Environmental Impact Assessment Report

Lairdmannoch Energy Park

Chapter 7: Ornithology

Lairdmannoch Energy Park Limited

May 2025

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Glossary of Terms

Term	Definition
The Applicant	Lairdmannoch Energy Park Limited
The Agent	Atmos Consulting Limited
Environmental Advisors and Planning Consultants	Atmos Consulting Limited
Environmental Impact Assessment	Environmental Impact Assessment (EIA) is a means of carrying out, in a systematic way, an assessment of the likely significant environmental effects from a development.
Environmental Impact Assessment Regulations	Electricity Works (Environmental Impact Assessment)(Scotland) Regulations 2017 ('the EIA Regulations')
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations.
The Proposed Development	Lairdmannoch Energy Park
The Proposed Development Site	The full application boundary as per Figure 1-1
Wind Farm Surveys/Wind Farm Survey Areas	The surveys carried out between 2019 -2021 in support of the development of a wind farm on the western part of the Proposed Development Site (Figure 7-1-2)
Solar Farm Surveys/Solar Farm Survey Areas	The surveys carried out in 2023 in support of the development of a solar farm on the eastern part of the Proposed Development Site (Figure 7-1-2)

List of Abbreviations

Abbreviation	Description
BoCC	Birds of Conservation Concern
CIEEM	Chartered Institute of Ecology and Environmental Management
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
RSG	Raptor Study Group
NS	NatureScot
RSPB	Royal Society for the Protection of Birds
VP	Vantage point
SBL	Scottish Biodiversity List
SNH	Scottish Natural Heritage – now known as NatureScot
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
NHZ	Natural Heritage Zone
WCA	Wildlife and Countryside Act 1981 (as amended)
GWFG	Greenland White-fronted goose *Anser albifrons*
HRA	Habitat Regulations Appraisal
PVA	Population Viability Assessment
NCSA	Nature Conservation (Scotland) Act 2004
JNCC	Joint National Conservation Committee
DGRSG	Dumfries and Galloway Raptor Study Group
SRMS	Scottish Raptor Monitoring Scheme
SPP	Species Protection Plan
ECoW	Ecological Clerk of Works
CEMP	Construction Environment Management Plan
CMS	Construction Method Statement

7 Ornithology

7.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) evaluates the likely effects arising from the construction, operation (including maintenance) and decommissioning of the Proposed Development on the ornithological receptors on and in the vicinity of the Proposed Development and the Proposed Development Site.

It should be read in conjunction with the following technical appendices and figured in Volume 3 and Volume 4 respectively:

- Technical Appendix 7-1 Ornithology;
- Technical Appendix 7-2 Ornithology Confidential Appendix; and
- Technical Appendix 7-3 Population Viability Assessment Modelling.

This Chapter has been prepared by Jenny Bell, Technical Director, Ornithology and HRA. Ms Bell has close to 30 years' experience in ornithology. She has extensive experience in assessing the impacts of wind farm developments on ornithology receptors, having been producing EIAs over the last 18 years in wind farm ornithology. Her knowledge of the ornithology of the area is also extensive having managed a large number of assessments and studies in this area.

7.2 Consultation

Table 7-1 shows the consultation carried out to date.

Table 7-1: Record of consultation around ornithology assessment

Consultee	Comment	Response
NatureScot (NS) (letter July 2019 requesting clarification around the Laughengie and Airie Site of Scientific Interest (SSSI) features)	Suggested Royal Society for Protection of Birds Scotland (RSPB) be contacted	Further information requested from RSPB and raptor study group (RSG) – this was not a formal consultation for the Proposed Development but formed part of the original feasibility work
RSPB Scotland (email August 2019 following on from NS inquiry)	RSPB/RSG were able to clarify the situation regarding the occurrence of SSSI features.	Information was included into survey requirements.
NatureScot (Scoping response)	We are broadly happy with the ornithological survey information presented in the scoping report. The report states that work has been undertaken according to NatureScot guidance, so it should be acceptable though, as no raw data is presented here, we cannot check this. This data should be presented in the Environmental Statement.	Data has been presented in Technical Appendix 7-1 and Technical Appendix 7-2
NatureScot (Scoping response)	We note that section 5.5.2 makes reference to access restrictions during raptor surveys. This will need to be	Limitations are discussed in Technical Appendix 7-1. Atmos is confident that the surveys

Consultee	Comment	Response
	discussed fully in the EIA and justification of the adequacy of the survey coverage given. We acknowledge the late start to the first season of breeding bird surveys due to covid restrictions, however the second season coverage started earlier so we are reasonably comfortable that overall coverage will be adequate.	accurately captured the baseline conditions of the Proposed Development.
NatureScot (Scoping response)	In section 5.5.3 we note that Dumfries and Galloway Raptor Study Group are still to be contacted. We advise that as per our guidance, this should be done earlier when planning surveys. The data requested from external sources should also cover the solar aspect of the proposal.	Dumfries and Galloway Raptor Study Group provided some initial information in relation to questions around the the SSSI interests.
NatureScot (Scoping response)	We note that no flights have been recorded for Greenland white-fronted geese (GWFG) *Anser albifrons* during vantage point surveys, but we are aware from communication with RSPB Scotland that GWFG from the Loch Ken and River Dee Marshes Special Protection Area have been recorded from tagging studies travelling directly over the proposed location. Data should be obtained from the RSPB to determine the level of activity here and an assessment made as to the requirement for any additional work to inform the assessment.	No activity was recorded for Greenland White-fronted Geese during two years of surveys. Because of that, data was not obtained because it was felt that with extensive survey data showing no occurrence, that any such flights must be very intermittent and therefore there would not be any impacts on the population
NatureScot (Scoping response)	With respect to the specific questions in section 5.5.7 we advise that: • Black grouse *Lyrurus tetrix* and raptor surveys would have been advisable, although data from alternative sources may be available which may give adequate information. • We agree that a population viability model should be undertaken for red kite given the high level of activity recorded and potential effects that may result on the wider population. • We are happy with the species identified for collision risk monitoring (not withstanding any further data that may be obtained for Greenland white-fronted geese). • We did not find information identifying which developments have already been identified in terms of looking at the cumulative effects, but given the potential significant impacts on red kite, this coverage will likely need to be extensive and should follow our cumulative assessment Which is here in this link to Nature.scot website -	Population viability modelling has been undertaken for Red kite *Milvus milvus* and results are presented both within Sections 7.7.2 and 7.8 as well as Technical Appendix 7-3. Upon further detailed assessment, only activity levels for Red kite justified collision risk modelling as all other species with higher levels of flight activity were assessed as being Less than Local (Sections 7.5.2 and 7.5.3). NatureScot were contacted separately for their cumulative database and this has formed the basis of the cumulative assessment, with additional research carried out to confirm and refine information.

Consultee	Comment	Response
	cumulative assessment guidance	
RSPB Scoping	We note that more than two years of field surveys has already been completed prior to Scottish Ministers issuing a Scoping Opinion for the EIA. A scoping exercise should help inform survey design and assessment of impacts: it is therefore disappointing to note that surveys have already been undertaken prior to this exercise. We would welcome information as to why this approach has been taken.	Timing of scoping is driven by many factors but the Onshore Wind Sector Deal identifies that scoping should be carried out at a time when there can be an informed focus on potentially significant effects. This does mean generally some survey work will need to be done to inform scoping and it is considered that industry practice has been followed in relation to the timing of the surveys in this application with respect to scoping.
RSPB Scoping	The proposed development is within the core foraging ranges of these qualifying species [Greylag goose and Greenland White-fronted goose]… Furthermore, the proposed development lies between a known roosting site at Loch Whinyeon loch and the Special Protection Area (SPA) overwinter ground which increases the probability that the birds will fly through the proposed development area. Likely significant effects on the SPA therefore cannot be ruled out and the competent authority must carry out an Appropriate Assessment.	The decision as to whether an Appropriate Assessment is required is one for the competent authority, as advised by NatureScot. However, given the very limited activity of Greylag goose and no observations of Greenland White-fronted goose, the SPA was scoped out from further assessment within the EIAR.
RSPB Scoping	We recommend that survey effort as part of the EIA, which will also inform the HRA process, should include evening (dusk) and dawn survey to assess movements of SPA qualifying species Greenland White Fronted Goose in relation to roosting habitat at Loch Whinyeon in relation to this project.	Dawn and dusk surveys were carried out in the first winter of surveys; no goose flights of any species were recorded around dawn or dusk.
RSPB Scoping	We also recommend that a data request is made to confirm movements of roosting qualifying Greenland White-fronted geese between the Loch Ken and River Dee SPA and Loch Whinyeon to inform the Habitats Regulations Appraisal (HRA) process	Given the absence of any sightings of Greenland White-fronted goose during surveys, it is considered there is no connectivity between the Proposed Development Site and the SPA and the request was not made.
RSPB Scoping	We note the reference to consultation with RSPB on sensitive species as part of confidential information (2019) (5.5.1). We ask that this information is provided to RSPB Scotland since we do not have record of this.	Information was provided to RSPB by letter on the 3rd of July 2024
RSPB Scoping	We note that survey effort in both years to record lekking Black Grouse was conducted outside the lekking season in	Surveys in year 1 were completed before the end of mid May (final date of first visit

Consultee	Comment	Response
	year 2 which is end of March to mid-May. Although we note that the EIAR states that a lek survey in year one was carried out in May it is not specified if this was before mid-May. We therefore, recommend that this survey should be updated with formal lek survey methodology within the lekking season. The status of Black Grouse would be further informed through data request to RSPB Scotland and Forestry and Land Scotland.	was 13th of May 2020). Second visits were used to carry out further lek surveys given the concerns about Black grouse in the area. In year 2, surveys commenced before mid May but were not all complete. However we note for Black grouse there is not a 'lekking season' – Gilbert (Gilbert *et al* 1990) states grouse will be on lek sites all year round but activity peaks mid-March -mid May. Full information on survey methodology has been provided and detailed results are also provided. However, activity of Black grouse on the Proposed Development Site has been extremely limited which suggests either a very low population or no leks in proximity to the Proposed Development. A request to RSPB is pending.
RSPB Scoping	Survey work and buffer areas - We note that survey areas were identified based on buffer areas from the turbine array rather than the whole development footprint. NatureScot guidance recommends survey to encompass the entire development area	The approach was taken based on the information available when the project commenced. As a result, the survey work has covered the development area (with one exception), where necessary supplemented by further surveys to ensure guidance is met as the design of the Proposed Development has evolved. The exception is the south-west Access Track, where access was not possible during surveys across the Proposed Development Site.
RSPB Scoping	Red Kite - We agree that based on the information provided in the Scoping Report that a Population Viability Assessment (PVA) to assess impact to Red Kite is required.	Population viability modelling has been undertaken for Red kite and results are presented both within Sections 7.7.2 and 7.8, as well as Technical Appendix 7-3.
RSPB Scoping	Collision Risk Modelling - With regard to information provided in Table 9 in the Scoping Report, we are unable to confirm if any other species should be included in the collision risk modelling until we have assessed the full results of all survey effort including VP survey that will be carried out as part of the EIA. There is no detail of the results of Nightjar	Given RSPB's lack of consultation on this point, despite further attempts to engage (see further explanation below), collision risk modelling has been carried out on those species, which, when evaluation of the species' occurrence on the

Consultee	Comment	Response
	Caprimulgus europaeus survey which may require CR assessment	Proposed Development was carried out, showed activity was sufficient for significant impacts to potentially occur.
RSPB Scoping	Cumulative impact assessment - We recommend that the cumulative assessment should include all projects within the search area, including new forestry/woodland creation	Further consultation was made on this point (see below), as it is not possible to include all planning applications within NHZ19 in a cumulative assessment, nor does the Applicant have sight of new forestry/woodland applications. Although we went back to RSPB to explain that their request was impossible to fulfil, they did not suggest an alternative scope which was possible. As a result of lack of further engagement, the cumulative assessment was carried out as described in the Scoping Request.
RSPB July 2024 – The record of consultation from 2019 was provided as requested and the issues around their response on cumulative assessment were explained and they were invited to re-engage on this point. Additional information on the timing of scoping was also provided.	Thanked for the comments and information about data consultations re-iterated.	As a result of lack of further engagement, the cumulative assessment was carried out as described in the Scoping Request.

7.3 Legislation, Planning Policy and Guidance

Wildlife and Countryside Act 1981 (as amended) & Conservation (Natural Habitats & c.) Regulations 1994 (as amended in Scotland)

The Wildlife and Countryside Act 1981 (as amended) (WCA) is the principal mechanism for the legislative protection of wildlife in Great Britain. All wild birds and their active nests, eggs and young are protected from damage, destruction or capture under the WCA. Bird species listed on Schedule 1 gain additional protection particularly around their nests, with disturbance listed as an offence, with special penalties for breaches of the law related to those Schedule 1 species. The WCA also provides the mechanism by which the Conservation of Wild Birds (Directive 2009/147/EC, the 'Birds Directive') is transposed into UK law, allowing for the designation of Special Protection Areas (SPAs).

The Birds Directive lays out special measures to conserve wild birds, their eggs, nests and habitats, and applies special protection to those species as listed under Annex 1 of the Directive. This is to apply special protection, in particular, to those species which are migratory and are considered to be of a shared heritage and conservation responsibility across all European Union member states.

The Conservation (Natural Habitats, &c.) Regulations 1994 , or 'Habitat Regulations', are the method by which the relevant European Directives are translated into Scottish law, with the most recent modification consisting of the 2012 revision. Specifically, the Habitat Regulations transpose the Convention on the Conservation of European Wildlife and Natural Habitats (the 'Bern Convention') and Natural Habitats and Wild Fauna and Flora (92/43/EEC, the 'Habitats Directive') into a Scottish context.

Nature Conservation (Scotland) Act 2004

The Scottish Biodiversity List (SBL) was developed to meet the requirements of Section 2 (4) of the Nature Conservation (Scotland) 2004 Act (NCSA) for the conservation of biodiversity. This legislation required Scottish Ministers to publish lists of species of flora, fauna and habitats considered to be of principal importance for the purposes of biodiversity.

Taken together, the WCA (1981) and NCSA (2004) ensure that all wild birds, their nests and eggs are protected by making it an offence to:

- Intentionally or recklessly kill, injure or take any wild bird;
- Intentionally or recklessly take, damage or destroy the nest of any wild bird while it is in use or being built;
- Intentionally or recklessly take or destroy the egg of any wild bird; and
- Intentionally or recklessly disturb any wild bird listed on Schedule 1 while it is nest building or is at (or near) a nest with eggs or young, or disturb the dependent young of such a bird without a Schedule 1 license provided by NatureScot.

Birds of Conservation Concern 5 (BoCC)

The leading government (Joint Nature Conservation Committee (JNCC)) and non-government conservation organisations in the UK jointly reviewed the population status of the 247 bird species that are regularly found within the United Kingdom using data from national monitoring schemes. This was most recently reviewed in 2021 (Stanbury, et al. 2021) with an update for seabirds provided in 2024 (Stanbury, et al. 2024).

On the basis of seven quantitative criteria, each species has been placed on one of three lists, these being:

- Red – red list species are those that are globally threatened, have had an historical population decline in the UK from 1800 -1995, a rapid (> or = 50%) decline in UK breeding population over the past 25 years, or a rapid (> or = 50%) contraction of UK breeding range over the past 25 years;
- Amber – amber listed species are those that have had a historical population decline from 1800-1995 but are recovering (population size has more than doubled over the past 25 years), a moderate (25-49%) decline in UK breeding population over the past 25 years, a moderate (25-49%) contraction of UK breeding range over the past 25 years, a moderate (25-49%) decline in UK non-breeding population over

the past 25 years, or species with unfavourable conservation status in Europe also known as Species of European Conservation Concern; and

- Green – green listed species are those that have no identified threat to their population status.

Ornithological Guidance and Information Sources

NatureScot (formerly Scottish Natural Heritage (SNH)) has published a number of guidance documents related to the assessment of impacts of wind farms on bird populations. The following list, which includes both NS and guidance or information produced by other organisations, was used to inform the ornithological assessment:

- Assessing the Cumulative Impacts of Onshore Wind Energy Developments (NatureScot 2012);
- Assessing Connectivity with Special Protection Areas (NatureScot 2016);
- Environmental Statements and Annexes of Environmentally Sensitive Bird Information (NatureScot 2016);
- Avoidance Rates for the Onshore SNH Bird Wind Farm Collision Risk Model (NatureScot 2018);
- Recommended bird survey methods to inform impact assessment of onshore wind farms (NatureScot 2017);
- Assessing the Significance of Impacts from Onshore Wind Farms on Birds at Sites Outwith Designated Areas (NatureScot 2025);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM 2022);
- NatureScot Pre-application Guidance for Solar Farms (NatureScot 2025); and
- Guidance on using an updated collision risk model to assess bird collision risk at onshore wind farms (NatureScot 2025).

In addition, contextual data on avian populations was obtained from a number of publications, primarily the following:

- The Birds of Scotland (Forrester 2007);
- National Heritage Zone Bird Population Estimates (Wilson 2015);
- Scottish Raptor Monitoring Scheme Annual Report 2020 (Challis, Beckmann, et al. 2023).

Data on local bird records was sought from the following sources to support the ornithological assessment:

- Royal Society for the Protection of Birds (RSPB);
- Dumfries and Galloway Raptor Study Group (DGRSG).

Information about designated sites was obtained by accessing the following online resources:

- NatureScot Sitelink website.

7.4 Methodology and Approach

7.4.1 Desktop and Field Survey

Full details of the survey methods and a discussion on any limitations are provided in Technical Appendix 7-1. Table 7-2 summarises the surveys carried out in support of the Proposed Development. In 2023, surveys were carried out on the Solar Farm Survey Area because breeding bird surveys had not previously been carried out on this area; the area had been covered by raptor surveys in 2019 – 2021 and vantage point surveys are not required for solar farms (NatureScot 2025) so the surveys were restricted to breeding bird surveys.

Table 7-2: Summary of field surveys

Survey type	Year 1 (2019 – 2020)	Year 2 (2020-2021)	Year 3 (2023)
Vantage point surveys	Yes	Yes	No
Vantage point surveys (dawn/dusk additional hours)	Yes	No	No
Breeding bird surveys	Yes	Yes	Yes
Breeding raptor surveys	Yes	Yes	No
Black grouse surveys	Yes	Yes	No
Nightjar surveys	Yes	Yes	No

Breeding bird surveys in 2019-2021 were carried out to inform the assessment of the impact of a wind farm in the western part of the Proposed Development Site; in 2023, surveys were carried out to inform the impact of a solar farm in the eastern part of the Proposed Development Site. Figure 7-1-2 shows the extent of the surveys in those two periods. Because the survey areas are very different for these two periods, the surveys carried out in 2019-21 will be described as the Wind Farm Surveys, while those in 2023 will be described as the Solar Farm Surveys. This allows the context of the survey areas and the survey results to be more easily described in the context of the entire Proposed Development Site.

Methodology for collision risk modelling is provided in Technical Appendix 7-1.

7.4.2 Assessment

The CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM 2022) (henceforth referred to as the CIEEM guidelines) form the basis of the impact assessment presented in this Chapter. These guidelines set out a process of identifying the value of each ecological receptor and then characterising the "impacts" that are predicted, before discussing the "effects" on the integrity or conservation status of the receptor, proposed mitigation and residual impacts.

The initial stage for assessment of impacts is to determine which features should be subject to detailed assessment. The ornithological receptors to be the subject of more detailed impact assessment should be of sufficient value that impacts upon them may be significant in EIA terms. This typically means receptors which have a nature conservation value of greater than local, although where receptors have special legal protection (i.e. listed on Schedule 1 of the Wildlife and Countryside Act 1981 as amended (WCA)) then further consideration may also be given to ensure protection is

in place to prevent unlawful acts such as disturbance arising from the Proposed Development. The receptors should also be vulnerable to significant impacts arising from the development.

All designated nature conservation sites, bird species and communities that occur within the "zone of impact" of the Proposed Development are defined as potential ornithological features (as described below). The zone of impact is defined for individual receptors based upon the potential effects and if there is any research showing the range of those effects and also NatureScot guidance such as (NatureScot, 2018).

Determining Value

The CIEEM guidelines recommend that the value of ornithological features is determined based on a geographic frame of reference. For this project the following geographic frame of reference is used:

- International (nature conservation designation, habitat or populations of species of international importance, e.g. a Special Protection Area or significant numbers of a designated population outside the designated site);
- National (nature conservation designation, habitat or populations of species of Scottish importance, e.g. a Site of Special Scientific Interest or a National Nature Reserve, a nationally important population/assemblage of a species listed on Schedule 1 of the Wildlife and Countryside Act 1981 or Annex 1 of the Birds Directive);
- Regional (a regionally (i.e. within Natural Heritage Zone (NHZ 19 Western Southern Uplands and Inner Solway) important population of birds which have a high conservation value (e.g. Schedule 1, Annex 1, Scottish Biodiversity List or Birds of Conservation Concern amber or red species;
- County (i.e. Dumfries and Galloway) (a population of high conservation birds which represent an important part of the county population of that species);
- Local (i.e. within 5 km) (a population of any species which is important at the local level); and
- Less than local (a population of birds which has little or no intrinsic nature conservation value).

Valuing Species

In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Rarity is an important consideration because of its relationship with threat and vulnerability although, because some species are inherently rare, it is necessary to look at rarity in the context of status. A species that is rare and declining should be assigned a higher level of importance than one that is rare with a stable population. Reference is made to a number of categorisations of ornithology conservation status, including;

- Annex I: Annex I of the Birds Directive on the conservation of wild birds lists species that are of conservation importance at a European level;
- Schedule 1: Rare breeding species in the UK, and / or species under threat of human persecution are listed on Schedule 1 of the WCA, which provides additional legal protection for such species at or around their nests;

- Schedule 1A: Certain Schedule 1 species are also listed on Schedule 1A of the WCA, which protects them from harassment all year round;
- Schedule A1: Certain Schedule 1 species are also listed on Schedule A1 of the WCA, which protects their nests all year round;
- UK Birds of Conservation Concern: A national classification that categorises breeding bird populations in the UK using a traffic light system to indicate an increasing level of conservation concern. Species are assessed against objective criteria such as population and distribution trends; those that have a declining range and / or population, or that are vulnerable to population effects due to their small population size are categorised as Red or Amber listed species, depending on the extent of the decline or vulnerability; and
- Scottish Biodiversity List: species which are identified as being important from a conservation viewpoint within a Scottish context are listed on the SBL.

Predicting and Characterising Impacts

In accordance with the CIEEM guidelines, when describing impacts, reference is made to the following, where appropriate:

- Confidence in predictions - the level of certainty that an impact will occur as predicted, based on professional judgement and where possible evidence from other schemes – this is based on a four point scale: certain/near certain; probable; unlikely; and extremely unlikely;
- Magnitude – the size of an impact in quantitative terms where possible;
- Extent – the area over which an impact occurs;
- Duration – the time for which an impact is expected to last;
- Reversibility – a permanent impact is one that is irreversible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A temporary impact is one from which a spontaneous recovery is possible; and
- Timing and frequency – i.e. whether impacts occur during critical life stages or seasons.

Both direct and indirect impacts are considered. Direct ornithological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ornithological impacts are attributable to an action which affect ornithological resources through effects on an intermediary ecosystem, process or receptor.

Significance Criteria

In accordance with the CIEEM guidelines, a significant impact, in ornithological terms, is defined as;

> *"an impact (whether negative or positive) on the integrity of a defined site or ecosystem and / or the conservation status of habitats or species within a given geographical area, including cumulative and in-combination impacts".*

The approach adopted here aims to determine an impact to be significant or not on the basis of a discussion of the factors that characterise it, i.e. the ornithological significance of an impact is not dependent on the value of the feature in question. The value of a feature that will be significantly affected is used to determine the

geographical scale at which the impact is significant, e.g. an ornithologically significant impact on a feature of local importance would be considered to represent a significant impact at a local area level. This in turn is used to determine the implications in terms of legislation, policy and/or development control.

Any significant impacts remaining after mitigation (the residual impacts), together with an assessment of the likelihood of success of the mitigation, are the factors to be considered against legislation, policy and development control when determining the application.

Assessment Areas

The bird surveys cover a wide area (Figure 7-1-2) with the survey areas based upon guidance (NatureScot 2017, NatureScot 2025), therefore impacts have been assessed within the zone of impact appropriate for each receptor taking into account ranging areas where published data is available (e.g NatureScot 2016). Additionally, the search area for historic data was larger again based upon NatureScot (2016) which identifies ranging distances for key species at risk from wind farms, and this has been used to inform the understanding of the wider area for those key species.

7.5 Baseline Conditions

Full results of surveys and the desk search results are provided in Technical Appendix 7-1 and Technical Appendix 7-2. This section instead describes the occurrence of sensitive receptors recorded on or in the vicinity of the Proposed Development.

7.5.1 Designated Sites

The results of the designated site search are shown in Table 7-3.

Table 7-3: Results of Designated Site Search

Site	Distance and Direction from the Proposed Development	Qualifying features
Laughenghie and Airie Hills SSSI	400 m west	**Non-breeding** Hen harrier *Circus cyaneus* **Breeding** Breeding bird assemblage; species listed are Osprey *Pandion haliateus*, Teal *Anas crecca*, Goosander *Mergus merganser*, Goldeneye *Bucephala clangula*, Greylag goose *Anser anser*, Golden plover *Pluvialis apricaria*, Curlew *Numenius arquata* and Raven *Corvus corax*.
Loch Ken and River Dee Marshes	5.31 km east	**Non-breeding** Greenland White-fronted goose and Greylag goose (see Table 7-4)
River Dee (Parton to Crossmichael) SSSI	6.6 km northeast	**Non-breeding** Greenland White-fronted goose, Greylag goose, and Whooper swan *Cygnus cygnus*.
Cree Estuary SSSI	16.4 km west	**Non-breeding** Pink-footed goose *Anser brachyrhynchus*
Solway Firth SPA	16.7 km south	See Table 7-5

As can be seen, two SPAs were also identified within the search area; Loch Ken and River Dee Marshes SPA and Solway Firth SPA. Details of the qualifying species for these sites are in Table 7-4 and Table 7-5 respectively.

Table 7-4: Qualifying features of Loch Ken and River Dee Marshes SPA

Species	Scientific name	Population	Population Estimate	Current condition
Greenland white-fronted Goose	*Anser albifrons flavirostris*	Non-breeding	360 individuals	Favourable maintained
Greylag Goose	*Anser anser*	Non-breeding	1,150 individuals	Favourable maintained

Table 7-5: Qualifying features of Solway Firth SPA

Species	Scientific name	Population	Population Estimate	Current condition
Bar-tailed Godwit	*Limosa lapponica*	Non-breeding	4,800 individuals	Favourable maintained
Black headed-gull	*Chrocicephalus ridibundus*	Non-breeding	13,732 individuals	Favourable maintained
Common Gull	*Larus canus*	Non-breeding	12,846 individuals	Favourable maintained
Common Scoter	*Melanitta nigra*	Non-breeding	1,588 individuals	Favourable maintained

Species	Scientific name	Population	Population Estimate	Current condition
Cormorant	*Phalacrocorax carbo*	Non-breeding	581 individuals	Favourable maintained
Curlew	*Numenius arquata*	Non-breeding	6,700 individuals	Favourable maintained
Dunlin	*Calidris alpina alpina*	Non-breeding	11,900 individuals	Favourable maintained
Golden Plover	*Pluvialis apricaria*	Non-breeding	3,380 individuals	Favourable maintained
Goldeneye	*Bucephala clangula*	Non-breeding	300 individuals	Favourable maintained
Goosander	*Mergus merganser*	Non-breeding	146 individuals	Favourable maintained
Grey Plover	*Pluvialis squatarola*	Non-breeding	720 individuals	Favourable maintained
Herring Gull	*Larus argentatus*	Non-breeding	3,034 individuals	Favourable maintained
Knot	*Calidris canutus*	Non-breeding	5,300 individuals	Favourable maintained
Lapwing	*Vanellus vanellus*	Non-breeding	5,037 individuals	Favourable maintained
Oystercatcher	*Haematopus ostralegus*	Non-breeding	33,850 individuals	Favourable maintained
Pink-footed Goose	*Anser Brachyrynchus*	Non-breeding	14,900 individuals	Favourable maintained
Pintail	*Anas acuta*	Non-breeding	1,400 individuals	Favourable maintained
Red-throated Diver	*Gavia stellata*	Non-breeding	521 individuals	Favourable maintained
Redshank	*Tringa totanus*	Non-breeding	2,100 individuals	Favourable maintained
Ringed Plover	*Charadrius hiaticula*	Non-breeding	981 individuals	Favourable maintained
Sanderling	*Calidris alba*	Non-breeding	260 individuals	Favourable maintained
Scaup	*Aytha marila*	Non-breeding	2,300 individuals	Favourable maintained
Shelduck	*Tadorna tadorna*	Non-breeding	1,600 individuals	Favourable maintained
Shovelor	*Anas clypeata*	Non-breeding	120 individuals	Favourable maintained
Svalbard Barnacle Goose	*Branta leucopsis*	Non-breeding	12,300 individuals	Favourable maintained
Teal	*Anas crecca*	Non-breeding	1,400 individuals	Favourable maintained
Turnstone	*Arenaria interpres*	Non-breeding	600 individuals	Favourable maintained
Whooper swan	*Cygnus cygnus*	Non-breeding	250 individuals	Favourable maintained
Waterfowl	Consisting of	Non-	122,000+	Favourable

Species	Scientific name	Population	Population Estimate	Current condition
Assemblage	species listed above	breeding	individuals	maintained

For Loch Ken and River Dee Marshes, the Proposed Development Site lies within connectivity distance for both species for which the SPA is designated. However, given the absence of any Greenland White-fronted goose observations, and the very low level of Greylag goose activity, some of which are attributed to local breeding populations (Section 7.5.2) there would be no adverse effects on the Loch Ken and River Dee Marshes SPA and it is scoped out of further assessment. For similar reasons, the River Dee (Parton to Crossmichael) SSSI would also be scoped out; in addition to the two species the associated SPA is designated for, there were no observations of Whooper swan so the SSSI is also scoped out of further assessment.

For Solway Firth SPA, the vast majority of species would not be connected to the Proposed Development due to the distance between the SPA and the Proposed Development. Given that distance, only Pink-footed goose would be considered as a possible species that the Proposed Development could impact on. However, given the level of activity of Pink-footed goose (section 7.5.2), there could be no adverse effects on the Solway Firth SPA, so it is scoped out of further assessment.

Similarly, the Cree Estuary SSSI, which is only designated for Pink-footed goose, could not be adversely affected by the Proposed Development due to the low level of activity of Pink-footed goose around the Proposed Development Site (section 7.5.2) and so the SSSI is scoped out of further assessment.

7.5.2 Species Accounts

Black Grouse

Black grouse are considered to be at risk from windfarms (NatureScot 2025). They are a species which is in decline across parts of their range in Scotland – particularly southern Scotland - and are red-listed on BoCC as well as being an SBL species. The NHZ19 population is estimated at 121 males (Wilson 2015).

No leks were identified during surveys. In 2021 they were heard calling during Black grouse surveys in an inaccessible area to the south-west of the Proposed Development Site.

There was one flight record of Black grouse (Table 7-6, also Figure 7-1-4c) and one incidental sighting during vantage point surveys when a Black grouse was flushed by a surveyor walking to a VP. Droppings were also present on the Proposed Development Site.

Table 7-6: Flight activity for Black grouse

Species	Scientific Name	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Sec-onds	At Risk Bird Sec-onds
Black grouse	*Lyrurus tetralix*	1	1	1	1	31	31

Activity was limited on the Proposed Development Site, but there was some usage. The presence of calling birds indicates the potential for leks in the wider area; as a result of this, surveys are planned for the access track due to the inability to survey this area

when pervious ornithology surveys were underway. The results of these surveys will provide more certainty as to the situation with Black grouse in this area. At this time however, given the presence of a small level of activity on the Proposed Development Site, it would be assessed as being of Local importance for this species. However, with such limited activity within the development area, no impacts could cause a significant impact on the Black grouse population and so it is not carried forward to assessment.

Curlew

Curlew are listed as BoCC red as well as being an SBL species. They are considered at risk from windfarms (NatureScot 2025). They are listed in the breeding bird assemblage for Laughenghie and Airie Hills SSSI.

Wilson estimates the NHZ19 population as 4,284 breeding pairs; the population may have declined further since the estimate was made.

No Curlew were recorded during wind farm surveys. However, one possible territory was recorded in the area of the solar farm surveys in 2023 (Figure 7-1-8b). This was present in the survey buffer, to the north-east of the Proposed Development.

With only one Curlew present within the survey area, no presence within the wind farm survey area and the single territory being outside the Proposed Development Site, the Proposed Development Site is assessed as being of Less than Local importance for this species. The species is therefore not considered for further assessment.

Golden Plover

Golden plover are an Annex I species, as well as being an SBL species. They are considered to be at risk from windfarms (NatureScot 2025). Golden plover are listed in the breeding bird assemblage for Laughenghie and Airie Hills SSSI.

There were three flights recorded during vantage point surveys. Two flights occurred in November 2019 (with groups of 60 birds and 35 birds) and one flight in March 2021 (39 birds). This last flock was responsible for 22,776 (70%) of the at risk bird seconds shown in Table 7-7. In addition birds were heard calling in September 2019.

The timing of activity suggests birds are migrating/ passing through the vicinity of the Proposed Development Site, but with only four observations, it also suggests this is a relatively infrequent occurrence. There was no evidence for breeding on the Proposed Development Site and no Golden plover were observed during the surveys carried out in 2023. There were no regular observations in the winter months outside the migration periods. Flight activity is shown on Figure 7-1-4 d.

Table 7-7: Flight activity for Golden plover

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Sec-onds	At Risk Bird Sec-onds
Golden plover	*Pluvialis apricaria*	Annex I, SBL	35	60	44.67	3	37,526	32,726

Although the species is listed within the breeding bird assemblage for the Laughenghie and Airie Hills SSSI, there was no evidence of Golden plover activity on the Proposed Development Site during the breeding season; as such, the SSSI population appears not to make use of the Proposed Development Site.

Given the infrequent occurrence of this species, and the relatively small groups of birds observed, together with the occurrence during migration periods the Proposed Development Site is considered to be of Less than Local importance for this species. Relatively large numbers of Golden plover move through the UK in autumn and spring, and because of this the infrequent occurrence of the species suggests limited value to this species. The species is therefore not considered for further assessment.

Goshawk

Goshawk *Accipiter gentilis* are on Schedule 1 of the WCA. Goshawk is considered to be at risk from wind farms (NatureScot 2018b).

The data from SRSG shows that 32 territories were checked in Dumfries and Galloway, with 22 territories occupied (Challis, Beckmann, et al. 2023). Wilson (Wilson 2015) also estimates 31 pairs present in NHZ19.

There was one record of Goshawk during the vantage point surveys (Table 7-8; Figure 7-1-4c).

Table 7-8: Flight activity of Goshawk

Species	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Goshawk	1	1	1	1	330	0

The Proposed Development Site has limited suitability for Goshawk, which are a forest dwelling species, although the plantation forestry around the Wind Development Area of the Proposed Development may be suitable and could be the source of the observation. However there was no evidence for any breeding. Goshawk is relatively secretive so it cannot be ruled out that it may be breeding in the vicinity of the Proposed Development. However, even if it is, the incidence of activity over the Proposed Development was extremely limited, as shown in Table 7-8.

As a result of the low levels of activity and suboptimal habitat present on the Proposed Development Site the Proposed Development Site is considered to be Less than Local for this species. The species is therefore not considered for further assessment.

Greylag Goose

Greylag goose are considered to be at risk from windfarms (NatureScot 2025). They are amber listed on BoCC. Large numbers winter in Scotland - Forrester estimates more than 85,000 (Forrester 2007), but there are also native and naturalised breeding populations. South-west Scotland holds a long-established breeding population which existed before the expansion of the feral/naturalised population but also was not included within the WCA as a fully native population (Sharrock 1976).

The species is listed or a qualifying feature on several of the designated sites identified in the designated site search. 'Non-feral' Greylag goose is listed in the breeding bird assemblage of the Laughenghie and Airie Hills SSSI. Non-breeding Greylag goose are also a qualifying feature of the Loch Ken and River Dee Marshes SPA as well as the underlying River Dee (Parton to Crossmichael) SSSI.

Greylag goose was recorded periodically during vantage point surveys (Table 7-9 , Figure 7-1-4d), but observations comprised:

- native/naturalised birds

  - two observations in late April and May of very small numbers
- potentially migrant birds
  - two observations of groups of 40 and 41 individuals, recorded in March and January
- observations where provenance was unclear
  - three birds seen twice on one day, so presumably the same birds, but recorded in February; the month indicates migrants but the flock size is more indicative of the naturalised population.

Greylag goose were also observed during the breeding bird surveys; there was no evidence of breeding in 2020 or 2021 on the windfarm surveys , but a possible territory was identified in 2023 on the solar farm surveys. This is likely to be from the naturalised population.

Table 7-9: Flight activity of Greylag goose

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Greylag goose	Anser anser	BOCC amber	2	41	15.5	6	18,541	14,220

As a result of the limited activity levels observed, the Proposed Development Site is assessed as being of Less than Local importance for this species. Given the low levels of activity, particularly from the wintering/non-breeding population there is considered to be no connectivity between the Proposed Development and the Loch Ken and River Dee Marshes SPA. The species is therefore not considered for further assessment.

Hen Harrier

Hen harrier are listed as an Annex I species as well as a Schedule 1 and 1A species on WCA 1981. They are red-listed on BoCC and are also a SBL species. Non-breeding Hen harrier are a reason for designation of the Laughenghie and Airie Hills SSSI.

The most recent estimate for the NHZ19 population is 18 females/pairs, although it is considered this is a likely underestimate (Wilson, 2015). The Scottish Raptor Monitoring Scheme (SRMS) reports that 12 ranges were checked and six were occupied in 2022 (Challis, Beckmann, et al. 2023).

Two flights for Hen harrier were recorded (Table 7-10, Figure 7-1-14c), and there were a further two incidental sightings around VP surveys. All records occurred outwith the breeding season, with the flights occurring in February and March 2020, and the incidental sightings in September and October 2019. There were no observations of the species during other surveys.

Table 7-10: Flight activity of Hen harrier

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Hen harrier	*Circus cyaneus*	Annex I, Schedule 1, BOCC red, SBL	1	1	1	2	71	0

While Hen harrier is a species of conservation concern and also a species for which the Laughenghie and Airie Hills SSSI is designated, the occurrence of Hen harrier on the Proposed Development Site was very low. There is a possibility that the observations could relate to birds from the SSSI population, and so the value of the Proposed Development Site would therefore be assessed as Local. However, because of the very low usage of the Proposed Development Site, there would be no opportunity for significant impacts to occur and so further assessment is not required.

Merlin

Merlin *Falco columbarius* are listed on Schedule 1, Annex I, are red-listed on BoCC and are an SBL species.

Wilson (Wilson 2015) estimates the NHZ19 population as 12 breeding pairs. The SRMS report suggests 12 ranges were checked and three were occupied territories in 2022 (Challis, Beckmann, et al. 2023).

Merlin were recorded twice during surveys, both times during the vantage point surveys (Table 7-11, Figure 7-1-4c). Both flights were outwith the breeding season (October 2019 and September 2020) and there was no evidence of the Proposed Development Site being used for breeding.

Table 7-11: Flight activity of Merlin

Species	Scientific Name	Conservation Designations [1]	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of fligh ts	Total Bird Sec- onds	At Risk Bird Sec- onds
Merlin	*Falco columbari us*	Annex I, Schedule 1, BOCC red, SBL	1	1	1	2	45	0

Due to the very limited use by Merlin, and the absence of any evidence for breeding, the Proposed Development Site would be assessed as being of Less than Local. The species is therefore not considered for further assessment.

Nightjar

Surveys were carried out for Nightjar because of their presence in Dumfries and Galloway and suitable habitat associated with the Proposed Development Site and surrounding area. However, two years of surveys failed to identify any Nightjar present within the windfarm survey area and so they are not considered to be present within the Proposed Development. There would be no impacts on this species to assess.

Pink-footed Goose

Pink-footed goose are considered to be at risk from windfarms (NatureScot 2025), and are amber listed on BoCC. They winter in large numbers in Scotland; Forrester estimates that around 200,000 pass through in October, with between 100,000 – 150,000 remaining through the winter (Forrester 2007). Cree Estuary SSSI is designated for roosting Pink-footed goose.

Pink-footed goose were recorded on five occasions (Table 7-11, Figure 7-1-4d) with the largest observation being 130 birds in November 2019. All other observations were in March or September, suggesting birds passing through on migration

Table 7-12: Flight activity of Pink-footed goose

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Sec-onds	At Risk Bird Sec-onds
Pink-footed goose	Anser brachyrhynchus	BOCC amber	1	130	43.6	5	20,999	106

There is no suitable foraging habitat within most of the Proposed Development Site and no evidence for use by the species. Flight activity was limited and mostly of birds passing over at migration periods. As such, the Proposed Development Site would be considered to be Less than Local for this species.

Due to the limited activity, there would be considered no connectivity between the Cree Estuary SSSI and the Proposed Development. The species is therefore not considered for further assessment.

Red Kite

Red kite are listed on Annex I, Schedule 1 and are an SBL list species. They are considered to be at risk form windfarms (NatureScot 2025).

Red kite were re-introduced to Dumfries and Galloway in 2001 and the population has expanded strongly. Wilson estimated the population as 83 pairs in 2013 (Wilson 2015). Challis recorded 168 home ranges checked and 147 occupied in Dumfries and Galloway in 2022 (Challis, Beckmann, et al. 2023). The population is outgrowing the ability to monitor all nest locations.

Red kite were the species most commonly recorded during vantage point surveys (Table 7-13; Figures 7-1-4a and 7-1-4b), with 285 flights recorded during the two years of surveys. Up to four were seen at any one time. There was no obvious focus of activity across the Proposed Development, with activity generally high across the site.

There were a number of territories identified during surveys; further details of these are provided in Technical Appendix 7-2.

Table 7-13: Flight activity of Red kite

Year	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Sec-onds	At Risk Bird Sec-onds
Year 1 (Sep 2019 – Aug 2020)	*Milvus milvus*	Annex I, Schedule 1, SBL	1	4	1.2	151	28,212	21,824
Year 2 (Sep 2020 – August 2021)	*Milvus milvus*	Annex I, Schedule 1, SBL	1	4	1.05	134	27,622	21,451

Given the number of territories present, and the usage of the Proposed Development identified from the vantage point surveys, this suggests that the Proposed Development Site is used by kites from the wider area which represent an important part of the

regional population. As such, it is considered to be of Regional importance to the Red kite population.

Snipe

Snipe *Gallinago gallinago* are listed as BoCC amber and are not considered to be at risk from windfarms (NatureScot 2025). However research has shown that they can be adversely affected by windfarm developments (J. S. Pearce-Higgins 2012).

Wilson estimates the NHZ19 population as being 1,252 pairs (Wilson 2015).

One Snipe was observed during vantage point surveys (Table 7-14 and Figure 7-1-4d). There were three territories (two possible, one probable) recorded during the 2021 breeding surveys – no territories were identified in 2020. No Snipe territories were identified during the solar farm surveys in 2023, although at least one bird was present.

Table 7-14: Flight activity for Snipe

Species	Scientific Name	Conservation Designations 1	Min. No. of Birds	Max. No. of Birds	Mean No. of Birds	No. of flights	Total Bird Seconds	At Risk Bird Seconds
Snipe	*Gallinago gallinago*	BOCC amber	1	1	1	1	79	79

Given the size of the regional population, the population of Snipe on the Proposed Development Site represents a very small proportion of that population. Even allowing for the Snipe being a somewhat elusive species, it would suggest that the Proposed Development Site is no more than Less than Local for this species. The species is therefore not considered for further assessment.

Sensitive Breeding Species With Proximity to the Solar Development Area

While the baseline has focussed on those species at risk from wind farms, the development of a solar array in the eastern part of the Proposed Development has the potential to impact other bird populations, which are not particularly susceptible to wind farm developments, such as passerine and other more common species.

Table 7-15 therefore summarises the results of the breeding bird surveys carried out within the Solar Development Area, highlighting species which are Annex I, Schedule 1, SBL or BoCC red species and which have not previously been described. This totals all confirmed, probable and possible territories to give a total estimate of territories; these are broken down in Technical Appendix 7-1. Survey results are shown on Figures 7-1-8a (for Meadow pipit *Anthus pratensis*, Willow warbler *Phylloscopus trochilus* and Skylark *Alauda* arvensis and 7-1-8b for less numerically common species.

Table 7-15: Summary of sensitive species within the Solar Farm Survey Area

Species	Scientific name	Conservation Designations	No. of Territories	Present within Proposed Development Site	Comments	Assessment of value
Crossbill	*Loxia curvirostra*	Schedule 1	None	Yes	Non-breeding record and limited habitat suitability within	Less than Local

Species	Scientific name	Conservation Designations	No. of Territories	Present within Proposed Development Site	Comments	Assessment of value
					Proposed Development Site	
Cuckoo	*Cuculus canorus*	SBL, BOCC red	5	Yes – 2 males	Likely to be feeding across wide area	Less than Local
Dunnock	*Prunella modularis*	SBL, BOCC amber	3	Yes – 1 territory		Less than Local
Herring gull	*Larus argentatus*	SBL BOCC red	None	Yes	Observed flying over	Less than Local
House martin	*Delichon urbica*	BOCC red	None	No	Observed near Loch Mannoch	Less than Local
House Sparrow	*Passer domesticus*	SBL, BOCC red	2	No	On in buildings adjacent to Proposed Development Site	Less than Local
Kestrel	*Falco tinnunculus*	Schedule 1, SBL, BOCC amber	1	No		Less than Local
Kingfisher	*Alcedo atthis*	Annex I, Schedule I, SBL	None	Yes	One sighting on Loch Mannoch, one on watercourse within Proposed Development Site	Local
Lesser Redpoll	*Acanthis cabaret*	SBL, BOCC red	1	Yes	On boundary of access track	Less than Local
Linnet	*Linaria cannabina*	SBL, BOCC red	7	Yes - 2	Both confirmed territories in vicinity of access track running to west	Less than Local
Mistle Thrush	*Turdus viscivorus*	BOCC red	5	Yes – 2	2 territories in array area	Less than Local
Reed Bunting	*Emberiza schoeniclus*	SBL, BOCC amber	13	Yes – 2	2 territories in vicinity of access track	Local – relatively high density for this species
Skylark	*Alauda arvensis*	SBL, BOCC red	9	Yes -3	2 territories in vicinity of access track and one within array	Less than Local
Spotted Flycatcher	*Muscicapa striata*	SBL, BOCC red	1	No		Less than Local
Starling	*Sturnus*	SBL, BOCC	2	No		Less than

Species	Scientific name	Conservation Designations	No. of Territories	Present within Proposed Development Site	Comments	Assessment of value
	vulgaris	red				Local
Swift	*Apus apus*	BOCC red	None			Less than Local
Tree Pipit	*Anthus trivialis*	SBL, BOCC red	3	No		Less than Local
Twite	*Linaria flavirostris*	SBL BOCC red	3	Yes - 1	One pair on boundary of Proposed Development, two in vicinity of Loch Mannoch	Regional
Whinchat	*Saxicola rubetra*	BOCC red	10	No		Less than Local

The species range was relatively diverse across the survey area, with a number of species of higher conservation concern identified. While most species were a small population of species present in much larger numbers across the regional/county, resulting in an evaluation of Less than Local, three species were assessed as having a value greater than this:

- Kingfisher – Forrester suggests a population of between 75 – 125 pairs for Dumfries and Galloway (Forrester 2007). Although no evidence for breeding was observed, it is considered that there may be at least one territory in the vicinity of the development. At the same time, suitable habitat is relatively limited for this species within the developable area. As such, while assessed as Local, it is scoped out of further assessment due to the lack of pathway for significant impacts. However, it is a Schedule 1 species so mitigation is included to ensure it is protected from unlawful disturbance;
- Reed bunting – relatively high population density within the survey area, which may be locally significant in Dumfries and Galloway where the density tends to be lower (Forrester 2007). However, given there were only two territories within the Proposed Development Site and these were in proximity to the access track to the west of the Solar Development Area, there would be limited ability for significant impacts to occur and so this species is scoped out of further assessment; and
- Twite – The species has a very limited distribution in Dumfries and Galloway, with populations only known from two locations (Forrester 2007). Additionally, while the population size is not known, Forrester describes the Mull of Galloway population as holding up to four pairs. The Proposed Development does not fall within either of the two known areas. BTO Atlas data also shows the species as absent in this area. As such, given the limited population in Dumfries and Galloway, and the number of territories recorded here, the Proposed Development Site holds a regionally significant population of this species. Further assessment is therefore required.

7.5.3 Receptors Brought Forward for Further Assessment

Receptors brought forward for assessment are those of County importance or greater, or where the receptor has been assessed as Local and there is considered to be a

pathway for a significant impact to occur (in EIA terms). The impact could be either beneficial or adverse.

The following receptors are therefore brought forward for assessment:

- Laughenghie and Airie Hills SSSI;
- Red kite; and
- Twite

7.6 Mitigation Measures

In line with CIEEM guidance, the impact assessment carried out in this Chapter is done on the basis that mitigation measures will be applied during the construction and operational phases of the project. This section therefore describes the ornithological receptors already taken account of during the design process and identifies mitigation and good practice measures which will be adopted during the construction and operational phases.

7.6.1 Design Mitigation

During Solar Development Design, a known Red kite nest which was used over several years was included as a constraint to reduce the impacts on the territory both of habitat loss and also to help prevent disturbance during the construction phase. More information is included in **Technical Appendix 7-2.**

7.6.2 Construction Phase

General

A Construction and Environmental Management Plan (CEMP) and Construction Method Statement (CMS) will be developed and agreed with the local planning authority (in consultation with other stakeholders) before construction commences. An outline CEMP is presented in Technical Appendix 15-1. This will inform the full CEMP prepared prior to construction, and will:

- Include measures to safeguard habitats and species to be implemented prior to construction, during construction and post-construction; and
- Provide details of all pre-construction surveys required including methods and timings.

An Ecological Clerk of Works (ECoW) will be present during enabling works and throughout the construction period of the Proposed Development. They will be a suitably experienced individual, whose role would be to provide advice so that works are carried out in accordance with environmental measures as detailed in the CEMP, and to monitor compliance with relevant legislation and good practice.

The ECoW would contribute to all relevant CMS and CEMP documents.

Prior to the start of construction, contractors will be made aware of the ornithological sensitivities within the Proposed Development Site (particularly with regard to the potential presence of Schedule 1 breeding species). The ECoW will give regular Toolbox Talks to contractors regarding the status and locations of protected and sensitive species and habitats at the Site.

Where possible, vegetation clearance and ground stripping will be carried out outwith the breeding season (September – mid March, inclusive). Should this not be possible, then the ECoW will carry out pre-construction survey checks during the bird breeding season) no more than 48 hours before any vegetation stripping or excavation works to check for the presence of any breeding birds.

In addition, regular nesting checks will be carried out within 100 m of working areas for all species, increasing to 1 km for breeding Red kite.

Any active nests found will be buffered; the buffer should be based upon distances in current guidance (Goodship and Furness 2022) (or any subsequent guidance), and with ECoW review. Where a species is not listed in Goodship & Furness (for example a non-Schedule 1 or Annex I species) then a minimum 5 m buffer would be observed, although the ECoW has discretion to increase this where they consider it necessary to protect the nest. Buffers may not be removed until the ECoW has determined that the nest is no longer in active use and/or there are no dependent young in the vicinity.

Species Protection Plan

A Species Protection Plan (SPP) will be developed. While this would primarily be targeted at Red kite and Twite, it will also detail protection and mitigation for all bird species. It will form part of the CEMP. It will detail measures to be implemented before and during construction to protect bird species potentially breeding/using the Proposed Development Site.

As part of the SPP, in the breeding season prior to construction commencing, a breeding raptor survey, using methods in Hardey (Hardey 2013), will be carried out to establish the distribution of breeding Red kite across the area to feed into the SPP before construction commences. Monitoring will also continue during the construction period to ensure that nests are identified and protected. Because of the potential for Black grouse leks to occur, particularly alongside the access track, in the breeding season prior to construction commencing and also during construction, Black grouse lek surveys should also be undertaken between mid March and mid May, within 500 m of the access route using methodology set out in Gilbert (Gilbert (1998).

7.6.3 Operational Phase

With the exception of the operation and general maintenance of infrastructure, there will be limited onsite activity during the operational phase, and therefore levels of disturbance will be considerably reduced relative to the construction phase.

7.6.4 Decommissioning

Embedded mitigation of decommissioning activities will follow those measures for the mitigation of construction activities, and will also including pre-decommissioning surveys and ecological supervision of activities.

7.7 Assessment of Effects

7.7.1 Construction Effects

The following impacts may arise during construction:

- Direct and/or indirect habitat loss during the construction stage - This is likely to be a continuous process, with impacts carrying over into the operational phase as well; and
- Disturbance and displacement as a result of human activity on the Proposed Development.

Laughenghie and Airie Hills SSSI

There will be no direct or indirect habitat loss during the construction stage due to the distance between the Proposed Development Site and the SSSI. While the boundaries of the Proposed Development and the SSSI are 400 m apart, the closest infrastructure (a turbine) is 1 km from the SSSI. The two are separated by a plantation forest and largely by a public road.

As identified in Section 7.5.1, activity from species associated with the SSSI was very limited and as such would mean that no significant displacement impacts would arise on the SSSI assemblage populations.

Hen harrier were recorded in the winter months but only on four occasions; there was no evidence for any roosting activity. With only four observations across two years, the level of use is so limited such that if displacement were to occur, because of the short term nature of the displacement during construction, the impact would be at most negligible and **Not Significant**.

Red kite

Across the Proposed Development, land take is calculated to be 28.43 ha, of which 1.9 ha is considered to be temporary (works compounds etc.) and the remainder permanent/for the lifetime of the Proposed Development. Because the loss will occur during construction, it is assessed as a construction phase loss, but there is an operational element as well, due to the loss continuing across the lifetime of the Proposed Development.

The areas of loss are spread across the Proposed Development Site and represent a relatively small part of the greater area. Given the ranging nature of Red kites, and the number observed across the Proposed Development, the area is small relative to the foraging range of Red kites. Additionally, birds in this area may make use of the Red kite feeding station at Laurieston, which would explain the high density observed in this area. This would mean they are less reliant on foraging than birds without access to supplementary feeding. As a result, the habitat loss of this magnitude is assessed as negligible and **Not Significant**.

Studies carried out at the Braes of Doune wind farm (K. &. Duffy 2014) showed some reduction in use of the site during the construction period. However, results from the vantage point surveys differed from those of radio tracking birds with radio tracking results showing more use of the area – this could mean there was a temporal displacement, with birds not using the site when construction was active, but making more use of it outside the working period. Nevertheless, it would be reasonable to assume there could be some limited displacement during the construction period. This would be short term, while construction was ongoing.

Given the absence of confirmed territories in close proximity to the Wind Development Area, the displacement would occur to birds drawn from the local population, rather than directly onto a few pairs. Design mitigation was also applied to a confirmed Red

kite nest in the vicinity of the Solar Development Area. As a result, it would be considered a minor and **Not Significant** impact; while use of the Proposed Development Site was high and the population is important, the short term nature, and the ability for there to be some ongoing use means it would not be considered significant.

Twite

There will be some habitat loss as a result of the development of the solar array. Two of the Twite territories were identified outwith the Proposed Development Site in wet/marshy grassland lying between the Proposed Development Site and Loch Mannoch, while the third territory was on the southern boundary of the Proposed Development Site close to the Tarff Water.

The closest territory is 100 m from the array infrastructure; the territory on the boundary of the Proposed Development is approximately 280 m from the solar array infrastructure and the third territory is 250 m from the array.

Due to the locations of territories, habitat loss for the species may be limited both due to the distance between territories and solar arrays and also the habitat present within the area of the arrays, which is mostly improved grassland. While Twite forage extensively on grass seed, reduced diversity in improved grassland can reduce seed availability and make improved grassland less suitable (Peak District National Park Authority 2021). Large areas of grassland habitat will still remain available for the population and as such, the impact would be considered to be minor and **Not Significant**. While the loss would initially occur during the construction phase, most of it would be long term (for the life time of the Proposed Development). There would be some limited regrowth around the array following construction but seed resource would be limited. There would be no effect on likely breeding habitat.

While there would be disturbance to breeding Twite during construction, mitigation measures would ensure that nests were protected from harm. Little is known about Twite sensitivity to disturbance, but disturbance impacts during construction would be modified by the distance between areas where Twite have been recorded and active working areas. Any impacts would be temporary and short term. As a result, the impact is assessed as negligible.

7.7.2 Operational Effects

The following impacts are considered for the operational phase:

- Disturbance/displacement including barrier effects; and
- Additional mortality as a result of collision risk (for Red kite only).

Laughenghie and Airie Hills SSSI

Section 7.7.1 identifies that there would be no disturbance or displacement impacts during construction due to the distance between the Proposed Development and the SSSI, and the limited usage of the Proposed Development by birds from the SSSI.

The same would apply to operational impacts on the SSSI. The usage by the breeding bird assemblage is too limited such that there would be no significant displacement impacts as a result of the operation of the Proposed Development.

With respect to Hen harrier, there is only limited evidence for displacement of Hen harrier (Haworth 2013), and that suggests that micro avoidance occurs, but that birds are not displaced from wind farm sites. Due to the low level of use of the Proposed Development Site during the non-breeding months, and the evidence that birds are not displaced from wind farm developments, there would be **No Significant** impact upon the Hen harrier population of the Laughenghie and Airie Hills SSSI.

Red Kite

The long term study at the Braes of Doune (K. &. Duffy 2014) also looked at the response of Red kites to an operational wind farm. The results were equivocal; there was evidence for a reduction in use of the wind farm area, but there was also evidence for a local change in distribution of Red kites so it was not clear if the result showing less activity was a result of displacement or altered distribution. Monitoring did not identify any behavioural aversion to turbines and birds were seen to apparently avoid blades on several occasions.

As a result, it is considered that any operational displacement would be limited and that levels of use would be similar to, or potentially slightly reduced as a result of the Proposed Development. This would result in a negligible impact which would be **Not Significant**.

Table 7-16 shows the results of the collision risk modelling for Red kite. This includes the annual values for the two years of observations together with the mean and a measure of the certainty around that estimate, as well as the likely range the collision risk lies within for the species. This shows collision risk has been estimated as 0.667 birds per year. As it is not predicted that there would be any displacement, there are no behaviour modifiers which would suggest this would be an overestimate.

Table 7-16: Collision risk results for Red kite

				Uncertainty				Range	
	Collisions at standard rate	Years per collision	Collisions over 40 year operational period	Variance in flight activity	Model Simplifications	Design options	Total	Lower range value	Upper range value
Year 1	**0.475**	2.11	18.985	50%	20%	15%	56%	0.209	0.740
Year 2	**0.859**	1.16	34.353	50%	20%	15%	56%	0.379	1.339
Mean	**0.667**	**1.5**	**26.669**	**50%**	**20%**	**15%**	**56%**	**0.294**	**1.039**

Population Viability Analysis (PVA) was carried out for this level of collision risk. Full details of this are provided in Technical Appendix 7-3. The addition of the mortality as a result of collision risk did not change the outcomes for the models. The deterministic model continued to increase in population, but the growth rate declined from 1.64% to 1.40% which over 35 years meant a population reduced by 20 females. The stochastic model however for both scenarios (collision risk/no collision risk) did not show growth; the addition of the collision risk meant the mean growth rate fell from -1.11% to -1.42%. Reasons why the stochastic model suggests a declining population when the local population is known to be still expanding are discussed in Technical Appendix 7-3.

Because the population is thought to be still growing (estimated at 3.8% growth 2009 – 2018 (SRMS 2023), and the population estimate used in the model may be an underestimate (it is based upon the number of home ranges reported occupied by

DGRSG; however if not all home ranges are monitored then this would only reflect a proportion of the population), it is considered that the outcomes from the stochastic model are more representative of the population. As such, this level of collision risk would be considered minor and **Not Significant** and it would not have an adverse impact on the population.

Twite

Once the solar farm becomes operational there could be additional displacement owing to the limited suitable habitat within the solar arrays. There may also be some avoidance of the solar arrays as Twite are species of open ground, and so could avoid structures which could increase their risk from predation. As such, the habitat loss initially identified within the Construction Phase could be enhanced by displacement effects. However, given the distance between the territory locations and the likely range associated with these species, combined with the habitat still available to them, this effect would be assessed as negligible and **Not Significant**.

7.7.3 Decommissioning Effects

It is difficult to predict what the baseline will be at the time of the Proposed Development's decommissioning; however it is envisaged that effects would be similar to those identified during the Construction Phase. This would be verified by pre-decommissioning surveys undertaken as part of a Decommissioning Plan.

7.8 Assessment of Cumulative Effects

Cumulative impacts of wind farms on ornithological features may be categorised into two areas:

- Larger scale effects of displacement and/or disturbance; and
- Increased mortality across a larger area due to collision risk.

Collision risk modelling is a broad-brush tool, the results of which provide an indication rather than a definitive risk calculation. Other factors such as disturbance and displacement, whether in the breeding season or winter, may carry as much weight, or more, in terms of realistic impacts. The greatest theoretical risks of significant cumulative effects are on species of National or International importance from a high volume of wind farms being present in a relatively small area. Current guidance suggests that the highest priority for cumulative impact assessment is for species that are declining and/or not in favourable conservation status, and that species of very high conservation importance or those vulnerable to wind farm developments should be targeted for cumulative assessments (NatureScot 2012).

The context in which cumulative impacts are considered also depends upon the ecology of the species in question. For example, it may be appropriate to consider cumulative collision risk to geese associated with a SPA within the context of their wider foraging range. For other receptors, such as breeding waders, it may be appropriate to consider the impacts on the local population in the context of any planned wind farms in the immediate vicinity which have the potential to cause additional displacement on a much more localised population.

Cumulative impact assessments are often complicated by limited availability of ornithological impact assessments for other wind farm developments; where this

information is available, survey periods and methods may differ between sites. Furthermore, some wind farm developments may have been operational or in planning for many years, and thus data may no longer be valid due to age of data and/or changes in bird populations since the time of survey, or have been assessed using different standards (for example, on older wind farm sites, collision risk avoidance rates may be different from those used currently and the EIA may not be explicit about what avoidance rate was used). Furthermore, figures used to calculate cumulative collision risk generally do not take into account proposed mitigation or compensation. Therefore, it is reasonable to assume, where agreed with NatureScot, that implementation of mitigation and compensation measures will reduce the overall impacts.

With respect to Laughenghie and Airie Hills SSSI, the Proposed Development is the only renewable energy development currently proposed which could affect the SSSI; as such, there are no cumulative effects to consider.

For the purposes of this cumulative assessment, there is no information available on potential cumulative impacts on Twite. Given the isolated and localised distribution, there would be limited opportunity for effects on one locale to have any non significant effects which would become significant due to in-combination effects. As such, given the finding of **Not Significant** effects on the Twite population, this would also be the finding of the cumulative assessment.

That leaves Red kite where the impact with potential to be significant cumulatively would be collision risk.

To allow assessment of cumulative collision risk, data was requested from NatureScot for the cumulative database they maintain for NHZ19. Table 7-17 shows the results of that search, detailing the wind farms included in the database and the collision risk they reported (corrected where necessary for current avoidance rates).

Table 7-17: Summary of wind farms within NHZ19 reporting collision risk for Red kite

Wind Farm	Status	Reported collision risk rate for Red kite (99% avoidance)
Bodinglee[1]	Application	0.070[1]
Cornharrow	Approved	0.089
Daer	Application	0.100
Fell	Approved	0.147
Glenshimmeroch	Consented, Variation submitted	0.070
Little Gala	Appealed	0.004
M74 West Renewable Energy Park	Application	0.058
Mochrum Fell	Approved	0.160
North Kyle	Approved	0.007
Overhill	Consented, Variation submitted	0.020
Sanquhar II	Approved	0.377
Shepherd's Rig	Approved	0.020
Stranoch 2	Approved	0.003
Troston	Approved	0.140

Wind Farm	Status	Reported collision risk rate for Red kite (99% avoidance)
Windy Rig	Operational	0.006

[1] There is currently an outstanding question regarding the accuracy of the estimate of this particular site; it may be subject to underestimation.

Table 7-18 provides the total estimate for regional collision risk for this species, broken into whether the developments are consented (which includes those with variations submitted) or in application (which includes Little Gala which is subject to appeal).

Table 7-18: Cumulative collision risk for Red Kite

Site state	Total	Total including Proposed Development
Approved	1.039	1.716
Application	0.232	0.909
All sites	1.271	1.948

The cumulative collision risk was also modelled using the rate for all approved sites (Technical Appendix 7-3). The results from the deterministic model showed that the population continued to grow, although the growth rate had declined from the baseline of 1.64% to 1.23%.

As with the other stochastic models variants, including cumulative collision risk also showed population decline; the population grown declined from -1.11% for the baseline no collision risk model to -1.9% for the cumulative collision risk.

Given the previous reservations about the stochastic model, more reliance is placed on the deterministic model. This continues to show population growth, albeit reduced after the inclusion of cumulative collision risk. The cumulative collision risk would therefore be classed as a minor impact but it would be considered **Not Significant**.

7.9 Residual Effects

Table 7-19 summarises the residual effects of the impact assessment.

Table 7-19: Summary of residual effects

Receptor	Evaluation	Assessment carried out	Construction		Operational	
			Habitat loss	Disturbance	Disturbance	Collision risk
Loch Ken and River Dee Marshes SPA	International	No				
Solway Firth SPA	International	No				
Laughengie and Airie Hills SSSI	National	Yes	Negligible – not significant	Negligible – not significant	Negligible – not significant	N/A
River Dee (Parton to	National	No				

Receptor	Evaluation	Assessment carried out	Construction		Operational	
Crossmichael) SSSI						
Cree Estuary SSSI	National	No				
Black grouse	Local	No				
Curlew	Less than Local	No				
Golden plover	Less than Local	No				
Goshawk	Less than Local	No				
Greylag goose	Less than Local	No				
Hen harrier	Local	No				
Merlin	Less than Local	No				
Nightjar	Not present	No				
Pink-footed goose	Less than Local	No				
Red kite	Regional	Yes	Negligible – not significant	Minor – not significant	Negligible – not significant	Minor – not significant
Snipe	Less than Local	No				
Sensitive breeding species:						
Twite	Regional	Yes	Minor – not significant	Negligible – not significant	Negligible – not significant	N/A
Kingfisher	Local	No				
Reed bunting	Local	No				
All other species	Less than Local	No				

7.10 Summary and Statement of Significance

The ornithological receptors on and in the vicinity of the Proposed Development Site have been identified and described. Nature conservation evaluations were carried out and three receptors – Laughengie and Airie Hills SSSI, Red kite and Twite taken forward for impact assessment.

Mitigation was identified to manage the potential for harm to occur to sensitive populations as well as ensuring that works will be undertaken in line with wildlife legislation.

Effects considered were habitat loss, construction and operational disturbance/displacement and additional mortality as a result of collision risk.

No significant effects have been identified as a result of this process and thus the Proposed Development could proceed without significant adverse impact on ornithological receptors.

7.11 References

Challis, A, B C Beckmann, M W Wilson, M A Eaton, A Stevenson, P Stirling-Aird, M Thornton, and N I Wilkinson . 2023. *Scottish Raptor Monitoring Scheme Report 2021 & 2022*. Stirling: BTO Scotland.

Challis, A, M W Wilson, M A Eaton, A Stevenson, P Stirling-Aird, M Thornton, and N I Wilkinson. 2022. *Scottish Raptor Monitoring Scheme Report 2020*. Stirling: BTO Scotland.

CIEEM. 2018. *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Winchester: Chartered Institute for Ecology and Environmental Management.

CIEEM. 2022. *Guidelines for Ecological Impact Assessment in the UK and Ireland; terrestrial, freshwater, coastal and marine version 1.2*. CIEEM.

Duffy, K & Urquhart, B. 2014. *Braes of Doune Windfarm; report on Red kite studies 2004-2012*. Banchory: NRP.

Duffy, K, and M Steward. 2008. *Turbine search methods and carcass removal trials at the Braes of Doune windfarm. Natural Research Information Note 4*. Banchory: Natural Research Ltd.

Energie Kontour. 2019. *Wall Muir EIAR*. Edinburgh: Energie Kontour.

Fielding, A.H. & Haworth, P.F. 2015. "Final report on the eight year monitoring programme (2007-2014) for the Edinbane wind farm on the Isle of Skye." Accessed 08 18, 2016. http://www.alanfielding.co.uk/fielding/pdfs/Edinbane%20Windfarm%20Monitoring%202007_14.pdf

Forrester, R.W, Andrews, I.J, McInerny, C.J, Murray, R.D, McGowan, R.Y, Zonfrillo, B, Betts, M.W, Jardine, D.C, & Grundy, D.S (eds). 2007. *The Birds of Scotland*. Aberlady: Scottish Ornithologists Club.

Gilbert, G. G. (1998). Bird Monitoring Methods. RSPB: Sandy.

Goodship, N M, and R W Furness. 2022. *Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species NatureScot Research Report 1283*. NatureScot.

Hardey, J, Crick, H, Wernham, C, Riley, H, Etheridge, B, Thompson, D. 2013. *Raptors A Field Guide for Surveys and Monitoring 3rd ed*. Edinburgh: TSO.

Haworth, P & Fielding, A. 2013. *A reviewof the impacts of terrestrial wind farms on breeding and wintering Hen harriers*. SNH - Unpublished.

NatureScot. 2012. *Assessing the Cumulative Impact of Onshore Wind Energy Developments*. Battleby: NatureScot.

NatureScot. 2016. *Assessing connectivity with Special Protection Areas (SPAs)*. Battleby: NatureScot.

NatureScot. 2016. *Environmental Statements and Annexes of Environmentally Sensitive Bird information*. Battleby: NatureScot.

NatureScot. 2017. *Recommended bird survey methods to inform impact assessment of onshore wind farms*. Battleby: SNH.

NatureScot. 2018. *Avoidance rates for the onshore SNH wind farm collision risk model.* Inverness: NatureScot.

NatureScot. 2024. *Guidance on using an updated collision risk model to assess bird collision risk at onshore wind farms.* Inverness: NatureScot.

NatureScot. 2025. *Assessing the Significance of Impacts from Onshore Wind Farms on Birds at Sites Outwith Designated Areas.* Inverness: NatureScot.

NatureScot. 2025 Pre-application guidance for solar farms. Inverness: NatureScot.

Peak District National Park Authority. 2021. "Feature Assessment: Twite." Accessed April 8, 2025. https://reports.peakdistrict.gov.uk/ccva/docs/assessments/wildlife/twite.html.

Pearce-Higgins, J.W, Stephen, L, Douse, A, & Langston, R.H.W. 2012. "Greater impacts of wind farms on bird populations during construction than subsequent operation: results of a mult-site and multi-species analysis." *Journal of Applied Ecology*.

Pearce-Higgins, J.W, Stephen, L, Langston, R.H.W, Bainbridge, I & Bullman, R. 2009. "The distribution of breeding birds around upland wind farms." *Journal of Applied Ecology*.

Pendlebury, C, S Zisman, R Walls, J Sweeney, E McLoughlin, C Robinson, L Turner, Loughrey, and J. 2011. *Literature review to assess bird species connectivity to Special Protection Areas; Scottish Natural Heritage commissioned report No. 390.* Battleby: SNH.

Ruddock, M. & Whitfield, D.P. 2007. *A review of disturbance distances in selected bird species.* SNH.

Sharrock, J. T.R. 1976. *The Atlas of Breeding Birds in Britain and Ireland.* Berkhamsted.: T. & A.D. Poyser.

SRMS. 2023. "Red Kite trends 2009 - 2018." Accessed 04 14, 2025. https://raptormonitoring.org/wp-content/uploads/2023/01/Red-Kite-trends-2009-2018.pdf.

Stanbury, A J, F Burns, N J Aebischer, H Baker, D Balmer, A F Brown, T Dunn, et al. 2024. "The status of the UK's breeding seabirds: an addendum to the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain." *British Birds* 117: 471-487.

Stanbury, Andrew, Mark Eaton, Nicholas Aebischer, Dawn Balmer, Andy Brown, Andy Douse, Patrick Lindley, Neil McCulloch, David Noble, and Ilka Win. 2021. "The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain." *British Birds* 114 723-747.

Wilson, M.W, Austin, G.E, Gillings, S, & Werhnham, C.V. 2015. *Natural Heritage Zone Bird population Estimates.* Scottish Windfarm Bird Steering Group.