CT	Dunlin	1	
22/06/2022	2	AW	Dunlin	1	Singing.
22/06/2022	2	AW	Dunlin	1	Alarm calling.
22/06/2022	2	AW	Dunlin	1	Singing.
22/06/2022	2	AW	Dunlin	1	Singing.
07/07/2022	4	DS	Dunlin	1	
25/03/2022	-	AB	Golden plover	2	Close to survey location throughout VP survey. Not mapped.
26/03/2022	-	AB	Golden plover	-	Heard only; calling close to survey location.
15/04/2022	-	CT	Golden plover	5	3 males and 2 females observed en route to survey location; calling.
16/04/2022	1	CT	Golden plover	1	Male; calling.
16/04/2022	1	CT	Golden plover	1	Female; calling.
16/04/2022	1	CT	Golden plover	2	Pair; calling.
16/04/2022	1	CT	Golden plover	1	Male; calling.
16/04/2022	1	CT	Golden plover	2	Pair; singing.
16/04/2022	1	MM	Golden plover	1	Singing.
17/04/2022	1	CT	Golden plover	1	Singing.
17/04/2022	1	CT	Golden plover	1	Calling.
17/04/2022	1	MM	Golden plover	1	Calling.
17/04/2022	1	MM	Golden plover	1	Calling.
17/04/2022	1	MM	Golden plover	2	Singing.
17/04/2022	1	MM	Golden plover	1	Calling.
17/04/2022	1	MM	Golden plover	1	Singing.
18/04/2022	1	MM	Golden plover	1	Calling.
19/04/2022	1	MM	Golden plover	1	Singing.
19/04/2022	1	MM	Golden plover	1	Singing.
19/04/2022	1	MM	Golden plover	1	Singing.
04/05/2022	2	RM	Golden plover	2	Pair; calling.
05/05/2022	1	RM	Golden plover	1	Calling.
05/05/2022	1	RM	Golden plover	1	Calling.
05/05/2022	1	RM	Golden plover	2	Pair; calling.
06/05/2022	2	RM	Golden plover	1	Calling.
06/05/2022	2	RM	Golden plover	1	Calling.
06/05/2022	2	RM	Golden plover	1	Calling.
09/05/2022	1	RM	Golden plover	1	Calling.
09/05/2022	1	RM	Golden plover	1	
10/05/2022	2	RM	Golden plover	1	Calling.
10/05/2022	2	RM	Golden plover	1	Calling.
11/05/2022	2	RM	Golden plover	1	Calling.
11/05/2022	2	RM	Golden plover	1	Calling.
11/05/2022	2	RM	Golden plover	1	Singing.
11/05/2022	2	RM	Golden plover	1	Calling.
14/05/2022	2	RM	Golden plover	1	Calling.
14/05/2022	2	RM	Golden plover	1	Calling.
16/05/2022	1	RM	Golden plover	1	Calling.
16/05/2022	1	RM	Golden plover	1	Calling.
16/05/2022	2	RM	Golden plover	1	Singing.
16/05/2022	2	RM	Golden plover	1	Singing.
18/05/2022	2	RM	Golden plover	2	Pair; calling.
16/05/2022	2	RM	Golden plover	1	Singing.
18/05/2022	2	RM	Golden plover	2	Pair; calling.
18/05/2022	2	RM	Golden plover	1	Singing; different bird from Ref_ID 153.
18/05/2022	2	RM	Golden plover	1	Singing; different bird from Ref_ID 152.
18/05/2022	-	RM	Golden plover	-	Heard only.
23/05/2022	2	RM	Golden plover	1	Calling; different bird from Ref_ID 157.
23/05/2022	2	RM	Golden plover	1	Calling; different bird from Ref_ID 156.
23/05/2022	2	RM	Golden plover	1	Calling.
24/05/2022	-	DS	Golden plover	1	Heard only; calling close to survey location.
25/05/2022	1	RM	Golden plover	1	Calling.
25/05/2022	1	RM	Golden plover	1	Male; calling; different bird from Ref_ID 236.
25/05/2022	1	RM	Golden plover	1	Male; calling; different bird from Ref_ID 235.
25/05/2022	1	RM	Golden plover	1	Male; calling.
01/06/2022	3	CT	Golden plover	1	Singing.
01/06/2022	3	CT	Golden plover	1	Calling.
01/06/2022	3	CT	Golden plover	1	Calling.
01/06/2022	3	MM	Golden plover	1	Calling; different bird from Ref_ID 174.
01/06/2022	3	MM	Golden plover	1	Calling; different bird from Ref_ID 175.
01/06/2022	3	MM	Golden plover	1	Alarm calling.
01/06/2022	3	MM	Golden plover	1	Alarm calling.
01/06/2022	3	MM	Golden plover	1	
01/06/2022	3	MM	Golden plover	1	Alarm calling.
02/06/2022	3	CT	Golden plover	1	Calling.
02/06/2022	-	MM	Golden plover	-	Heard only.
03/06/2022	3	CT	Golden plover	2	Alarm calling; very vocal; nest likely nearby.
03/06/2022	3	CT	Golden plover	1	Singing.
03/06/2022	3	MM	Golden plover	1	Calling.
03/06/2022	3	MM	Golden plover	1	
03/06/2022	3	MM	Golden plover	1	

Date	Survey visit	Observer	Species	Number recorded	Notes
03/06/2022	3	MM	Golden plover	1	Calling.
03/06/2022	3	MM	Golden plover	2	
03/06/2022	3	MM	Golden plover	2	Pair.
03/06/2022	3	CT	Golden plover	2	Pair; alarm calling.
06/06/2022	2	MM	Golden plover	1	
06/06/2022	2	MM	Golden plover	1	
06/06/2022	-	MM	Golden plover	-	Heard only.
06/06/2022	-	CT	Golden plover	-	Heard only; multiple birds calling close to survey location.
08/06/2022	3	CT	Golden plover	1	Singing.
08/06/2022	3	MM	Golden plover	1	
08/06/2022	3	MM	Golden plover	1	
08/06/2022	3	MM	Golden plover	1	
08/06/2022	3	MM	Golden plover	1	
09/06/2022	2	CT	Golden plover	1	
22/06/2022	2	AW	Golden plover	1	Calling; different bird from Ref_ID 267 & 269.
22/06/2022	2	AW	Golden plover	1	Calling; different bird from Ref_ID 267 & 268.
22/06/2022	2	AW	Golden plover	1	Calling; different bird from Ref_ID 268 & 269.
22/06/2022	2	AW	Golden plover	1	Calling; different bird from Ref_ID 265.
22/06/2022	2	AW	Golden plover	1	Calling; different bird from Ref_ID 253.
22/06/2022	2	AW	Golden plover	1	Calling; different bird from Ref_ID 252.
22/06/2022	2	AW	Golden plover	1	Calling.
22/06/2022	2	AW	Golden plover	1	Calling; different bird from Ref_ID 256.
22/06/2022	2	AW	Golden plover	1	Calling; different bird from Ref_ID 255.
22/06/2022	2	AW	Golden plover	1	Calling.
22/06/2022	2	AW	Golden plover	1	Alarm calling; different bird from Ref_ID 261.
22/06/2022	2	AW	Golden plover	1	Calling.
22/06/2022	2	AW	Golden plover	1	Alarm calling; different bird from Ref_ID 261.
22/06/2022	2	AW	Golden plover	1	Alarm calling; different bird from Ref_ID 260.
22/06/2022	2	AW	Golden plover	1	Calling; different bird from Ref_ID 264.
01/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 193.
01/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 192.
01/07/2022	4	DS	Golden plover	2	Pair.
01/07/2022	4	DS	Golden plover	1	Calling.
01/07/2022	4	DS	Golden plover	1	
01/07/2022	4	DS	Golden plover	2	Pair.
01/07/2022	4	DS	Golden plover	2	Pair.
01/07/2022	4	DS	Golden plover	2	Pair.
01/07/2022	4	DS	Golden plover	1	
01/07/2022	4	DS	Golden plover	1	
01/07/2022	4	DS	Golden plover	1	Calling.
04/07/2022	3	DS	Golden plover	2	Family.
04/07/2022	3	DS	Golden plover	1	Calling; different bird from Ref_ID 272.
04/07/2022	3	DS	Golden plover	1	Calling.
04/07/2022	3	DS	Golden plover	1	Calling; different bird from Ref_ID 271.
04/07/2022	3	DS	Golden plover	1	Calling.
05/07/2022	4	DS	Golden plover	1	Calling.
05/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 206 & 207.
05/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 205 & 207.
05/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 205 & 206.
07/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 212.
07/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 211.
07/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 214.
07/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 213.
08/07/2022	4	DS	Golden plover	1	Calling.
08/07/2022	4	DS	Golden plover	1	Calling.
08/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 219.
08/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 218.
08/07/2022	-	DS	Golden plover	-	Heard only.
11/07/2022	4	DS	Golden plover	1	Calling.
11/07/2022	4	DS	Golden plover	1	Calling.
11/07/2022	4	DS	Golden plover	1	Calling.
11/07/2022	4	DS	Golden plover	1	Calling.
11/07/2022	4	DS	Golden plover	1	Calling.
14/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 222.
14/07/2022	4	DS	Golden plover	1	Calling; different bird from Ref_ID 221.
14/07/2022	4	DS	Golden plover	1	Calling.
21/07/2022	3	AW	Golden plover	1	Calling.
21/07/2022	3	AW	Golden plover	1	Calling; different bird from Ref_ID 287.
21/07/2022	3	AW	Golden plover	1	Calling; different bird from Ref_ID 286.
21/07/2022	3	AW	Golden plover	1	Calling.
21/07/2022	3	AW	Golden plover	1	Alarm calling; different bird from Ref_ID 282.
21/07/2022	3	AW	Golden plover	1	Calling; different bird from Ref_ID 281.
21/07/2022	3	AW	Golden plover	1	Calling.
21/07/2022	3	AW	Golden plover	1	Calling.
21/07/2022	3	AW	Golden plover	1	Calling.
21/07/2022	3	AW	Golden plover	1	Calling; different bird from Ref_ID 290.
21/07/2022	3	AW	Golden plover	1	Calling; different bird from Ref_ID 289.
17/04/2022	1	CT	Golden plover	1	Singing.
15/04/2022	-	CT	Greenshank	-	Heard only; singing.
16/04/2022	1	CT	Greenshank	1	Singing.
16/04/2022	1	CT	Greenshank	1	Singing.
16/04/2022	1	MM	Greenshank	1	Calling.
17/04/2022	1	CT	Greenshank	1	
17/04/2022	1	CT	Greenshank	1	Alarm calling.
17/04/2022	1	CT	Greenshank	1	Singing.
17/04/2022	1	CT	Greenshank	1	Calling.
17/04/2022	1	CT	Greenshank	1	Singing.
17/04/2022	1	MM	Greenshank	1	Calling.
17/04/2022	1	MM	Greenshank	1	Calling.
18/04/2022	1	CT	Greenshank	1	Singing.
18/04/2022	1	MM	Greenshank	1	Singing.
19/04/2022	1	CT	Greenshank	1	Singing.
19/04/2022	1	CT	Greenshank	1	Singing.
19/04/2022	1	CT	Greenshank	1	Singing.
19/04/2022	1	MM	Greenshank	1	Calling.
19/04/2022	1	MM	Greenshank	1	
04/05/2022	2	RM	Greenshank	1	Calling.
05/05/2022	1	RM	Greenshank	1	Calling.
05/05/2022	1	RM	Greenshank	1	Calling.
06/05/2022	2	RM	Greenshank	1	Calling.
06/05/2022	2	RM	Greenshank	1	Calling.
09/05/2022	1	RM	Greenshank	1	
10/05/2022	2	RM	Greenshank	1	Calling.
10/05/2022	2	RM	Greenshank	1	Calling.
10/05/2022	2	RM	Greenshank	1	Calling.

Date	Survey visit	Observer	Species	Number recorded	Notes
11/05/2022	2	RM	Greenshank	1	Calling.
14/05/2022	2	RM	Greenshank	1	Calling.
16/05/2022	2	RM	Greenshank	1	Calling.
18/05/2022	2	RM	Greenshank	1	Calling.
24/05/2022	-	DS	Greenshank	1	Heard only near Ceann Loch Shealg.
25/05/2022	1	RM	Greenshank	2	Alarm calling; probably nesting nearby.
01/06/2022	3	CT	Greenshank	1	Alarm calling.
01/06/2022	3	CT	Greenshank	1	Singing.
01/06/2022	3	MM	Greenshank	1	
02/06/2022	3	CT	Greenshank	1	Singing.
02/06/2022	3	RM	Greenshank	1	Alarm calling.
02/06/2022	-	MM	Greenshank	-	Heard only.
03/06/2022	3	CT	Greenshank	2	Singing.
03/06/2022	3	MM	Greenshank	1	
03/06/2022	3	MM	Greenshank	1	Calling.
03/06/2022	3	CT	Greenshank	1	Calling.
06/06/2022	2	MM	Greenshank	1	Alarm calling.
06/06/2022	2	MM	Greenshank	2	Alarm calling.
06/06/2022	2	MM	Greenshank	1	Alarm calling.
06/06/2022	2	MM	Greenshank	1	Alarm calling.
06/06/2022	2	MM	Greenshank	1	Alarm calling.
06/06/2022	-	MM	Greenshank	-	Heard only from lochs.
06/06/2022	-	CT	Greenshank	-	Observed en route to survey. Not mapped.
06/06/2022	-	CT	Greenshank	1	Heard only; singing.
08/06/2022	3	MM	Greenshank	1	
09/06/2022	2	CT	Greenshank	1	Alarm calling.
22/06/2022	2	AW	Greenshank	2	Pair; alarm calling.
22/06/2022	2	AW	Greenshank	2	Pair; alarm calling.
01/07/2022	4	DS	Greenshank	1	Alarm calling.
04/07/2022	3	DS	Greenshank	2	Family.
05/07/2022	4	DS	Greenshank	1	Calling.
06/07/2022	4	DS	Greenshank	1	
11/07/2022	4	DS	Greenshank	1	Calling.
20/07/2022	-	DS	Greenshank	-	Heard only.
21/07/2022	3	AW	Greenshank	1	Alarm calling.
21/07/2022	3	AW	Greenshank	1	Alarm calling.
23/05/2022	2	RM	Oystercatcher	1	Alarm calling.
03/06/2022	3	MM	Ringed plover	1	
16/04/2022	1	CT	Snipe	1	Singing.
06/05/2022	2	RM	Snipe	1	
09/05/2022	2	RM	Snipe	1	
11/05/2022	2	RM	Snipe	1	Singing.
11/05/2022	2	RM	Snipe	1	Singing.
16/05/2022	2	RM	Snipe	1	Flushed.
01/06/2022	3	CT	Snipe	1	Singing.
01/06/2022	3	CT	Snipe	1	Calling.
06/06/2022	-	MM	Snipe	-	Heard only.
06/06/2022	-	CT	Snipe	-	Observed en route to survey. Not mapped.
01/07/2022	4	DS	Snipe	1	Singing.
04/07/2022	3	DS	Snipe	1	Calling.

D.3 Winter Walkover Records

Table D-4 details all the species recorded. Refer to **Annex B** for survey methodology and **Annex C** for weather data.

Table D-4 Winter walkover survey records: 2022/2023 non-breeding season (sorted by species then chronologically)

Date	Survey visit	Observer	Species	Number recorded	Notes
17/11/2022	1	RR	Blackbird	-	
20/02/2023	4	RR	Buzzard	-	
19/12/2022	2	DS	Cormorant	1	
13/12/2022	2	RR	Dipper	-	
17/11/2022	1	RR	Feral pigeon	-	
13/12/2022	2	RR	Feral pigeon	-	
09/01/2023	3	RR	Feral pigeon	-	
20/02/2023	4	RR	Feral pigeon	-	
27/02/2023	4	RR	Feral pigeon	-	
17/11/2022	1	RR	Fieldfare	-	
17/11/2022	1	RR	Golden eagle	1	
13/12/2022	2	RR	Golden eagle	1	
19/12/2022	2	BJ	Golden eagle	1	
19/12/2022	2	BJ	Golden eagle	1	
09/01/2023	3	RR	Golden eagle	1	
09/01/2023	3	RR	Golden eagle	1	
09/01/2023	3	RR	Golden eagle	1	Displaying.
28/01/2023	3	DL	Golden eagle	1	Satellite-tagging project ongoing at time of survey. Bait left out to draw birds in so flights probably influenced by this.
29/01/2023	3	DL	Golden eagle	2	1 satellite-tagged bird.
30/01/2023	3	DL	Golden eagle	1	One member of pair; flying near partner (Ref_ID 317).
30/01/2023	3	DL	Golden eagle	1	One member of pair; flying near partner (Ref_ID 316).
12/02/2023	4	DL	Golden eagle	2	
13/02/2023	4	DL	Golden eagle	1	
13/02/2023	4	DL	Golden eagle	1	
13/02/2023	4	DL	Golden eagle	1	Satellite-tagged bird.
13/02/2023	4	DL	Golden eagle	1	
13/02/2023	4	DL	Golden eagle	1	
20/02/2023	4	RR	Golden eagle	1	
20/02/2023	4	RR	Golden eagle	1	
20/02/2023	4	RR	Golden eagle	1	
20/02/2023	4	RR	Golden eagle	1	
20/02/2023	4	RR	Golden eagle	2	
27/02/2023	4	RR	Golden eagle	1	
20/02/2023	4	RR	Golden plover	2	
20/02/2023	4	RR	Golden plover	-	Not mapped.
09/01/2023	3	RR	Great black-backed gull	-	
20/02/2023	4	RR	Great black-backed gull	-	
27/02/2023	4	RR	Great black-backed gull	-	
20/02/2023	4	RR	Hooded crow	-	
27/02/2023	4	RR	Hooded crow	-	

Date	Survey visit	Observer	Species	Number recorded	Notes
19/12/2022	2	DS	Kestrel	1	
20/02/2023	4	RR	Mallard	-	
09/01/2023	3	RR	Meadow pipit	-	
17/11/2022	1	RR	Raven	-	
13/12/2022	2	RR	Raven	-	
09/01/2023	3	RR	Raven	-	
20/02/2023	4	RR	Raven	-	
27/02/2023	4	RR	Raven	-	
17/11/2022	1	RR	Red grouse	-	
19/12/2022	2	DS	Red grouse	1	
19/12/2022	2	DS	Red grouse	2	
09/01/2023	3	RR	Red grouse	-	
17/11/2022	1	RR	Redwing	-	
20/02/2023	4	RR	Shag	-	
25/11/2022	1	DL	Snipe	1	Flushed. Not mapped.
13/12/2022	2	RR	Snipe	1	
09/01/2023	3	RR	Snipe	1	
20/02/2023	4	RR	Snipe	-	
17/11/2022	1	RR	Stonechat	-	
13/12/2022	2	RR	Stonechat	-	
17/11/2022	1	RR	White-tailed eagle	1	Likely to have flown out of roost
17/11/2022	1	RR	White-tailed eagle	1	
24/11/2022	1	DL	White-tailed eagle	1	
24/11/2022	1	DL	White-tailed eagle	1	
25/11/2022	1	DL	White-tailed eagle	3	
25/11/2022	1	DL	White-tailed eagle	1	
25/11/2022	1	DL	White-tailed eagle	3	
25/11/2022	1	DL	White-tailed eagle	1	
19/12/2022	2	BJ	White-tailed eagle	1	
19/12/2022	2	BJ	White-tailed eagle	1	
28/01/2023	3	DL	White-tailed eagle	3	Satellite-tagging project ongoing at time of survey. Bait left out to draw birds in so flights probably influenced by this.
29/01/2023	3	DL	White-tailed eagle	1	
13/02/2023	4	DL	White-tailed eagle	2	
13/02/2023	4	DL	White-tailed eagle	1	Landed on crag; joining a second bird.
13/02/2023	4	DL	White-tailed eagle	2	Same birds as Ref_ID 325.
20/02/2023	4	RR	White-tailed eagle	1	
20/02/2023	4	RR	White-tailed eagle	2	
17/11/2022	1	RR	Woodcock	-	
13/12/2022	2	RR	Woodcock	1	
09/01/2023	3	RR	Woodcock	1	
09/01/2023	3	RR	Woodcock	1	
27/02/2023	4	RR	Woodcock	1	
27/02/2023	4	RR	Woodcock	-	
17/11/2022	1	RR	Wren	-	
13/12/2022	2	RR	Wren	-	
09/01/2023	3	RR	Wren	-	
20/02/2023	4	RR	Wren	-	
27/02/2023	4	RR	Wren	-	

D.4 Scarce Breeding Bird Records

Table D-5 details all records of raptors and divers recorded during surveys, however only Annex 1[1] or Schedule 1[2] species are considered to be scarce breeding birds (i.e. target species). Refer to **Annex B** for survey methodology, **Annex C** for weather data and **Confidential Technical Appendix 9.2** for confidential data relating to black-throated diver, golden eagle, merlin, red-throated diver and white-tailed eagle.

Table D-5 Raptor and diver records: 2022 breeding season (sorted by species then chronologically)

Date	Species	Number recorded	Sex	Age	Notes
16/04/2022	Black-throated diver	2	-	Adult	Pair.
19/04/2022	Black-throated diver	1	-	Adult	
19/04/2022	Black-throated diver	1	-	Adult	
20/04/2022	Black-throated diver	2	-	Adult	
05/05/2022	Black-throated diver	2	-	Adult	Pair.
07/05/2022	Black-throated diver	2	-	Adult	Pair.
11/05/2022	Black-throated diver	2	-	Adult	Pair.
16/05/2022	Black-throated diver	2	-	Adult	Pair.
08/06/2022	Black-throated diver	2	-	Adult	Pair.
06/07/2022	Black-throated diver	2	-	Adult	Pair; on adjacent pool to nesting lochan; breeding attempt suspected to have failed.
07/07/2022	Black-throated diver	2	-	Adult	Pair.
11/07/2022	Black-throated diver	1	-	Adult	
21/07/2022	Black-throated diver	2	-	Adult	Pair; some weak displaying observed.
20/04/2022	Buzzard	2	-	-	
20/04/2022	Golden eagle	1	-	Adult	
09/05/2022	Golden eagle	1	-	Adult	
16/05/2022	Golden eagle	1	-	Adult	
01/06/2022	Golden eagle	1	-	Adult	
02/06/2022	Golden eagle	1	-	Adult	
03/06/2022	Golden eagle	1	-	Adult	
03/06/2022	Golden eagle	1	-	Adult	
08/06/2022	Golden eagle	1	-	Adult	Perched on ridge near newborn red deer; not mapped.
08/06/2022	Golden eagle	1	-	Adult	
04/07/2022	Golden eagle	1	-	Adult	
06/07/2022	Golden eagle	1	-	Adult	
06/07/2022	Golden eagle	1	-	Adult	
11/07/2022	Golden eagle	1	-	Adult	Calling.
14/07/2022	Hen harrier	1	Female	Adult	
16/04/2022	Merlin	1	-	Adult	Calling.
16/04/2022	Merlin	1	-	Adult	Calling.
18/04/2022	Merlin	1	-	Adult	Hunting.
14/07/2022	Merlin	4	-	Juvenile	Four juveniles interacting and 'playing'.
23/05/2022	Peregrine falcon	1	-	Adult	
04/05/2022	Red-throated diver	2	-	Adult	Pair.
11/05/2022	Red-throated diver	2	-	Adult	Pair.
03/06/2022	Red-throated diver	1	-	Adult	Calling.
08/07/2022	Red-throated diver	2	-	Adult	Pair.

[1] Annex 1 of the EU Bird Directive

[2] Schedule 1 of the Wildlife and Countryside Act 1981, as amended by the Nature Conservation Act (Scotland) 2004

Date	Species	Number recorded	Sex	Age	Notes
16/04/2022	White-tailed eagle	2	Male/Female	Adult	Pair.
20/04/2022	White-tailed eagle	1	-	Adult	
05/05/2022	White-tailed eagle	1	-	Adult	
06/05/2022	White-tailed eagle	1	-	Adult	
11/05/2022	White-tailed eagle	1	-	Adult	Calling.
11/05/2022	White-tailed eagle	1	-	Adult	
18/05/2022	White-tailed eagle	1	-	Adult	
18/05/2022	White-tailed eagle	1	-	Adult	
18/05/2022	White-tailed eagle	1	-	Adult	
18/05/2022	White-tailed eagle	4	-	Adult	Aggressive interaction.
19/05/2022	White-tailed eagle	1	-	Adult	
25/05/2022	White-tailed eagle	1	-	Adult	
25/05/2022	White-tailed eagle	1	-	Adult	
25/05/2022	White-tailed eagle	1	-	Adult	
01/06/2022	White-tailed eagle	1	-	Adult	
01/06/2022	White-tailed eagle	1	-	Adult	
06/06/2022	White-tailed eagle	1	-	Adult	
08/06/2022	White-tailed eagle	1	-	Adult	
06/07/2022	White-tailed eagle	1	-	Adult	

D.5 Bird Species Index

A total of 57 bird species or signs was recorded at, or adjacent, to the Site during the ornithological surveys.

Table D-6 comprises a list of all these species along with their conservation status.

Table D-6 All bird species recorded at Uisenis Wind Farm (March 2022 to February 2023)

Species	Conservation status	Species	Conservation status
Blackbird	BoCC Green	Kestrel	BoCC Amber
Black-headed gull	BoCC Amber	Lesser redpoll	BoCC Red
Black-throated diver	Annex 1, Schedule 1, BoCC Amber	Mallard	BoCC Amber
Buzzard	BoCC Green	Meadow pipit	BoCC Amber
Chaffinch	BoCC Green	Merlin	Annex 1, Schedule 1, BoCC Red
Coal tit	BoCC Green	Oystercatcher	BoCC Amber
Common crossbill	Schedule 1, BoCC Green	Peregrine falcon	Annex 1, Schedule 1, BoCC Green
Common gull	BoCC Amber	Raven	BoCC Green
Common sandpiper	BoCC Amber	Red grouse	BoCC Green
Common tern	Annex 1, BoCC Amber	Red-breasted merganser	BoCC Amber
Cormorant	BoCC Green	Red-throated diver	Annex 1, Schedule 1, BoCC Green
Cuckoo	BoCC Red	Redwing	Schedule 1, BoCC Amber
Curlew	BoCC Red	Ringed plover	BoCC Red
Dipper	BoCC Amber	Robin	BoCC Green
Dunlin	BoCC Red	Rock dove	BoCC Green
Dunnock	BoCC Amber	Shag	BoCC Red
Feral pigeon	BoCC Green	Skylark	BoCC Red
Fieldfare	Schedule 1, BoCC Red	Snipe	BoCC Amber
Goldcrest	BoCC Green	Snow bunting	Schedule 1, BoCC Amber
Golden eagle	Annex 1, Schedule 1, BoCC Green	Song thrush	BoCC Amber
Golden plover	Annex 1, BoCC Green	Stonechat	BoCC Green
Great black-backed gull	BoCC Amber	Swallow	BoCC Green
Great tit	BoCC Green	Wheatear (Northern)	BoCC Amber
Greenshank	Schedule 1, BoCC Amber	White-tailed eagle	Annex 1, Schedule 1, BoCC Amber
Grey heron	BoCC Green	Willow warbler	BoCC Amber
Greylag goose	BoCC Amber	Woodcock	BoCC Red
Hen harrier	Annex 1, Schedule 1, BoCC Red	Woodpigeon	BoCC Green
Herring gull	BoCC Red	Wren	BoCC Green
Hooded crow	BoCC Green		

ANNEX E. COLLISION RISK ASSESSMENTS

A Collision Risk Analysis Area (CRAA) was created using a 500m buffer around turbines in the north (18 turbines) and south (seven turbines) arrays (**Figure 9.1**). Using the larger 500m area around the turbines accounts for possible inaccuracies in the recording of flightlines and ensures the assessment is precautionary.

The ultimate aim is to have 100% coverage of the turbines and associated CRAA by the viewsheds, however in practice this is often unachievable as a result of the topography of the Site, presence of mature forestry and limited to no access outwith the application boundary. For the proposed development, although some small areas of the CRAA remain 'invisible' at 30m above ground level (**Figure 9.1**), the habitat within these areas is of sufficient similarity such that the survey data collected and subsequently assessed are considered to be representative of the whole CRAA. In addition, there were no records made during any of the surveys which would suggest that this area was of any particular importance to target species. Furthermore, the flying time at risk height (secsHahr^{-1}) for each species is calculated as a single mean activity rate within the entirety of the CRAA. **Table E-1** to **Table E-5** present the parameters which apply to each Collision Risk Model (CRM).

Table E-1 Wind farm parameters

Size of wind farm envelope	816.41	hectares (ha)
Number of turbines	18 (north) and 7 (south)	turbines
Rotor diameter	155	metres (m)
Hub height	122.5	m
Max. rotor depth	1.16	m (at 15° pitch angle)
Max. chord	4.5	m
Pitch	15	degrees (°)
Rotation period (nominal)	6.4	seconds (secs)
Turbine operation time	85	percent (%)
Risk height: lowest	45	m
Risk height: highest	200	m
Flight risk volume	1265434793	m^3

Table E-2 CRM parameters per species

Species	Length (m)	Wingspan (m)	Assumed flight speed, v (ms^{-1})	Avoidance rate	Probability of collision	Bird transit time (secs)
Golden eagle	0.815	2.12	15	0.99	0.0688	0.1320
Greenshank	0.315	0.69	14	0.98	0.0495	0.1057
Herring gull	0.64	1.5	12.8	0.98	0.0648	0.1410
Merlin	0.28	0.56	13	0.98	0.0491	0.1111
Peregrine falcon	0.48	1.1	12.1	0.98	0.0595	0.1359
Red-throated diver	0.73	1.3	17	0.995	0.0595	0.1115
White-tailed eagle	0.9	2.4	13.6	0.95	0.0752	0.1518

Table E-3 Visible area within the CRAA per vantage point (North)

VP	Area (ha)
1	328.62
2	339.78
3	35.79
4	147.28
5	1.82

Table E-4 Visible area within the CRAA per vantage point (South)

VP	Area (ha)
1	0
2	16.26
3	145.99
4	137.37
5	41.80

Birds are assumed to be active during all the daylight hours and this is estimated by calculating the number of hours per day between sunrise and sunset (adjusting for correct latitude) for the survey seasons as defined in **Table E-5** below.

Table E-5 Season definitions per species/species group

Species	Breeding season			Non-breeding season		
	Start date	End date	Hours presumed present	Start date	End date	Hours presumed present
Eagles	1st February	31st August	2838	1st September	31st January	1670
Divers	15th April	31st August	2314	1st September	14th April	2194
Raptors	15th March	31st August	2716	1st September	14th March	1793
Waders	1st April	31st July	2029	1st August	31st March	2479

Outputs for the CRM for the following species are presented in the following order below:

- Golden eagle;
- Greenshank;
- Herring gull;
- Merlin;
- Peregrine falcon;
- Red-throated diver; and
- White-tailed eagle.

E.1 Golden Eagle

Breeding Season 2022 (North)

Table E-6 Golden eagle flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	1.3	11830.5	0.00000001
2	59.9	12232.2	0.00000054
3	6.8	1288.3	0.00000006
4	178.9	5302.1	0.00000162
5	0.0	65.4	0.00000000

Table E-7 Golden eagle mortality estimates

Mean activity in wind farm at rotor height	0.0018	hr^{-1}
Total Combined rotor swept volume	672391.2133	m^3
Bird occupancy	5.1769	hrs/season
Bird occupancy of rotor swept volume	9.9027	bird-sec
No. of transits through rotors	75.0324	per season
Estimated collisions	4.9496	per season
Estimated collisions after correction for operation	4.2071	per season
Estimated collisions after avoidance factor	0.0421	per season
Equivalent to 1 bird every	23.7692	seasons

Breeding Season 2022 (South)

Table E-8 Golden eagle flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
2	0.00	585.23	0.0000000
3	32.08	5255.62	0.0000007
4	136.68	4945.43	0.0000031
5	254.70	1504.65	0.0000058
2	0.00	585.23	0.0000000

Table E-9 Golden eagle mortality estimates

Mean activity in wind farm at rotor height	0.0034	hr^{-1}
Total Combined rotor swept volume	261485.4718	m^3
Bird occupancy	9.6603	hrs/season
Bird occupancy of rotor swept volume	16.4981	bird-sec
No. of transits through rotors	125.0055	per season
Estimated collisions	8.2461	per season
Estimated collisions after correction for operation	7.0092	per season
Estimated collisions after avoidance factor	0.0701	per season
Equivalent to 1 bird every	14.2670	seasons

Non-Breeding Season 2022/2023 (North)

Table E-10 Golden eagle flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	277.63	9858.73	0.000003
2	650.78	10193.50	0.000007
3	437.33	1073.62	0.000005
4	0.00	4418.44	0.000000
5	0.00	54.50	0.000000

Table E-11 Golden eagle mortality estimates

Mean activity in wind farm at rotor height	0.0121	hr^{-1}
Total Combined rotor swept volume	672391.2133	m^3
Bird occupancy	20.2032	hrs/season
Bird occupancy of rotor swept volume	38.6461	bird-sec
No. of transits through rotors	292.8198	per season
Estimated collisions	19.3161	per season
Estimated collisions after correction for operation	16.4187	per season
Estimated collisions after avoidance factor	0.1642	per season
Equivalent to 1 bird every	6.0906	seasons

Non-Breeding Season 2022/2023 (South)

Table E-12 Golden eagle flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
2	0.00	487.69	0.000000
3	64.93	4379.69	0.000002
4	41.10	4121.19	0.000001
5	104.30	1253.88	0.000003
2	0.00	487.69	0.000000

Table E-13 Golden eagle mortality estimates

Mean activity in wind farm at rotor height	0.0020	hr^{-1}
Total Combined rotor swept volume	261485.4718	m^3
Bird occupancy	3.3871	hrs/season
Bird occupancy of rotor swept volume	5.7846	bird-sec
No. of transits through rotors	43.8296	per season
Estimated collisions	2.8913	per season
Estimated collisions after correction for operation	2.4576	per season
Estimated collisions after avoidance factor	0.0246	per season
Equivalent to 1 bird every	40.6907	seasons

E.3 Greenshank

Breeding Season 2022 (North)

Table E-14 Greenshank flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	1.43	7886.99	0.00000002
2	0.00	8154.80	0.0000
3	0.00	858.90	0.0000
4	0.00	3534.75	0.0000
5	0.00	54.50	0.0000

Table E-15 Greenshank mortality estimates

Mean activity in wind farm at rotor height	0.0000	hr^{-1}
Total Combined rotor swept volume	502568.4954	m^3
Bird occupancy	0.0321	hrs/season
Bird occupancy of rotor swept volume	0.0460	bird-sec
No. of transits through rotors	0.4349	per season
Estimated collisions	0.0206	per season
Estimated collisions after correction for operation	0.0175	per season
Estimated collisions after avoidance factor	0.0004	per season
Equivalent to 1 bird every	2851.0410	seasons

E.4 Herring gull

Breeding Season 2022 (North)

Table E-16 Herring gull flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	97.08	11830.48	0.0000009
2	0.00	12232.20	0.0000
3	0.00	1288.35	0.0000
4	0.00	5302.13	0.0000
5	0.00	65.40	0.0000

Table E-17 Herring gull mortality estimates

Mean activity in wind farm at rotor height	0.0007	hr^{-1}
Total Combined rotor swept volume	612953.2620	m^3
Bird occupancy	1.9462	hrs/season
Bird occupancy of rotor swept volume	3.3937	bird-sec
No. of transits through rotors	24.0703	per season
Estimated collisions	1.5069	per season
Estimated collisions after correction for operation	1.2808	per season
Estimated collisions after avoidance factor	0.0256	per season
Equivalent to 1 bird every	39.0369	seasons

Breeding Season 2022 (South)

Table E-18 Herring gull flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
2	0.00	585.23	0.0000
3	0.00	5255.62	0.0000
4	0.00	4945.43	0.0000
5	40.11	1504.65	0.0000009

Table E-19 Herring gull mortality estimates

Mean activity in wind farm at rotor height	0.0003	hr^{-1}
Total Combined rotor swept volume	238370.7130	m^3
Bird occupancy	0.8754	hrs/season
Bird occupancy of rotor swept volume	1.3629	bird-sec
No. of transits through rotors	9.6666	per season
Estimated collisions	0.6052	per season
Estimated collisions after correction for operation	0.5144	per season
Estimated collisions after avoidance factor	0.0103	per season
Equivalent to 1 bird every	97.2034	seasons

E.5 Merlin

Non-Breeding Season 2022/2023 (North)

Table E-20 Merlin flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0.00	11830.48	0.0000
2	102.00	12232.20	0.0000009
3	0.00	1288.35	0.0000
4	0.00	5302.13	0.0000
5	0.00	65.40	0.0000

Table E-21 Merlin mortality estimates

Mean activity in wind farm at rotor height	0.0008	hr^{-1}
Total Combined rotor swept volume	490680.9051	m^3
Bird occupancy	1.3500	hrs/season
Bird occupancy of rotor swept volume	1.8845	bird-sec
No. of transits through rotors	16.9575	per season
Estimated collisions	0.8007	per season
Estimated collisions after correction for operation	0.6806	per season
Estimated collisions after avoidance factor	0.0136	per season
Equivalent to 1 bird every	73.4615	seasons

E.6 Peregrine falcon

Breeding Season 2022 (North)

Table E-22 Peregrine falcon flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0.00	11830.48	0.0000
2	0.00	12232.20	0.0000
3	7.80	1288.35	0.00000007
4	0.00	5302.13	0.0000
5	0.00	65.40	0.0000

Table E-23 Peregrine falcon mortality estimates

Mean activity in wind farm at rotor height	0.0001	hr^{-1}
Total Combined rotor swept volume	558609.9923	m^3
Bird occupancy	0.1563	hrs/season
Bird occupancy of rotor swept volume	0.2484	bird-sec
No. of transits through rotors	1.8278	per season
Estimated collisions	0.1051	per season
Estimated collisions after correction for operation	0.0893	per season
Estimated collisions after avoidance factor	0.0018	per season
Equivalent to 1 bird every	559.6757	seasons

E.7 Red-throated diver

Breeding Season 2022 (North)

Table E-24 Red-throated diver flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	45.38	9858.73	0.0000005
2	0.00	10193.50	0.00
3	0.00	1073.62	0.00
4	40.22	4418.44	0.0000004
5	0.00	65.40	0.00

Table E-25 Red-throated diver mortality estimates

Mean activity in wind farm at rotor height	0.0008	hr^{-1}
Total Combined rotor swept volume	643521.3512	m^3
Bird occupancy	1.7540	hrs/season
Bird occupancy of rotor swept volume	3.2110	bird-sec
No. of transits through rotors	28.8109	per season
Estimated collisions	1.6432	per season
Estimated collisions after correction for operation	1.3967	per season
Estimated collisions after avoidance factor	0.0070	per season
Equivalent to 1 bird every	143.1934	seasons

Breeding Season 2022 (South)

Table E-26 Red-throated diver flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
2	0.00	487.69	0.0000
3	0.00	4379.69	0.0000
4	0.00	4121.19	0.0000
5	17.96	1504.65	0.0000005

Table E-27 Red-throated diver mortality estimates

Mean activity in wind farm at rotor height	0.0002	hr^{-1}
Total Combined rotor swept volume	250258.3032	m^3
Bird occupancy	0.3911	hrs/season
Bird occupancy of rotor swept volume	0.6393	bird-sec
No. of transits through rotors	5.7362	per season
Estimated collisions	0.3272	per season
Estimated collisions after correction for operation	0.2781	per season
Estimated collisions after avoidance factor	0.0014	per season
Equivalent to 1 bird every	719.2063	seasons

E.8 White-tailed Eagle

Breeding Season 2022 (North)

Table E-28 White-tailed eagle flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	384.73	11830.48	0.0000035
2	20.90	12232.20	0.0000002
3	214.42	1288.35	0.0000019
4	226.12	5302.13	0.0000020
5	0.00	65.40	0.0000

Table E-29 Golden eagle mortality estimates

Mean activity in wind farm at rotor height	0.0062	hr^{-1}
Total Combined rotor swept volume	701261.0753	m^3
Bird occupancy	17.7319	hrs/season
Bird occupancy of rotor swept volume	35.3751	bird-sec
No. of transits through rotors	233.0142	per season
Estimated collisions	16.8759	per season
Estimated collisions after correction for operation	14.3446	per season
Estimated collisions after avoidance factor	0.7172	per season
Equivalent to 1 bird every	1.3943	seasons

Breeding Season 2022 (South)

Table E-30 White-tailed eagle flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
2	73.46	585.23	0.0000017
3	19.18	5255.62	0.0000004
4	228.07	4945.43	0.0000052
5	241.19	1504.65	0.0000055

Table E-31 White-tailed eagle mortality estimates

Mean activity in wind farm at rotor height	0.0045	hr^{-1}
Total Combined rotor swept volume	272712.6404	m^3
Bird occupancy	12.8183	hrs/season
Bird occupancy of rotor swept volume	22.8314	bird-sec
No. of transits through rotors	150.3893	per season
Estimated collisions	10.8919	per season
Estimated collisions after correction for operation	9.2581	per season
Estimated collisions after avoidance factor	0.4629	per season
Equivalent to 1 bird every	2.1603	seasons

Non-Breeding Season 2022/2023 (North)

Table E-32 White-tailed eagle flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
1	0.00	9858.73	0.0000
2	58.45	10193.50	0.0000006
3	80.81	1073.62	0.0000009
4	0.00	4418.44	0.0000
5	0.00	54.50	0.0000

Table E-33 White-tailed eagle mortality estimates

Mean activity in wind farm at rotor height	0.0012	hr^{-1}
Total Combined rotor swept volume	701261.0753	m^3
Bird occupancy	2.0600	hrs/season
Bird occupancy of rotor swept volume	4.1098	bird-sec
No. of transits through rotors	27.0709	per season
Estimated collisions	1.9606	per season
Estimated collisions after correction for operation	1.6665	per season
Estimated collisions after avoidance factor	0.0833	per season
Equivalent to 1 bird every	12.0011	seasons

Non-Breeding Season 2022/2023 (South)

Table E-34 White-tailed eagle flight activity

VP	Seconds at risk height	Observation effort (HaHr)	Flying time at risk height (secsHahr^{-1})
2	0.00	487.69	0.0000
3	66.95	4379.69	0.0000018
4	16.64	4121.19	0.0000005
5	2094.89	1253.88	0.0000568

Table E-35 White-tailed eagle mortality estimates

Mean activity in wind farm at rotor height	0.0210	hr^{-1}
Total Combined rotor swept volume	272712.6404	m^3
Bird occupancy	35.0821	hrs/season
Bird occupancy of rotor swept volume	62.4867	bird-sec
No. of transits through rotors	411.5973	per season
Estimated collisions	29.8098	per season
Estimated collisions after correction for operation	25.3383	per season
Estimated collisions after avoidance factor	1.2669	per season
Equivalent to 1 bird every	0.7893	seasons

Uisenis Wind Farm White-tailed Eagle Population Model

Technical Appendix 9.3

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CONTENTS

1 INTRODUCTION

A population model has been developed to aid investigation into the population-level impacts of additional mortality on white-tailed eagles as a consequence of predicted annual collision rates associated with the proposed Uisenis Wind Farm on the Isle of Lewis (the 'proposed development') (see EIA Report Chapter 9: Ornithology and Technical Appendix 9.1 for further details).

The model is similar to the one developed on behalf of NatureScot to predict the population trajectory of white-tailed eagles in Scotland after a series of reintroduction programmes since the mid-1970s (Sansom *et al.* 2016[1]).

2 MODEL METHODS AND ASSUMPTIONS

Sansom *et al.* (2016) show how alternative scenarios can be modelled to obtain predicted rates of population growth over a duration of up to 25 years, with varying rates of additional mortality on adults and/or sub-adults due to identified threats such as illegal killing or wind farm collision mortality. The predicted population growth rate and the expected number of occupied territories after a period of 25 years can be reviewed whilst varying levels of additional mortality. The Sansom *et al.* (2016) used the Population Viability Analysis (PVA) software Vortex (Lacy et al., 2005[2]) to model population growth covering the period over which there were observed estimates of the number of territorial pairs (1975-2014). They also ran predictive models for periods of 10 (2025) and 25 (2040) years.

A similar PVA, structured as a stochastic Leslie matrix model, was used for the current assessment to explore how additional white-tailed eagle mortality may affect predicted growth rates of the appropriate reference populations, in this case, the Outer Hebrides (equivalent to the Natural Heritage Zone 3 population) and the national (Scottish) populations.

There are four key demographic parameters in the model:

- number of occupied ranges;
- mean number of young fledged per pair per year;
- annual survival rate of young birds; and
- annual survival rate of adult, range-holding birds.

Estimates for the first two are available with a reasonably high degree of confidence, particularly for the Outer Hebrides population. The latter two (survival) parameters are more difficult to estimate at the level of regional populations and therefore the values in Sansom *et al.* (2016) have been used.

The parameters considered in this, and for comparison, the Sansom *et al.* (2016) model for assessing the potential impacts of the proposed development, are outlined in **Table 1** below.

[1] Sansom, A., Evans, R. & Roos, S. 2016. Population and future range modelling of reintroduced Scottish white-tailed eagles (Haliaeetus albicilla). Scottish Natural Heritage Commissioned Report No. 898.
[2] Lacy, R. C., Borbat, M. & Pollak, J. P. 2005. Vortex: A stochastic simulation of the extinction process. Chicago Zoological Society, 9.50, Brookfield, IL.

During population projections, to simulate environmental stochasticity, at each time step demographic rates were drawn at random from appropriate probability distributions (beta for survival, bounded at 0-1 and a stretched beta bounded at 0 and 3 for productivity) and used to estimate the population at the following time step. Since small populations are at an elevated risk due to chance events, demographic stochasticity was also incorporated using a binomial method. The simulations were run as density independent with no feedback between population size and demographic rates.

Table 1 Parameters used in the NatureScot and Uisenis White-tailed Eagle Population Models

Parameter	NatureScot Model	Values to be used in Uisenis Model	Rationale
Number of breeding pairs within Outer Hebrides	n/a	50	Information provided by Robin Reid and RSPB: 50-51 pairs monitored in Lewis, Harris and Uists in 2022. Some other pairs considered likely so an estimated 50-55 pairs present in Outer Hebrides.
Number of breeding pairs National population	90 (in 2014)	150	Scottish Raptor Monitoring Scheme (SRMS) monitored 123 pairs in 2020 (Challis *et al.* 2022[3]). Only 33 pairs were monitored in Lewis, Harris and the Uists in 2020, but 50 pairs were monitored in 2022 (see above) . This means that the current national population is likely to be at least 150 pairs, based on current growth trend and assuming not all pairs in Scotland are monitored.
Carrying capacity	National population: None, 2,000, 3,000 and 4,000 individuals Maximum 64-78 breeding pairs predicted for Western Isles as separate exercise in report, but not incorporated into PVA.	None	Most of the models presented in the NatureScot report did not specify any density-dependence in either breeding success or survival, and they assumed an infinite amount of available habitat and nest sites (i.e. no carrying capacity was set). Report found no evidence of density-dependent population growth nationally in Scotland. Results showed that setting the carrying capacity to an arbitrary level of 4,000 individuals had very little effect on the total number of breeding pairs, over the timescale considered.
Survival rate from fledging to age 5	**Released:** 0-3: 0.785 ± 0.032 3-4: 0.809 ± 0.062 4-5: 0.757 ± 0.060 5+: 0.928 ± 0.016	0-3: 0.874 ± 0.016 3-4: 0.890 ± 0.037 4-5: 0.855 ± 0.036 5+: 0.961 ± 0.008	From NatureScot report survival estimates by age class for released and wild-bred white-tailed eagles in Scotland based on the model with the best fit to the data. Wild bird rates used for Outer Hebrides and National populations in this model on basis that natural recruitment is now the primary means of population growth rather than further captive releases.

[3] Challis, A., Wilson, M.W., Eaton, M.A., Stevenson, A., Stirling-Aird, P., Thornton, M. & Wilkinson, N.I. (2022). Scottish Raptor Monitoring Scheme Report 2020. BTO Scotland, Stirling.

Parameter	NatureScot Model	Values to be used in Uisenis Model	Rationale
	Wild: 0-3: 0.874 ± 0.016 3-4: 0.890 ± 0.037 4-5: 0.855 ± 0.036 5+: 0.961 ± 0.008		
Initial population in each age class (Outer Hebrides)	n/a	0-1: 24 1-2: 20 2-3: 18 3-4: 14 4-5: 12 5+: 100	Total numbers in each age class (188 total individuals).
Initial population in each age class (National)		0-1: 72 1-2: 60 2-3: 54 3-4:42 4-5: 36 5+ 300	Total numbers in each age class (564 total individuals).
% females and males of breeding age which breed each year	82 ± 12.26	82 ± 12.26	Assumed in NatureScot PVA to be the percentage of females hatching at least one egg and thereafter producing at least one fledgling.
Age of first breeding	5	5	NatureScot PVA estimated age at first breeding of wild-bred birds showed that on average wild birds bred at five years of age, with males and females showing very similar average ages of first breeding (4.9 and 5.0).
Productivity: Number of fledglings produced per *successful* breeding attempt (time period and mean ± SD of chicks fledged per successful breeding attempt)	National population: 1975-1984: 0.000 ± 0.000 1985-1994: 1.506 ± 0.359 1995-2004: 1.524 ± 0.191	n/a	The number of fledglings produced per successful breeding attempt was used in the NatureScot PVA. For those analyses, data from the years 1983 to 2014 were used. This is a slight

Parameter	NatureScot Model	Values to be used in Uisenis Model	Rationale
	2005-2014: 1.382 ± 0.080		difference compared with Evans et al. (2009[4]), who reported the number of fledglings produced per territorial pair (i.e. including pairs where the final outcome was not known, so the minimum number of young produced was spread across all pairs). Therefore, the NatureScot PVA reports a slightly higher productivity than some figures in Evans et al. (2009).
Productivity: Number of chicks fledged per territorial pair	National: 0.673	National: 0.673 Outer Hebrides: 0.720 ± 0.192	National: NatureScot report stated that since 2006, the number of chicks fledged per breeding attempt appears to have remained relatively constant at an average of 0.673 chicks fledged per territorial pair. Outer Hebrides: Mean chicks fledged per pair occupied home range monitored in Lewis and Harris (data from SRMS annual reports 2016 to 2020).

[4] Evans, R. J., Wilson, J. D., Amar, A., Douse, A., MacLennan, A., Ratcliffe, N. & Whitfield, D. P. (2009). Growth and demography of a re-introduced population of White-tailed Eagles Haliaeetus albicilla. Ibis, 151, 244-254.

3 MODEL RESULTS

3.1 Baseline Scenario

The baseline scenario represents the predicted population growth of the Outer Hebrides and national white-tailed eagle populations, without any additional mortality associated with the proposed development.

3.1.1 Outer Hebrides Population

Under the baseline scenario, an average annual growth rate of 1.087 (8.7%) was predicted. By year 25, the number of pairs is predicted to increase from 50 to 400, with a total of 1,500 individuals (up from an initial 188 individuals) (Figure 1).

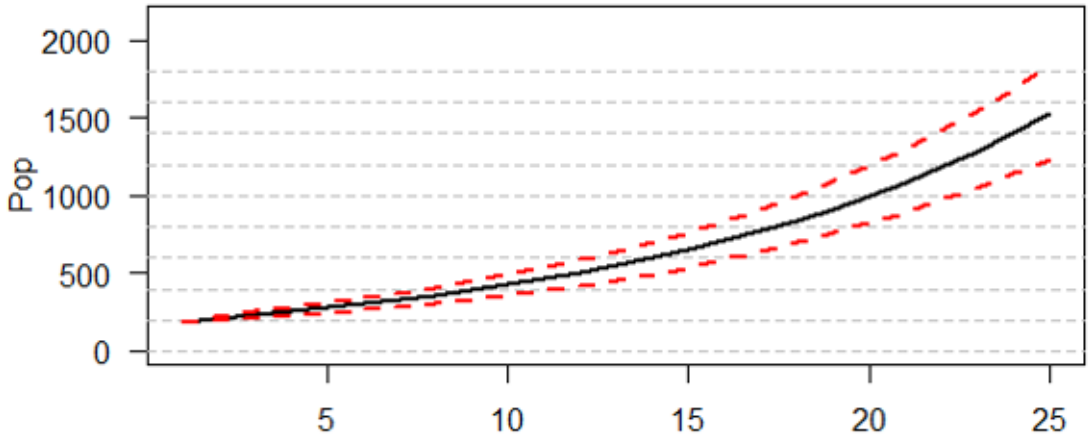


Figure 1. Projected white-tailed eagle population on the Outer Hebrides for a period of 25 years. The average population prediction is shown in black, 95% confidence intervals in red (dashed).

3.1.2 National Population

Under the baseline scenario, an average annual growth rate of 1.0877 (8.7%) was predicted. By year 25, the number of pairs is predicted to increase from 150 to 1,200, with a total of 4,550 individuals (up from an initial 564 individuals) (Figure 2).

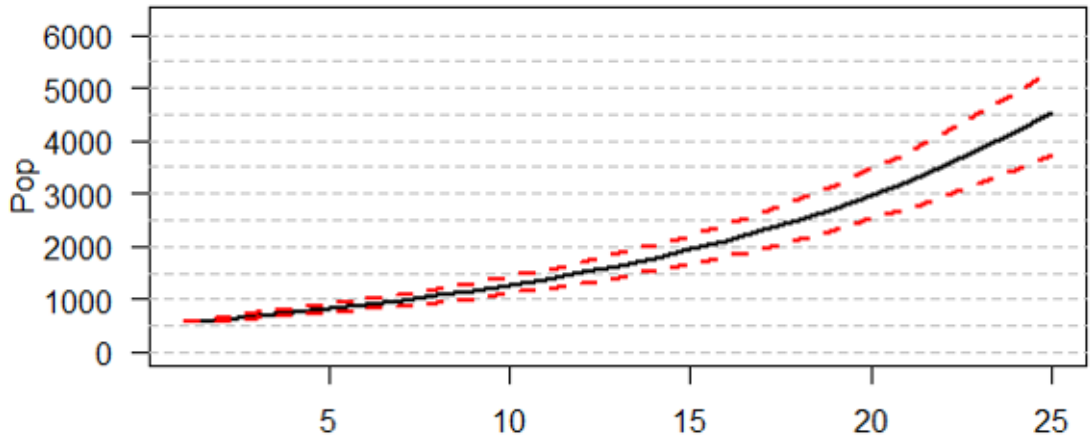


Figure 2. Projected national white-tailed eagle population for a period of 25 years. The average population prediction is shown in black, 95% confidence intervals in red (dashed).

3.2 Additional Mortality

Additional annual mortality of 1, 2, 3, 4 and 5 individuals per year was added to the model, split across each age class in proportion to their presence. Since this would have required applying mortalities of less than one individual to the individual age classes, instead the effect was applied by reducing the relevant survival rates by the equivalent amount.

Outputs are presented as counterfactuals of population size (CPS) and population growth (CPG). The black line represents the mean, with red/green lines representing 95% confidence intervals.

3.2.1 Outer Hebrides Population

The results show that, as an example, at an additional annual mortality of two individuals, the reduction in population size is 24 % (CPS = 0.7599), and the reduction in growth rate is 1.11 % (CPGR = 0.9889).

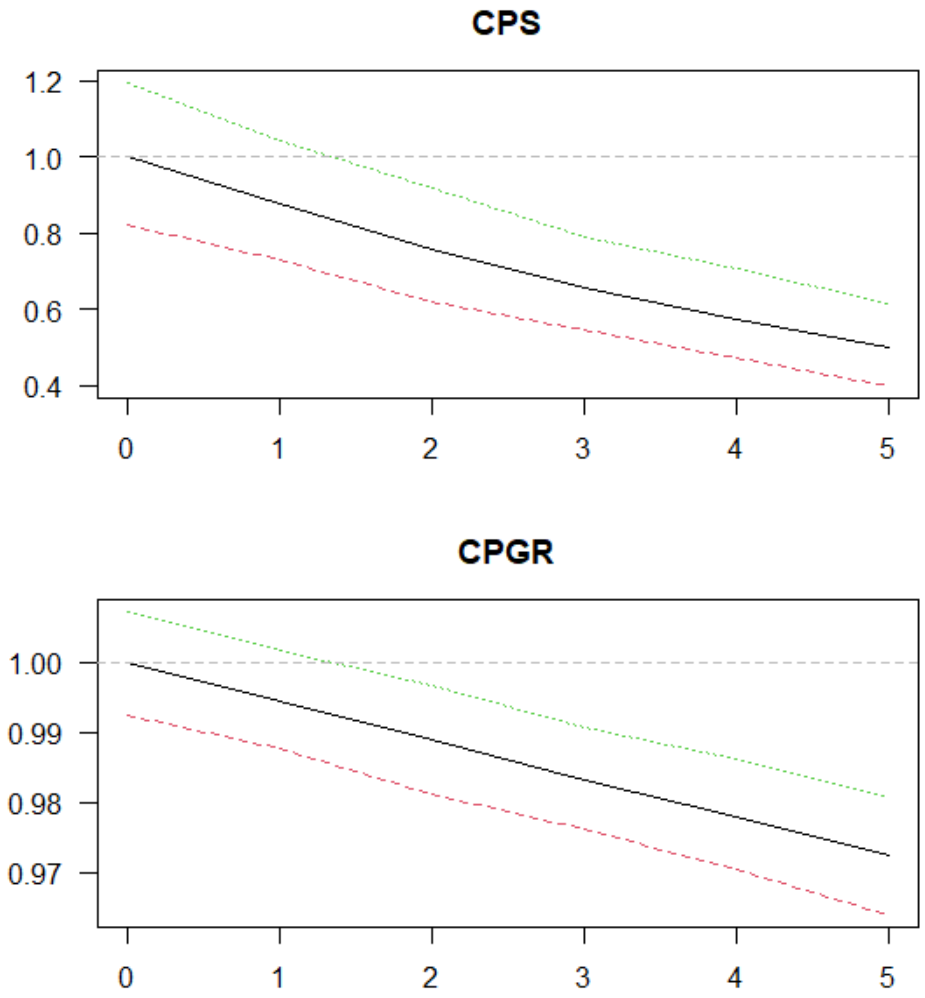


Table 1: Predicted CPS (Outer Hebrides)

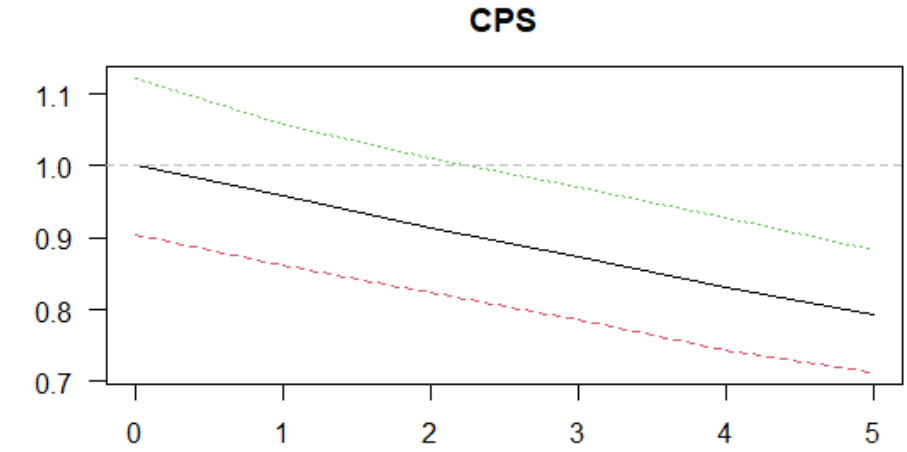
Mortality	CPS	2.50%	97.50%
0	1.0022	0.8240	1.1945
1	0.8753	0.7312	1.0430
2	0.7599	0.6209	0.9198
3	0.6581	0.5468	0.7910
4	0.5737	0.4716	0.7049
5	0.4999	0.3993	0.6143

Table 2: Predicted CPGR (Outer Hebrides)

Mortality	CPGR	2.50%	97.50%
0	0.9999	0.9923	1.0071
1	0.9945	0.9876	1.0017
2	0.9889	0.9811	0.9967
3	0.9832	0.9761	0.9907
4	0.9778	0.9704	0.9861
5	0.9724	0.9639	0.9807

3.2.2 National Population

The results show that as an example, at additional annual mortality of two individuals, the reduction in population size is 8.6 % (CPS = 0.9140), and the reduction in growth rate is 0.36 % (CPGR = 0.9964).



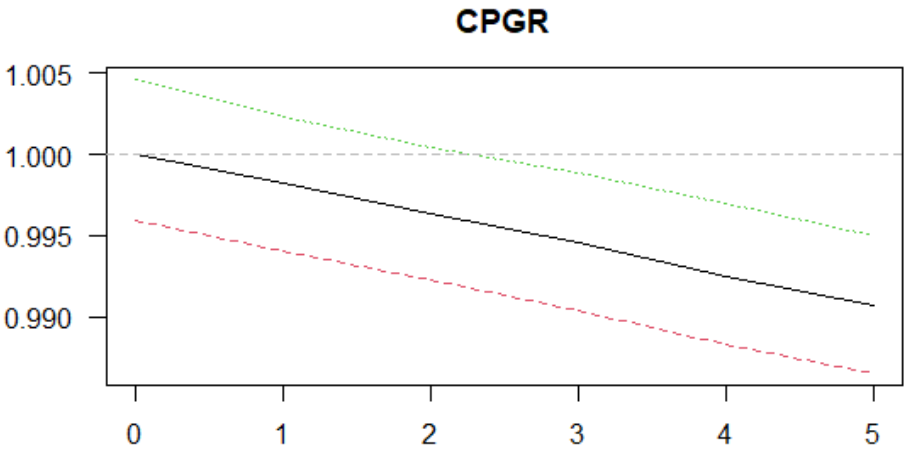


Table 3: Predicted CPS (national)

Mortality	CPS	2.50%	97.50%
0	1.0016	0.9030	1.1213
1	0.9587	0.8616	1.0582
2	0.9140	0.8236	1.0113
3	0.8746	0.7858	0.9709
4	0.8301	0.7446	0.9266
5	0.7930	0.7129	0.8822

Table 4: Predicted CPGR (national)

Mortality	CPGR	2.50%	97.50%
0	1.0000	0.9959	1.0046
1	0.9983	0.9941	1.0023
2	0.9964	0.9923	1.0005
3	0.9946	0.9904	0.9988
4	0.9925	0.9883	0.9970
5	0.9907	0.9866	0.9950

Uisenis Wind Farm

Golden Eagle Population Model

Technical Appendix 9.4

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Document Quality Record

Version	Status	Person Responsible	Date
0.1	Draft	R. Dewar	18/07/2023
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0.3	Updated	R. Dewar	24/07/2023
1	Internal Approval	R. Dewar	26/07/2023

CONTENTS

1 INTRODUCTION

Population modelling has been used to assess potential impacts for some Scottish wind farm projects where golden eagle has been identified as a sensitive feature, and has commonly been based on the golden eagle population modelling (GEPM) methods used in Whitfield *et al.* (2004[1]; 2006[2], 2008[3]); Fielding and Haworth (2010[4]) and Haworth (2014[5]). The GEPM procedure has been used here for assessing the potential effects on golden eagles due to the proposed Uisenis Wind Farm, Isle of Lewis ('the proposed development'). The model uses a deterministic matrix formulation and can be used to explore how additional eagle mortality may affect predicted growth rates of the appropriate reference populations, in this case, the Natural Heritage Zone (NHZ) 3: Coll, Tiree & the Western Isles golden eagle population.

There are four key parameters in the model:

- number of occupied ranges;
- mean number of young fledged per pair per year;
- annual survival rate of young birds; and
- annual survival rate of adult, range-holding birds.

Estimates for the first two are available with a reasonably high degree of confidence for the NHZ 3 population, however the latter two parameters are more difficult to estimate at the level of regional populations and therefore the values for these have been informed by studies conducted on other populations, in combination with regional information, such as trends in the number of occupied ranges, which can be used to modify their values (Haworth 2014[5]).

Only the female half of the population is modelled. Therefore, calculated collision rates were halved, assuming a 1:1 sex ratio, equal activity and equal risk of collision (as per O' Toole *et al.* 2002[6]; Whitfield *et al.* 2008[3]).

Fielding and Haworth (2010[4]) describe how alternative scenarios can be modelled to obtain predicted rates of population growth over a duration of 25 years, with or without a proposed wind farm and with varying rates of additional mortality on adults and/or sub-adults. The predicted population growth rate, the expected number of occupied territories after a period of 25 years and the time to

[1] Whitfield, D.P., Fielding, A.H., McLeod, D.R.A. & Haworth, P.F. 2004. Modelling the effects of persecution on the population dynamics of golden eagles in Scotland. Biological Conservation 119: 319–333.
[2] Whitfield, D. P., Fielding, A. H., McLeod, D. R. A., Haworth, P. F. & Watson, J. 2006. A conservation framework for the golden eagle in Scotland: refining condition targets and assessment of constraint influences. Biological Conservation, 130(4), 465-480.
[3] Whitfield, D P, Fielding, A H, McLeod, D R A and Haworth, P F (2008). A conservation framework for golden eagles: implications for their conservation and management in Scotland. Scottish Natural Heritage.
[4] Fielding, A. and Haworth, P. (2010). Golden eagles and wind farms: A report created under an SNH Call-of-Contract Arrangement. Haworth Conservation.
[5] Haworth, P. (2014). The Dunmaglass Wind Farm Regional Eagle Conservation Management Plan. Haworth Conservation.
[6] O'Toole, L., Fielding, A.H. & Haworth, P.F. (2002). Re-introduction of the golden eagle into the Republic of Ireland. Biological Conservation, 103, 303-312.

reach a notional population target (e.g. the level associated with the wider concept of "Favourable Conservation Status" outlined below) can be reviewed whilst varying levels of additional mortality.

The parameter ranges considered in the GEPM for assessing the potential impacts of the Development and other wind farms cumulatively are outlined in turn in **Table 1** and detailed in the text below.

Table 1 Parameters used in the GEPM.

Parameter	Golden Eagle Conservation Framework Report 2008	Values to be used in Proposed Development GEPM	Rationale
Number of pairs within NHZ 3	81	95	A total of 81 active territories (equating to number of pairs) in NHZ 3 was estimated by Whitfield *et al.* (2008[3]) using the 2003 national census results. The Scottish Raptor Monitoring Scheme (SRMS) report (Challis *et al.* 2016[7]) covering the most recent national census in 2015 recorded 95 home ranges in Lewis & Harris and Uist occupied by pairs.
Total number of ranges within NHZ 3	93	101	Number of known territories in 2003 and the population cap used in GEPM for NHZ 3 by Whitfield *et al.* (2008[3]) was 93. The Scottish Raptor Monitoring Scheme (SRMS) report (Challis *et al.* 2016) stated that 101 home ranges in Lewis & Harris and Uist were checked in 2015.
Favourable Conservation Status of NHZ 3: Occupancy	87%	94%	87% and 94% occupancy rate of total available ranges within NHZ 3, using the 2003 and 2015 national census data respectively.
S2 – adult survival (note this is the annual rate)	0.9512	0.9512	0.9512 was used by Whitfield *et al.* (2006[2], 2008[3]) and Haworth (2014). This is a precautionary estimate which equates to a minimal adult survival rate (20 years of occupation) which predicts stability or expansion for any credible measure of productivity which has been identified. No NHZ-specific information is available.
S1 – survival rate from fledging to age 4 (note this is not the annual rate but the product of four annual rates)	0.4	0.195 0.330 0.400	0.195 for ages 0-4 combined is the value extrapolated from the model, based on the best fit of a stable population from 2015 onwards, using the predicted adult survival (0.9512) and the five-year mean productivity rate from 2016 to 2020 (0.5338), taken from SRMS annual reports[8]. This is considered to be a precautionary worst-case representation of a static future population trend. 0.330 for ages 0-4 combined is the value extrapolated from the model, based on the best fit of a population increase from 81 pairs in 2003 to 95 pairs in 2015, using the predicted adult survival

[7] Challis, A., Wilson, M.W., Holling, M., Roos, S., Stevenson, A. & Stirling-Aird, P. (2016). Scottish Raptor Monitoring Scheme Report 2015. BTO Scotland, Stirling. Available at: https://raptormonitoring.org/annual-report

[8] https://raptormonitoring.org/annual-report

Parameter	Golden Eagle Conservation Framework Report 2008	Values to be used in Proposed Development GEPM	Rationale
			(0.9512) and the 2003-2015 mean productivity rate (0.4232 – see below). Assumes continuation of this trend until capacity is reached. 0.4 was used by Whitfield *et al.* (2008[3]) and Haworth (2014[5]). This equates to a 40% survival from fledging to adulthood (annual survival of 0.795[4]). This was considered to be the minimal sub-adult survival rate which would predict stability or expansion for any credible measure of productivity which has been identified.
Mean fledging rate per pair within NHZ 3 (both sexes)	0.33 (mean) 0.35 (2003)	0.4232 0.4539 0.5338	For the 2003 national census, the productivity rate for NHZ 3 was given as 0.35 (Whitfield *et al.* 2008[3]), with the long-term mean (1982 to 2003) given as 0.33. Mean fledging rate of Lewis & Harris and Uist (NHZ 3) for all years during and between national censuses (2003 to 2015) was 0.4232, taken from SRMS annual reports. Long-term mean fledging rate for NHZ 3 (2003 to 2020) was 0.4539, taken from SRMS annual reports. Most recent five-year mean fledging rate for NHZ 3 (2016 to 2020) was 0.5338, taken from SRMS annual reports.

2 CONSERVATION STATUS OF NHZ 3 POPULATION

Whitfield *et al.* (2008[3]) proposed three tests that should be applied to a golden eagle population to assess its conservation status. All three tests must be passed to achieve a favourable status.

1. Regionally, at least 66% of known territories should be occupied by pairs.
2. Demographic parameter values should allow the maintenance of a stable or expanding population. With limited information available on survival rates, an annual adult survival of 95.12% was adopted as the lower limit for a favourable conservation status classification. This equates to an expected average of 20 years of territory occupation by an adult. A minimum acceptable rate for sub-adult survival of 40% (across the first four years of life which equates to an annual survival rate of 79.5%) was used. Under these survival rates an average reproductive rate of about 0.28 fledglings per pair per year is the minimum required to maintain a stable population (i.e. a growth rate of 1). It follows, however, that if these parameter values varied regionally then lower rates in one parameter could be compensated for, to a degree, by higher rates in another parameter.
3. Compare the predicted population projections from the population model against the observed trends in the number of occupied territories from previous censuses. If the observed population trend failed to match predictions then the survival rates applied in the Level 2 test were probably too high (for example, if stability or increase was predicted but decline was observed). Under

these circumstances it would be assumed that survival was below the lower limit for favourable status and the population would be deemed to have failed the Level 3 test.

The NHZ 3 golden eagle population was assessed by Whitfield *et al.* (2008[3]) as being in favourable conservation status, fulfilling the criteria for the three tests:

1. The population passed the Level 1 test because, in 2003, 81 ranges out of 93 known at that time were occupied, giving an occupation rate of 87%.
2. For the Level 2 test, Whitfield *et al.* (2008[3]) ran a population model for the NHZ with a starting population set at the 2003 level, and with a capped population set at the number of known territories. The output was the mean predicted number of occupied territories after 21-30 years averaged over 100 simulated runs using randomly generated parameter values. NHZ 3 passed both Level 2 tests with observed fledging rates of 0.33 (mean for the 1982, 1992 and 2003 national surveys) and 0.35 for the 2003 national survey (i.e. above the minimum mean reproductive rate of 0.28).
3. The Level 3 test was passed because the productivity rates (0.33-0.35 per pair), which permit population expansion, was expressed by an increasing population, from 62 pairs in 1992, to 81 pairs in 2003.

3 GEPM INPUT PARAMETERS

3.1 Level 1 Test: Number of Currently Occupied Ranges

In Whitfield *et al.* (2008[3]) a target of 66% occupation of known territories was prescribed before each NHZ population could be considered to be in favourable condition. For the NHZ 3 population, this would be 67 out of a possible 101 known territories. Evidence in 2015 suggested that 95 territories were occupied (94% occupation).

3.2 Level 2 Test: Survival Rates

Survival rates specific to the NHZ 3 population are unknown and so precautionary values for S1 (sub-adult) and S2 (adult) survival rates were used in the model, taken from the sources detailed below.

- **S2 survival: 0.9512** was used in Whitfield *et al.* (2008[3]) for various NHZs. This was defined as the lowest rate for attaining favourable conservation status used in Whitfield *et al.* (2006[2]).
- **S1 survival:** a four-year survival rate of **0.330** for survival from ages 0-4 (equating to annual survival of 0.758) was derived using the model to match the observed increased population growth from 2003 to 2015, with conservative adult survival (0.9512) and the mean observed productivity rates for this period (0.4232). This is lower than the national mean survival rate of 0.400 used in the Golden Eagle Conservation Framework model, which was defined as the lowest rate for attaining favourable conservation status used in Whitfield *et al.* (2006[2]), in combination with the S2 survival rate above.

Using the S1 survival rate = 0.330 in the model as per Whitfield *et al.* (2008[3]), the current NHZ 3 population would be expected to reach a carrying capacity of 101 pairs within five years (i.e. around 2028 onwards), whereafter, all excess individuals would have to be recruited to neighbouring NHZ populations to breed. To simulate this in the GEPM a cap of 101 was placed on the number of pairs.

Once this population size was achieved in the model the growth rate becomes 1.00 (i.e. stable). Due to the format of the population model, until the stable age structure has been achieved (which typically takes about 6 to 7 time steps) the annual population growth rate estimates vary around the ultimate long term rate. However as these initial rates are slightly unreliable and unrepresentative of the long-term trend stable growth rate (Caswell 2001[9]), the values reported below (**Table 2**) are given as the long-term rate (i.e. once the carrying capacity has been reached) with an indication of the year this is predicted to be reached. For projections when the carrying capacity was not attained the growth rate was the average calculated after omitting the first 5 time steps.

3.3 Level 2 Test: Mean Fledging Rate

The mean fledging rate of 0.4232 was based on the long-term mean value within NHZ 3 from 2003 to 2015, as per **Table 1**. The most recent five-year mean (2016 to 2020) was 0.5338.

4 NHZ 3: RESULTS OF THE GEPM

4.1 Baseline Scenario

With the more recent data now available, an updated evaluation of the current conservation status of the NHZ 3 population can be made, within the context of the three tests described above.

1. Occupancy: based on results of the most recent census, 95 out of a possible 101 territories are likely to be currently occupied within NHZ 3, resulting in an occupancy rate of 94%, thereby exceeding the minimum 66% occupancy rate: **Favourable Conservation Status achieved**.
2. Using the mean productivity (0.4232) and survival rates which best fitted the observed growth from 2003 to 2015 (S1 = 0.330; s2 = 0.9512) population growth would rapidly stabilise following attainment of the carrying capacity (100% territory occupancy) within three years: **Favourable Conservation Status achieved**.
3. The predicted growth rates correspond to the steady growth between the 2003 census and the 2015 population estimate (an increase in the NHZ 3 population from 81 to 95 pairs): **Favourable Conservation Status achieved**.

This means that on the basis of the most recent data, the NHZ 3 population is in **Favourable Conservation Status**.

In **Table 2** below, a growth rate above 1.00 indicates population increase, a rate below 1.00 indicates decline and a rate of 1.00 means stability (in practice this reflects attainment of the carrying capacity). A rate of 1.05 would indicate 5% annual growth. Note that the mean growth rate only applies until the population attains the carrying capacity (101 pairs), after which the population would be assumed to remain stable with an average growth rate of 1.0. The most realistic scenario, based on known demographic parameters (S1 survival rate of 0.330 and long-term mean fledging rate of 0.4539), has been highlighted red.

[9] Caswell, H. (2001) Matrix Population Models. Sinauer Associates, Inc., Sunderland, MA.

Table 2 Predicted mean annual growth rate of NHZ 3 golden eagle population under baseline scenario (excluding any effects associated with the proposed development)

S1 survival rate	Mean fledging rate		
	0.4232	**0.4539**	**0.5338**
0.195	0.992	0.994	1.002
0.330	>=1.00 (from yr 5)	>=1.00 (from yr 3)	>=1.00 (from yr 2)
0.400	>=1.00 (from yr 2)	>=1.00 (from yr 2)	>=1.00 (from yr 2)

When considering this scenario (highlighted red), without additional mortality due to predicted collisions at the proposed development alone or cumulatively, the population would reach its estimated carrying capacity within three years. Once all available territories are occupied it is reasonable to suppose that individuals unable to acquire territories would emigrate to other NHZs. The model indicates the number of breeding age adult emigrants would be around 2 per year.

4.2 With Additional Mortality due to Predicted Collisions at the Proposed Development

The collision model mean annual mortality prediction of 0.995 birds per year (i.e. one every year) due to the proposed development was included in the GEPM as an additional source of mortality to the NHZ 3 population (note this was halved to account for female only collisions under the assumption of equal collision risk for both sexes). Using the long-term mean fledging rate of 0.4539, and an S1 survival rate of 0.330, the population limit of 101 pairs would be reached one year later than in the baseline prediction (4 years instead of 3; **Table 3**).

Table 3 Predicted mean annual growth rate of NHZ 3 golden eagle population with a mean annual collision rate of 0.995 (both sexes) associated with the proposed development.

S1 survival rate	Mean fledging rate		
	0.4232	**0.4539**	**0.5338**
0.195	0.986	0.989	0.998
0.330	>=1.00 (from yr 7)	>=1.00 (from yr 4)	>=1.00 (from yr 2)
0.400	>=1.00 (from yr 3)	>=1.00 (from yr 3)	>=1.00 (from yr 2)

This demonstrates that the NHZ 3 golden eagle population would be expected to continue to expand, despite the additional collision mortality predicted to be associated with the proposed development.

4.3 With NHZ 3 Cumulative Annual Collision Rate

A worst-case cumulative annual collision rate for both sexes combined for all other installed, constructed, consented or application stage wind farm projects, including the proposed development, within NHZ 3 was estimated to be 1.527 collisions per year (assuming all collisions are attributable to NHZ 3 adult birds; note for the female only GEPM this equates to mortality of 0.763 females).

Using this value, the population limit of 101 pairs would be reached two years later than in the baseline prediction (5 years instead of 3; **Table 4**). This suggests that the NHZ 3 golden eagle population is likely to continue to increase despite the additional mortality predicted to be associated with collisions with wind turbines at the proposed development and other projects within NHZ 3.

Table 4 Predicted mean annual growth rate of NHZ 3 golden eagle population with a mean annual cumulative collision rate of 1.527 associated with all NHZ 3 projects.

S1 survival rate	Mean fledging rate		
	0.4232	**0.4539**	**0.5338**
0.195	0.982	0.985	0.993
0.330	>=1.00 (from yr 8)	>=1.00 (from yr 5)	>=1.00 (from yr 3)
0.400	>=1.00 (from yr 3)	>=1.00 (from yr 3)	>=1.00 (from yr 2)

5 SUMMARY AND CONCLUSIONS

Based on the increase in number of occupied territories between 2003 and 2015, the NHZ 3 golden eagle population is currently considered to be in favourable conservation status. Modelling of the potential effects of collisions on the population suggest that:

- under an unimpacted (baseline) scenario growth would continue until the NHZ's carrying capacity of 101 pairs is reached (within a model prediction of three years);
- with additional mortality due to predicted collisions at the proposed development (0.995 per year), initial population growth would be slightly reduced which would delay the duration until the carrying capacity is reached by one year (from three to four years);
- with additional collision mortality from the proposed development and all other wind farm projects within NHZ 3 (1.527 per year), initial population growth would be further reduced resulting in a predicted delay until the NHZ 3 carrying capacity would be attained to an estimated five years; and
- with continued growth predicted over the long-term, despite additional mortality associated with collisions due to the proposed development and other projects, it is predicted that Favourable Conservation Status would be maintained, and there would be no significant effects on the NHZ 3 population as a result of additional mortality associated with collisions.

Uisenis Wind Farm

Consultation

Technical Appendix 9.5

Date: 10 August 2023

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Address: 93 South Woodside Road |Glasgow | G20 6NT

From: [redacted]
Sent: Wednesday, July 5, 2023 12:09 PM
To: [redacted]
Cc: [redacted]
Subject: RE: Uisenis Wind Farm LVIA - final cumulative list

Alison

We haven't yet got feedback from our landscape advisor on the painted blade mitigation. However, I also asked our Bird team to have another think about it, seeing the reason for seeking landscape advice on this is predicated on its utility as CR mitigation.
Their view is that it is interesting, but too risky to 'trial' when there is such a potentially big impact if it doesn't work.

My colleague who has been looking at potential mitigation as part of his update of collision modelling guidance generally, felt that there was a lack of evidence that most of the painting of turbines in various ways works effectively enough. So to reiterate that this is our default position on this, based on our knowledge of what has been published to date on blade painting.
Regards
Mark
[redacted]

From: [redacted]
Sent: 20 June 2023 16:16
To: [redacted]
Cc: [redacted]
Subject: RE: Uisenis Wind Farm LVIA - final cumulative list

Thanks Allison. We will get feedback to you as soon as possible.
FYI, [redacted] is no longer a landscape advisor, having taken on a different role in NatureScot.
Regards
Mark

From: [redacted]
Sent: 19 June 2023 09:39
To: [redacted]
Cc: [redacted]
Subject: RE: Uisenis Wind Farm LVIA - final cumulative list

Hi Mark,

I hope you're well. We've now exported two example visualisations illustrating the painted blade mitigation for turbines (T19-T25, indicated on the attached plan).
I've uploaded the following images to **WeTransfer**, with corresponding colours used for modelling noted:

- VP02_B8060, east of the Site_VD268_IA90_PHM_DAY_DARK GREY BLADE VARIANT - LIGHT GREY TURB MAT: turbines shown in Light Grey (RAL 7035), painted blades shown in Signal Black (RAL 9004)
- VP03_BeinnMhor_VD62_IA90_PHM_DAY_DARK GREY BLADE VARIANT - LIGHT GREY TURB MAT: turbines shown in Light Grey (RAL 7035), painted blades shown in Signal Black (RAL 9004)

These visualisations represent a worst-case scenario as turbines have been modelled based on light levels associated with clear and bright conditions. In these conditions, reflectance of sunlight on the main colour (Light Grey (RAL 7035)) of the turbines is high and results in a relatively bright/evident appearance to the main light grey part of the turbines. This also results in a high contrast value between the Light Grey as compared to the Signal Black painted blades, which may lead to the painted blades 'catching the eye' in the view (noting that this needs to be considered on balance with the level of contrast required to deliver the mitigation for ornithological purposes). In the changeable conditions of the Western Isles, turbines are more likely to be seen in variable cloud cover conditions (as seen in the baseline photography for VP 2: B8060, east of the Site), which would result in a more dull appearance to the light grey parts of the turbines. For example, for VP2: B8060, east of Site, it is clear from the baseline photography that some turbines would be sat in shadow due to passing cloud cover, and in reality the grey of these turbines would likely appear less bright than how they are shown in the visualisations. This varies to VP3: Beinn Mhor, for which the visualisation more accurately reflects the clear conditions of baseline photography and consistent brightness of the light grey parts of the turbines across the cluster.

We're aware this type of mitigation is being looked at for other schemes in Scotland and abroad, for example for a few Iberdrola wind farms in Spain (https://www.iberdrola.com/press-room/news/detail/iberdrola-painting-wind-turbine-blades-protect-birdlife – the video clip here shows how painted blades appear when rotating/in operation). Given the novel nature of the mitigation and

the requirement to illustrate its application in visualisations, we would welcome comment on the visual representation of this mitigation from your landscape advisor for Uisenis and more widely, perhaps from Catherine Harry is she is available? We're currently progressing the full package of visualisations, and as such, would appreciate if any comments could be provided as soon as possible. We are happy to engage directly with your contracted landscape advisor to discuss in further detail how these visualisations were produced if helpful.
Please let me know if there are any issues downloading the files from WeTransfer.

Many thanks,
Allison

From: [redacted]
Sent: *Tuesday, 28 March 2023 13:50*
To: [redacted]
Cc: [redacted]
Subject: *RE: Uisenis Project Update (white-tailed eagles)*

Rafe

Apologies that I wasn't around to meet up last week. I trust the public exhibitions went well.

Thanks for your technical note - see thoughts below on the questions raised there:

- Does NatureScot agree with the general approach to the assessment of WTE collision risk for the EIA?

Yes, we are content for you to present CRM results at a range of avoidance rates, and with a range of mitigation scenarios, including reduction in blade diameter and hub height, and blade painting. Our position continues to be to recommend that an avoidance rate of 95% be used for calculating collision risk for white tailed-eagle. If in your submission you are able to marshal the evidence to sustain your contention for using a different figure, then we will consider that.

- • Does NatureScot agree that the painting of blades can be considered as appropriate and effective mitigation as part of the EIA process?

We consider the evidence from Smola on this to be interesting and encouraging. We think more work needs to be done to give confidence that this is a repeatable measure which could be relied on to produce similar results in Scotland. Again, we are content for you to make the case in the submission for the effectiveness of this measure, and will consider that on its merits.

- • If considered appropriate and effective mitigation, does NatureScot believe the seven turbines selected are the best for mitigation?

Given the information available to you, we think you should be in a better position at present to judge this. Figure 1 in your note does not appear to be conclusive in demonstrating that turbines 17-23 are necessarily the most appropriate for applying this mitigation measure to.

- • If considered appropriate and effective mitigation, does NatureScot consider that the painting of a single blade is a suitable method, or are there any alternative options that may be preferable (whilst considering any Landscape & Visual implications)?

We consider that the best way forward on this is for you to present a review of the evidence for single-blade painting and alternatives, and evaluate the site-specific factors which are likely to influence their success or otherwise at Uisenis.

- • Does NatureScot consider the planned interpretation of the population model is appropriate, or are there an alternative outputs and interpretation that would be more suitable?

Yes, your proposed approach is appropriate. The outputs from this, and their significance, will be key in leading us to our position in relation to the Uisenis proposal.

Of course, the implications of some of these mitigation measures for landscape and visual impacts what need to be considered separately.

I hope you find these comments helpful. Happy to discuss.

Regards

Mark

[redacted]

NatureScot | [redacted]

[redacted]

From: [redacted]
Sent: 28 March 2023 12:00
To: [redacted]
Subject: RE: Uisenis Project Update (white-tailed eagles)

Hi Mark,

Apologies for all these emails, but I've been asked by Eurowind if they can expect any advice soon from NatureScot on the attached note – could you please let me know if there has been any discussion and NatureScot plans to provide further comment at present?

Many thanks

Rafe

[redacted]

From: [redacted]
Sent: Tuesday, March 14, 2023 1:26 PM
To: [redacted]
Cc: [redacted]

[redacted]

Subject: Uisenis Project Update (white-tailed eagles)

Hi Mark,

I'm getting in touch just to remind you that the next round of public exhibitions for the Uisenis Wind Farm project are on next week, and I will be on Lewis with Eurowind. As such we were wondering whether it may be possible for us to arrange a meeting with you at some point to update you on the Uisenis project, and in particular the ongoing work being done in relation to white-tailed eagles? I have attached a technical note which summarises our progress since our last meeting, and also contains requests for advice from NatureScot on specific matters. It would be good to discuss these things when we are visiting, but regardless of whether this is possible, we would gratefully appreciate comment from NatureScot in the near future, as we reach a critical stage in the project.

I think the exhibitions are due to take place from mid-afternoon onwards but we would be available up to perhaps 2pm on Tues 21 to Thurs 23 March if any of these days suited.

Many thanks

Rafe

MacArthur Green

[redacted]

From: [redacted]
Sent: *Wednesday, 21 December 2022 14:16*
To: [redacted]
Cc: [redacted]
Subject: *RE: Uisenis Eishken Estate Windfarm*

Rafe

With apologies for the delay, and further to our meeting last month, we have now had an opportunity to consider the information provided and discussed. We appreciate the opportunity to input at this stage, and hope it will be helpful

NatureScot considers potential impacts on golden eagles in the Outer Hebrides in light of the Golden eagle and White-tailed eagle NHZ3 PVA report from Natural Research Projects, and taking the potential renewables impact on NHZ3 golden eagles into account (c1 bird/yr collision risk and 2-3 ranges potentially being lost).

We conclude that the NHZ3 population could withstand these impacts, for the following reasons:

1. The breeding population is at an all-time high which now exceeds the theoretical cap put on it for the Golden Eagle Conservation Framework and is effectively at carrying capacity or very near it (95 occupied territories in 2015 national survey and possibly higher now).

2. Productivity on average is still above 0.3/pair, so high enough to maintain the population.

3. Emerging evidence from satellite tagged Scottish golden eagles that they avoid wind farms in general and therefore collision risk predictions are unlikely to be fully realised.

The report here using GET still predicts potential significant range loss with abandonment risks and is fairly comparable with the previous PAT based assessment, so overall it isn't suggesting in terms of displacement/habitat loss a worse case than previously.

The one thing that could affect this assessment is Avian influenza (AI). Two dead golden eagles in Harris have tested positive this year, and indications are that it has been a rvery poor breeding season. Whether the latter is an AI impact is unclear at the moment (there have been similarly poor breeding seasons before attributed to weather and this year's weather was poor). We don't have evidence of large scale die off in eagles, and the satellite tagged birds in the Outer Hebrides are still behaving as normal. The big unknown is whether they can get AI and recover and

whether there may be any lingering physiological issues (e.g. reduced fertility) as a result of this. We may not know this for a few years. There would have to be a significant die off of breeding adults and/or several poor breeding seasons to significantly change the assessment.

We are still working on draft guidance on interpreting the GET model for wind farm assessment (informed by reports from Alan Fielding and Phil Whitfield – the GET model main authors). Much of what's in the report here is likely to be what we will have in the guidance, so we don't disagree with the assessment overall.

That said, the impact on sub-adult habitat is said to be small because they wander large distances and tend to avoid high densities of eagles. This is probably true on the mainland, but we know that NHZ3 birds tend to stay within the NHZ whilst dispersing. The high density of breeding eagles means they do have to spend time in areas used by territorial birds. Were 1 or 2 ranges to become abandoned it is likely that sub-adult use of any 'gap areas' without territorial adults will increase.

In such a high density area there may well be much higher levels of territorial interaction, be it with neighbours or intruding sub-adults and risk of collision should not be discounted, especially as the layout proposed has some outer turbines on areas of high GET score. There have been, as far as we know, 5 golden eagle collisions in Scotland and all of these are since 2015 including one at wind farm where golden eagle activity was trivial in the ES and it's not on particularly high GET scores.

Therefore, the advice on golden eagle here is without prejudice to seeing the full ES and potential collision risks, as flight line data doesn't always match the GET model (e.g. potential food source making an area of lower scores important or for unknown reason an area of predicted high activity not be in reality).

The report does make some recommendations about reducing the impact of the layout on golden eagles and these do seem sensible and we would strongly encourage the applicant to consider these.

Please get back to me with any further queries.

Regards

Mark

[redacted]

NatureScot | [redacted]

[redacted]

From: [redacted]
Sent: 04 October 2022 14:39
To: [redacted]
Cc: [redacted]
Subject: RE: Uisenis Eishken Estate Windfarm

Hi Mark,

As I mentioned in my recent email, Eurowind are in the process of finalising the turbine layout for the Uisenis Eishken Windfarm, and eagles remain one of the key sensitivities in the process. We therefore considered that it would be worthwhile for NatureScot to feed into the process at this stage, prior to design freeze and EIA submission. I have attached some figures which show the locations of golden eagle and white-tailed eagle nest sites, both recently active, and historic, in relation to the current Layout 2, and the previously consented layout. We would appreciate it if you could review these figures and provide us with any comment/suggestions which we could take on board, in particular, whether NatureScot would consider there to be significant unmitigated effects on any territories, and at a population level.

On the figures we have shown the most recent year of occupancy for each nest site – where there is no date label, it is considered 'historic' – i.e. last occupied sometime before 2017, but no most recent year of occupancy is provided in the dataset.

I have also attached an expert opinion report provided by Alan Fielding earlier this year which provides some useful information on local golden eagle territories, although please note that it was based on the EDF scoping layout which was relevant at the time of Eurowind's acquisition. The current layout offers some improvements on the EDF scoping layout having turbines moved eastwards from Beinn Mheadhanach and Feiriosbhal.

Once you have had the chance to review we would be happy to have a meeting to discuss the layout and possible mitigation. Do you have any availability next week for a Teams call on 10th or 14th October, or the following week 17th or 18th October to discuss?

Regards

Rafe

From: [redacted]
Sent: *Thursday, 12 May 2022 11:25*
To: [redacted]
Cc: [redacted]
Subject: *RE: Uisenis Eishken Estate Windfarm*

Rafe

Yes, that all seems fine. As I think I mentioned, we ideally like to see eagle surveys start from February, but understand that sometimes delays occur.

Regards

Mark

[redacted]

NatureScot | [redacted]

[redacted]

From: [redacted]
Sent: 11 May 2022 08:55
To: [redacted]
Cc: [redacted]
Subject: RE: Uisenis Eishken Estate Windfarm

Hi Mark,

Just a quick message to say that we are progressing with the various ornithology surveys for Eishken as previously discussed, and outlined below. I was just wondering whether you had any comments on the programme or coverage?

Regards

Rafe

MacArthur Green

[redacted]

From: [redacted]
Sent: 14 April 2022 13:43
To: [redacted]
Cc: [redacted]
Subject: RE: Uisenis Eishken Estate Windfarm

Hi Mark,

Thanks for the meeting on the Eishken bird surveys last month – I mentioned to you that I would confirm the survey programme once things were worked out. So just to confirm, we are planning to do the following between now and August, following the NatureScot survey guidance:

- Flight activity (vantage point) surveys from 5 VPs, min 36 hrs per VP. Four of these VPs are the same as used in 2017-18, with VP5 moved to avoid potential disturbance to a white-tailed eagle nest to the southwest (see attached map). Surveys started in March.
- Scarce breeding bird surveys within 2km of turbines, focussing on Schedule 1 raptor species, other than eagles. I believe Robin has already spoken to you and agreed what eagle pairs/territories should be covered by him this year. He will keep us up to date with the results of his monitoring.
- Breeding divers out to 1km from the turbines. Results will be used to inform the requirements for any focal diver VP watches. These surveys will also focus on recording any greenshanks around the lochs.
- Breeding waders – focussing on golden plover and dunlin on the higher slopes, away from the lochans

Hopefully this all sounds ok but let me know if you have any comments or queries.

Regards

Rafe

MacArthur Green

[redacted]

From: [redacted]
Sent: 15 March 2022 13:48
To: [redacted]
Cc: [redacted]
Subject: RE: Uisenis Eishken Estate Windfarm

Rafe

I have pretty good availability next week, other than Monday 21st. If you pick a time that suits you I should be able to go with that.

Regards

Mark

[redacted]

NatureScot | [redacted]

[redacted]

From: [redacted]
Sent: 15 March 2022 13:26
To: [redacted]
Cc: [redacted]
Subject: RE: Uisenis Eishken Estate Windfarm

Hi Rafe

Cc Mark

Thanks for your email.

I've copied in Mark [redacted]– Operations Officer. Mark has been our lead officer with this site for many years, and will be better placed than me to discuss existing data and the need for any new data. Can I leave it with you to arrange a time to meet Mark?

Kind regards

David

[redacted]

From: [redacted]
Sent: 14 March 2022 15:42
To: [redacted]
Cc: [redacted]
Subject: Uisenis Eishken Estate Windfarm

Hello David,

MacArthur Green has recently taken on the role of reviewing and planning the ornithological work associated with the Uisenis Eishken wind farm, on behalf of Eurowind. As you are aware there is quite a lot of historic data available for the site and surrounding area, and there will be ongoing eagle monitoring this year. Because of this I have been trying to determine whether any further bird surveys are required, and if so, what would be a reasonable programme, based on our existing knowledge of the sensitivities within the site.

I was therefore wondering whether you may be available for a discussion on this any time next week commencing 21st March? I can provide a bit of information on data sources prior to this, so it's clear to all of us what is available.

Regards

Rafe

MacArthur Green

[redacted]