2022

Glenmuckloch to Glenglass Reinforcement Project

Appendix 9.1: Ornithology Technical Report

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Introduction

9.1.1 This report details the ornithological survey work undertaken at the Glenmuckloch to Glenglass Reinforcement Project (GGRP), which at the time the surveys were commissioned was anticipated to comprise two proposed overhead line grid connections (Glenmuckloch Wind Farm (WF) 33kV and Glenmuckloch Pumped Storage Hydro (PSH) 132kV) near Kirkconnel, Dumfries and Galloway. The surveys were commissioned by Scottish Power Energy Networks (SPEN) in 2018. The requirements for the GGRP have changed in the intervening period, and the project now comprises a single overhead line on steel towers from the existing Glenglass Substation to the proposed new Glenmuckloch Substation which forms part of the GGRP. The area proposed for survey encompassed all potential route options which were being considered at that time, and thus once the ornithological survey buffers were applied a large survey area was required (as shown on EIA Report **Figure 9.1**).

9.1.2 The field surveys described and data in this report includes information from both the Natural Research (Projects) Ltd. (NRP) and the MBEC survey areas, and therefore relate to the entire visible study area.

9.1.3 Following consultation with NatureScot (then Scottish Natural Heritage (SNH)) one breeding season of surveys was agreed with all surveys taking place between April and July 2018. Further black grouse surveys were required in 2021 following access problems in 2018.

9.1.4 Following information obtained from RSPB Scotland of a satellite-tagged hen harrier that had roosted in the study area, hen harrier roost surveys were conducted in February and March 2022.

9.1.5 The objectives of the study were to:

- Map the distribution of breeding birds, including scarce breeding species listed in Annex 1 of the EU Birds Directive (2009/147/EEC) on the Conservation of Wild Birds 1979 (the Birds Directive) or Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA); and
- Record the presence and abundance of other birds of conservation importance (those listed in Biodiversity Action Plans (BAPs) or on the Red List of Birds of Conservation Concern (BoCC) (Eaton *et al.* (2015)).

9.1.6 This report is supported by **Appendix 9.2: Confidential Annex**.

Desk Study and Consultation

9.1.7 The desk study was carried out using survey and desk study data provided by SPEN for Glenmuckloch Wind Farm, Glenmuckloch Pumped Storage Hydro and Sandy Knowe Wind Farm which at the time of preparation was not yet in the public domain. These were supplemented with publicly available data from a number of other Environmental Statements (ESs) and Environmental Impact Assessment (EIA) Reports for developments in the area, comprising Sanquhar Community Windfarm; Lethans Wind Farm; and the Southwest Scotland Renewables Connection Project.

9.1.8 Data was sought through consultation with RSPB Scotland and the Dumfries & Galloway Raptor Study Group (DGRSG) and was provided in August 2018. The RSPB provided a dataset of records from 2000 to 2016 which included records of black grouse and waders relevant to GGRP. The DGRSG data included breeding locations, occupancy and success for peregrine (from 2002 to 2018) and goshawk (2013 to 2018).

9.1.9 Some of the data gathered during these exercises had little metadata provided and therefore not all records illustrated from these sources would have been recorded during the breeding season.

9.1.10 The site is not designated at international or national levels for ornithological interests. The nearest Special Protection Area (SPA) is the Muirkirk and North Lowther Uplands SPA, which lies approximately 1.7 kilometres north of the GGRP. The qualifying interests of this SPA are breeding hen harrier, golden plover, merlin, peregrine, short-eared owl and non-breeding hen harrier (EIA Report **Figure 9.2**).

Field Survey Methods

9.1.11 The area proposed for survey encompassed all potential route options which were being considered at that time, and thus once the ornithological survey buffers were applied a large survey area was required (as shown on EIA Report **Figure 9.1**). The reporting areas were the 2 km survey boundary for hen harrier, merlin, peregrine and short-eared owl, the 1.5 km survey boundary for black grouse, the 1 km survey boundary for goshawk and barn owl and the 500 m survey boundary for breeding waders (EIA Report **Figure 9.3**).

9.1.12 During the main survey period in 2018 there were restrictions in the access allowed to some portions of the survey area, where access was either: not granted; or was restricted until after lambing had finished at the end of May; or access permission was not received until the end of May. These areas are indicated on EIA Report **Figure 9.1**. Where possible all areas for which access was restricted were surveyed from adjacent accessible land. This was achieved by surveyors scanning carefully from suitable vantage points, which allowed birds in flight or calling to be mapped and thus provide locations which could be added to locations from surveys in the later survey periods. Publicly accessible roads, tracks and paths which ran through or near to areas of restricted access were also used as vantage points. Dependent on terrain, most but not all areas were visible using these methods.

9.1.13 A large proportion of the southern part of the survey area was already scheduled for the ornithological survey work required by the Sandy Knowe Wind Farm grid connection. This work was being carried out by MBEC ornithologists during 2018, and therefore to prevent unnecessary disturbance to birds and repetition of survey effort, the survey area required for the GGRP was split between MBEC and NRP (see EIA Report **Figure 9.1**), with all relevant data shared between the two specialist ornithology companies.

9.1.14 For the areas which were not accessed at all during the survey period in 2018, these are adjacent to ground of similar habitat types which was accessible. It is therefore reasonable to presume similar species and densities to those areas. In addition, as the majority of the ground which was not accessed at all is already under development for other proposals, the desk study has provided information on the species using these areas including data on scarce raptors and black grouse. NatureScot should also have access to all confidential data from these developments to confirm if any species of high conservation concern may have been present there. During consultation with NatureScot NRP were not made aware of any confidential data in addition to that supplied by RSPB Scotland and the DGRSG.

9.1.15 In addition, access was granted in April and May 2021 to carry out black grouse surveys in an area of ground that was previously inaccessible (EIA Report **Figure 9.1**). This is an area where black grouse were known to have been recorded in the past.

9.1.16 Following information obtained from RSPB Scotland of a satellite-tagged hen harrier that had roosted in the study area between October 2019 and March 2020 hen harrier roost surveys were conducted in February and March 2022.

9.1.17 The NRP field surveyors were Fiona Leckie (FL), Bob Stakim (RAS), Alex Ash (AA) and MBEC surveyors were Peter Carroll (PC), Stephen Ray (SR), Paul Bradshaw (PB) and Gerry Palmer (GP). All field surveyors are trained ornithologists with extensive experience in surveying birds. Field surveyors received training prior to and during survey work to maintain professional standards.

Scarce Breeding Birds

9.1.18 Priority was given to detecting the species considered most likely to breed in the area: hen harrier (*Circus cyaneus*), short-eared owl (*Asio flammeus*), merlin (*Falco columbarius*), peregrine (*Falco peregrinus*), goshawk (*Accipiter gentilis*) and barn owl (*Tyto alba*)

9.1.19 In total 102.25 hours were spent searching for evidence of scarce breeding birds. In addition to this, search effort undertaken during other surveys also included searches for signs of occupancy by raptors and owls. (**Table 9.1.1**).

9.1.20 Surveys were undertaken within suitable habitat which was located within: the 2 km survey boundary for hen harrier, merlin, peregrine and short-eared owl; and the 1 km survey boundary for goshawk and barn owl (EIA Report **Figure 9.1** & **9.3**).

Hen harrier

9.1.21 Survey methods in Hardey *et al.* (2013) were followed, with emphasis given to any stands of tall heather.

Merlin

9.1.22 Survey methods in Hardey *et al.* (2013) were followed, with emphasis given to any stands of tall heather, boulders, hummocks, bushes and trees including old crow nests (which could be re-used by merlin) were checked for signs of occupation (e.g. plucked prey, moulted feathers, pellets and faeces).

Peregrine

9.1.23 Survey methods in Hardey *et al.* (2013) were followed. All potential nests sites were visited and checked for occupation. All crags and steep banks identified from OS maps and ground searches were checked. Surveyors looked for birds or signs of occupation (e.g., faecal splash, fresh plucks).

Short-eared owl

9.1.24 Survey methods in Hardey *et al.* (2013) were followed. Emphasis was given to stands of tall heather.

Goshawk

9.1.25 Survey methods in Hardey *et al.* (2013) were followed. Emphasis was given to stands of mature conifers, particularly stands of European larch (*Larix decidua*).

Barn owl

9.1.26 Suitable nest and roost locations were searched for signs of occupancy particularly derelict buildings or those with easy access and nest boxes.

Table 9.1.1. Details of survey effort searching for Scarce Breeding Birds.

Date	Obs	Start	Finish	Duration	Weather					
					Cloud 10ths	Cloud base (m)	Wind Direction	Wind Force	Precipitation*	Visibility (km)
NRP										
27/04/2018	FL	0545	1415	8.50	5	800	NA	0	nil	10
28/04/2018	FL	0545	1045	5.00	0	NA	NA	0	nil	20
15/05/2018	FL	0430	1430	10.00	8	1000	NA	0	nil	20
16/05/2018	FL	0430	1030	6.00	1	1000	NNE	1	nil	20
16/05/2018	FL	1230	1400	1.50	0	NA	NA	0	nil	20
04/07/2018	RAS	1130	1445	3.25	3	900	W	3	nil	5
MBEC										
07/04/2018	PC/GP	10:30	14:30	4.00	2	-	SE	2	nil	1
09/04/2018	PC/GP	15:00	20:00	5.00	10	100	SE	3	nil	10
26/04/2018	PC/GP	08:30	13:00	4.50	8	500	W	2	IHR	4
26/04/2018	PC/GP	08:30	13:00	4.50	8	500	W	2	IHR	4
02/05/2018	PC/GP	14:00	19:00	5.00	5	1000	W	4	nil	10
02/05/2018	PC/GP	14:15	19:20	5.00	6	750	W	4	nil	10
03/05/2018	PC/GP	10:00	14:00	4.00	1	750	SW	3	ILS	10

Table 9.1.1. Details of survey effort searching for Scarce Breeding Birds.

Date	Obs	Start	Finish	Duration	Weather					
					Cloud 10ths	Cloud base (m)	Wind Direction	Wind Force	Precipitation*	Visibility (km)
03/05/2018	PC/GP	10:00	14:00	4.00	9	750	W	3	ILS	10
12/06/2018	PC/GP	10:30	16:30	6.00	100	1000	NW	2	nil	10
10/07/2018	PC/GP	22:15	24:00	1.75	7	1000	SW	1	nil	10

* Precipitation codes: Continuous/Intermittent + Light/Heavy + Rain/Snow/Hail/Fog

9.1.27 In January 2021 data became available from the RSPB of a satellite-tracked hen harrier that had been recorded roosting in two locations within the survey area between October 2019 and March 2020 (**Appendix 9.2: Table 9.2.3**).

9.1.28 To identify any regular communal roosts weekly vantage point surveys were carried out between 4 February and 29 March 2022 at one of these locations as well as monthly ground searches of suitable habitat for signs of roosting hen harriers. One of these locations was within the footprint of the recently constructed Sandy Knowe wind farm and unsuitable as a hen harrier roost.

9.1.29 Roost surveys were carried out following guidance found in Gilbert *et al.* (1998) for a two-hour period covering the period 1.5 hours before sunset to 0.5 hours after sunset with the location and activity of all hen harriers mapped onto enlarged 1:25000 scale OS maps.

9.1.30 A Pulsar Helion thermal imaging scope was used to observe birds in low light.

Table 9.1.2. Details of hen harrier roost survey effort.

Date	Obs	Start	Finish	Duration	Weather					
					Cloud 10ths	Cloud base (m)	Wind Direction	Wind Force	Precipitation*	Visibility (km)
NRP										
04/02/2022	RAS	1400	1530	1.50	7	600	SW	4	nil	5
04/02/2022	RAS	1530	1730	2.00	7	600	SW	3	ILS	5
09/02/2022	AA	1540	1840	3.00	8	1000	SW	4	ILS	20
15/02/2022	AA	1550	1750	2.00	9	1000	SW	4	nil	20
21/02/2022	AA	1603	1803	2.00	4	1000	SW	4	nil	20
01/03/2022	RAS	1630	1830	2.00	3	900	nil	0	nil	5
18/03/2022	AA	1655	1855	2.00	0	9999	SE	3	nil	20
23/03/2022	AA	1705	1905	2.00	0	9999	SE	2	nil	20

Table 9.1.2. Details of hen harrier roost survey effort.										
Date	Obs	Start	Finish	Duration	Weather					
					Cloud 10ths	Cloud base (m)	Wind Direction	Wind Force	Precipitation*	Visibility (km)
29/03/2022	RAS	1815	2015	2.00	10	600	NE	2	nil	2
* Precipitation codes: Continuous/Intermittent + Light/Heavy + Rain/Snow/Hail/Fog										

Black Grouse

9.1.31 Methods followed those in Gilbert *et al.* (1998). Areas of suitable habitat within a 1.5 km survey boundary were visited (EIA Report **Figures 9.1** & **9.3**) to search for signs of occupation (droppings, feathers) and to locate and count any displaying (lekking) males. Spring visits were made within two hours of dawn from mid-April in dry, calm weather with good visibility. Surveyors listened and scanned carefully for lekking males. In total 24 hours were spent searching for black grouse in 2018 with a further 4.5 hours in 2021 to survey an area not accessible in 2018 (**Table 9.1.3**).

Table 9.1.3. Details of survey effort searching for Black Grouse.										
Date	Obs	Start	Finish	Duration	Weather					
					Cloud Cover 10ths	Cloud base (m)	Wind Direction	Wind Force	Precipitation*	Visibility (km)
NRP										
27/04/2018	FL	0545	0815	2.50	10	400	NA	0	nil	20
28/04/2018	FL	0545	0800	2.25	0	NA	NA	3	nil	5
15/05/2018	FL	0430	0800	3.50	1	1000	NA	0	nil	5
16/05/2018	FL	0430	0800	3.50	1	1000	NNE	3	nil	4
22/04/2021	RAS	0530	0800	2.50	4	1000	SW	2	nil	5
21/05/2021	AA	0420	0620	2.00	9	800	SW	3	nil	20
MBEC										
07/04/2018	PC	06:00	09:10	3.25	10	750	SE	2	nil	5
03/05/2018	PC	04:20	07:20	3.00	-	750	SW	3	nil	10
03/05/2018	PC	04:25	07:25	3.00	9	750	W	3	nil	10
15/05/2018	PC	03:55	06:55	3.00	1	1000	SW	2	nil	10
*Precipitation codes: Continuous/Intermittent + Light/Heavy + Rain/Snow/Hail/Fog										

Breeding Birds of Open Ground

9.1.32 Surveys were completed using a four-visit adapted Brown & Shepherd (1993) method for upland waders. These visits were completed within a 500 m survey boundary of the proposed route options (**Figures 9.1 & 9.3**). Selected bird species were surveyed, namely those included on Annex 1 of the Birds Directive, Schedule 1 of the WCA, Red-listed BoCC and those listed on the UK and local BAPs together with selected other species (see **Annex 9.1.1** for a full list).

9.1.33 Surveys were completed four times between April and July 2018 to allow for differences in detection rate between early and late breeding species. Fieldwork was not undertaken in conditions considered likely to affect bird detection, for example, strong winds (greater the Beaufort Force 5), persistent precipitation, poor visibility (less than 300 m) or in unusually hot or cold temperatures. Surveys were undertaken for a total of 157.75 hours. (**Table 9.1.4**).

9.1.34 The survey aimed to cover the ground systematically with a constant search effort. All points within the survey areas were approached closely typically to within 100 m. Patches of scrub, isolated trees, rocky outcrops and streams were investigated closely and surveyors paused at regular intervals to scan and listen for calling and singing birds. Careful attention was given to recording behaviour indicative of breeding with care taken to avoid counting the same individual more than once.

9.1.35 The location and activity of birds were mapped onto enlarged 1:25,000 scale OS maps using standard BTO codes (Marchant 1983). The position of each bird was mapped at the point of first detection and flight lines recorded. At the end of each visit, a summary map was compiled showing the locations of each identified territory or breeding pair. The following evidence was considered diagnostic of breeding: song, courtship or territorial display; territorial dispute; nest building and hole excavation; agitated behaviour by adult bird(s) indicative of the presence of a nearby nest or young (e.g. repetitive alarm calling, distraction display); adult(s) carrying food; presence of newly fledged young; adult(s) removing faecal sac.

9.1.36 Where a number of breeding individuals were present and it was not possible to determine the exact number of breeding pairs, a method was devised to allow the number of discrete territories to be estimated. Registrations of individual birds were deemed to represent discrete breeding territories / pairs if the distance between them was more than 250 m (500 m for curlew, 200 m for small passerines). Whilst it is recognised that these distances are arbitrary and the territory size varies both inter- and intra- specifically, this approach produces a standardised index of abundance based on the distance that members of a breeding pair are likely to move during the survey period. In cases where two individuals were considered to constitute a pair of birds, the location of the pair was placed centrally by convention.

9.1.37 Population estimates were derived by comparing the summary maps for the four survey visits. Again, a method was devised whereby discrete territories could be estimated. Territories plotted during each visit were considered to be separate from one another if they were located more than 1000 m apart (500 m for snipe, common sandpiper and skylark, 300 m for other small passerines). These

distances were chosen to reflect the distances birds could plausibly move between survey dates. The locations of territories mapped in more than one survey period were plotted centrally.

Table 9.1.4. Survey effort for Breeding Birds of Open Ground.

Date	Obs.	Start	Finish	Duration	Visit No.	Weather					
						Cloud 10^{ths}	Cloud base (m)	Wind Direction	Wind Force	Precip*	Visibility (km)
NRP											
26/04/2018	FL	1630	2000	3.50	1	5	700	SW	2	nil	20
27/04/2018	FL	0815	1015	2.00	1	5	800	NA	0	nil	10
28/04/2018	FL	0545	1045	5.00	1	0	NA	NA	0	nil	20
15/05/2018	FL	0430	1430	10.00	2	9	1000	SW	1	nil	20
16/05/2018	FL	0730	0900	1.50	2	0	NA	NA	0	nil	20
16/05/2018	FL	1230	1400	1.50	2	0	NA	NA	0	nil	20
15/06/2018	RAS	0815	1630	8.25	3	8	800	W	3	ILR	5
21/06/2018	RAS	1045	1945	9.00	3	5	900	NW	6	nil	5
22/06/2018	RAS	0845	1745	9.00	3	5	900	W	5	nil	5
04/07/2018	RAS	1200	1930	7.50	4	8	900	W	3	nil	5
MBEC											
23/04/2018	SR/PB	09:45	16:15	6.50	1	8	750	W	3	IHR	3
24/04/2018	SR/PB	08:40	16:15	7.50	1	10	750	W	2	ILR	6
25/04/2018	SR/PB	08:45	17:00	8.25	1	7	750	W	2	nil	4
25/04/2018	SR/PB	08:45	17:00	8.25	1	7	750	W	2	nil	4
14/05/2018	SR/PB	09:45	16:15	6.5	2	1	1000	SE	1	nil	10
15/05/2018	SR/PB	08:40	16:15	7.5	2	9	1000	W	3	nil	10
16/05/2018	SR/PB	08:40	16:05	7.5	2	4	1000	W	2	nil	10
18/06/2018	SR/PB	11:45	16:30	4.75	3	1	750	SW	4	nil	7
19/06/2018	SR/PB	07:45	16:00	8.25	3	1	750	W	2	nil	7
20/06/2018	SR/PB	08:00	16:00	8	3	8	500	W	4	nil	5
21/06/2018	SR/PB	08:00	10:00	2	3	7	1000	NW	3	nil	10
09/07/2018	SR/PB	10:15	16:15	6	4	1	1000	SW	2	nil	10
10/07/2018	SR/PB	08:00	16:16	8.25	4	9	1000	SW	2	nil	10
11/07/2018	SR/PB	08:30	16:30	8	4	7	1000	NE	3	nil	10
12/07/2018	SR/PB	08:15	11:30	3.25	4	7	1000	SW	1	nil	2

* Precipitation codes: Continuous/Intermittent + Light/Heavy + Rain/Snow/Hail/Fog

Field Survey Results

Raptors and Owls

Occurrence and Status

9.1.38 Sightings of hen harrier, peregrine, goshawk, barn owl and long-eared owl were recorded. All these species, except long-eared owl are listed on Annex 1 of the Birds Directive and are listed on Schedule 1 of the WCA.

Abundance and distribution

9.1.39 Peregrine and barn owl were confirmed to be breeding in the survey buffer, peregrine in one location and barn owl in one location (**Appendix 9.2: Confidential Annex**).

9.1.40 There was no evidence that any of the other species recorded had bred within the survey buffers. The DGRSG confirmed that no breeding sites for goshawk were located in the study area during 2018 with their previous nest location being lost due to ongoing forestry operations.

9.1.41 Though hen harrier was recorded on one occasion during the breeding season (**Figure 9.6**) there was no evidence that birds were breeding within the study area.

9.1.42 Information obtained from the RSPB regarding roosting hen harrier is included in **Appendix 9.2: Confidential Annex.** During November 2017 hen harrier was recorded incidentally on two occasions as part of the Sandy Knowe grid connection surveys.

9.1.43 No evidence of any hen harriers roosting within the survey area was obtained during dedicated hen harrier watches.

9.1.44 During hen harrier roost surveys there were single observations of hunting long-eared owl and barn owl.

Black grouse

Occurrence and Status

9.1.45 This species was not recorded during any surveys in 2018 despite survey conditions being very good on all visits. A lek site, known from the desk studies, within the MBEC survey area was occupied in 2018 but was not accessible therefore no further information was available for it (see EIA Report **Figure 9.1**).

9.1.46 In 2021 this area was surveyed and two lek sites were located, one containing a single male bird and another was heard only but was also believed to only contain one bird. A single female was flushed from the same area during the May visit (see EIA Report **Figure 9.4**).

Waders

Occurrence and Status

9.1.47 Sightings of curlew (*Numenius arquata*), lapwing (*Vanellus vanellus),* oystercatcher (*Haematopus ostralegus*), snipe (*Gallinago gallinago)* and common sandpiper (*Actitis hypoleucos*) were recorded. Lapwing and curlew are both Red-listed Birds of Conservation Concern. Curlew is also listed on IUCN 'Red list – 'Near Threatened' (IUCN, 2021).

Abundance and Distribution

9.1.48 Two species of waders of moderate conservation concern were recorded as breeding within the 500 m survey buffer: curlew (6 territories) and lapwing (1 territory), plus two species of lesser conservation concern: snipe and common sandpiper (see EIA Report **Figure 9.5**).

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Annex 9.1.1 Survey Species Lists and BTO Codes

List A		List B		List C			
Species	**BTO Code**	**Species**	**BTO Code**	**Species**	**BTO Code**	**Species**	**BTO Code**
Diver spp.	RH/BV	Greylag goose	GJ	Cormorant	CA	Song thrush	ST
Common scoter	CX	Barnacle goose	BY	Heron	H.	Grasshopper warbler	GH
White-tailed eagle	WE	White-fronted goose	EW(Euro)/NW(Grld)	Kestrel	K.	Wood warbler	WO
Golden eagle	EA	Pink-footed goose	PG	Buzzard	BZ	Spotted flycatcher	SF
Hen harrier	HH	Brent goose	DB(Dark)/PB(Pale)	Sparrowhawk	SH	Marsh/Willow tit	MT/WT
Goshawk	GI	Bean goose	BE	Red grouse	RG	Crested tit	CI
Red kite	KT	Golden plover	GP	Grey partridge	P.	Starling	SG
Osprey	OP	Dunlin	DN	Lapwing	L.	House/Tree sparrow	HS/TS
Merlin	ML	Greenshank	GK	Redshank	RK	Linnet	LI
Peregrine	PE	Whimbrel	WM	Common sandpiper	CS	Twite	TW
Hobby	HY	Curlew	CU	Oystercatcher	OC	Lesser redpoll	LR
Barn owl	BO	Wood sandpiper	OD	Snipe	SN	Crossbill/ Scottish c'bill	CR/CY
Short-eared owl	SE	Tern spp.	AE/CN	Woodcock	WK	Bullfinch	BF
Black grouse	BK	Arctic Skua	AC	Herring gull	HG	Hawfinch	HF
Capercaillie	CP	Great Skua	NX	Cuckoo	CK	Yellowhammer	Y.
Nightjar	NJ			Skylark	S.	Reed bunting	RB
Chough	CF			Tree pipit	TP	Corn bunting	CB
Whooper swan	WS			Dunnock	D.	Raven	RN
Rare raptors	HZ/MR/RF/YF			Ring ouzel	RZ	Other wildfowl spp.	MS/MA/GD/T.