9 Ornithology Assessment

9.1 Introduction

9.1.1 This chapter of the EIAR considers the likely effects on ornithology associated with the construction, operation and decommissioning of the Proposed Development. The specific objectives of the chapter are to:

- describe the current baseline;
- describe the assessment methodology and significance criteria used in completing the impact assessment;
- describe the potential impacts, including direct, indirect and cumulative impacts;
- describe the mitigation measures proposed to address any likely significant effects;
- assess the residual effects remaining following the implementation of mitigation measures.

9.1.2 The assessment has been carried out by MacArthur Green in accordance with NatureScot and Chartered Institute of Ecology and Environmental Management (CIEEM 2018[i]) guidelines. All staff contributing to this chapter have undergraduate and/or postgraduate degrees in relevant subjects, have extensive professional ornithological impact assessment experience, hold professional membership of the and abide by the CIEEM Code of Conduct.

9.1.3 The chapter is supported by:

- Technical Appendix 9.1 – Ornithology (including Annexes A – E); and
- Technical Appendix 9.2 – Confidential Ornithology.

9.1.4 Figures 9.1 – 9.15 and Confidential Figures 9.2.1 and 9.2.2 are referenced in the text where relevant.

9.2 Legislation, Policy and Guidance

Legislation

9.2.1 Relevant European Union (EU) legislation has been considered as part of this ornithological assessment. Of particular relevance is the following:

- EU Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive')[ii];
- EU Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora ('Habitats Directive')[iii]; and
- EU Environmental Impact Assessment Directive 2014/52/EU[iv].

9.2.2 The following national legislation, which has been amended as a consequence of EU exit (Scottish Government 2019[v], 2020[vi]), is also considered as part of the ornithology assessment:

- The Wildlife and Countryside Act 1981[vii];
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) ('The Habitats Regulations')[viii];
- The Nature Conservation (Scotland) Act 2004 (as amended)[ix]; and
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended)[x].

Policy

9.2.3 This ornithological assessment considers the relevant aspects of Scottish policy, Planning Advice Notes and other relevant guidance. Of relevance to ornithology are the following policies:

- UK Post-2010 Biodiversity Framework (2012[xi]);
- Scottish Biodiversity Strategy: It's in Your Hands (2004)[xii]/2020 Challenge for Scotland's Biodiversity (2013)[xiii];
- Scottish Government (2000[xiv]). Planning Advice Note 60: Planning for Natural Heritage;
- Scottish Government (2017[xv]). Planning Advice Note 1/2013-Environmental Impact Assessment, Revision 1.0;
- National Planning Framework 4 ('NPF4') (February 2023[xvi]); and
- The Scottish Biodiversity List[xvii].

Guidance

9.2.4 Guidance on the following topics has also been considered:

- Environmental impact assessment: NatureScot (SNH 2016a[xviii], 2018a[xix], 2018b[xx], NatureScot 2020a[xxi]), CIEEM (2018[i]), SERAD (2000[xxii]);
- Designated sites: SNH (2016b[xxiii]), European Commission (2010[xxiv]);
- Collision risk modelling: SNH (2000[xxv], 2018c[xxvi]), Band *et al.* (2007[xxvii]);
- Cumulative assessments: SNH (2018d[xxviii]);
- Bird populations/species specific guidance: Stanbury *et al.* (2021[xxix]), SNH (2002[xxx], 2014[xxxi], 2017[xxxii]), Pearce-Higgins (2021[xxxiii]); and
- Construction and birds: SNH (2016e[xxxiv]).

9.3 Consultation

9.3.1 In undertaking the assessment, consideration has been given to the scoping responses and other consultation which has been received in relation to ornithological matters, as detailed in **Table 9.1**.

Table 9.1: Consultation Responses

Consultee	Consultation Response	Comment
NatureScot Scoping Response 16th September 2022	We agree there is no connectivity with the Cairngorms Massif and Glen Tanner Special Protection Areas (SPAs) and there are unlikely to be significant adverse effects on the integrity of the Loch Skeen SPA.	Noted. The Cairngorms Massif SPA and Glen Tanar SPA are accordingly scoped out of the assessment. Consideration of the Loch of Skene SPA is provided in Paragraph 9.5.5.
	The scoping report does not provide details of the surveys to be undertaken and if a second breeding season was undertaken in 2022. All surveys should be in accordance with our guidance document (SNH 2017)	A full two-year baseline survey period was undertaken between October 2020 to August 2022, in compliance with SNH (2017 guidance). Refer to **Paragraph 9.4.6** for a summary of the surveys undertaken and **Technical Appendix 9.1: Ornithology Assessment** for further detail.
	We note the vantage point watches do not cover all of the required study area and only just include many of the turbines. Any changes to the wind farm layout may require additional areas to be surveyed.	The final layout is shown with the vantage point viewshed coverage on **Figure 9.3**. Viewshed coverage of the proposed turbine locations has improved since the scoping layout as part of the design process and viewshed coverage is considered to be sufficient and a representative sample area.
	We recommend contacting the local raptor study group to gather records of breeding birds in vicinity of the site.	The North East Scotland Raptor Study Group was contacted to request historic breeding raptor data.
RSPB Scotland Scoping Response 16th September 2022	We recommend approaching the North East Scotland Biological Records Centre for additional records that can inform the baseline conditions on the site.	The North East Scotland Raptor Study Group was contacted to request historic breeding raptor data.
	We note in Section 5.4: Baseline surveys, that it is acknowledged that three turbines (T2, T4, T11) are out with the viewshed area. If these turbines remain in the final design collision risk must be accurately assessed in the EIA Report.	The final layout is shown with the vantage point viewshed coverage on **Figure 9.3**. It is acknowledged that T10 and T5 are just outside the 2 km viewshed coverage (by approximately 40 m and 15 m respectively), but this is not considered to affect the robustness of the assessment. See **Paragraph 9.6.3** for details.
	We note that the turbines proposed are 250m in height. Following NatureScot guidance (SNH, 2017), we would expect that observers are fully trained in recording and assessing the flying height of birds in order to accurately assess collision risk.	The ornithological surveyors working on the project are all experienced in flight activity surveys and assessing the flight height of birds. It should be noted that bird flight activity at the Site was recorded within five height bands (0-20 m, 21-40 m, 41-100 m, 101-150 m and 151-250 m) to account for difficulties in accurately estimating exact flight altitude, and the proposed turbines will be a combination of 180 m and 200 m to tip.
	We agree that cumulative impacts must be fully considered, especially given the increasing number of windfarms proposed and operational within this part of Aberdeenshire.	Noted. The cumulative assessment is provided in **Section 9.9**.

Consultee	Consultation Response	Comment
Aberdeenshire Council Scoping Response 26th September 2022	"Do consultees agree that the methodology and scope of the assessment is appropriate?" Cognisance must be given to the emerging Scottish Biodiversity Strategy (2023 onwards) and associated draft guidance. It is suggested that a Biodiversity Net Grain (BNG) assessment be undertaken in order to identify, inform and secure enhancement measures. The Habitat Management Plan (HMP, para. of scoping report 5.23) should include mitigation and enhancement measures (informed by BNG assessment) for important ornithological features. The Habitat Management Plans must consider construction, operation and decommissioning phases, it must include the long-term management of any biodiversity enhancement features which are to be created.	Please refer to **Chapter 8: Ecology Assessment** for information on the biodiversity net gain assessment. An outline Biodiversity Enhancement and Management Plan (BEMP, the renamed HMP) is also provided as part of **Chapter 8: Ecology Assessment** as **Technical Appendix 8.5**.
	"Are there any other relevant consultees who should be contacted, or other sources of information that should be referenced with respect to the ornithology assessment?" NatureScot and RSPB will almost certainly have been consulted at scoping. Commentary will be key to this chapter.	NatureScot and RSPB responses are detailed in in this table and are considered in the chapter where relevant.
	"Do consultees agree with the features proposed to be scoped out of the assessment?" As stated above, commentary from NatureScot and the RSPB would be key to this aspect of the EIA.	NatureScot and RSPB responses are detailed in in this table and are considered in the chapter where relevant.
Cluny, Midmar & Monymusk Community Council Scoping Response 27th September 2022	Based on local information we would request that Curlew are scoped in to the assessment.	Curlew were infrequently recorded within the survey area (refer to **Paragraph 9.5.25**) and on the basis of their limited presence and lack of likely significant effects at a population level, were scoped out of the assessment.

9.4 Methodology

Scope of Assessment

9.4.1 This chapter considers any impacts of construction, operation and decommissioning of the Proposed Development upon those ornithological features identified during the review of desk-based information and field surveys. The following identified potential impacts upon ornithological features are assessed:

- Direct temporary and permanent habitat loss for birds through construction and operation of the Proposed Development;
- Displacement of birds from the Proposed Development and its surrounding area due to construction disturbance, turbine operation, maintenance, and visitor disturbance. This also includes potential barriers to commuting or migrating birds due to the presence of the Proposed Development turbines;
- Habitat modification due to change in land type or changes in hydrological regime, and consequent impacts on bird populations; and
- Death or injury of birds through collisions with turbine blades, or fences (if any) associated with the Proposed Development.

9.4.2 The chapter also assesses the potential for additional cumulative impacts when considered in addition to other consented or proposed developments which are subject to EIA.

9.4.3 The assessment is based on the Proposed Development as described in **Chapter 2: Project Description**.

Baseline Characterisation

Study Area

9.4.4 The ornithology assessment considers the following study areas which are based on the final turbine layout and associated infrastructure (**Figure 9.1**), as defined by NatureScot:

- Designated sites – the Proposed Development and a 20 km study area buffer (from the proposed turbines) (based on the greatest foraging range for any species, as provided in SNH 2016b[xxiii]) (**Figure 9.2**);
- Collision risk modelling – the results of the flight activity surveys have been used to inform collision modelling. A Collision Risk Analysis Area ('CRAA') has been created using a 500 m buffer around the proposed turbine locations to create a wind farm area (as per relevant guidance, SNH 2017[xxxii]) (**Figure 9.3**);
- Scarce breeding birds[1] – the Proposed Development and a 2 km (turbines) / 800 m (access track) study area buffer (SNH 2017[xxxii]) (**Figure 9.1**);
- Black grouse – the Proposed Development and a 1.5 km (turbines) / 750 m (access track) study area buffer (SNH 2017[xxxii]) (**Figure 9.1**);

[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 and owl species listed on either Annex 1 or Schedule 1.

- Breeding upland waders and wintering waders, raptors, owls and wildfowl – the Proposed Development and a 500 m study area buffer (around the proposed turbine locations and infrastructure) (SNH 2017[xxxii]) (**Figure 9.1**); and
- Cumulative assessment – as per NatureScot guidance (SNH 2018d[xxviii]), the Natural Heritage Zone (NHZ) level is considered practical and appropriate for breeding species of wider countryside interest.

Desk Study / Field Survey

9.4.5 The following data sources were considered as part of the assessment:

- NatureScot SiteLink website[xxxv] for designated site information; and
- Various EIA reports and monitoring documents for wind farm projects within relevant study areas.

9.4.6 The North East Raptor Study Group (NERSG) were also consulted to request historic breeding raptor data, however no response was received.

9.4.7 Fieldwork within and surrounding the Site was undertaken from October 2020 to August 2022. This covers two breeding seasons (2021 and 2022) and two non-breeding seasons (2020/2021 and 2021/2022). The following surveys were undertaken following NatureScot survey guidance (SNH 2017[xxxii]) (refer to **Technical Appendix 9.1: Ornithology Annex B** for details of the survey methodologies):

- Flight activity surveys – October 2020 to August 2022;
- Scarce breeding bird surveys – spring/summer 2021 and 2022;
- Black grouse surveys – spring 2021 and 2022;
- Breeding bird (wader) surveys – spring/summer 2021 and 2022; and
- Winter walkover surveys – autumn/winter 2020/2021 and 2021/2022.

Assessing Wider-Countryside Ornithological Features

9.4.8 The evaluation for wider-countryside features (i.e., features unrelated to SPAs, but including Sites of Special Scientific Interest ('SSSIs') and Ramsar Sites) has been made using the following process:

- Identifying the potential impacts associated with the Proposed Development on an ornithological feature;
- Considering the likelihood of occurrence of potential impacts on an ornithological feature;
- Defining the sensitivity of a feature to an impact from its Nature Conservation Importance ('NCI') and conservation status;
- Establishing the magnitude of the impact (both spatial and temporal);
- Based on the above criteria, making a judgement as to whether or not the resultant effect on an ornithological feature is significant with respect to the EIA Regulations;
- If a potential effect is determined to be significant, suggesting measures to mitigate or compensate the effect where required; and
- Considering residual effects after mitigation, compensation and/or enhancement.

Habitats Regulations Appraisal (HRA) Process

9.4.9 The method for assessing the likely significant effects on a European site (in this context, an SPA) is different from that outlined above for wider-countryside ornithological interests. This is based on the Habitats Directive, which is transposed into domestic legislation by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland) Regulation 48 and includes a number of steps to be taken by the competent authority before granting consent (these are referred to here as an HRA). In order of application, the first four are:

- Step 1: consider whether the proposal is directly connected to or necessary for the management of the SPA (Regulation 48(1)(b)).
- if not, Step 2: consider whether the proposal (alone or in combination) is likely to have a significant effect on the SPA (Regulation 48(1)(a)).
- if so, Step 3: make an Appropriate Assessment of the implications for the SPA in view of that SPA's conservation objectives (Regulation 48(1)(a)).
- Step 4: consider whether it can be ascertained that the proposal will not adversely affect the integrity of the SPA ("Integrity Test") having regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which they propose that the consent, permission or other authorisation should be given (Regulation 48(5) and 48(6)).

9.4.10 It can clearly be established that the Proposed Development does not meet the criteria for Step 1. Where likely significant effects have been identified (Step 2), the results of baseline surveys and scientific conclusions presented in this chapter are therefore used to inform the HRA process, and allow the competent authority, in this case, the Scottish Ministers, to conduct an Appropriate Assessment (Step 3), and to conclude whether any adverse effects on site integrity can be ascertained (Step 4) if required.

Sensitivity Criteria

9.4.11 The sensitivity of ornithological features on or near to the Proposed Development is assessed in line with best practice guidance, legislation, statutory designations and/or professional judgement.

9.4.12 Determination of the level of sensitivity of an ornithological feature is based on a combination of the feature's NCI and conservation status. There are three levels of NCI as detailed in **Table 9.2**.

Table 9.2: Determining Factors of a Feature's NCI

Importance	Description
High	Populations receiving protection by an SPA, proposed SPA, Ramsar Site, SSSI or which would otherwise qualify under selection guidelines. Species present in nationally important numbers (>1 % national breeding or wintering population).
Medium	The presence of breeding species listed on Schedule 1 of the Wildlife and Countryside Act 1981. The presence of species listed in Annex I of the Birds Directive (but population does not meet the designation criteria under selection guidelines). The presence of rare, Red-listed breeding species noted on the latest Birds of Conservation Concern ('BoCC') Red list (Stanbury *et al*. 2020[xxix]). Regularly occurring migratory species, which are either rare or vulnerable, or warrant special consideration on account of the proximity of migration routes, or breeding, moulting, wintering or staging areas in relation to the Proposed Development. Species present in regionally important numbers (>1 % regional breeding population).
Low	All other species' populations not covered by the above categories.

9.4.13 Important Ornithological Features ('IOFs', as per CIEEM 2018[i]) to be assessed for the purposes of the EIA Report, are taken to be those species of high or medium NCI.

9.4.14 As defined by NatureScot (SNH 2018a[xix]), the conservation status of a species is "*the sum of the influences acting on it which may affect its long-term distribution and abundance, within the geographical area of interest*". Conservation status is considered by NatureScot (SNH 2018a[xix]) to be 'favourable' under the following circumstances:

- "population dynamics indicate that the species is maintaining itself on a long-term basis as a viable component of its habitats;
- the natural range of the species is not being reduced, nor is likely to be reduced for the foreseeable future; and
- there is (and probably will continue to be) a sufficiently large habitat to maintain its population on a long-term basis."

9.4.15 NatureScot (SNH 2018a[xix]) recommends that "*the concept of favourable conservation status of a species should be applied at the level of its Scottish population, to determine whether an impact is sufficiently significant to be of concern. An adverse impact on a species at a regional scale (within Scotland) may adversely affect its national conservation status*". Thus, "*An impact should therefore be judged as of concern where it would adversely affect the existing favourable conservation status of a species or prevent a species from recovering to favourable conservation status, in Scotland.*"

9.4.16 In the case of non-designated sites in Scotland, the relevant regional context for many breeding species is considered to be the appropriate NHZ (SNH 2002[xxx]) which the Site falls within. The majority of the Proposed Development is within NHZ 12 (North East Glens), but the very start of the access route (approximately 650 m), batching plant and temporary enabling works compound is just within the boundary of NHZ 9 (North East Coastal Plain). For the purposes of this assessment and based on most likely impacts being associated with bird populations of the regional upland habitats, effects are considered within the context of the NHZ 12 populations only.

9.4.17 For wintering or migratory species, the national UK population or flyway population is considered to be the relevant scale for determining effects on the conservation status, and this approach is applied here.

Magnitude of Impact

9.4.18 An impact is defined as a change of a particular magnitude to the abundance and/or distribution of a population as a result of the Proposed Development. Impacts can be adverse, neutral, or beneficial.

9.4.19 In determining the magnitude of impacts, the resilience of a population to recover from temporary adverse conditions is considered in respect of each potentially affected population.

9.4.20 The sensitivity of individual species to anthropogenic activities is considered when determining spatial and temporal magnitude of impact and is assessed using guidance described by Goodship & Furness (2022[xxxvi]).

9.4.21 Impacts are judged in terms of magnitude in space and time. There are five levels of spatial and temporal effect magnitude as detailed in **Table 9.3** and **Table 9.4** respectively.

Table 9.3: Spatial Magnitude of Impact

Spatial Magnitude	Description
Very high	Total/near total loss of a bird population due to mortality or displacement. Total/near total loss of productivity in a bird population due to disturbance. Guide: >80 % of population lost or increase in additive mortality.
High	Major reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 21-80 % of population lost or increase in additive mortality.
Medium	Partial reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 6-20 % of population lost or increase in additive mortality.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Guide: 1-5 % of population lost or increase in additive mortality.
Negligible	Very slight (or no discernible) reduction in the status or productivity of a bird population due to mortality or displacement or disturbance. Reduction barely discernible, approximating to the "no change" situation. Guide: <1 % of population lost or increase in additive mortality.

Table 9.4: Temporal Magnitude of Impact

Temporal Magnitude	Description
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken as approximately 25-30 years), except where there is likely to be substantial improvement after this period. Where this is the case, long-term may be more appropriate.
Long-term	Approximately 15-25 years or longer (see above).
Medium-term	Approximately 5-15 years.
Short-term	Up to approximately 5 years.
Negligible	<12 months.

Assessing Cumulative Impacts

9.4.22 Cumulative impacts are assessed in **Section 9.9** and present information about the potential impacts of the Proposed Development combined with other operational, consented or proposed wind farm projects located within NHZ 12.

9.4.23 NatureScot (SNH 2018d[xxviii]) has provided guidance on assessing the cumulative effects on birds. This assessment follows the principles set out in that guidance.

9.4.24 Cumulative effects may include cumulative disturbance-displacement, collision mortality, habitat loss or barrier effects. Some cumulative effects, such as collision risk, may be summed quantitatively, but according to NatureScot (SNH 2018d[xxviii]) "*In practice, however, some effects such as disturbance or barrier effects may need considerable additional research work to assess impacts quantitatively. A more qualitative process may have to be applied until quantitative information becomes available for developments in the area, e.g., from post-construction monitoring or research*".

Significance Criteria

9.4.25 The potential significance of effect was determined through a standard method of assessment based on professional judgement, considering both sensitivity and magnitude of impact as detailed in **Table 7.5. Major** and **moderate** effects are considered '**significant**' in the context of the EIA Regulations.

Table 9.5: Determining Significance of Effects

Significance of Effect	Definition
Major	The impact is likely to result in a long-term significant effect on the integrity of a feature.
Moderate	The impact is likely to result in a medium term, potentially significant effect on the integrity of a feature.
Minor	The impact is likely to affect a feature at an insignificant level by virtue of its limitations in terms of duration or extent, but there will probably be no effect on its integrity.
Negligible	No material impact.

Project Assumptions

9.4.26 The assessment of potential effects is based on the Proposed Development description (outlined in **Chapter 2: Project Description**). In relation to describing impacts on ornithological features, the relevant specifications used to determine the 'worst-case' Proposed Development involve:

- Up to 16 turbines, five with a maximum tip height of 200 m/maximum rotor diameter of 155 m and 11 with a maximum tip height of 180 m/maximum rotor diameter of 155 m.
- The associated infrastructure will include wind turbines and associated foundations, access tracks, crane hardstandings, underground cabling, on-site substation and maintenance building, battery energy storage system, temporary construction compounds, laydown area and borrow pits.
- Existing access roads will be reused where possible.
- The construction period will last for approximately 18-24 months, comprising a construction programme as described in **Chapter 2: Project Description**. The number of bird breeding seasons potentially disrupted would depend on the month in which construction commences and the breeding season of the potentially affected species. The main breeding season of most birds at the Site extends from March to August. For the purposes of this assessment, it is

assumed that, for any given species of bird, construction activities would commence during the breeding season and would therefore potentially affect up to three breeding seasons. This, therefore, represents a worst-case scenario.

9.4.27 In addition to the above considered during the design process, this Chapter has been prepared on the basis of the assumptions/embedded mitigation listed below:

- All electrical cabling between the proposed turbines and the associated infrastructure will be underground in shallow trenches which would be reinstated post-construction and, in most cases, follow the proposed access tracks.
- Any disturbance areas around permanent infrastructure during construction will be temporary and land will be reinstated or restored before the construction period ends. The only excavation in these areas will be for cabling as noted above and otherwise may only be periodically used for side-casting of spoil until reinstatement.
- Borrow pits will be excavated during the construction period and will be reprofiled at the end of the construction period.
- To ensure all reasonable precautions are taken to avoid disturbance to birds and comply with environmental legislation, prior to construction and decommissioning the Applicant will appoint a suitably qualified Ecological Clerk of Works (ECoW) who will advise the Applicant and the Principal Contractor on all ornithological matters (with the assistance of a suitably qualified/licenced ornithologist if required). The ECoW will be required to be present on Site during the construction and decommissioning periods and will carry out monitoring of works and briefings with regards to any ornithological sensitivities on the Site to the relevant staff within the Principal Contractor and subcontractors.
- A Bird Disturbance Management Plan (BDMP) will be implemented during construction of the Proposed Development. The BDMP will detail measures to ensure legal compliance and safeguard breeding birds known to be in the area and will include species-specific guidance. The BDMP shall include pre-construction surveys and good practice measures during construction. Pre-construction surveys will be undertaken to check for any new breeding bird activity in the vicinity of the construction works. The ECoW will oversee the implementation of the above measures.

9.5 Baseline

Current Baseline

9.5.1 A range of surveys were employed to accurately record baseline ornithological conditions within the Site and appropriate survey buffers. Terms referred to are as follows:

- 'survey area' is defined as the area covered by each survey type at the time of survey; and
- 'study area' is defined as the area of consideration of impacts on each species at the time of assessment and as the area used for any desk-based study (**Figure 9.1**).

9.5.2 The spatial extent of each survey area is detailed in **Technical Appendix 9.1: Ornithology**.

Designated Sites

9.5.3 There are no statutory designations with ornithological features within the Site. The desk-based study has identified three SPAs, three SSSIs (of which two which underpin the SPAs), and one Ramsar within 20 km of the Site (**Figure 9.2**). Note that the distances provided below are to the nearest proposed turbine.

- Loch of Skene SPA (underpinned by Loch of Skene SSSI and Loch of Skene Ramsar) – 8.4 km to the north-east and designated for non-breeding goldeneye, goosander and greylag goose;
- Cairngorms Massif SPA – 16.7 km to the south-west, designated for breeding golden eagle;
- Glen Tanar SPA (underpinned by the Glen Tanar SSSI) – 18.8 km to the west and designated for breeding capercaillie, hen harrier, osprey and Scottish crossbill; and
- Muir of Dinnet SSSI – 19.9 km to the west and designated for non-breeding greylag goose and a breeding bird assemblage (noted in the citation[xxxvii] as including great-crested grebe, little grebe, mute swan, water rail, spotted crake, sedge warbler, wigeon, goosander, goldeneye, osprey, black grouse, capercaillie, Scottish crossbill, buzzard and sparrowhawk).

9.5.4 On the basis of the foraging ranges provided by NatureScot's SPA connectivity guidance (SNH 2016b[xxiii]) and the scoping response provided by NatureScot (**Table 9.1**) there is considered to be no connectivity between the Proposed Development and the Glen Tanar SPA (and associated SSSI) or the Cairngorms Massif SPA and these designated sites are scoped out of the assessment.

9.5.5 Whilst the Proposed Development does lie within the foraging range of greylag goose from the Loch of Skene SPA and Muir of Dinnet SSSI (20 km, SNH 2016b[xxiii]), considering the upland nature of the Site and limited greylag goose flight activity

recorded within the vicinity of the Site there is considered to be limited to no connectivity between the Proposed Development and the Loch of Skene SPA or Muir of Dinnet SSSI. Baseline surveys recorded limited evidence of greylag geese overflying the Site and there were no records of greylag geese foraging either on the Proposed Development or in the area directly around it (refer to **Paragraphs 9.5.31** and **9.5.32** for a summary of greylag goose activity recorded). NatureScot's scoping response notes that they do not anticipate there to be "*significant adverse effects on the integrity of the Loch Skene SPA*" (**Table 9.1**) and considering the information available, it is considered that there is **no adverse effect on the integrity of the Loch of Skene SPA** as a result of the construction or operation of the Proposed Development.

Flight Activity Summary

9.5.6 A summary of all target species recorded during flight activity surveys at the Site is presented in **Table 9.6**. This summarises all flights observed during the baseline survey period regardless of the location of the flights in relation to the Wind Turbine Development Area. For further details of the flight activity surveys, refer to **Technical Appendix 9.1: Ornithology**.

9.5.7 A summary of the collision risk model results is presented in **Table 9.7** (refer to **Technical Appendix 9.1: Ornithology Annex E** for detailed results). It should be noted that as the Proposed Development consists of a combination of two tip heights (180 m and 200 m, as per **Figure 9.1**), collision modelling was undertaken for each turbine type with the worst-case for each species considered in the assessment (indicated in **bold** in **Table 9.7).**

Table 9.6: Target Species Recorded During Flight Activity Surveys, 2020-2022

Species	Total Number of Flights Recorded	Total Number of Birds Recorded	Total Bird Seconds[2] Recorded
Goshawk	16	16	3,853
Greylag goose	1	20	1,000
Hen harrier	3	3	267
Herring gull	3	7	897
Osprey	2	4	1,517
Peregrine falcon	5	5	767
Pink-footed goose	12	950	167,016
Red kite	39	41	12,078

Table 9.7: Predicted Collision Rates (worst case provided per species, refer to Technical Appendix 9.1: Ornithology for the results of all collision modelling)

Species	Turbine Tip Height	Mean Breeding Season	Mean Non-Breeding Season	Mean Annual	Number of Years Per Collision
Goshawk	200 m	0.0635	0.0072	0.0707	14.2
Greylag goose	180 m	-	0.0088	0.0088	114
Hen harrier	180 m	0.0016	-	0.0016	630
Herring gull	180 m	0.0198	-	0.0198	51
Osprey	180 m	0.0255	-	0.0255	39
Peregrine falcon	180 m	0.0030	0.0206	0.0236	42
Pink-footed goose	200 m	-	0.1741	0.1741	5.74
Red kite	180 m	0.6037	0.0381	0.6418	1.56
Red kite	200 m	0.2920	0.0150	0.3071	3.26

Raptors

Golden Eagle

9.5.8 There was no evidence of breeding golden eagle within 2 km of the Site. During the baseline survey period, golden eagle were recorded on two occasions (an adult in November 2021 and a sub-adult in April 2022, **Figure 9.4**).

9.5.9 Considering this species' lack of breeding activity, infrequent occurrence and no predicted risk of collision, golden eagle is scoped out of the assessment.

Goshawk

9.5.10 Goshawk were identified to be present during the 2021 and 2022 breeding seasons at two locations (GI_2 and GI_3, **Confidential Figure 9.2.1**) with breeding confirmed at GI_2 both years and at GI_3 in 2021[3]. An old goshawk nest (GI_1, **Confidential Figure 9.2.1**) was also located just outside of the 2 km study area, but was confirmed to not be in use in either 2021 or 2022. All nest locations are located in forestry outwith the Site and are over 500 m from the nearest turbine (2.1 km, 780 m and 630 m respectively). Goshawk were predominately recorded within the survey area during the 2021 (14 records) and 2022 (23 records) breeding seasons with birds only recorded on seven occasions during the non-breeding seasons (an immature female in November 2020 and March 2021, adult female in November 2020 and November 2021, adult male in January 2022 and two unsex adult birds in November 2020). **Confidential Figure 9.2.1** details all non-flight activity survey

[2] Bird seconds are calculated for each observation as the product of flight duration and number of individuals. This has then been summed to provide the total bird seconds for each species recorded over the entire survey period.

[3] Breeding was considered to be 'potential' at GI_3 in 2022 with a territorial pair present early in the season but no further evidence recorded.

records. Considering that goshawk breeding activity is all within forestry habitat outwith the Site and the infrastructure associated with the Proposed Development is situated with open moorland, significant impacts on any breeding territories is considered unlikely.

9.5.11 Flight activity surveys recorded 16 flights (**Table 9.6**, **Figure 9.5**), and collision risk modelling predicted a mean annual collision rate of one bird every 14.2 years (**Table 9.7**).

9.5.12 Considering that this species' breeding behaviour is all over 500 m from the nearest infrastructure (and is in forestry habitat outwith the Site), low predicted risk of collision and embedded mitigation (pre-construction surveys and ECoW**, Paragraph 9.4.27**), goshawk is scoped out of the assessment.

Hen Harrier

9.5.13 No evidence of breeding hen harrier was located within 2 km of the Site and no hen harrier were recorded within the survey area during the 2021 or 2022 breeding seasons. An adult male hen harrier was recorded on one occasion in November 2020 (**Figure 7.4**) however no evidence of roosting was recorded.

9.5.14 Flight activity surveys recorded three flights (**Table 9.6**, **Figure 9.6**), and collision risk modelling predicted a mean annual collision rate of one bird every 630 years (**Table 9.7**).

9.5.15 Considering this species' lack of breeding activity, infrequent occurrence and **negligible** predicted risk of collision, hen harrier is scoped out of the assessment.

Osprey

9.5.16 No evidence of breeding osprey was located within 2 km of the Site. Osprey were recorded on four occasions (an adult in April 2021 and April 2022, and two adults together in June 2022, **Figure 9.4**).

9.5.17 Flight activity surveys recorded two flights (**Table 9.6**, **Figure 9.7**), and collision risk modelling predicted a mean annual collision rate of one bird every 39 years (**Table 9.7**).

9.5.18 Considering this species' lack of breeding activity, infrequent occurrence and **negligible** predicted risk of collision, osprey is scoped out of the assessment.

Peregrine Falcon

9.5.19 Peregrine falcon were identified to be present at one location in 2021 and 2022 (PE_1, **Confidential Figure 9.2.2**) with breeding a pair confirmed to be occupying the territory (breeding success unknown) in 2021 and breeding confirmed in 2022. The nest is located outwith the Site and is over 500 m from the nearest turbine (2.2 km).

9.5.20 Flight activity surveys recorded five flights (**Table 9.6**, **Figure 9.8**), and collision risk modelling predicted a mean annual collision rate of one bird every 42 years (**Table 9.7**).

9.5.21 Considering that the nest site is over 2 km from the nearest infrastructure, Site usage is infrequent and there was a negligible predicted risk of collision, peregrine falcon is scoped out of the assessment.

Red Kite

9.5.22 No evidence of breeding red kite was located within 2 km of the Site. Red kite were the most frequently recorded target species and were predominately recorded within the survey area during the 2021 (25 records) and 2022 (31 records) breeding seasons with birds only recorded on four occasions during the non-breeding seasons (single adults in March 2021, November 2021 and February 2022 and three adults together in October 2021). **Figure 9.4** details all non-flight activity survey records.

9.5.23 Flight activity surveys recorded 39 flights (**Table 9.6**, **Figure 9.9**), and collision risk modelling predicted a worst-case mean annual collision rate of one bird every 1.56 years (**Table 9.7**).

9.5.24 Considering this species' Site usage and predicted collision risk, red kite is scoped in to the assessment.

Waders

Curlew

9.5.25 Curlew were infrequently recorded within the survey area with a possible breeding pair identified in 2021 to the north-west of the Site (one record of a bird calling in suitable breeding habitat near Tillenturk in March 2021, **Figure 9.10**) and a possible breeding pair within the Site in 2022 (single record of a pair alarm calling at a passing red kite in April 2022, **Figure 9.10**).

9.5.26 Considering this species' limited presence within the study area and no predicted risk of collision, curlew is scoped out of the assessment.

Golden Plover

9.5.27 Golden plover were not identified to be breeding withing the survey area during baseline surveys, however non-breeding birds were infrequently recorded (flocks of 16 and 20 birds in November 2020, and single birds in May 2021, November 2021 and April 2022, **Figure 9.10**).

9.5.28 Considering this species' limited presence within the study area, no evidence of breeding and no predicted risk of collision, golden plover is scoped out of the assessment.

Woodcock

9.5.29 Woodcock were not identified to be breeding withing the survey area during baseline surveys, however non-breeding birds were infrequently recorded (single birds in November 2021 and March 2021, **Figure 9.10**).

9.5.30 Considering this species' limited presence within the study area, no evidence of breeding and no predicted risk of collision, woodcock is scoped out of the assessment.

Geese, Swans and Gulls

Greylag Goose

9.5.31 Greylag geese were recorded overflying the Site on five occasions in November 2020 (flocks of 14-110 birds, **Figure 9.11**) and no evidence of greylag geese foraging within the Site was recorded.

9.5.32 Flight activity surveys recorded one flight (**Table 9.6**, **Figure 9.12**), and collision risk modelling predicted a mean annual collision rate of one bird every 114 years (**Table 9.7**).

9.5.33 Considering this species' limited presence within the study area and negligible predicted risk of collision, greylag goose is scoped out of the assessment.

Pink-Footed Goose

9.5.34 Pink-footed geese were recorded overflying the Site during the 2020/2021 non-breeding season (14 records, flocks ranging from 15-210 birds, **Figure 9.11**) and 2021/2022 non-breeding season (two records, flocks ranging from 46-48 birds, **Figure 9.11**). Pink-footed geese were also recorded foraging over 2 km to the west of the Site on two occasions in March 2021 (500 birds) and March 2022 (150 birds), **Figure 9.11**.

9.5.35 Flight activity surveys recorded 12 flights (**Table 9.6**, **Figure 9.13**), and collision risk modelling predicted a mean annual collision rate of one bird every 5.74 years (**Table 9.7**). Pink-footed goose is not listed as a feature at any designated sites within 20 km of the Site (paragraph 9.5.3). As such, the pink-footed geese recorded are therefore considered to be part of the wider countryside population and following NatureScot guidance[xxxviii], collision risk is not considered to be an issue for non-SPA pink-footed geese.

9.5.36 Considering the NatureScot guidance regarding pink-footed goose collision risk, and lack of suitable habitat within the Site, pink-footed goose is scoped out of the assessment.

Whooper Swan

9.5.37 Whooper swan were recorded overflying the Site on two occasions in October 2021 (flocks of six and 13, **Figure 9.11**).

9.5.38 Considering this species' limited presence within the study area and no predicted risk of collision, whooper swan is scoped out of the assessment.

Herring Gull

9.5.39 Flight activity surveys recorded three flights (**Table 9.6**, **Figure 9.14**), and collision risk modelling predicted a mean annual collision rate of one bird every 51 years (**Table 9.7**).

9.5.40 Considering this species' limited presence within the study area, no evidence of breeding and negligible predicted risk of collision, herring gull is scoped out of the assessment.

Summary of Scoped In Important Ornithological Features

9.5.41 The assessment is applied to those scoped in IOFs of medium or high NCI (**Table 9.2**), as confirmed through survey results and consultations. In this case, red kite is the only scoped in IOF.

Table 9.8: Scoped In IOF

Feature	NCI	Reason for Inclusion
Red kite	Medium	Schedule 1 and Annex I listed, priority bird species for assessment in Scotland (SNH 2018a[xix]).

9.5.42 The conservation status of red kite is detailed in **Table 9.9**.

Table 9.9: Conservation Status of Scoped In IOFs

IOF	Conservation Status	Information
Red kite	Annex I, Schedule 1, BoCC Green list	Woodward *et al.* (2020[xxxix]) estimates the red kite UK breeding population to be 4,400 pairs (based on 2017 data) and red kite are included on the BoCC Green list (Stanbury *et al.* 2021[xxix]) indicating that the national population is in favourable conservation status. The Scottish red kite breeding population was estimated by the Scottish Raptor Monitoring Scheme (SMRS) to be at least 273 pairs in 2020 (Challis *et al.* 2022[xl]). Red kite were introduced in the north-east Scotland/Aberdeenshire region between 2007 and 2009 and it was stated by the RSPB in 2017 that this 'Aberdeenshire' population had established a minimum of 35 breeding pairs by 2016 and fledged around 300 chicks[xli]. The RSPB noted in 2017 that this population was ranging from the original Aberdeenshire area out to the western edge of the Cairngorms National Park and south into Angus[xli]. It should be noted that there has been some variation in how the regions have been reported across this time period but that the 'Aberdeenshire' region in which red kite were reintroduced is considered to be the regions classed by the SMRS as Angus and Aberdeenshire as this correlates to the range of the Aberdeenshire reintroduction detailed above by the RSPB in 2017. The most recent SMRS report for 2020 recorded 19 occupied territories (of 26 checked) in north-east Scotland and 12 occupied territories (of 21 checked) in Angus, however it should be noted that coverage in 2020 may have been restricted due to nation-wide lock downs related to the Covid-19 pandemic. A review of the SMRS annual reports for the north-east Scotland and Angus areas between 2015 and 2020 shows a range of 28 to 32 occupied territories monitored across the combined area in any one year resulting in an average of 30.6 occupied territories across this five-year period. It appears that the north-east regional population is relatively stable and is likely in favourable conservation status.

Future Baseline

9.5.43 In the absence of the Proposed Development, assuming the continuation of current predominately commercial estate land management practices within and around the Site and allowing for changes in bird behaviour and distribution related to climate change, the bird populations are likely to continue to be present in largely similar abundances and distributions to those described in the baseline. Any changes in numbers and diversity of species are likely to be a reflection of their wider population trends and influences such as climate change (e.g., delayed breeding, reduced or increased breeding success depending on the species range, Pearce-Higgins (2021[xxxiii])), rather than site-specific factors.

9.6 Assessment of Potential Effects

Assessment Limitations

9.6.1 Survey effort either met or exceeded the minimum requirements stipulated in NatureScot guidance (SNH 2017[xxxii]). In general, weather conditions were appropriate for the surveys, but where not, surveys were suspended (or additional surveys were undertaken) (refer to **Technical Appendix 9.1: Ornithology**).

9.6.2 Limitations exist with regard to the knowledge base on how some species, and the populations to which they belong, react to impacts associated with onshore wind farms and associated construction activities. A precautionary approach is taken in these circumstances, and as such it is considered that these limitations do not affect the robustness of this assessment.

9.6.3 It is acknowledged that T10 and T5 are just outside the 2 km viewshed coverage (by approximately 40 m and 15 m respectively, **Figure 9.3**). Whether this would affect the robustness of the collision risk modelling depends on how similar the flight activity rates in the un-surveyed areas around these two turbine locations are to the flight activity rates recorded in the viewshed areas surveyed. In this case it is considered that the recorded flight activity rates would be sufficiently representative. The two turbines are located in similar habitat and on similar gradients to the remaining 14 turbines covered by VP 3 and VP 4's viewsheds. It is therefore likely that flight activity, particularly from large raptors (e.g., red kite), would be similar around the two turbines as recorded across the Site. Therefore, the mean flight activity rates per unit area (hectare) used in the collision model inputs are considered to be appropriate, and unlikely to result in inaccurate collision rates.

Construction Effects

9.6.4 The main potential impacts of construction activities due to the Proposed Development are the displacement and disruption of breeding, foraging or roosting birds as a result of noise and general disturbance over a short-term period (either the duration of a particular construction activity within working hours, or the duration of the whole construction period).

9.6.5 Impacts on breeding birds would be confined to areas in the locality of temporary construction compounds, turbines, tracks and other infrastructure.

9.6.6 Direct habitat loss would also occur due to the Proposed Development's construction, which would be both temporary (e.g. construction compounds) and long-term (access tracks, turbines and substation). This has the potential to affect breeding or foraging individuals.

Red Kite

9.6.7 **Impact**: breeding or foraging red kite may be displaced from the Site during construction, either by disturbance or direct habitat loss.

9.6.8 **Sensitivity**: medium NCI (**Table 9.2**) and favourable conservation status (**Table 9.9**), therefore considered to have an overall **medium** sensitivity.

9.6.9 **Magnitude of impact**: red kite usually forage within 3 km of a nest but can forage up to 6 km (Hardey *et al*. 2013[xlii]) and there are various areas of woodland within 3 km of the Site that may host nesting (or roosting) red kite. Baseline surveys did not however identify any breeding or roosting red kite activity within the 2 km survey area.

9.6.10 Goodship and Furness (2022[xxxvi]) recommend a disturbance buffer of up to 300 m from red kite nests/roosts. No breeding or roosting red kite have been located within the 2 km survey area and so there is considered to be limited potential for breeding or roosting red kite to be displaced by construction activities. Furthermore, given that the majority of the Proposed Development is situated within open ground with only two relatively small areas of infrastructure (no turbines) situated within areas of commercial plantation (**Figure 9.1**), there would only be limited areas of the Site where there would be a risk of construction activities taking place in an area where red kite may breed at in the future.

9.6.11 It is likely that at least some of the red kite activity recorded within the Site is related to non-breeding individuals (either juveniles or non-breeding adults) that may range across wide areas. Given that red kites are often found nesting relatively close to human habitation and can take advantage of supplementary feeding opportunities, any disturbance due to construction activities is unlikely to significantly affect individuals' ability to forage in the area or extend much beyond the disturbance source. Because of the opportunistic nature of feeding, direct habitat loss associated with the Proposed Development is also unlikely to result in a measurable adverse effect.

9.6.12 Overall, it is considered that the impacts from construction disturbance would be of **negligible** and short-term magnitude.

9.6.13 **Significance of effect:** the unmitigated construction effect on the Aberdeenshire red kite population is considered to be **minor adverse** and therefore **not significant** in the context of the EIA regulations.

Operational Effects - Displacement

Red Kite

9.6.14 **Impact**: red kite may be at risk of displacement from foraging habitat due to the presence of operational turbines, thereby impacting on productivity, fitness and survival rates.

9.6.15 **Sensitivity**: medium.

9.6.16 **Magnitude of impact:** red kite were not identified to be breeding within 2 km of the Site (maximum disturbance distance as recommended by Goodship and Furness (2022[xxxvi]) is 300 m) and there is limited suitable nesting habitat within 300 m of the Proposed Development. Consequently, operational displacement is not considered to be a risk to nesting birds.

9.6.17 Red kite was the most frequently recorded target species during baseline surveys and was recorded ranging widely across the survey area. Considering the lack of breeding evidence within at least 2 km of the Site, the birds recorded during surveys are likely to be predominately non-breeding individuals (either juveniles or non-breeding adults). Of the total 99 records (from both flight activity surveys and distribution surveys), only 12 were of more than one bird together and were of either two or three birds.

9.6.18 It is therefore likely that activity on site is made up of a small number of non-breeding birds and whilst there may be some localised displacement directly around turbines it is considered that it will be of **negligible**, long-term magnitude as there will continue to be sufficient foraging habitat surrounding the Turbine Development Area.

9.6.19 **Significance of effect:** the unmitigated operational displacement effect on the Aberdeenshire red kite population is considered to be **minor adverse** and therefore **not significant** in the context of the EIA regulations.

Operational Effects – Collision Risk

Red Kite

9.6.20 **Impact**: birds that utilise the airspace within the Proposed Development at potential collision heights may be at risk of collision with turbines, thereby increasing the annual mortality rate of the population above background levels. For the collision risk modelling methods used, and detailed results, see **Technical Appendix 9.1: Ornithology Annex E**.

9.6.21 **Sensitivity**: medium.

9.6.22 **Magnitude of impact**: the collision risk model predicted a worst-case mean annual collision rate of 0.6418, or one bird every 1.56 years.

9.6.23 The most recent estimate for the Aberdeenshire reintroduction breeding population is estimated to be a minimum of 35 pairs, or 70 individuals (**Table 9.9**). There is no clear estimate for the number of non-breeding birds that may also be present in the Aberdeenshire population, however, Katzenberger *et al.* (2021[xliii]) note that "*In a healthy raptor population, the ratio of breeding to non-breeding individuals can be expected as nearly 1:1*" and it would be reasonably estimated that there may be a total Aberdeenshire population of a minimum 140 birds. Based on this population, the additional mortality due to collisions would be an increase over the baseline mortality of 3.27 % (using, as a precaution, an annual adult mortality rate of 0.14, per Sansom *et al.* 2016[xliv], for the whole population). This is likely to be an overestimate as the Aberdeenshire reintroduction population appears to be expanding (early analysis of the Aberdeenshire red kite population trend between 2007 and 2014 by Sansom *et al.* 2016[xliv] noted that the observed population growth in the Aberdeenshire population appeared to correlate more with the stronger population growth seen in Central Scotland and Dumfries and Galloway than the low population growth observed in the North Scotland population), and so the few (likely non-breeding) individuals regularly using the Site are likely to form an increasingly small percentage of the population, as the population range expands.

9.6.24 Nevertheless, as a precaution, this increase in baseline mortality is considered to be of **low** and **long-term/permanent magnitude**.

9.6.25 **Significance of effect**: the unmitigated collision risk effect on the Aberdeenshire red kite breeding population is considered to be **minor adverse** and therefore **not significant** in the context of the EIA regulations.

Operational Effects – Turbine Lighting

9.6.26 Where turbines have a tip height over 150 m, lighting would be required, in accordance with Article 222 of the Air Navigation Order 2016 (ANO) (in line with current guidance from the Civil Aviation Authority (CAA 2016). As advised by NatureScot (2020b[xlv]), there are potential lighting effects on birds which require consideration within an EIA.

Red Kite

9.6.27 **Impact**: lighting could have various impacts on birds: they may be attracted to lights and thereby placed at higher risk of collisions, have migration patterns disrupted, show avoidance of lights with a consequent displacement effect, or be subject to increased predation threat. NatureScot (2020b[xlv]) has identified attraction (phototaxis) as posing the principal threat to birds, in relation to turbines, however for red kite it should be noted that foraging is diurnal (and so unaffected by nocturnal lighting) and the species does not undertake large scale migration movements.

9.6.28 **Sensitivity**: medium.

9.6.29 **Magnitude of impact**: in NatureScot's (2020a[xxi]) advice on the scope of assessment for turbine lighting, it is identified that an assessment of the possible effects of lighting on birds may be required in the following three situations, where risk is greater: (i) turbines on or adjacent to a seabird colony that hosts burrow nesting species; (ii) turbines that are on or adjacent to protected areas that host large concentrations of wintering waterbirds, where such sites are located within open country away from other sources of artificial light; and (iii) where wind farms are located on migratory corridors or bottlenecks for nocturnally migrating passerines.

9.6.30 It is clear that the Proposed Development does not fit any of these situations. As such, based on guidance provided by NatureScot (2020a[xxi], 2020b[xlv]), it is considered that there is little evidence to indicate that any species would be significantly affected either negatively or positively by lighting requirements of the Proposed Development. An effect of **negligible**, **long-term/permanent magnitude** is therefore predicted.

9.6.31 **Significance of effect**: the unmitigated effect on red kite as a result of operational turbine lighting is predicted to be **negligible** and **not significant** in the context of the EIA Regulations.

Decommissioning Effects

9.6.32 Decommissioning effects for the Proposed Development are difficult to predict with any confidence because of the long timeframe until their occurrence. Decommissioning effects are considered for the purpose of this chapter to be similar in nature to those of construction effects but are likely to be of shorter duration. The significance of effects predicted in the construction section are therefore considered appropriately precautionary for assessing decommissioning effects on IOFs.

9.7 Mitigation

Construction

9.7.1 No significant unmitigated effects were predicted for any IOF, and therefore no specific mitigation other than the embedded mitigation already outlined (BDMP, ECoW and pre-construction surveys) is required. These measures will aim to ensure that no breeding activity is disrupted by construction activities.

Operation

9.7.2 No significant unmitigated effects were predicted for any IOF, and therefore no specific mitigation is required.

9.7.3 The aims of the outline BEMP (**Technical Appendix 8.5**) are to restore bog areas on identified deeper peat areas, undertake targeted riparian planting to improve riparian habitats and slope stability, undertake bracken management and Sitka spruce self-regeneration management, and undertake reduced heathland management practices in areas to allow areas of heathland to regenerate and provide cover for ground nesting bird species and invertebrate prey. A deer management plan will be produced prior to construction commencing and will include provision for the removal of deer carrion and grallochs from within 200 m of the Proposed Development turbines throughout the operational period to help reduce the attractiveness of areas near turbines, and therefore reduce collision risk for red kite.

9.7.4 It should also be noted that the bracken management will extend outwith the wind farm area (**Technical Appendix 8.5 Figure 1)** and the removal of bracken will provide additional foraging areas for red kite, thus reducing any potential reliance on the open ground contained within the wind farm area.

Decommissioning

9.7.5 Similar embedded mitigation to that outlined during the construction phase will be undertaken (BDMP, ECoW and pre-decommissioning surveys).

9.8 Assessment of Residual Effects

Construction

9.8.1 No significant unmitigated effects were predicted for red kite and so the residual effect on the Aberdeenshire population remains unchanged (**minor adverse** and therefore **not significant** in the context of the EIA Regulations).

Operation

9.8.2 No significant unmitigated effects as a result of operational displacement or collision risk were predicted for red kite and so the residual effect on the Aberdeenshire population remains unchanged (**minor adverse** and therefore **not significant** in the context of the EIA Regulations).

Decommissioning

9.8.3 Decommissioning effects for the Proposed Development are difficult to predict with any confidence because of the long timeframe until their occurrence. Decommissioning effects are considered for the purpose of this chapter to be similar in nature to those of construction effects but are likely to be of shorter duration. The significance of effects predicted in the construction section are therefore considered appropriately precautionary for assessing decommissioning effects on IOFs.

9.9 Assessment of Cumulative Effects

9.9.1 This section assesses the potential cumulative effects of the Proposed Development combined with other operational, consented or proposed wind farm projects that are located within the appropriate spatial context on the basis of the species considered.

Methods

9.9.2 The main projects likely to cause similar effects to those associated with the Proposed Development are other operational wind farm developments, or those under construction, consented, or in the planning process within the appropriate spatial context.

9.9.3 Wind farm projects at scoping stage have been scoped out of the cumulative assessment because either they do not have sufficient information on potential effects to be included; because the baseline survey period is ongoing; or because results have not been published. Projects that have been refused (and no longer capable of appeal) or withdrawn have also been scoped out of the cumulative assessment.

9.9.4 Small wind farm projects with three or fewer turbines have also been scoped out from the cumulative assessment as often these projects are not subject to the same level of detail of ornithological assessment, and so there are no directly comparable data. Because of the small scale of such projects, effects are likely to be negligible on the IOFs assessed here. No other renewable or non-renewable projects were identified that could have a cumulative effect on the IOFs.

Scope of the Assessment

9.9.5 Based on the conclusions of the assessment presented in **Section 9.6**, and the committed mitigation outlined in **Section 9.7**, the following have been scoped out of the cumulative assessment:

- Cumulative construction effects for red kite – negligible effects considering the proposed embedded and additional mitigation; and

- Cumulative operational displacement effects for red kite (negligible residual effects when considering enhancement associated with the outline BEMP, **Technical Appendix 8.5**).

9.9.6 The remaining cumulative effects are considered below:

- Cumulative collision effects on red kite.

Red Kite – Collision Risk

9.9.7 The relevant geographical context for assessing red kite is considered to be the Aberdeenshire reintroduction population which as noted above is considered to extend within the Aberdeenshire and Angus council areas. **Table 9.10** identifies the wind farm projects in Aberdeenshire and Angus councils that have been scoped in to the cumulative assessment, and their latest known status. This information was obtained from a combination of the last updated version of the NatureScot wind farm database (mid-2019) and an extensive search of the Aberdeenshire and Angus Council Planning portals for changes/new projects between mid-2019 and September 2023.

Table 9.10: Aberdeenshire and Angus Council Wind Farm Projects

Council Area	Wind Farm	Status	No. Turbines	EIA Information Available
Aberdeenshire	Boyndie + Ext.	Operational	8	None
Aberdeenshire	Clochnahill	Operational	4	None
Aberdeenshire	Dummuie	Operational	7	None
Aberdeenshire	Glens of Foundland	Operational	21	None
Aberdeenshire	Gordonstown Hill	Operational	5	None
Aberdeenshire	Kildrummy (revised)	Operational	8	None
Aberdeenshire	Meikle Carewe (revised)	Operational	12	None
Aberdeenshire	Mid Hill (I+II)	Operational	33	None
Aberdeenshire	Skelmonae	Operational	4	None
Aberdeenshire	St John's Hill	Operational	9	None
Aberdeenshire	Tullo	Operational	7	None
Aberdeenshire	Tullo II / Twinshiels	Operational	10	None
Aberdeenshire	Clashindarroch	Consented	22	EIA
Aberdeenshire	Fetteresso Forest	Consented	10	Additional Information Chapter
Aberdeenshire	Craigneil	Appeal	11	EIA
Aberdeenshire	Craig Watch	Application	11	EIA
Aberdeenshire	Glendye (and Fasque)	Application	26	EIA
Angus	Ark Hill	Operational	8	None
Angus	Govals	Consented	6	EIA
Angus	Frawney (2014)	Appeal	4	EIA
Angus	Ark Hill Ext	Application	4	EIA

9.9.8 The total predicted annual collision rate associated with all wind farm projects within Aberdeenshire and Angus councils (where information is available) is 0.48 – 0.72 (**Table 9.11**), which rises to 1.1218 – 1.3618, or one every 0.89 to 0.73 years, when including the annual collision rate of 0.6418 associated with the Proposed Development (**Table 9.7**).

Table 9.11: Predicted Red Kite Collision Rates – Aberdeenshire and Angus Council Areas

Phase	Cumulative Annual Collisions	Detail
Operational Wind Farms	n/a	No information available for the 13 operational sites
Consented Wind Farms	0.0000	Red kite not recorded at any of the three consented projects
Application Wind Farms (excluding the Proposed Development)	0.48 – 0.72[4]	Red kite recorded at three of the five projects at application stage.

9.9.9 In order to ascertain whether this level of additional cumulative mortality would result in a significant effect on the Aberdeenshire population, a deterministic matrix formulation population model has been developed which is presented in this section. Demographic rates were taken from Sansom *et al.* (2016[xliv]) and Challis *et al.* (2022[xl], 2020[xlvi], 2019[xlvii], 2018a[xlviii] and 2018b[xlix]) which are presented in **Table 9.12**. These values were entered into a 3x3 population matrix (**Table 9.13**) – note that fecundity rates (top row) were calculated as survival x productivity, with an assumed 80 % of 2 year old birds breeding and 100 % of adults, and that only females are modelled, hence the productivity was also halved on the basis of an equal sex ratio.

Table 9.12: Red Kite Demographic Rates Used for Modelling the Aberdeenshire Population

Demographic Rate	Mean	SD
Survival: 0-1	0.41	0.00
Survival: 1-2	0.71	0.2
Survival: adult	0.86	0.02
Productivity (fledged/pair)	1.38	0.28

Table 9.13: Population Matrix

-	0.39	0.59
0.41	-	-
-	0.71	0.86

9.9.10 The estimated number of breeding pairs in the population is 31 (Challis *et al.* 2020[xl]). These were split across two-year old (80 % first breed at this age) and adult (the remaining 20 % first breed at this age) birds using the model's stable age distribution, giving initial female age class population estimates of 17, 6 and 25 for one-year olds, two year-olds and adults respectively.

9.9.11 The population matrix was multiplied against the initial population vector [17, 6, 25] to obtain a population projection for a 25-year time span. This was conducted with no additional mortality (baseline) and with annual additional adult mortality values of 0.6418 (the Proposed Development alone), 1.1218 and 1.3618 (the cumulative range, including the Proposed Development).

9.9.12 The baseline prediction for 25 years is for the population to increase in size at an average annual growth rate of 1.0454 (i.e., 4.5 %; **Table 9.14**). This would result in an increase from 48 to 145 females, and from 31 to 95 pairs over this period.

9.9.13 At an additional mortality of 0.6418 individuals per year due to the Proposed Development, the average growth rate would still be strongly positive but reduce to 4.2%. The female population would be predicted to reach 125, with 82 pairs after 25 years.

9.9.14 When considering cumulative impacts, at an additional mortality of 1.1218 the annual growth rate would reduce to 3.8% and the population would be predicted to reach 111 females (72 pairs). At an additional mortality of 1.3618 the annual growth rate would be 3.6% and population would be predicted to reach 104 females (67 pairs).

[4] Craigneil (at appeal) – provided a range of collision predictions for red kite between 0.42 and 0.36; Glendye (and Fasque) – provided a range of collision predictions for red kite between 0.19 and 0.01; Ark Hill Extension – provided a collision prediction for red kite of 0.11.

Table 9.14: Population Projections (no. Females) Under Baseline Conditions and With Additional Mortality

Year	Total Female Population Size (number of pairs also provided in brackets)			
	No additional mortality (baseline)	0.6418 additional mortality	1.1218 additional mortality	1.3618 additional mortality
0	48 (31)	48 (31)	48 (31)	48 (31)
1	50 (33)	50 (32)	49 (32)	49 (32)
2	52 (34)	51 (34)	51 (33)	51 (33)
3	55 (35)	53 (34)	52 (34)	52 (34)
4	57 (38)	55 (37)	54 (35)	53 (34)
5	60 (39)	57 (38)	56 (37)	55 (36)
6	62 (40)	59 (39)	57 (37)	56 (37)
7	65 (43)	62 (40)	59 (38)	58 (38)
8	68 (44)	64 (42)	61 (39)	60 (39)
9	71 (47)	67 (43)	63 (41)	61 (40)
10	74 (49)	69 (45)	65 (43)	63 (41)
11	78 (51)	72 (47)	67 (44)	65 (42)
12	81 (53)	75 (49)	70 (46)	67 (44)
13	85 (56)	78 (51)	72 (47)	69 (46)
14	89 (58)	81 (53)	75 (48)	72 (47)
15	93 (61)	84 (54)	77 (51)	74 (48)
16	97 (63)	87 (57)	80 (52)	76 (50)
17	102 (67)	91 (59)	83 (54)	79 (52)
18	106 (69)	95 (62)	86 (56)	81 (53)
19	111 (73)	98 (64)	89 (58)	84 (55)
20	116 (76)	102 (67)	92 (61)	87 (57)
21	121 (79)	107 (70)	96 (62)	90 (58)
22	127 (83)	111 (72)	99 (65)	93 (61)
23	133 (87)	116 (76)	103 (67)	97 (63)
24	139 (91)	120 (78)	107 (70)	100 (66)
25	145 (95)	125 (82)	111 (72)	104 (67)
Annual population growth rate	1.0454	1.0417	1.0382	1.0360

9.9.15 Assuming a cumulative loss of 1.1218 – 1.3618 birds per year, this would result in a c.23.4 % to 28.3 % smaller Aberdeenshire female population over the long-term (25 years), compared with the predicted unimpacted population. The annual growth rate of the Aberdeenshire population would remain positive, at 1.0382 to 1.0360 (i.e., 3.8 % to 3.6 %), but reduced by 0.72 % to 0.94 % compared to the unimpacted population (4.5 %). At year 25, the Aberdeenshire population could still theoretically reach 67 to 72 pairs, instead of around 95 pairs without additional collision mortality (assuming no carrying capacity by that point). Note that if carrying capacity became a factor, the difference between unimpacted and impacted population sizes would be less at year 25 that what the model predicts.

9.9.16 Sansom *et al.* (2016[xliv]) observed in their model for the North East Scotland population, on the basis of 64 pairs (2014 estimate for North East Scotland), less than five fatalities a year due to collisions was considered to have only a small effect on population growth. Considering that the Aberdeenshire population is around half that of the North East Scotland population (31 pairs as opposed to 64 pairs), it could be considered that under two fatalities a year in the Aberdeenshire population would be similarly considered to have a small effect on population growth and the worst-case cumulative collision rate is 1.3618.

9.9.17 It should also be noted that whilst no available information exists for the operational phase wind farms, all the operational wind farms listed in **Table 9.10** commenced operation between 2005 and 2014. Consequently, any impacts from these projects will be incorporated into the annual baseline reports for red kite activity between 2016 and 2020 provided by the Scottish Raptor Monitoring Scheme (Challis *et al.* 2022[xl], 2020[xlvi], 2019[xlvii], 2018a[xlviii] and 2018b[xlix]).

9.9.18 Overall, assuming all the wind farm projects at application stage that predict a collision risk for red kite are consented, the Aberdeenshire population would still continue to grow, but after 25 years it would be around 23.4 to 28.3 % lower than without the potential cumulative mortality. With this level of impact, it is considered that favourable conservation status can still be attained/maintained over the long-term. The unmitigated impact of cumulative collisions on the Aberdeenshire population is therefore considered to be of low magnitude, and therefore considered to be **minor adverse** and **not significant** in the context of the EIA regulations.

9.10 Summary

9.10.1 **Table 9.15** provides a summary of the effects detailed within this chapter.

Table 9.15: Summary of Residual Effects

Potential Effect	Mitigation	Means of Implementation	Residual Effect
Red kite: construction displacement	None required	N/A	Not significant
Red kite: operational displacement	None required	N/A	Not significant
Red kite: operational collision risk	None required	N/A	Not significant
Red kite: cumulative collision risk	None required	N/A	Not significant

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