

Chapter 9: Ornithology

Chapter 9

Ornithology

Introduction

9.1 This chapter presents the findings of the assessment of likely significant effects of the proposed Loch Liath Wind Farm (the 'Proposed Development') on ornithological features. It details the methods used to establish the bird populations within the Site (**Chapter 4: Project Description: Figure 4.1**) and its surroundings, the results of the baseline surveys, and the process used to determine the sensitivity of the bird populations present. The ways in which birds might be affected (directly or indirectly) by the construction and operation of the Proposed Development are assessed, prior to and after the application of any required mitigation measures.

9.2 Particular attention has been paid to species of high or moderate Nature Conservation Importance (target species). These include, but are not restricted to, species with national or international protection under the Wildlife and Countryside Act 1981 (and later amendments) and the EU Birds Directive (79/409/EEC).

9.3 This chapter presents the findings of the assessment of effects of the Proposed Development on birds. Effects on other flora and fauna are presented in **Chapter 8: Ecology**.

9.4 The ornithology assessment was undertaken by Natural Research (Projects) Ltd.

9.5 The following appendices are also referred to throughout the chapter:

- **Appendix 9.1: Ornithology Technical Report;**
- **Appendix 9.2: Collision Risk Modelling;**
- **Appendix 9.3: Confidential Report on GET Modelling;**
- **Appendix 9.4: Confidential Ornithology Annex;** and
- **Appendix 9.5: Regional Eagle Conservation Management Plan for NHZ 7 (RECOMP).**

9.6 The following terminology will be referred to throughout this chapter:

- 'Ornithology Study Area' ('OSA') refers to the area enclosed by the OSA boundary (see **Appendix 9.1: Figure 1**);
- 'Moorland breeding bird survey area', 'winter walkover survey area' or 'core survey area' refers to the OSA plus an additional 500 m wide strip around the OSA;
- 'Black grouse survey area' refers to the OSA plus an additional 1.5 kilometre (km) wide strip;
- 'Scarce breeding bird survey area' refers to the OSA plus an additional 2-6km wide strip depending on the focal species and presence of contiguous suitable habitat outside of the core survey area; and
- 'Flight activity survey area' or 'FASA' refers to a polygon around the outermost turbines plus an additional 500m strip around the polygon.

9.7 Please note that the Ornithology Study Area was defined prior to the design refinement of the Proposed Development and therefore encompasses an area much larger than the Planning Application boundary ("red-line boundary"). However, the study area for this assessment is defined with reference to the locations of turbines, tracks and ancillary infrastructure associated with the final design of the Proposed Development.

Assessment Methodology

Legislation and Guidance

Legislation

9.8 This assessment is carried out in accordance with the principles contained within relevant European legislation. Of particular relevance is the following European legislation:

- Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive'; European Commission, 2016a);
- Directive 92/43/EEC on Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) ('Habitats Directive'; European Commission, 2016b); and
- Environmental Impact Assessment Directive 2014/52/EU (European Commission, 2016c).

9.9 The following national legislation, which has recently been amended as a consequence of the UK's exit from the European Union, has also be considered as part of the ornithology assessment:

- Scottish Government (2020). EU Exit: The Habitats Regulations in Scotland;
- The Conservation (Natural Habitats &c.) Regulations 1994 (as amended) (The Habitats Regulations);
- The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 (as amended) (the EIA Regulations);
- The Nature Conservation (Scotland) Act 2004 (as amended); and
- The Wildlife and Countryside Act 1981 (as amended).

Guidance

9.10 This assessment is carried out with due regard to the following documents:

- Band, W., Madders, M. & Whitfield, D.P. (2007). Developing field and analytical methods to assess avian collision risk at wind farms. In de Lucas, M, Janss, G.F.E. and Ferrer, M. (Eds.) Birds and Wind Farms: Risk assessment and Mitigation, pp. 259 - 275. Quercus, Madrid;
- Brown, A.F. & Shepherd, K.B. (1993). A method for censusing upland breeding waders. Bird study 40: 3 pp189-195;
- CIEEM. (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester;
- European Commission. (2010). Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'. European Commission, Brussels;
- Gilbert, G., Gibbons, D.W. & Evans, J. (1998). Bird monitoring methods. Royal Society for the Protection of Birds (RSPB) Sandy, Bedfordshire;
- Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). Raptors, a field guide to survey and monitoring. 3rd Edition. The Stationery Office, Edinburgh;
- NatureScot. (2022). General pre-application and scoping advice for onshore wind farms. Guidance;
- Scottish Natural Heritage (SNH). (2000a). Windfarms and birds: calculating a theoretical collision risk assuming no avoidance action. SNH Guidance Note;
- SNH. (2000b). Natural Heritage Zones. SNH, Battleby, UK;
- SNH. (2016a). Assessing connectivity with Special Protection Areas (SPAs). Version 3;
- SNH. (2016b). Environmental Statements and Annexes of Environmentally Sensitive Bird Information; Guidance for Developers, Consultants and Consultees Version 2;
- SNH. (2017). Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Windfarms. SNH Guidance Note;
- SNH. (2018a). Assessing significance of impacts from onshore windfarms on birds out with designated areas. Version 2;
- SNH. (2018b). Assessing the cumulative impacts of onshore wind farms on birds. SNH Guidance Note;.

- SNH. (2018c). Environmental Impact Assessment Handbook - Version 5: Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland.
- SERAD (Scottish Executive Rural Affairs Department). (2000). Habitats and Birds Directives, Nature Conservation; Implementation in Scotland of EC Directives on the Conservation of Natural Habitats and of Wild Flora and Fauna and the Conservation of Wild Birds ("the Habitats and Birds Directives"). Revised Guidance Updating Scottish Office Circular No 6/1995; and
- Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., & Win I. (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.

Consultation

9.11 In undertaking the assessment, consideration has been given to the Scoping responses and other consultation which has been undertaken as detailed in **Table 9.1**.

Table 9.1: Consultation Responses

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
Highland Council 24/02/2021	Scoping	The EIAR ¹ should provide a baseline survey of the bird interest on site.	Details of baseline bird surveys are provided in Appendix 9.1 .
		The presence of Schedule 1 Birds must be included and considered as part of the planning application process, not as an issue which can be considered at a later stage.	Protected bird species that are listed in Schedule 1 of the Wildlife & Countryside Act and/or Annex I of the EU Birds Directive have been determined to be important ornithological features and taken forward for assessment if there is the possibility of a significant effect.
		The EIAR should address the likely impacts on the nature conservation interests of all the designated sites in the vicinity of the Proposed Development.	The potential for likely significant effects on the nature conservation interests of designated sites has been considered as part of the assessment presented within this chapter.
NatureScot 23/02/2021	Scoping	NatureScot agree that it is possible to scope out impacts in the Glen Affric to Starthconon Special Protection Area (SPA)	Noted. Effects on the SPA have been scoped out of the ornithological assessment.
		NatureScot advise that the North Inverness Lochs SPA and Loch Knockie & nearby Lochs SPA be scoped back into the EIA.	A Technical Report detailing the reasoning behind the scoping out of the North Inverness Lochs SPA and Loch Knockie & nearby Lochs SPA was provided to NatureScot on 14/05/2021 (see below).
		The Upland Breeding Bird Survey does not conform to NatureScot guidance which states there should be a minimum of two years of survey work and that a modified version of the Brown & Shepherd methodology, using 4 visits, should be used.	One year of survey was completed in 2021 within the OSA and appropriate survey buffers, following SNH (2017) guidance. See Assessment Limitations. NatureScot subsequently confirmed one year is sufficient (see below).
NatureScot 07/07/2021	Post-Scoping Response to NRP Technical Report	NatureScot agree that North Inverness Lochs SPA and Loch Knockie & nearby Lochs SPA designated for their breeding populations of Slavonian grebe) can be scoped out the EIA inform the EIA. Confirmed by email dated 07/07/2021	Noted. Effects on the SPA have been scoped out of the ornithological assessment.

Consultee and Date	Scoping/Other Consultation	Issue Raised	Response/Action Taken
NatureScot 17/12/2021	Post-Scoping Response to NRP Technical Report	NatureScot satisfied that a single year of Upland Breeding Bird Survey is sufficient to inform the EIA. Confirmed by email dated 17/12/2021.	Noted.
Royal Society for the Protection of Birds (RSPB) 01/02/2021	Scoping	RSPB recommended that the North Inverness Lochs SPA and Loch Knockie & nearby Lochs SPA be scoped back into the EIA.	Consultation with NatureScot concluded that North Inverness Lochs SPA and Loch Knockie & nearby Lochs SPA (can be scoped out the EIA. This was confirmed by NatureScot in an email dated 07/07/2021.
		The Golden Eagle Topography (GET) model should be used to inform the windfarm layout.	The GET model was used to inform the wind farm layout and the impact assessment within this chapter (see Appendix 9.3).
		RSPB are generally happy with the scope of survey work undertaken and proposed, although raised concerns that upland breeding bird surveys are only scheduled for one year and that there does not appear to have been any surveys around proposed roads/infrastructure.	Consultation with NatureScot concluded that a single year of Upland Breeding Bird Survey is sufficient to inform the EIA. Confirmed by email dated 17/12/2021. All new tracks and infrastructure have been adequately surveyed. Full details of survey methodology and effort are presented in Appendix 9.1 .
Royal Society for the Protection of Birds (RSPB) 26/01/2023	Gate Check 1 response	On the basis of the clarified position agree that Slavonian grebe can be scoped out of the assessment.	Noted.

Study Area

9.12 There are three study areas under consideration within this chapter: the baseline ornithological study area, the proposed Development study area and the NHZ study area. Baseline ornithological surveys collected information on bird populations in the wider area, these data are then refined to the scale of the proposed Development and associated buffers. Any effects on bird populations are then assessed against the NHZ population of the potentially effected species.

9.13 During collection of baseline ornithological data, bird populations were surveyed up to a maximum of 6 kilometres (km) from the initial, much larger Ornithology Study Area (OSA) boundary (**Appendix 9.1: Figure 1**). However, the study area for this assessment is defined with reference to the locations of turbines, tracks and ancillary infrastructure associated with the final design of Loch Liath Wind Farm as detailed in **Chapter 4** and as shown on **Figure 4.1**. Hence, within this chapter, the 'Proposed Development' refers to these elements and the study area pertaining to the ornithological assessment is defined by the Proposed Development and relevant buffers around this. Full details of the study areas pertaining to relevant survey methods, or surveys targeted at individual species, are given in **Appendix 9.1**.

9.14 The study area for the assessment of effects on bird populations is the Northern Highlands Natural Heritage Zone (NHZ 7), as defined by NatureScot (SNH, 2000b).

Desk Based Research and Data Sources

9.15 A desk-based study was undertaken to collate existing bird records/data. Distribution and abundance data were collected from published sources and consultees.

- NatureScot Sitelink (online information about designated sites);
- UK Biodiversity Action Plan (BAP);
- The Birds of Conservation Concern (BoCC) (Stanbury *et al.*, 2021);

¹ Environmental Impact Assessment Report

- International Union for the Conservation of Nature (IUCN, 2022) Red list of threatened species;
- Scottish Biodiversity List (Scottish Biodiversity Forum, 2013);
- National Biodiversity Network (NBN) Gateway website (<https://data.nbn.org.uk/>);
- RSPB; current and historical survey records on scarce breeding birds; and
- Highland Raptor Study Group (HRSG); information on scarce breeding raptors including current and historical survey records throughout the survey period.

Field Survey

9.16 NatureScot guidance (SNH, 2017) was used to inform the initial survey design and a range of baseline ornithological surveys commenced within the OSA and surrounding area in September 2019. These continued until end of August 2021, providing two years of baseline survey.

9.17 The baseline ornithological study area was defined with reference to the OSA and encompasses a series of buffers of up to 6 km radius from the OSA, with buffer size dependent on the sensitivity of key species to potential effects associated with the Proposed Development (**Appendix 9.1: Figure 1**).

9.18 The assessment has been informed by the following baseline surveys:

- Flight Activity (vantage point) Surveys (September 2019 to August 2021; within the OSA and 500m buffer);
- Upland Breeding Bird Surveys (four visits, April to July 2021; within the OSA and 500m buffer);
- Breeding Raptor Surveys (February to August 2020 and 2021; within the OSA and buffer extending up to 6km depending on species);
- Breeding Divers and Slavonian Grebe Surveys (April to August 2020 and 2021; within the OSA and buffer extending up to 2km);
- Focal Watches for Breeding Divers (April to August 2020 and 2021; within the OSA boundary); and
- Black Grouse Survey (April to May 2020 and 2021; within the OSA and buffer extending up to 1.5km).

9.19 Survey methods follow contemporary best practice guidance; further details of the survey methods and results are provided in **Appendix 9.1**.

Assessing Significance

9.20 The assessment follows the process set out in the Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the Regulations') and Scottish Government guidance on the implementation of the Birds and Habitats Directives. The process of evaluating the effects of the Proposed Development on birds ensures that the consenting authority has sufficient information to determine whether the Proposed Development (either alone or in combination with other projects) is likely to have a significant effect on bird interests.

9.21 The assessment determines the potential effects of the Proposed Development and considers the likelihood of their occurrence. Effect is defined as change in the assemblage of bird species present as a result of the effects accrued by the Proposed Development. Change can occur either during or beyond the life of the Proposed Development. Where the response of a population has varying degrees of likelihood, the probability of these differing outcomes is considered. Note effects can be adverse, neutral or beneficial.

9.22 In assessing whether an effect is significant or not, three factors are considered:

- The Nature Conservation Importance of the species involved;
- The magnitude of the likely effect; and
- The conservation status of the species.

9.23 The significance of potential effects is then determined by integrating the assessments of these factors in a reasoned way. The magnitude of likely effects involves consideration of their spatial and temporal magnitudes. In making judgements on significance by this integration, consideration is given to the national and regional trends of the potentially affected species, and how the integrated

effects may impinge on the conservation status of the species involved at these geographical levels. Further details of the process underlying the assessment and the determination of significance follow.

Nature Conservation Importance

9.24 The Nature Conservation Importance of each species potentially affected by the Proposed Development is defined according to **Table 9.2**.

Table 9.2: Nature Conservation Importance

Importance	Description
High	Species listed in Annex 1 of the EU Birds Directive.
	Breeding species listed on Schedule 1 of the WCA.
Moderate	Species on the BoCC 'Red list' (Stanbury <i>et al.</i> , 2021) or IUCN Red List of Threatened Species (IUCN, 2022).
	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 population).
Low	All other species.

9.25 Species listed in Local Biodiversity Action Plans (LBAPs) are considered moderately important only if the Proposed Development supported as least 1% of the regional population.

9.26 All other species are considered of low Nature Conservation Importance and are not considered further in this assessment.

Magnitude

9.27 Magnitude is determined by consideration of the spatial and temporal nature of each potential effect. There are five levels of spatial magnitude (**Table 9.3**) and four levels of temporal magnitude (**Table 9.4**). In the case of non-designated sites, spatial magnitude is assessed in respect of populations within the appropriate ecological unit; in this case the appropriate unit is taken to be the Northern Highlands Natural Heritage Zone (NHZ 7), as defined by NatureScot (SNH, 2000b).

Table 9.3: Levels of Spatial Magnitude

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 regional population affected.
High	Major reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Guide: 21-80% of regional population affected.
Moderate	Partial reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Guide: 6-20% of regional population affected.
Low	Small but discernible reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Guide: 1-5% of the regional population affected.
Negligible	Very slight reduction in the status or productivity of a bird population due to mortality, displacement or disturbance. Reduction barely discernible, approximating to the 'no change' situation. Guide: <1% of regional population affected.

Table 9.4: Levels of Temporal Magnitude

Magnitude	Description
Permanent	Impacts continuing indefinitely beyond the span of one human generation (taken as approximately 25 years), except where there is likely to be substantial improvement after this period (e.g., the replacement of mature trees by young trees which need >25 years to reach maturity, or restoration of ground after removal of a development). Such exceptions can be termed very long effects.
Long-term	Approximately 15-25 years or longer (refer to above).
Medium-term	Approximately 5-15 years.
Short-term	Up to approximately 5 years.

9.28 The magnitude of an effect can be influenced by when it occurs. For example, operations undertaken in daylight hours may have little temporal overlap with the occupancy of birds' night-time roosts; and seasonality in a bird population's occupancy of a site may mean that effects are unlikely during certain periods of the year.

9.29 A population's behavioural sensitivity may also be considered when assessing the magnitude of effects. Behavioural sensitivity may be judged as being high, moderate or low according to the species' ecological function and behaviour. Behavioural sensitivity can differ even between similar species and, for a particular species, some populations and individuals may be more sensitive than others, and sensitivity may change over time, e.g. species are often more sensitive during the breeding season.

9.30 Importantly, in determining sensitivity and its contribution to an effect, where such information exists from monitoring sites, data on the responses of individual birds and bird populations to wind farms and similar developments are taken into account, along with knowledge of how rapidly the population or performance of a species is likely to recover following loss or disturbance (e.g. birds being recruited from other populations elsewhere).

Conservation Status

9.31 Where the available data allows, the conservation status of each potentially affected population is considered within the Natural Heritage Zone (NHZ). For these purposes, conservation status is taken to mean the sum of the influences acting on a population which may affect its long-term distribution and abundance. Conservation status is considered to be favourable where:

- A species appears to be 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 will probably continue to be) sufficient habitat to maintain the species' population on a long-term basis.

Significance

9.32 Following the classification of each species' Nature Conservation Importance and consideration of the magnitude of each effect, professional judgement is used to make a reasoned assessment of the likely effect on the conservation status of each potentially affected species.

9.33 In accordance with the Regulations, each likely effect is evaluated and classified as either significant or not significant. The significance levels of effect on bird populations are described in **Table 9.5**. Detectable changes in the conservation status of regional populations of Nature Conservation Importance are automatically considered to be significant effects for the purposes of the Regulations (i.e., no distinction is made between effects of "major" or "moderate" significance). Non-significant effects include all those which are likely to result in barely detectable (minor) or non-detectable (negligible) changes in conservation status of regional (and therefore national) populations. If a potential effect is determined to be significant, measures to avoid, reduce or remedy the effect are suggested wherever possible.

Table 9.5: Significance Criteria

Significance	Description
Major	Detectable changes in regional populations of Nature Conservation Importance that would have a severe on conservation status.
Moderate	Detectable changes in regional populations of Nature Conservation Importance that would likely have an impact on their conservation status.
Minor	Small or barely discernible changes that would be unlikely to have an impact on the conservation status of regional populations of Nature Conservation Importance.
Negligible	No or non-detectable changes in the conservation status of regional populations of Nature Conservation Importance.

Assessment Limitations

9.34 The UK wide Covid-19 lockdown was implemented on 23 March 2020 and access to the OSA was briefly suspended between 24 March until 22 April 2020. As agreed with NatureScot this gap is not considered to be a limitation to the baseline survey findings to inform a robust assessment, for the reasons outlined per survey type below:

- **Flight activity surveys:** the recommended minimum of 36 hours survey effort per VP was still achieved for each VP during the 2020 breeding season, as flight activity survey hours missed in March and April were caught up in May;
- **Scarce breeding bird surveys:** whilst there is some potential for breeding activity to have been missed in early April, surveys recommenced in late April and the key species known to be present at the OSA are likely to have been adequately surveyed;
- **Upland breeding bird surveys:** No systematic survey of upland breeding birds was undertaken in 2020. However, evidence of breeding behaviour in upland birds was recorded during other surveys and whilst walking to and between vantage points. Comparison between the results of the 2020 breeding season and the formal, systematic survey conducted during the 2021 breeding season are considered to be consistent and provide a robust estimation of important breeding populations; and
- **Black grouse surveys:** NatureScot (2017) guidance recommends that surveys are undertaken in April and May for black grouse. Whilst limited surveys for black grouse were undertaken in April 2020, full coverage was completed in May 2020 and April to May 2021. The distribution of lekking activity is comparable between years and the data available are considered to provide a good understanding of black grouse activity at the OSA.

9.35 Deep snow cover prevented access onto the OSA during February 2021 which resulted in no flight activity or winter transect surveys being undertaken. The recommended minimum of 36 hours survey effort per VP was still achieved for each VP during the 2021 non-breeding season as flight activity survey hours missed in February were caught up in March.

9.36 The available information on bird populations at the NHZ and regional level is limited, and available information on the results of monitoring, mitigation and enhancement work at other existing and Proposed Developments is sparse. Therefore, as is standard with these assessments, use is necessarily made of the available literature and professional judgement to inform the assessment.

9.37 Whilst some information gaps have been identified, it is considered that there is sufficient information to enable an informed decision to be taken in relation to the identification and assessment of likely significant environmental effects on ornithology.

Existing Conditions

Designated Sites

9.38 There are no statutory nature conservation designations with an ornithological interest within the OSA. **Table 9.6** lists the sites designated for their ornithological features within 20km of the Proposed Development and these are also shown in **Figure 9.1**.

Table 9.6: Designated sites within 20km of the Proposed Development

Designation	Name	Designated For	Distance from Site Boundary (km)
SPA	North Inverness Lochs	Slavonian grebe; breeding	3.4
SSSI	Dubh Lochs	Slavonian grebe	3.4
SPA	Glen Affric to Strathconon	Golden eagle; breeding	6.0
SSSI	Glen Affric	Breeding bird assemblage	6.0
SPA	Loch Knockie and Nearby Lochs	Slavonian grebe; breeding	7.0
SSSI	Knockie Lochs	Slavonian grebe	7.0
SSSI	Balnagrantach	Slavonian grebe	7.9
SSSI	Glendoe Lochans	Slavonian grebe; common scoter	16.3
SPA	Loch Ruthven	Slavonian grebe; breeding	17.1
SSSI	Loch Ruthven	Slavonian grebe; Breeding bird assemblage	17.1

9.39 North Inverness Lochs Special Protection Area (SPA), Loch Knockie and Nearby Lochs SPA and Loch Ruthven SPA are designated for their breeding populations of Slavonian grebe. As agreed in consultation with NatureScot, as the Proposed Development is located in habitats intrinsically unsuitable for Slavonian grebe and there are no known or historic breeding sites located within the vicinity of the Proposed Development, it is considered highly unlikely that Slavonian grebe will pass through the Proposed Development to reach their breeding grounds. On this basis, no effects on Slavonian grebe are predicted. As such, the North Inverness Lochs SPA, Loch Knockie and Nearby Lochs SPA and Loch Ruthven SPA are not considered further in this assessment. It follows, therefore, that there will be no detrimental effects on the associated SSSI designations of these sites.

9.40 The distances between the Proposed Development and golden eagle breeding sites within the Glen Affric to Strathconon SPA are greater than the reported 6km range/connectivity distance for the qualifying species (SNH, 2016a). Furthermore, as the Site forms part of a non-qualifying golden eagle territory it is unlikely that golden eagle from the Glen Affric to Strathconon SPA utilise habitats within the Proposed Development Site. Therefore, no effects are predicted, and the Glen Affric to Strathconon SPA is not considered further in this assessment. It follows, therefore, that there will be no detrimental effects on the Glen Affric SSSI designation.

9.41 In summary, no effects on designated sites are predicted and none, therefore, are considered further in this assessment.

Baseline Bird Populations

Divers

9.42 Red-throated diver is a species of high Nature Conservation Importance (Table 9.2) and was recorded regularly during both breeding seasons of baseline surveys. During 2020, four pairs of red-throated diver were confirmed to have attempted to breed within the scarce breeding bird survey area; three pairs were successful, fledging five juveniles and one pair failed (Appendix 9.4). A further pair was considered to have probably bred based on observations of behaviour conducive to breeding, e.g., territorial behaviour and displaying. During 2021, four pairs of red-throated diver were confirmed to have attempted to breed within the scarce breeding bird survey area; two pairs were successful, fledging three juveniles whilst the other two pairs failed (Appendix 9.4).

9.43 Baseline flight activity surveys recorded 83 flights by red-throated divers (Appendix 9.1). Of these flights, nine passed within the FASA for a total duration of 361 seconds and of this time, 238 seconds was at potential collision risk height (Appendix 9.2).

9.44 Given the potential for disturbance and/or displacement from breeding sites and the potential for collision mortality red-throated diver is considered further in this assessment.

Grebes

9.45 Slavonian grebe is a species of high Nature Conservation Importance (Table 9.2) and was recorded regularly during both breeding seasons of baseline surveys (Appendix 9.4). During 2020, four pairs of Slavonian grebes attempted to breed within the scarce breeding bird survey area. A further breeding pair was recorded on a component loch of the North Inverness Lochs SPA at a distance greater than 2km from the OSA. During 2021, five pairs of Slavonian grebes attempted to breed within the scarce breeding bird survey area. A further breeding pair was recorded on a component loch of the North Inverness Lochs SPA.

9.46 No flights involving Slavonian grebe were recorded during baseline flight activity surveys.

9.47 Given that the Proposed Development lies in upland habitat intrinsically unsuitable for breeding Slavonian grebe, the distance between the Proposed Development and known and historic breeding sites and the lack of flight records by this species within the FASA over all baseline breeding seasons no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (Table 9.2), Slavonian grebe is not considered further in this assessment.

Wildfowl

9.48 Whooper swan was recorded infrequently during baseline surveys. A total of 12 flights were recorded involving a total of 76 birds. Six flights, totalling 38 birds, were recorded during GVP watches to quantify flight activity in the non-breeding season of which no flights passed within the FASA. Given the lack of flight records by this species within the FASA over all baseline non-breeding seasons no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (Table 9.2), whooper swan is not considered further in this assessment.

9.49 Other wildfowl species recorded of lesser conservation concern included greylag goose, pink-footed goose, gadwall, mallard and teal. Pink-footed goose and greylag goose are regular migratory species and as such are afforded protection under the Birds Directive and are of moderate Nature Conservation Importance. Other species of wildfowl are considered to be of low Nature Conservation Importance. Due to the very low numbers and level of flight activity it is considered unlikely that the Proposed Development will result in significant effects under the Regulations therefore none of these species are considered further in this assessment.

Waders

9.50 Wood sandpiper is a species of high Nature Conservation Importance (Table 9.2) and was recorded on two occasions in 2021, on 17 May and 27 May. No evidence of breeding was recorded during baseline surveys, despite searches in potential breeding habitat; and it was suspected these birds were on passage to their breeding grounds further north. No flights involving wood sandpiper were recorded during baseline flight activity surveys. Due to the very low numbers and that no flight activity was recorded, it is considered unlikely that the Proposed Development will result in significant effects under the Regulations. Hence, despite their high Nature Conservation Importance (Table 9.2), wood sandpiper is not considered further in this assessment.

9.51 Greenshank is a species of high Nature Conservation Importance (Table 9.2) and was recorded regularly throughout the breeding season during the study period. During the 2020 breeding season, a nest with four eggs was located and adults with chicks were observed at two breeding sites; these records coupled with additional records of breeding behaviour, including display flights, agitated alarm calling and territorial singing, suggested a minimum of five breeding pairs within the moorland breeding bird survey area. During the 2021 breeding season, five breeding territories were located and chicks were confirmed at one of these locations. Results of the 2021 Moorland Bird Survey indicate that two territories lie within 500 metres (m) of the Proposed Development. Twenty-two flights by greenshank were recorded during GVP watches to quantify flight activity in the breeding season of which three flights passed within the FASA, none of which were at collision risk height (Appendix 9.2). Therefore, due to the low numbers and that no flight activity was recorded that would place greenshank at risk of collision, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (Table 9.2), greenshank is not considered further in this assessment.

9.52 Golden plover is a species of high Nature Conservation Importance (Table 9.2) and was recorded throughout the breeding season during the study period. The majority of records comprised single and paired birds between March and June. During the 2020 breeding season, bird behaviour, including display flights, agitated alarm calling and territorial singing, suggested a minimum of eight breeding pairs within the moorland breeding bird survey area. During the 2021 breeding season, 22 breeding territories were located. A flock of 50 birds seen on 15 September 2019 were considered likely to be birds on their southward migration. Results of the 2021 Moorland Bird Survey indicate that two territories lie within the 500m of the Proposed Development. Fifteen flights by golden plover

were recorded during GVP watches to quantify flight activity in the breeding season of which five flights passed within the FASA, two of which were at collision risk height (**Appendix 9.2**). Therefore, due to the low numbers and that very low levels of flight activity was recorded that would place golden plover at risk of collision, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), golden plover is not considered further in this assessment.

9.53 Dunlin is a species of high Nature Conservation Importance (**Table 9.2**) and was recorded infrequently during the study period. During the 2020 breeding season, breeding behaviour, including display and agitated alarm calling, suggested a minimum of two breeding pairs within the moorland breeding bird survey area. During the 2021 breeding season, six dunlin territories were identified. Results of the 2021 Moorland Bird Survey indicate that two territories lie within the 500m of the Proposed Development. Three flights by dunlin were recorded during GVP watches to quantify flight activity in the breeding season of which one flight passed within the FASA, which was not at collision risk height (**Appendix 9.2**). Therefore, due to the very low numbers and that no flight activity was recorded that would place dunlin at risk of collision, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), dunlin is not considered further in this assessment

9.54 Lapwing is a species of moderate Nature Conservation Importance (**Table 9.2**) and was recorded infrequently during the study period. On 8 May 2020 a pair of lapwing were observed displaying at Lochan Dubh and a single bird was seen in the same location later in the day. Behaviour, including display, suggests one breeding pair within the moorland breeding bird survey area. During 2021, a pair of lapwing, recorded in the same location, showed signs of breeding behaviour indicating one breeding pair within the OSA. No evidence of breeding was found within the 500m of the Proposed Development. No flights involving lapwing were recorded during baseline flight activity surveys. Therefore, due to the very low numbers and that no flight activity was recorded, there is no possibility that any potential effects will be significant under the Regulations. Hence, lapwing is not considered further in this assessment.

9.55 Curlew is a species of moderate Nature Conservation Importance (**Table 9.2**) and was recorded once during the study period. On 14 May 2020 a flight by a single bird was observed. No evidence of breeding was found during the study period. No flights involving curlew were recorded during baseline flight activity surveys. Therefore, due to the very low numbers and that no flight activity was recorded, there is no possibility that any potential effects will be significant under the Regulations. Hence, curlew is not considered further in this assessment.

9.56 Woodcock is a species of moderate Nature Conservation Importance (**Table 9.2**). Eleven woodcock were flushed during the course of winter walked transects. No evidence of breeding was found during the study period. No flights involving woodcock were recorded during baseline flight activity surveys. Therefore, due to the very low numbers and that no flight activity was recorded, there is no possibility that any potential effects will be significant under the Regulations. Hence, woodcock is not considered further in this assessment.

9.57 Other wader species recorded of lesser conservation concern included common sandpiper and snipe. Both species are considered to be of low Nature Conservation Importance and are not considered further in this assessment.

Scarce Raptors and Owls

9.58 Golden eagle, a species of high Nature Conservation Importance (**Table 9.2**), was present throughout the study period and was recorded regularly in flight in and around the OSA. A known breeding site (Territory A) is located within the OSA boundary and a second territory (Territory B) is located within 6 km of the OSA. Territory A failed to breed in 2020, and in 2021 evidence suggested the pair attempted to breed but failed. In 2020, Territory B did not attempt to breed at the known nest location; they may have bred elsewhere. In 2021, the pair built a new eyrie close to the known breeding location. The attempt failed at the early chick stage. Two hundred and ten flights by golden eagles were recorded during GVP watches to quantify flight activity. A total duration of 49,205 seconds of flight activity was recorded, of which 1,088 seconds (2.2 %) was spent within the FASA (**Appendix 9.2**). Of that time, 934 seconds was spent at potential collision risk height. Given the potential for displacement from foraging areas and the potential for collision mortality golden eagle is considered further in this assessment.

9.59 White-tailed eagle is a species of high Nature Conservation Importance (**Table 9.2**) and was recorded on ten occasions during the study period. The majority of observations were made during the non-breeding season. No evidence of breeding by white-tailed eagle was obtained during baseline surveys. Five flights by white-tailed eagle were recorded from GVPs during the study period. A total duration of 3,548 seconds of flight activity was recorded, of which none was spent within the FASA. Therefore, due to the very low numbers, no flight activity recorded within the FASA and no breeding sites of white-tailed were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been

undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), white-tailed eagle are not considered further in this assessment.

9.60 Honey buzzard is a species of high Nature Conservation Importance (**Table 9.2**) and was recorded on seven occasions during the 2021 breeding season. Although a nesting area had been identified, no breeding site was found despite extensive searches in potential breeding habitat within the OSA and 2km buffer. No flights by honey buzzard were recorded from GVPs during baseline surveys. Therefore, as the suspected breeding site was not at a distance from the Proposed Development that could possibly invoke an adverse effect and due to the very low numbers and that no flight activity was recorded within the FASA, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), honey buzzard are not considered further in this assessment.

9.61 Red kite is a species of high Nature Conservation Importance (**Table 9.2**) and was recorded on 42 occasions during the study period, with 17 records made during the non-breeding season and 25 records during the breeding season. No evidence of breeding or roosting by red kite was obtained during baseline surveys, despite extensive searches in potential breeding/roosting habitat. Thirty-one flights involving 36 red kites were recorded from GVPs during baseline flight activity surveys. A total duration of 9,454 seconds of flight activity was recorded. However, only one flight passed within the FASA at potential collision risk height (**Appendix 9.2**). Therefore, due to the low numbers, low level of flight activity recorded within the FASA, and no breeding sites of red kites were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), red kite are not considered further in this assessment.

9.62 Goshawk is a species of high Nature Conservation Importance (**Table 9.2**) and was recorded on six occasions during the study period. In 2021, a breeding site was located however the attempt had failed by 12 July 2021. Two flights by goshawk were recorded from GVPs during the study period. A total duration of 27 seconds of flight activity was recorded; none of which was within the FASA. Therefore, as the breeding site was not at a distance from the Proposed Development that could possibly invoke an adverse effect and due to the very low numbers and that no flight activity was recorded within the FASA, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), goshawk are not considered further in this assessment.

9.63 Hen harrier is a species of high Nature Conservation Importance (**Table 9.2**) and was observed irregularly during the study period with the majority of observations being made late in the 2020 breeding season. There was no evidence of breeding despite extensive searches in potential breeding habitat within the OSA and 2km buffer; however, a juvenile was recorded hunting on three occasions on 12 August 2020 suggesting breeding could have occurred just beyond the 2km buffer. No hen harriers were observed after 12 August 2020. Six flights by hen harrier were recorded from GVPs during the study period. A total duration of 727 seconds of flight activity was recorded, however only one flight passed within the FASA below potential collision risk height. Therefore, due to the low numbers, low level of flight activity recorded within the FASA, and no breeding sites of hen harriers were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), hen harrier are not considered further in this assessment.

9.64 Osprey is a species of high Nature Conservation Importance (**Table 9.2**) and was recorded infrequently during the breeding season. No evidence of breeding by osprey was obtained, despite searches in potential breeding habitat within the OSA and 2km buffer. Osprey was recorded on 14 occasions during the study period, including a flight by an adult and two juveniles on 18 August 2021. Nine flights by osprey were recorded during baseline flight activity surveys and a total of 2,297 seconds of flight was recorded. However, only three flights passed within the FASA at potential collision risk height (**Appendix 9.2**). Therefore, due to the low numbers, low level of flight activity recorded within the FASA, and no breeding sites of osprey were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), osprey are not considered further in this assessment.

9.65 Peregrine is a species of high Nature Conservation Importance (**Table 9.2**) and was recorded on 17 occasions during the study period. Thirteen records involved adult birds and an immature bird was seen on 24 April 2020, the remaining three records were unaged. No evidence of breeding by peregrine was obtained during baseline surveys, despite extensive searches in potential breeding habitat within the OSA and 2km buffer. Nine flights by peregrine were recorded from GVPs during the study period. A total of 690 seconds of flight was recorded, of which none was spent within the FASA. Therefore, due to the low numbers, no flight activity

recorded within the FASA, and no breeding sites of peregrine were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), peregrine are not considered further in this assessment.

9.66 Merlin is a species of high Nature Conservation Importance (**Table 9.2**) and was recorded regularly during the study period, in total 36 observations were made. During the 2020 breeding season, evidence of breeding by merlin was obtained in potential breeding habitat within the OSA and 2km buffer (but greater than 1km from the turbine footprint), however no nest sites were located. Juveniles were recorded on five occasions indicating successful breeding had occurred within the OSA and 2km buffer. During the 2021 breeding season, evidence of breeding by merlin was again obtained in potential breeding habitat within the OSA and 2km buffer (but greater than 1km from the turbine footprint), however no nest sites were located. Juveniles were recorded on two occasions indicating successful breeding had occurred within the OSA and 2km buffer, including two juveniles seen together on 6 August 2021. Eighteen flights by nineteen merlin were recorded from GVPs during the study period for a total duration of 869 seconds. One flight was recorded within the FASA at potential collision risk height (**Appendix 9.2**). Therefore, due to the low numbers, very low flight activity recorded within the FASA, and no breeding sites of merlin were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), merlin are not considered further in this assessment.

9.67 Hobby is a species of high Nature Conservation Importance (**Table 9.2**) and was recorded on three occasions in September 2019; records involved one adult and two juveniles. No evidence of breeding by hobby was obtained, despite searches in potential breeding habitat within the OSA and 2km buffer. No further records of hobby were made during baseline surveys, and it is suspected that these birds were transient individuals migrating south. Three flights by hobby were recorded from GVPs during the study period. A total duration of 44 seconds of flight was recorded. No flights were recorded within the FASA. Therefore, due to the low numbers, no flight activity recorded within the FASA, and no breeding sites of hobby were found, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations. Hence, despite their high Nature Conservation Importance (**Table 9.2**), hobby are not considered further in this assessment.

9.68 Other raptor species recorded of lesser conservation concern included buzzard, kestrel and sparrowhawk. These species are considered to be of low Nature Conservation Importance and are not considered further in this assessment.

Black Grouse

9.69 Black grouse is a species of moderate Nature Conservation Importance and was recorded within the OSA and study area (i.e. within 1.5 km buffer of the OSA) throughout the study period.

9.70 Targeted surveys for 'lekking' (displaying) birds in April and May 2020 located five 'core' lekking areas (**Appendix 9.1: Figure 24**). The maximum count of males attending these lek sites was 13, 7, 7, 6 and 2, totalling 35 males. Observations were also made of highly dispersed and mobile single displaying males, so called 'singletons'. Therefore, the population of male black grouse within the study area is likely to be in the region of 40 males. All five 'core' lekking areas are at distances greater than 2km from the Proposed Development.

9.71 Targeted surveys for lekking birds in April and May 2021, located six 'core' lekking areas (**Appendix 9.1: Figure 25**). The maximum count of males attending these lek sites was 19, 9, 9, 6, 6 and 6, totalling 56 males. Fewer observations of singletons were made in 2021, however the population of male black grouse within the study area is likely to be in the region of 60 males. All six 'core' lekking areas are at distances greater than 2km from the Proposed Development.

9.72 Sixteen flights by black grouse were recorded, involving 51 birds and the total flight duration was 1,198 seconds. However, no flights by black grouse were recorded within the FASA during flight activity surveys (**Appendix 9.1: Figure 24 and Figure 25**).

9.73 Therefore, due to the separation distance between the 'core' lekking areas and all elements of the Proposed Development, together with no flight activity being recorded within the FASA, no significant effects are considered likely and a detailed assessment of effects on this species arising from the Proposed Development has not been undertaken in accordance with the Regulations.

Hence, despite their moderate Nature Conservation Importance (**Table 9.2**), black grouse are not considered further in this assessment.

Implications of Climate Change

9.74 The UK Climate Projections (UKCP18)² for temperature and precipitation based on a precautionary intermediate representative concentration pathway for greenhouse gases of 6.0, suggests that Scotland will become hotter and drier in the summer (June to August) and warmer and wetter in the winter (December to February).

9.75 If the overwinter and spring weather conditions are suitable for adults to reach breeding condition, then for many species the main period of concern will be the months in spring and early summer when they nest, and the chicks require feeding. Low cloud and rainfall can adversely affect the foraging activities of birds which forage in flight, such as raptors and insectivorous birds, and effects their ability to breed or feed chicks. Furthermore, the availability of invertebrates as food for chicks of species such as hirundines and swifts, gamebirds and waders may be affected by the alteration in the rainfall. For ground nesting species (e.g., waders, gamebirds and hen harrier) eggs and chicks could be subject to chilling due to rainfall. The nests of other species such as raptors, which often nest in exposed locations, could also be susceptible to chilling. Dry conditions in summer may benefit breeding success by improving conditions for the chicks, as long as the temperatures do not go too high. Warm and wet winters may well improve growing conditions for vegetation and hence provide better food for geese and swans.

Future Baseline in the Absence of the Proposed Development

9.76 The majority of study area is presently managed as a sporting asset. Provided the existing land-management of the area continues as at present, changes in the bird population during the medium to long term are likely to be typical of those associated with areas of commercial plantation forest, open upland moorland, waterbodies and open rough grazing.

Design Considerations

9.77 The following considerations relating to ornithological interests have been incorporated into the Proposed Development design as embedded mitigation:

- A diver raft will be deployed on Loch nam Meur (south) before the start of construction, at a distance greater than 500m from construction activities;
- A flight corridor of greater than 400m between turbines was maintained to allow red-throated diver to access for feeding at larger lochs, including Loch nam Meur (north), Loch nam Meur (south) and Loch na Ruighe Duibhe;
- All waterbodies used by breeding red-throated diver during baseline surveys have been buffered by at least 500m;
- All waterbodies used by breeding Slavonian grebes during baseline surveys have been buffered by at least 2km;
- All black grouse lek sites recorded during baseline surveys holding two or more males have been buffered by at least 1000m;
- All golden eagle breeding sites recorded during baseline surveys have been buffered by at least 1500m; and
- The final turbine layout has been designed to minimise potential effects on golden eagle by avoiding the creation of turbine strings and outliers, and by maintaining a turbine cluster (Prospective guidance from Natural Research to NatureScot (NatureScot, 2021))³.

Scope of the Assessment

Effects Assessed in Full

9.78 The assessment of effects is based upon the Proposed Development description outlined in **Chapter 4** and is structured as follows:

- Construction effects of the Proposed Development;

² <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index>

³ NatureScot. 2021. NatureScot statement on modelling to support the assessment of forestry and wind farm impacts on golden eagles. Available at <https://www.nature.scot/doc/naturescot-statement-modelling-support-assessment-forestry-and-wind-farm-impacts-golden-eagles>

- Operational effects of the Proposed Development; and
- Cumulative effects of the Proposed Development.

9.79 Potential effects are evaluated in respect of regularly occurring species of high and moderate Nature Conservation Importance, whose regional populations could be potentially affected by the Proposed Development as set out in **Table 9.7: Nature Conservation Importance of Potentially Affected Species**. Consideration has been given to the criteria in **Table 9.2: Nature Conservation Importance** when assigning the Nature Conservation Importance of potentially affected species.

Table 9.7: Nature Conservation Importance of Potentially Affected Species

Importance	Species
High	Red-throated diver, golden eagle
Moderate	N/A

Effects Scoped Out

9.80 On the basis of the desk based and field survey work undertaken (see **Appendix 9.1**), the professional judgement of the EIA team, experience from other relevant projects and policy guidance or standards, and feedback received from consultees, the following topic areas have been 'scoped out' of detailed assessment. Specifically, following due consideration of the potential for the Proposed Development to give rise to significant effects on relevant ornithological interests, it has been concluded that significant effects are unlikely. Therefore, a detailed assessment is not required under the Regulations. Hence, the topic areas scoped out of this assessment are national / international designated interests and all bird species, as follows:

- **Effects on European and national designated sites of ornithological importance:** The Proposed Development is not covered by any statutory nature conservation designations for ornithological interests nor is it within the vicinity of any statutory nature conservation designation which could be adversely affected as a result of the construction or operation of the Proposed Development. The nearest European and national designated sites of ornithological importance are shown in **Figure 9.1** and **Table 9.6**. Since none of the cited bird species at these sites will exploit habitats in the vicinity of the Proposed Development due to the separation distances involved, there is no likelihood of adverse effects as a consequence of the Proposed Development. Therefore, effects on European and national designated sites of ornithological importance are not considered further in the ornithological assessment.
- **Effects on the following bird species:** Slavonian grebe, greylag goose, pink-footed goose, whooper swan, wood sandpiper, greenshank, golden plover, dunlin, lapwing, curlew, woodcock, white-tailed eagle, honey buzzard, red kite, goshawk, hen harrier, osprey, peregrine, merlin, hobby and black grouse. Baseline studies recorded all of these species which are considered to be of high or moderate Nature Conservation Importance (**Table 9.2**). Although these species were present, they were recorded infrequently, and/or in relatively small numbers (see **Existing Conditions: Baseline Bird Populations** and **Appendix 9.1**). Hence, their reliance on habitats (e.g., for breeding, roosting or foraging) and airspace in the vicinity of the Proposed Development was considered low, and the Proposed Development will have no significant effects on relevant populations of these species. Consequently, given regional abundance and/or behavioural sensitivity there is considered to be no potential for any adverse effect on regional populations as a result of construction or operational activities. Therefore, these species are not considered further in the ornithological assessment.

Embedded Protection Measures

9.81 To conform with the Wildlife and Countryside Act (WCA), surveys within a 500m buffer of construction activities to locate nests of birds listed in Schedule 1 of the WCA and Annex 1 of the Birds Directive would be undertaken prior to construction operations during the breeding period as part of a Bird Protection Plan (BPP) which would be overseen by an Ecological Clerk of Works (ECoW). If it is judged that these activities are likely to disturb breeding attempts, then appropriate exclusion zones (Ruddock & Whitfield, 2007)⁴ or other protection measures would be agreed with NatureScot prior to recommencing works. Further detail on the BPP is provided below.

9.82 The assessment has been undertaken on the basis that a Bird Protection Plan (BPP), devised in consultation with NatureScot, will be in place prior to the onset of construction activities. The BPP will describe survey methods for the identification of sites used by protected birds and will detail protocols for the prevention, or minimisation, of disturbance to birds as a result of activities associated with the Proposed Development.

9.83 The BPP will describe surveys to locate the nests or other key sites (e.g. roosts) of birds listed in Schedules 1 and 1A of the WCA, in advance of construction works progressing. In the event that an active nest or roost of a Schedule 1 or Schedule 1A species is discovered within distances given by Ruddock & Whitfield (2007) (or within a 500m radius for Schedule 1 species not listed), a disturbance risk assessment will be prepared under the BPP. The disturbance risk assessment will detail any measures considered necessary to safeguard the breeding attempt or roost (e.g., exclusion zones or restrictions on timing of works) and will be submitted to NatureScot before recommencing work. Similarly, although the species is not listed on Schedule 1, surveys to locate black grouse lek sites will be undertaken with potentially suitable habitats, and appropriate measures to safeguard relevant lek sites will be agreed with NatureScot (over and above those already included in the BPP, if necessary).

Assessment of Effects

Construction Effects

Habitat Loss

9.84 Full details of habitat loss as a result of the construction of the Proposed Development are presented in **Chapter 8**. In summary, habitat loss as a result of construction of the Proposed Development would amount to approximately 20 hectares which comprises primarily blanket bog, modified bog, dry and wet heath habitats. There is an abundance of similar habitats within the Site, and these are not considered to be of critical value to potentially affected bird species (**Table 9.7: Nature Conservation Importance of Potentially Affected Species**). Further, the effect of this habitat loss is spatially negligible in relation to the home range requirements of all potentially affected bird species. Hence, there would be no change in the conservation status of potentially affected species as a result of habitat loss and the effects of direct habitat loss on all ornithological interests are deemed **negligible** and therefore **not significant** under the Regulations.

Displacement

9.85 The construction activities of the Proposed Development, including the construction of the Site access tracks, turbine hard-standings and erection of the turbines is expected to last a total of 18 months. The number of bird breeding seasons potentially disrupted by construction activities will depend on the month in which construction works begin and the components of the Proposed Development. For the purposes of this assessment a worst-case scenario is assumed: i.e., that construction work will start during a bird breeding season and, for any given species, breeding would be potentially affected for up to two seasons. Breeding could also be affected along the main access route used by construction traffic to access the turbines.

9.86 The effects on birds most likely to occur during the construction phase comprise indirect habitat loss due to displacement of birds through disturbance by activity of people and machines in the vicinity of the Proposed Development. It is likely that noise and visual disturbance associated with construction activities could temporarily displace some of the breeding and foraging birds present, dependent on their behavioural sensitivity to human activities. Birds that are disturbed at breeding sites are vulnerable to a variety of potential effects on breeding performance, including the chilling or predation of exposed eggs/chicks, damage to or loss of eggs/chicks caused by panicked adults and the premature fledging of the young. Birds disturbed when foraging during the breeding season may also feed less efficiently and thereby breed less successfully. These effects may lead to a short-term reduction in the productivity of bird populations.

9.87 Disturbance effects on breeding birds would be confined to areas in the locality of the turbine layout and associated infrastructure, with different species varying in their sensitivity. Larger bird species, those higher up the food chain e.g., most raptors, or those that feed in flocks in the open tend to be more susceptible to disturbance than small birds living in structurally complex or closed habitats (e.g., woodlands) (Hill *et al.*, 1997)⁵.

⁴ Ruddock, M. & Whitfield, D.P. (2007). A review of disturbance distances in selected bird species. Report from Natural Research (Projects) Ltd. to Scottish Natural Heritage.

⁵ Hill, D.A., Hockin, D., Price D., Tucker G., Morris, R. & Treweek, J. (1997). Bird disturbance: improving the quality of disturbance research. *Journal of Applied Ecology* 34, pp 275-288.

Red-Throated Diver

9.88 Any breeding attempts by red-throated diver within the vicinity of proposed construction activities will be identified during pre-construction surveys detailed in the BPP for the Proposed Development (see **Embedded Protection Measures**). The BPP will then detail appropriate measures to avoid disturbance to the breeding attempt in compliance with legislation. All drilling and blasting at borrow pits which are located at distances less than 1 km from red-throated diver breeding sites will take place outside the breeding season (April-August), unless checked and confirmed by the ECoW that such activities can progress.

9.89 A maximum of four breeding sites were recorded in any one year of baseline surveys within the OSA and 2km survey buffer. All these breeding sites are located at distances greater than 1km from any proposed construction activities and therefore disturbance to these breeding sites is considered unlikely.

9.90 In 2020, a probable breeding attempt was identified on a loch which lies partly within 500m of a proposed turbine and associated track (Turbine 14 and associated track). Therefore, red-throated divers may be displaced from breeding at this location due to the effects of construction activities. Turbine 14 and associated track within 500m of the loch will be constructed outside the breeding season, where possible. In the event that this is not possible, further protection measures will be deployed in consultation with the ECoW and NatureScot. As a further precaution, an artificial raft will be deployed pre-construction and before the start of the breeding season. Deployment of the raft to the north of the loch will provide a potential breeding site at a distance greater than 500m from proposed construction activities.

9.91 There is evidence that breeding red-throated divers have been observed to abandon nests as a result of anthropogenic disturbance, albeit not windfarm related (Bergman & Derksen, 1977⁶; Gomersall, 1986⁷; McGuinness *et al.*, 2015⁸). However, in a breeding study on Shetland by Gomersall *et al.* (1984)⁹, although no systematic investigation was made of the effects of disturbance, some nests were found very close to roads, peat-cuttings and other areas of human activity, suggesting that birds may learn to be tolerant of some human activity.

9.92 In summary, measures set out in the BPP coupled with the deployment of an artificial raft, the possible tolerance of construction activities by breeding red-throated divers and the distances at which nesting attempts have occurred in the past, mean that displacement from suitable breeding sites is considered unlikely during construction. Any short-term negative effects on breeding success at these locations are not considered to be sufficient to affect regional productivity and hence the trajectory of the regional population and its conservation status would be unaffected. Given the above, construction effects on red-throated divers are predicted to be **negligible** and **not significant** under the Regulations.

Golden Eagle

9.93 All construction will be undertaken at distances greater than 1.5km from the nearest known golden eagle nest site. However, any breeding attempts by golden eagle within the vicinity of proposed construction activities will be identified during pre-construction surveys detailed in the BPP for the Proposed Development (see **Embedded Protection Measures**). The BPP will then detail appropriate measures to avoid disturbance to any breeding attempt in compliance with legislation. All drilling and blasting at borrow pits which are located at distances less than 2 km from golden eagle breeding sites would take place outside the breeding season (February - August), unless checked and confirmed by the ECoW that such activities can progress.

9.94 Windfarm construction activities have been shown to displace non-breeding golden eagles, with lower levels of flight activity recorded during construction years than found prior to construction (Haworth & Fielding, 2013)¹⁰. In addition, but in relation to breeding birds, there is also some evidence that golden eagles in the Beinn an Tuirc breeding range shifted their activity away from the Beinn an Tuirc Windfarm following construction, although targeted habitat management aimed at providing better foraging

opportunities away from the turbines makes interpretation of these results more difficult (Walker *et al.*, 2005)¹¹. Also, it is unclear whether this effect, if it occurred, was attributable to the construction activities, or resulted from the operation of the windfarm.

9.95 Nevertheless, assuming that construction activities lead to the displacement of golden eagles, with evidence suggesting that this may extend to around 300m from turbines (Fielding *et al.*, 2021¹²; Fielding *et al.*, 2022¹³; Prospective guidance from Natural Research to NatureScot (NatureScot, 2021³)), the effects on the resident pair of golden eagles would amount to a reduction in the use of a relatively small area of potential foraging habitat (i.e. ca. 250 hectares of suitable foraging habitat within 300m of the turbines (see **Appendix 9.3**)). There were no indications from baseline surveys that the small area affected was critical or even favoured by the resident pair. Given the small area of potentially suitable foraging habitat affected, it is considered unlikely that short-term displacement from suitable foraging habitats would elevate mortality rates or reduce reproductive rates in the golden eagle population to the extent that the population trajectory in the region would be affected.

9.96 In summary, measures set out in the BPP coupled with the distances at which nesting attempts have occurred in the past, mean that displacement from suitable breeding sites is considered unlikely during construction. Any short-term displacement from suitable foraging habitats is not considered to be sufficient to affect regional productivity or survival rates and hence the trajectory of the regional population and its conservation status would be unaffected. Given the above, construction effects on golden eagle are predicted to be **negligible** and **not significant** under the Regulations.

Proposed Mitigation

9.97 As no construction effects are deemed significant, no mitigation is proposed. Measures set out in the BPP will ensure that disturbance to sites used by protected bird species is avoided.

Residual Construction Effects

9.98 Any disturbance and/or displacement to red-throated diver and golden eagle would be temporary and both the magnitude and significance of any effects as a result of disturbance and displacement from foraging habitats generated by construction are therefore anticipated to be **negligible** and **not significant** under the Regulations.

Operational Effects

Displacement

9.99 The presence and operation of wind turbines could potentially displace birds from nesting and foraging areas. Existing information (e.g., de Lucas *et al.*, 2007¹⁴; Douglas *et al.*, 2011¹⁵; Haworth & Fielding, 2013¹⁰; Fielding *et al.*, 2021¹²; Fielding *et al.*, 2022¹³) and reviews of effects (e.g., Madders & Whitfield, 2006¹⁶; Hötter *et al.*, 2006¹⁷; Gove *et al.*, 2013¹⁸) suggest that most birds are affected only slightly, if at all, although these effects require further study. For example, breeding birds have not been found to be completely displaced at distances greater than 300 m from a turbine (e.g., Gill *et al.*, 1996¹⁹; Percival, 1998²⁰; Hötter *et al.*, 2006¹⁸; Fielding *et al.*, 2021¹²; Fielding *et al.*, 2022¹³) although other studies suggest partial displacement effects at greater distances (Pearce-Higgins *et al.*, 2009)²¹. However, wind turbines might displace birds from much larger areas if they act as a barrier to bird movements, or if availability of suitable habitat is restricted. In addition, displacement effects may vary over time, as birds habituate to the operation of turbines or site-faithful individuals are lost from the population.

9.100 The evidence suggests that effects vary between species and sites (see discussion for raptors in Madders & Whitfield, 2006¹⁷). There is potential for some disruption to feeding and nesting due to increased human activity for maintenance purposes. However, this would be relatively infrequent, involve low levels of disturbance and would be restricted to areas of the Proposed Development

⁶ Bergman, R.D. & Derksen, D.V. (1977). Observations on Arctic and Red-throated loons at Storkersen Point, Alaska. *Arctic* 41 – 51.

⁷ Gomersall, C.H. (1986). Breeding performance of the Red-throated diver *Gavia stellata* in Shetland. *Holarctic Ecology* 9: 277 – 284.

⁸ McGuinness, S., Muldoon, C., Tierney, N., Cummins, S., Murray, A., Egan, S. & Crowe, O. (2015). Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland. *BirdWatch Ireland*, Kilcoole, Wicklow.

⁹ Gomersall, C.H., Morton, J. S. & Wynde, R. M. (1984) Status of breeding Red-throated Divers in Shetland, 1983, *Bird Study*, 31:3, 223-229.

¹⁰ Haworth, P. F. & Fielding, A. H. (2013). Edinbane Windfarm: Ornithological Monitoring. A review of the spatial use of the area by birds of prey. Report for Vattenfall.

¹¹ Walker, D., McGrady, M., McCluskie, A., Madders, M. & McLeod, D.R.A. (2005). Resident Golden Eagle ranging behaviour before and after construction of a windfarm in Argyll. *Scottish Birds*, 25: 24-40.

¹² Fielding, A.H., Anderson, D., Benn, S., Dennis, R., Geary, M., Weston, E. & Whitfield, D.P. (2021). Non-territorial GPS-tagged golden eagles *Aquila chrysaetos* a two Scottish wind farms: Avoidance influenced by preferred habitat distribution, wind speed and blade motion status. *PLoS ONE* 16(8): e0254159.

¹³ Fielding A. H., Anderson D., Benn S., Dennis R., Geary M., Weston E. & Whitfield, D.P. (2022). Responses of dispersing GPS-tagged Golden Eagles *Aquila chrysaetos* to multiple wind farms across Scotland. *Ibis*. 164, 102-117.

¹⁴ de Lucas, M., Janss, G.F.E. & Ferrer, M. (eds) (2007). *Birds and Wind Power: Risk Assessment and Mitigation*. Quercus, Madrid.

¹⁵ Douglas, D.J.T., Bellamy, P.E. & Pearce-Higgins, J.W. (2011). Changes in the abundance and distribution of upland breeding birds at an operational wind farm. *Bird Study* 58, 37-43.

¹⁶ Madders M. & Whitfield D.P. (2006). Upland raptors and the assessment of wind farm impacts. *Ibis* 148 (Suppl. 1), 43-56.

¹⁷ Hötter, H., Thomsen, K.-M. & Jeromin, H. (2006). Impacts on biodiversity of exploitation of renewable energy sources: the example of birds and bats - facts, gaps in knowledge, demands for further research, and ornithological guidelines for the development of renewable energy exploitation. Michael-Otto-Institut im NABU, Bergenhusen.

¹⁸ Gove, B., Langston, R.H.W., McCluskie, A., Pullan, J.D. & Scrase, I. (2013). Wind farms and birds: an updated analysis of the effects of wind farms on birds, and best practice guidance on integrated planning and impact assessment. Report prepared by BirdLife International on behalf of the Bern Convention. Strasbourg, 17 September 2013.

¹⁹ Gill, J.P., Townsley, M. & Mudge, G.P. (1996). Review of the impacts of wind farms and other aerial structures upon birds. *SNH Review* 21: 68pp

²⁰ Percival, S.M. (1998). Birds and Turbines: managing potential planning issues. *Proc. of the 20th BWEA Conference 1998*: pp 345-350.

²¹ Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W., Bainbridge, I.P. & Bullman, R. (2009). The distribution of breeding birds around upland wind farms. *Journal of Applied Ecology* 46, 1323-1331

accessible by tracks. Therefore, the overriding source of disturbance and displacement of birds during the operational period is considered to be the turbines operating (Pearce-Higgins *et al.*, 2009)²².

Red-throated Diver

9.101 A maximum of four breeding sites were recorded in any one year of baseline surveys. Of these, one breeding site, used in 2020 and 2021, is located approximately 1500m from a proposed turbine and associated track. Three further breeding sites are located at distances greater than 2km from any proposed turbine or associated tracks (**Appendix 9.4**). Therefore, disturbance to these sites is considered unlikely during operation.

9.102 There have been a small number of studies on the displacement effects of wind farms on red-throated diver. Humphreys *et al.* (2017)²² evaluated three studies of displacement effects on red-throated divers and concluded that there is some evidence for the abandonment of breeding sites following wind farm construction. A study at Burgar Hill, Orkney showed that numbers of breeding divers decreased after construction, but it was suggested by the authors of the study that these negative effects were likely due to preventable increases in human-related disturbance associated with the wind farm, rather than to the wind turbines themselves. Indeed, as reported after wind farm construction, one or two pairs still breed each year very close to a row of six wind turbines. The authors of the study reported that while red-throated divers were present on the breeding loch in the early morning while wind turbines were operational, they left the Site when people arrived onsite, indicating that their response was more likely to be to human disturbance rather than wind turbines.

9.103 At Carraig Gheal Wind Farm in Argyll, a reduction in flight lines within the turbine area suggested evidence of avoidance of turbines. Although red-throated divers nested in both years of study at one lochan just under 1km from the nearest turbine location, a second lochan within 500m of the nearest turbine that was recorded as occupied in 2010 (pre-construction) was not occupied in 2014 (during operation).

9.104 Studies of red-throated divers breeding on the island of Smøla, Norway, were carried before and after construction of a large wind farm in two stages from 2001 to 2005. Before turbine construction began, three red-throated diver nest sites were within what became the wind farm area; all three nest sites were abandoned in the year in which construction occurred and were not reoccupied up until at least 2007 (Halley & Hopshaug, 2007)²³. However, it is unclear whether these sites were abandoned due to the wind farm itself or due to increased human disturbance as a result of construction of new roads into this part of the island (Halley & Hopshaug, 2007)²⁴.

9.105 Therefore, evidence suggests that disturbance associated with increased human access and activities during the operational period of a wind farm may pose the greater risk than the wind turbines themselves. It is therefore considered likely that red-throated divers would not be displaced from potential nest sites due to the presence of operational wind turbines.

9.106 In summary, breeding red-throated divers possibly show a tolerance of operational turbines and the distances at which nesting attempts have occurred in the past, mean that disturbance from suitable breeding sites is unlikely during operation. Any negative effects on breeding success at these locations are not considered to be sufficient to affect regional productivity and the trajectory of the regional population and hence its conservation status will be unaffected. Given the above, operational effects on red-throated divers are predicted to be **negligible** and **not significant** under the Regulations.

Golden Eagle

9.107 Breeding sites used by golden eagle in 2020 and 2021 were located at distances greater than 1500m from the nearest turbine and associated infrastructure (**Appendix 9.4**). Therefore, disturbance to these sites is considered unlikely during operation.

9.108 The central consideration, therefore, is the potential for displacement effects on the range-holding pair of golden eagles and how displacement may affect their productivity and/or survival, or whether the range would remain functionally sustainable.

9.109 The direct loss of habitat resulting from the Proposed Development is small and therefore any effect is unlikely to affect productivity or survival. However, there is a growing body of evidence from satellite tagged eagles that golden eagles will avoid areas developed for turbines resulting in additional habitat loss (indirect habitat loss). Therefore, assuming that the areas between turbines are unlikely to be available to foraging golden eagles on the basis of avoidance of turbines, displacement and loss of habitat has been

calculated using a 300m radius buffer around each turbine (Fielding *et al.*, 2021¹²; Fielding *et al.*, 2022¹³; Prospective guidance from Natural Research to NatureScot (NatureScot, 2021)¹⁴).

9.110 NatureScot recommend the use of the Golden Eagle Topography (GET) model to inform potential habitat loss to golden eagle ranges in the vicinity of wind farms (NatureScot, 2021)¹⁴. The GET model predicts that the Proposed Development will overlap the nearest golden eagle range by 329 hectares (ha) and that 248 ha of preferred GET 6+ habitat will be lost (**Appendix 9.3**).

9.111 However, the GET model is a predictive tool and whilst it can be useful in providing an indication of the potential importance of a proposed wind farm site to breeding golden eagles at a very early stage of the assessment process it should not be considered a substitute for good quality field survey.

9.112 Baseline empirical evidence shows that the area in which the turbines are proposed is little used by the range-holding pair and is likely on the periphery of their range. During 1,879 hours of Vantage Point watches, golden eagle was observed in flight for 49,205 seconds, of which 1,088 seconds of flight activity was seen within 500m of the proposed turbines (FASA) (**Appendix 9.1 & 9.2**). This equates to 2% of all flight activity observed. There were no indications from baseline surveys that the localised area affected by the Proposed Development was critical or even favoured by the resident pair. Given the small area of potentially suitable foraging habitat affected, it seems unlikely that displacement from suitable foraging habitats would elevate mortality rates or reduce reproductive rates in the golden eagle population to the extent that the population trajectory in the region would be affected.

9.113 It is considered therefore that the area in which the turbines are proposed is not functionally important for the maintenance of the territory nor to sustain the range-holding pair (survivorship) or a breeding attempt (productivity). **Appendix 9.1: Figures 16-19** show that the majority of flight activity is centred away from the Proposed Development to the east.

9.114 On the basis of the above and given the distances at which nesting attempts have occurred in the past, disturbance from suitable breeding sites is considered unlikely during operation. Any negative effects on breeding success or survival rates are not considered to be sufficient to affect regional productivity or the trajectory of the regional population, and unlikely to cause range abandonment. Hence, the conservation status of golden eagle within NHZ 7 will be unaffected. Given the above, effects of operational disturbance and displacement on golden eagle are predicted to be **negligible** and **not significant** under the Regulations.

Collision Risk

9.115 Birds that are not displaced would be potentially vulnerable to collision with the turbines. The level of collision with wind turbines is presumed to be dependent on the amount of flight activity over the Proposed Development and the ability of birds to detect and manoeuvre around rotating turbine blades. Birds that collide with a turbine are likely to be killed or fatally injured. This may in turn affect the maintenance of bird populations.

9.116 Flight activity by red-throated diver and golden eagle was recorded within the 500m buffer of the proposed turbine layout at heights that put them at risk of collision with turbine blades. As such, collision risk modelling (CRM) for these species was undertaken (see **Appendix 9.2**).

Red-Throated Diver

9.117 The speed used in the collision risk calculations was 18 m / sec for red-throated diver. Collision risks have been calculated assuming 99.5% avoidance (SNH, 2018). Full details of the calculations are shown in **Appendix 9.2**.

9.118 Applying an accepted avoidance rate of 99.5% for red-throated diver, this equates to one bird colliding with a turbine approximately every 134 years.

9.119 The red-throated diver population numbers range between 19 - 64 breeding pairs in NHZ 7 (Wilson *et al.*, 2015)²⁴. The potential loss of one red-throated diver every 134 years is of negligible magnitude and the overall effect at the scale of the NHZ would be **negligible**. This effect is considered **not significant** in terms of the Regulations and the population would maintain favourable conservation status.

²² Humphreys, E.M., Marchant, J.H., Wilson, M.W. & Wernham, C.V. (2015). Red-throated Diver (*Gavia stellata*): SWBSG Species Dossier 4. Report by BTO Scotland to SWBSG as part of Project 1403. Updated by SWBSG March 2017.

²³ Halley, D.J. & Hopshaug, P. (2007). Breeding and overland flight of red-throated divers *Gavia stellata* at Smøla, Norway, in relation to the Smøla wind farm. NINA Report 297.

²⁴ Wilson, M. W., Austin, G. E., Gillings S. & Wernham, C. V. (2015). Natural Heritage Zone Bird Population Estimates. SWBSG Commissioned report number SWBSG_1504. pp72. Available from: www.swbsg.org.

Golden Eagle

9.120 The speed used in the collision risk calculations was 14 m / sec for golden eagle. Collision risks have been calculated assuming 99 % avoidance (SNH, 2018). Full details of the calculations are shown in **Appendix 9.2**.

9.121 Applying an accepted avoidance rate of 99% for golden eagle, this equates to one bird colliding with a turbine approximately every 19 years.

9.122 The CRM process is inherently precautionary, and the usefulness of its predictions should be treated with a high degree of caution as modelling low levels of activity infers a false level of accuracy in an imprecise model. Furthermore, there is a growing body of satellite-tag data that shows range-holding golden eagles avoid entering wind farms and collisions are very rare events (Fielding *et al.*, 2021¹²; Fielding *et al.*, 2022¹³); on this basis the potential loss of one golden eagle over a 19-year period is considered to be precautionary.

9.123 The NHZ 7 golden eagle population was determined by Whitfield *et al.* (2008)²⁵ to be in unfavourable conservation status because, in 2003, only 43 ranges out of 90 known at that time were occupied. Data provided from the Highland Raptor Study Group showed that the population had increased to at least 49 pairs within NHZ 7 in 2019.

9.124 The population effect of the potential loss of one golden eagle every 19 years is difficult to measure, (bearing in mind that any such loss would comprise one out of 1,862 adult eagles (49 x 2 x 19) plus an unknown number of non-breeding birds), as it would be impossible to separate the effects of collision mortality from environmental and demographic processes that are subject to stochastic variability. Moreover, the predicted rate of additional mortality is beyond any practical possibility of empirical measurement that it would not be scientifically credible to consider that such rates could contribute to population effects. Therefore, based on professional judgement, the loss of one golden eagle every 19 years will not contribute to population effects.

9.125 With a breeding population of at least 49 pairs within NHZ 7, overall effects on golden eagles arising from collision mortality are considered to be of low magnitude and negligible significance at the scale of the NHZ.

9.126 Given the above, the effect of collision mortality on golden eagle is predicted to be **negligible** and **not significant** under the Regulations.

Proposed Mitigation

9.127 As no operational effects are deemed significant, no mitigation is proposed.

Residual Operational Effects

9.128 As no mitigation is proposed the residual operational effects are therefore anticipated to be **negligible** and **not significant** under the Regulations.

Cumulative Effects

9.129 The Regulations require the cumulative effects of the Proposed Development with other relevant projects to be assessed. NatureScot guidance (SNH, 2018b) on assessing cumulative effects has been followed. In considering cumulative effects, it is necessary to identify any effects that are minor (or greater) in isolation (**Table 9.5**) but that may be major or moderate, and therefore significant, cumulatively. Predicted adverse effects on birds arising from the construction and operation of the Proposed Development have the potential to contribute to cumulative effects upon wider regional populations, in this case populations within NHZ 7.

9.130 "Target" species were taken to be those species of high or moderate Nature Conservation Importance (**Tables 9.2** and **9.7**) for which there was some indication of a potential effect as a result of the Proposed Development, which may be exacerbated cumulatively.

9.131 Other projects of immediate relevance to the consideration of cumulative effects include the operational Bhlaraidh Wind Farm and Corrimony Wind Farm. There is also the recently consented Bhlaraidh Wind Farm Extension adjacent to the Proposed Development. However, given that no significant effects of the Proposed Development were identified, and all effects on all bird species were deemed to be of negligible significance (**Table 9.5**), the predicted in-isolation effects of the Proposed Development are considered to have no potential to contribute to cumulative effects and are, therefore, negligible across all species.

9.132 In conclusion, for all bird species, the cumulative effects of the Proposed Development in-combination with other projects in the NHZ are likely to be **negligible** and deemed to be **not significant** under the terms of the Regulations.

Interrelationship between Effects

9.133 There are interrelationships between potential effects assessed in this chapter and those discussed in **Chapter 8**. Many of the effects identified in the ecology chapter, relating primarily to habitat loss and disturbance, are of importance to ornithological features, and have informed the assessment of effects on ornithology.

Further Survey Requirements and Monitoring

9.134 Monitoring of the location and breeding performance of red-throated diver and golden eagle will be commissioned, and will continue prior to, during, and after construction to enable a 'before and after' assessment to be made. Further information on bird monitoring is provided in the Outline Restoration and Enhancement Plan for the Proposed Development in **Appendix 8.5**.

Regional Eagle Conservation Management Plan (RECOMP) for NHZ 7

9.135 Significant effects on golden eagle as a result of the Proposed Development are not considered likely to occur; however, further enhancement measures are proposed which are aimed to enable population growth across NHZ 7 rather than concentrate on the Estate. A Regional Eagle Conservation Management Plan (RECOMP) approach will be adopted, based on the model implemented successfully in NHZ 10. It is considered that a regional approach is preferable to a local/Estate based one and will likely deliver a clear and demonstrable conservation gain for the species.

9.136 The overall aim of the RECOMP is to improve the regional conservation status of golden eagle and maintain Favourable Conservation Status within NHZ 7. To help meet this overall aim, the Applicant has committed to the founding of the NHZ 7 RECOMP Advisory Group and surveys and monitoring of golden eagle breeding 'territories' within NHZ 7. The Applicant proposes complete censuses on territory occupancies, vacancies and their breeding fates across the NHZ 7 RECOMP area (where access is achieved) once every three years. These measures, coupled with the additional measures set out in **Appendix 9.5**, will enable population growth across NHZ 7.

9.137 Further details are provided in **Appendix 9.5**.

Proposed Enhancement Measures

9.138 Enhancement measures to improve habitats, particularly the maintenance, restoration and re-wetting of modified peat areas will form part of the Outline Restoration and Enhancement Plan (OREP) for the Proposed Development (see **Appendix 8.5** in **Chapter 8**), which will be agreed in consultation with NatureScot. Peatland restoration will improve the quality and diversity of blanket bog habitats providing suitable habitats for a range of ornithological species. It will also improve the quality of suitable habitat for a range of mammal and reptile species, which in turn optimises the prey availability for ornithological features.

9.139 The OREP also proposes the planting of broadleaved woodland, riparian woodland and low-density montane scrub such as dwarf birch, which will provide benefits for golden eagle and a range of upland bird species. Annual monitoring will be undertaken to check the effectiveness of habitat management for golden eagles, including monitoring of breeding success.

9.140 Enhancement measures to improve the likelihood of red-throated diver breeding success would involve the deployment and maintenance of three artificial nesting rafts, in addition to the raft to be installed on Loch nam Meur (south) before the start of construction). The rafts would help to reduce the risk of predation, trampling and the risk of flooding to nests. Monitoring will be undertaken to check the effectiveness of the rafts, as well as preventing any inter-specific competition, e.g., use by geese. Further information on the deployment and maintenance of rafts is provided in the OREP (**Appendix 8.5**).

9.141 In summary, the following habitat enhancement measures, detailed within the OREP (**Appendix 8.5**), are predicted to provide positive biodiversity enhancement for the benefit of ornithological features:

- 2ha of peatland restoration proposed as enhancement;
- Tree and montane scrub planting including riparian tree planting;

²⁵ Whitfield, D. P., Fielding, A. H., McLeod, D. R. A. & Haworth, P. F. (2008). A conservation framework for golden eagles: implications for their conservation and management in Scotland. Scottish Natural Heritage Commissioned Report No.193 (ROAME No. F05AC306).

- Grazing management; and
- Provision of an additional three red-throated diver rafts.

Summary of Significant Effects

9.142 No Significant effects are predicted to arise from the construction or operation of Loch Liath Wind Farm on ornithology (including cumulatively).

Sections to be completed by specialists that will be used by LUC to compile other parts of the EIA Report

Non-Technical Summary (NTS)

9.143 This chapter considers the potential effects of the Proposed Development on ornithology. It details the methods used to establish the bird species and populations present, together with the process used to determine their Nature Conservation Importance. The ways in which birds might be affected (directly or indirectly) by the construction and operation of the Proposed Development are explained and an assessment is made with regards the significance of these effects.

9.144 The assessment is structured around the consideration of potential effects, including cumulative effects, of construction and operation of the Proposed Development upon those ornithological receptors identified during survey work.

9.145 Desk-based studies and field surveys were carried out in and around the Proposed Development over respective 'study areas' to establish baseline conditions and the species and populations present.

9.146 It was possible to 'scope out' the effects on a number of species of high Nature Conservation Importance by virtue of their ecology, absence, distance from the Proposed Development, small numbers, low levels of activity and the nature and location of this activity.

9.147 Two bird species were included in the assessment, golden eagle and red-throated diver. These species were considered to be of high Nature Conservation Importance due to their listing as Annex I (Birds Directive) and Schedule 1 (Wildlife and Countryside Act 1981, as amended by the Nature Conservation (Scotland) Act 2004).

9.148 Habitat loss arising from the construction of tracks, borrow pits and turbine bases is unlikely to result in adverse effects upon any bird species. Any effects are likely to be negligible and not significant. Population reductions due to habitat loss, displacement and/or collision mortality are also likely to be minimal. Any effects are likely to be negligible and not significant for all bird species.

9.149 The contribution of adverse effects accrued by the Proposed Development to regional populations would be undetectable and so cumulative effects of the Proposed Development with existing and planned windfarm developments in the region are judged as being unlikely to have a significant effect on existing bird populations. Overall, it is concluded that construction and operation of the Proposed Development would not have a significant effect on birds under the terms of the Regulations.

9.150 Information is presented to allow the competent planning authority to consider the requirement for an assessment of potential effects of the Proposed Development on the integrity of a number of Special Protection Areas (SPAs). This information demonstrates that the Proposed Development would not have a likely significant effect on any SPA, therefore further consideration under the Habitats Regulations is not required.

Statement of Expertise

Blair Urquhart is Director of Operations at Natural Research (Projects) Ltd. and has over 26 years' experience of working with birds and their conservation and has managed a range of projects within the energy and conservation sectors. Blair joined NRP from Scottish Natural Heritage (SNH) where he worked as SNH's lead for certain complex, contentious or novel renewable energy casework. He has an excellent knowledge and working experience of UK and European laws relating to wildlife and the countryside, he also contributed to the development of SNH casework guidance in relation to birds, their interaction with wind energy and powerline developments and impact assessment. Blair has worked on onshore wind farm projects across Scotland, Europe and the Middle East, and has been involved in preparing and writing numerous Technical Reports and EIA Report chapters and provided ornithological management advice for a number of renewable energy and powerline developments.