

# QUADRAT Scotland Ltd

ENVIRONMENTAL IMPACT ASSESSMENT (ORNITHOLOGICAL  
ASSESSMENT)  
FOR PROPOSED WIND DEVELOPMENT AT  
STRONAFIAN COMMUNITY WOODLAND

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*Cruach nam Mult from VP3 to VP1*

## Summary

This report describes and assesses the ornithological activity around the site envelope of the proposed Stronafian Community Forest wind turbine development.

The proposed scheme is for two wind turbines to the east of Cruach nam Mult. The turbines will be located on largely degraded peatland and felled conifer plantation.

The site has been surveyed to determine populations of breeding birds present, populations of wintering birds, and flights recorded through the proposed turbine location and its surrounds. A 2 km envelope around the proposed turbine locations has been covered, as per SNH recommended survey methods (SNH, 2014).

Vantage points were located on Creag Liath (west) and A'Cruach (east) in addition to specific breeding bird surveys.

The main sensitivities observed were as follows.

- A pair of hen harrier present during the early part of the 2014 breeding season, on the south of the site, showed no clear signs of breeding behaviour
- Two male black grouse were observed lekking on site. Whilst the site is not thought to be a main lek site, this could be a regular satellite lek that develops in time
- Peregrine. A pair appears to be holding territory in the Southern part of the plantation
- Crossbills were commonly observed on site, and are deemed to be nesting in the plantation trees. Crossbills are covered under Wildlife and Countryside act schedule 1
- Golden eagle, hen harrier and merlin flights were recorded. None of these species are thought to be breeding within the survey area, but birds flying through, including juveniles, are at risk of collision with turbines
- Grasshopper warbler were heard in the rush pasture near the current end of the track. This marshland should be avoided by the project.

Mitigation measures include:

- Habitat restoration and protection where appropriate
- Pre-construction checks for breeding behaviour and roosts, if works are started within the appropriate seasons
- A toolbox talk provided to all contracted staff to ensure they are aware of the sensitivities identified, areas to avoid, and what to do if any bird issues are identified, e.g. nesting within disturbance limits
- Any felling or lopping of trees should be done outside the breeding season i.e. between the end July-March 15<sup>th</sup>. If it becomes necessary to fell or lop any trees within the breeding season, a check to ensure that nests are not

present will be required within two weeks of the works. If nests are present, felling/lopping will need to wait until the chicks have fledged and dispersed.

- Any ground clearance should be done outside the bird breeding season, i.e. between the end July- March 15th. If ground clearance is required within the breeding period, dissuasion by means of flicker tape flags may be used, however fortnightly checks will still be required to determine the location of any nests within the area to be cleared. If nests are present, works will need to avoid them with an appropriate buffer (dependant on species) until the chicks have fledged and dispersed.
- An ecologist/ornithologist should be retained to oversee the above works and ensure that they are carried out.

## 1. Introduction

The proposed scheme is for a community wind project of two turbines to be constructed to the east of Cruach nam Mult.

Bird surveys were carried out from April 2014 to May 2015 by Damian Kelly, Phil Golder and Nikki Dayton of Quadrat Scotland Ltd.

Further desk-based information was obtained from SNH, NBN Gateway and UKBAP websites.

The survey assessed the presence, behaviour and breeding activity of bird species within a 2km distance around the proposed site. In addition, any signs of other protected species were noted during the surveys.

### 1.2 Site description

The site envelope for the proposed wind-farm is open ground and felled conifer within an extensive area of conifer plantation, around Cruach nam Mult near Colintrave.

The surveyed site is predominantly felled conifer plantation, *Molinia caerulea* grassland, wet heath and rush (*Juncus sp.*) dominated habitats with more extensive wet heath and blanket bog to the north of the hill. Small, marshy burns with willow scrub and birch woodland run along the eastern and southern margins of the site, draining to the south-east.

### 1.3 Aims and objectives

The aims of this study were to:

- Assess use of the study area by birds
- Identify breeding sites that could be disturbed or damaged during construction or medium term or permanent changes
- Identify winter roosts that could be disturbed or damaged during construction or through medium term or permanent changes
- Provide the necessary data to determine potential need for licences for disturbance of target species and/or to inform mitigation needs
- Record signs of any other protected species that may be using the site.

### 1.4 Relevant legislation and planning policy guidance

The following planning policy and guidance documents have been taken into account in this assessment:

- Scottish Planning Policy (The Scottish Government, 2014). This sets out all of the Scottish Government's Planning Policy of particular relevance to this assessment. It replaces National Planning Policy Guidance 14: Natural Heritage which describes how policies for conservation and enhancement of flora and fauna should be reflected in land use planning

- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011
- Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the ‘Habitats Directive’)
- EU Council Directive 79/409/EEC and 2009/147/EC on the Conservation of wild birds (the ‘Birds Directive’)
- The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004 (as amended), which translates the Birds and Habitats Directives into Scottish Law
- ‘Managing Natura 2000 Sites’ (European Communities 2000), which gives guidance on the implementation of the Birds and Habitats Directives
- The Wildlife and Countryside Act 1981
- The UK Biodiversity Action Plan
- The Scottish Biodiversity Action Plan

## **2. Ornithological assessment measures**

### **2.1 Assessment methodology**

This assessment has been carried out with reference to the assessment methodologies produced by Scottish Natural Heritage (updated in 2014) for impact assessment of onshore wind farms.

The conservation importance of the bird populations in the study area was assessed with reference to:

- Annex 1 of the EC Birds Directive
- Schedule 1 of the Wildlife & Countryside Act 1981
- Birds of Conservation Concern

A 2 km zone around the proposed turbine site was studied, to include breeding territories, winter roosts and potential fly-over from nearby territories and migrants. This distance adhered to the SNH recommendation regarding raptors (2 km) and woodland grouse (1.5 km).

Walk over assessment of the turbine area and Brown and Shepherd methodology was completed during the 2014 breeding season, with a further winter walk-over assessment.

Some species-specific survey methodologies were employed for species that might not be detected by Brown and Shepherd. The study area, and the wider area, could be used by black grouse, hen harrier, golden eagle, white-tailed eagle, peregrine, merlin, long-eared owl and short-eared owl, so specific raptor and black grouse surveys targeted these species. This was with the exception of long-eared owls, as time did not permit pre/post daylight searches in the wooded areas.

Standard survey methodologies were used following SNH guidance (SNH, 2014), including additional surveys at dusk/dawn for black grouse. The surveys were carried

out between April 2014 and May 2015. In April and May 2015 the site was monitored for hen harrier activity.

Vantage point surveys were carried out from April 2014 to January 2015. Three sites were used, VP1 – NS 01141 83743 looking East, VP2 – NS 01073 83802 looking North, and VP3 - NS 03507 84219 looking West. Three hour surveys were completed at each VP. In total, 15 hours observation was made from VP1 and VP2, and 12 hours from VP3 during the breeding season. 9 hours were recorded at each VP during the winter. Flights were mapped and times, duration, height and behaviour recorded.

Weather conditions were noted during all surveying.

### 3. Results

#### 3.1 Baseline conditions and receptors

Previous data on Stronafian was available from a report by RPSGROUP. Additional information was taken from local bird groups, people working in the study area, and consultation with SNH.

There are currently no local conservation designations.

#### 3.2 Ornithological baseline results

**Table 1 - The estimated number of territories held by breeding populations in the bird survey area (within 2 km) in 2014, and their conservation status.**

Species	Sp. code	Estimated number of breeding pairs	UK Bap/ SAF	IUCN red/ amber list	W & C schedule 1	EU Birds directive
Red grouse	RG	2	BAP	Amber		
Black grouse	BK	1	BAP/SAF	Red		
Buzzard	BZ	3				
Sparrowhawk	SH	1				
Kestrel	K.	1		Amber		
Peregrine falcon	PE	1 just outside		Amber	Yes	Annex 1
Wood pigeon	WP	4				
Cuckoo	CK	1		Amber		
Tawny owl	TO	1				
Skylark	S.	1	BAP	Red		
Meadow pipit	MP	8		Amber		
Grey wagtail	GL	1		Amber		
Dunnock	D.	3		Amber		

Species	Sp. code	Estimated number of breeding pairs	UK Bap/ SAF	IUCN red/ amber list	W & C schedule 1	EU Birds directive
Song thrush	ST	1	BAP	Red		
Mistle thrush	M.	1		Amber		
Blackbird	B.	1				
Robin	R.	8				
Whinchat	WC	1				
Willow warbler	WW	12		Amber		
Grasshopper warbler	GH	1	BAP	Red		
Goldcrest	GC	3		Amber		
Wren	WR	5				
Spotted flycatcher	SF	1	BAP	Red		
Great tit	GT	2				
Coal tit	CT	7				
Long tailed tit	LT	2				
Treecreeper	TC	1				
Jay	J.	1				
Hooded crow	HC	1				
Raven	RN	1				
Chaffinch	CH	14				
Redpoll	LR	2	BAP	Amber		
Siskin	SK	2				
Common crossbill	CR	2			Yes	

Key information for the main sensitive species breeding on site:

- A **black grouse** lek was recorded during the survey, with at least two males lekking at a site within the plantation just to the North of the proposed turbine site (grid reference NS 020 847). Two males were also seen, on more than one occasion, feeding and gritting around the base of the meteorological mast. A flight with four birds was recorded in September 2014.
- A pair of **peregrines** were recorded flying and sky dancing over the plantation to the South East of the proposed turbine location. There is a known nest site just to the South of the survey area.

- Adult and juvenile **crossbills** were recorded regularly on site. Parrot crossbill is IUCN amber listed and Scottish crossbill is IUCN red and BAP listed. However, the habitat (spruce plantation) and geographical location suggests that only common crossbill are present. All crossbills are covered under the wildlife and countryside act schedule 1. As crossbills are known to breed in the plantation, the harvesting work during the 2015 breeding season will have been in breach of the Act if the area harvested was not surveyed prior to activity.
- Five BAP listed passerine species and red grouse were identified within the study envelope. Of these song thrush and redpoll were recorded within 500 m of the proposed turbine location and grasshopper warbler were noted singing in the marshy grassland immediately to the south of Cruach nam Mult.

**Table 2 - Non-breeding species recorded at the site from April 2014 to January 2015, and their conservation status.**

Species	sp. code	UK Bap/ SAF	IUCN red/ amber list	W & C schedule 1	EU Birds directive
Mute swan	MS		Amber		
Mallard	MA				
Golden eagle	EA		Amber	Yes	Annex 1
Hen harrier	HH		Red	Yes	Annex 1
Merlin	ML		Amber	Yes	Annex 1
Woodcock	WK		Amber		
Lesser black backed gull	LB		Amber		
Herring gull	HG	BAP	Amber		
Great black backed gull	GB				
House martin	HM		Amber		
Wheatear	W.				
Stonechat	SC		Amber		
Carrion crow	C.				
Reed bunting	RB	BAP	Red		

- There was a record of a single **golden eagle** flight over the site in April 2014, by an immature bird. The flight was from West to East across the site within 1 km of the proposed turbine site.
- Although none were seen during surveys, discussions with the on site contract tree harvesters revealed that there are a number of owl territories onsite, including possibly short and long-eared owls. It is possible that long

ered owl nests could have been destroyed in the area of plantation that was felled during the 2015 breeding season.

- There were sightings of **hen harrier** in spring and late Autumn. Despite a male and female being present early in the 2014 breeding season, there were no obvious breeding attempts
- One **merlin** flight was recorded. However, there was no evidence of breeding within the main study area
- Herring gull and reed bunting are UK BAP species. See below for a summary of herring gull flights. Three reed bunting were seen on the access track in January, further than 500 m from the proposed turbine site

**Table 3 - Bird flights recorded over the survey area from April to September 2014**

Species	Flights per hour			Total sightings	% flights are rotor height
	VP1	VP2	VP3		
Mallard	0	0	0.08	1	0%
Red grouse	0	0	0.17	2	0%
Black grouse	0	0.4	0	6	0%
Golden eagle	0	0.07	0.08	2	100%
Hen harrier	0.13	0	0	2	50%
Buzzard	0.07	0.07	1.25	17	76%
Sparrowhawk	0	0	0.08	1	0%
Peregrine	0	0	0.17	2	100%
Kestrel	0.07	0	0	1	100%
Great black backed gull	0.47	0	0.08	8	100%
Herring gull	0.07	0.13	0	3	33%
Lesser black backed gull	1.27	0.27	0.25	26	77%
Raven	0.2	0.07	1.58	23	65%

The table gives flights per hour recorded for each species recorded during the vantage point surveys, and the percentage of flights of each species recorded at rotor height. Rotor height is judged to be between 20 and 125 metres, to allow for errors in flight estimation. Vantage points 1 and 2 were watched for 15 hours each, and vantage point 3 was watched for 12 hours.

**Table 4 - Bird flights recorded over the survey area from October to January 2014/2015**

Species	Flights per hour			Total sightings	% flights are rotor height
	VP1	VP2	VP3		
Mute swan	0	0.11	0	1	0%
Red grouse	1.22	0	0.11	12	0%
Black grouse	0	0.22	0	2	50%
Hen harrier	0.11	0	0	1	100%
Buzzard	0	0.11	0.33	4	75%
Sparrowhawk	0	0.11	0	1	100%
Kestrel	0	0.22	0.44	6	50%
Raven	1.67	1.56	3.67	64	55%

The table gives flights per hour recorded for each species recorded during the vantage point surveys, and the percentage of flights of each species recorded at rotor height. Vantage points 1, 2 and 3 were watched for 9 hours.

Tables 3 and 4 indicate that there could be a high risk to buzzard, lesser black backed gull and raven, and a significant risk to great black backed gull and kestrel. Black grouse flights recorded during this survey are typically lower than rotor blades, but black grouse are known to fly at rotor height and measures should be taken to reduce the risk of collision to this and other species.

## 4. Impacts and mitigation

### 4.1 Potential impacts

The main impact of wind farms on bird populations are considered to be direct loss of breeding or feeding habitat, potential collision risk and indirect loss of habitat from disturbance (either temporary, during construction, or permanent from operating turbines) (Percival 2005, Drewitt and Langston 2006).

#### 4.1.1 Habitat loss

Bird habitat loss should be minimal. A small area will be taken up by the turbine base(s), and a track will be installed to site. The majority of Stronafian Community Forest has already suffered considerable environmental degradation through plantation activity. However, there are small areas of high value blanket bog near the proposed site, and these should be avoided. Ground nesting birds will use the vegetation around the site. Mitigation is discussed in section 4.2.

#### 4.1.2 Collisions

There is a collision risk to any bird recorded flying at turbine height. This includes species listed as of conservation importance, including black grouse, golden eagle, hen harrier and peregrine. Given that populations of these birds are already low, and that collisions are extremely likely to result in bird mortality, the collision risk to these species should be carefully considered.

### **4.1.3 Disturbance**

Disturbance could potentially affect an area greater than that exposed to direct habitat loss. The maximum distance that wind turbines have been shown to affect breeding birds is 800m (Percival 2005; Pearce-Higgins et al. 2009), though most reliable studies have not reported effects further than 600m from turbines (Drewitt and Langston 2006) and displacement is usually partial rather than complete (i.e. a reduction in use not complete exclusion). Displacement has generally been more widely reported and over a greater distance outside the breeding season.

Disturbance is likely during construction. Pearce-Higgins et al. (2012) found that red grouse, snipe and curlew densities all declined on wind farms during construction, whilst densities of skylark and stonechat increased. Construction also involves the presence of work personnel on site which itself can be an important source of potential disturbance.

At this time displacement from a zone around the wind turbines is likely to be only partial. Pearce-Higgins et al. (2012) reported decreases in curlew density during construction of 40% and snipe by 53%. The construction disturbance assessment in this study assumes that all breeding birds within 500m of the wind turbines could potentially be at risk of displacement (Percival 2005; Drewitt and Langston 2006). For key target species assessment consideration has also been given to the disturbance distances given in Ruddock and Whitfield (2007).

Pearce-Higgins et al. 2009 indicate that breeding upland species can be partially displaced by turbine activity. A study completed by Sansom of the RSPB in 2014 suggests that golden plover can be completely displaced when turbines become active. However, the only birds likely to nest within 500 m are meadow pipits and possibly some other passerines. The populations of these species are at risk of displacement, but could increase during construction.

A further potential operational disturbance effect could be disruption to important flight lines (barrier effect). Birds may change their route to avoid flying through turbines. This would reduce the risk of collision but could make it more difficult for the birds to access important feeding areas (if diversions were of a sufficient scale) resulting in increased energy consumption. This type of risk is likely to be negligible considering the location and number of turbines.

### **4.2 Mitigation Proposals**

The applicant has been asked to avoid developing an area of open blanket bog to the North of the proposed turbine site (Cruach nam Mault).

An area of about 1.5ha has been set aside as a new wetland about 750m south of the site with new native tree planting and inundation habitats. This will create new niche opportunities for wetland, ground-nesting and tree-nesting species in an area away from the turbine. This may encourage black grouse and other sensitive species to move away from the development site. The area felled in early 2015 will also provide new habitat if replanted.

Other best practice measures are listed below.

Designated working areas, storage areas and access routes should be identified at the commencement of the construction phase. The proposed works should be

phased so that access tracks are built early in the construction programme. Vehicular access should be restricted to designated routes throughout construction and operation as far as possible, minimising potential disturbance of birds.

It is essential to ensure that no Schedule 1 species are disturbed during the breeding season (crossbill), particularly during the construction phase of the wind farm. Further surveys for crossbill and any other Schedule 1 species should be undertaken immediately prior to construction if planned for the bird breeding season (approx 15th March-end July). If any are found then potentially disturbing activities should be suspended until the end of the season, within an appropriate zone (dependent on the location of the birds and the species involved, to be agreed with SNH, and following Ruddock and Whitfield 2007).

As all nesting birds are protected, measures should be implemented to deter birds from nesting in those areas that will be affected by the proposed works. For this reason it is proposed to remove the vegetation within the footprint for the development, i.e. turbine foundations, access tracks, etc., outside of the bird breeding period. This should include grass and scrub, which are used by willow warblers and meadow pipits. Vegetation removal should take place during the period September to February inclusive, to minimise the risk of an offense being committed (this should also apply if any of the surrounding plantation is required to be felled).

Site ground-works (i.e. laying of site tracks, laying out of the temporary construction compound and excavation of the turbine foundations and footings for the substation) should be undertaken outside of the March to August nesting and nest building period. Where works affecting habitats which could be used by nesting birds must take place between March and August (inclusive), they should only be carried out following an on-site check for nesting birds by an experienced ecologist.

If nesting birds are found to be present, a protection zone should be set up in accordance with the Wildlife and Countryside Act 1981 *et seq.* Work should not take place in that area until the adult birds and young have left the nest.

The extent of the working area should be clearly marked to minimise the risk of machinery encroaching onto adjacent habitat. It is important to protect habitats adjacent to the working area, since they might be used by nesting birds.

This mitigation should apply to all relevant activity in the Stronafian Community Forest, including any tree felling.

#### **4.3 Assessment of residual effects**

There should be limited disturbance and ongoing risk of collision, from construction and operation of the turbines.

The proposed habitat improvement measures will compensate for the minimal habitat losses due to the scheme and could result in a net gain to the conservation value of the area, following the removal of the turbines. It is recommended that the proposed mitigation measures are implemented, and the site is not re-planted with non-native timber stock.

#### **4.4 Cumulative ornithological assessment**

The site is next to an existing development, the Cruach Mhor windfarm. It is likely that the installation of this development has resulted in the displacement of some species, perhaps raven and black grouse, to within the study area.

The habitat enhancement area provided as mitigation for the Cruach Mhor development may have encouraged conservation sensitive species, such as the hen harrier, into the area (Robson, 2011).

Data from Griffin wind farm in Perthshire (Stanek, 2013) shows that male hen harriers are at risk of collision with turbines when hunting and displaying. A comparison with data from the previous assessment made by RPS Group suggests that hen harrier numbers have declined since 2010.

## **5. Summary of effects and conclusions**

Whilst there are only two proposed turbines for the site, this could still impact on some of the bird species present. Of note are the flights and sightings recorded of black grouse and raptors known to be vulnerable to collisions with turbine blades, such as hen harriers and golden eagles.

Black grouse are lekking near to the proposed turbine site, and there will need to be sufficient mitigation measures to prevent disturbance to the birds during lekking, during and following construction. These measures should include a buffer of at least 400m around leks and habitat protection and restoration (Section 4.2).

## **6. Monitoring and enhancement**

Monitoring of the local bird populations should continue during development.

Species specific surveys should be conducted for black grouse and hen harrier, using the survey methods recommended in the SNH guidance.

VP surveys should be undertaken annually during construction, and for the following three years, then at 5, 10 and 15 years. If there is deemed to be a collision risk to sensitive species then monitoring should take this into consideration.

## **7. References**

Drewitt, A. L. and R. H. W. Langston. 2006. Assessing the impacts of wind farms on birds. *Ibis* 148:29- 42.

Pearce- Higgins, J. W., L. Stephen, A. Douse, and R. H. W. Langston. (2012). Greater impacts of wind farms on bird populations during construction than subsequent operation: results of a multi- site and multi- species analysis. *Journal of Applied Ecology* 49:386- 394.

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

Percival, S. M. 2005. Birds and wind farms: what are the real issues? *British Birds* 98:194- 204.

Robson, P. 2011. Hen harrier activity at Cruach Mhor windfarm (review of monitoring data 2001-2011). <http://www.snh.gov.uk/docs/A689039.pdf> (accessed June 2015)

Ruddock, M. and D. P. Whitfield. 2007. A Review of Disturbance Distances in Selected Bird Species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

Sansom, A. 2014. A case study of the impacts of wind farm construction on breeding golden plover. <http://www.bou.org.uk/bouproc-net/uplands/poster-sansom.pdf> (accessed June 2015)

SNH, 2014. Guidance: Recommended bird survey methods to inform impact assessment of onshore wind farms May 2014. <http://www.snh.gov.uk/docs/C278917.pdf> (accessed June 2015)

Stanek, N. 2013. Dicing with Death? An evaluation of Hen Harrier (*Circus cyaneus*) flights and associated collision risk with wind turbines, using a new methodology. <http://www.iccs.org.uk/wp-content/thesis/consci/2013/Stanek.pdf> (accessed June 2015)

The Scottish Government, 2014. Scottish planning policy. <http://www.gov.scot/Publications/2014/06/5823/0> (accessed June 2015)

The Scottish Government publish a list of Scottish and UK BAP bird priorities at <http://www.gov.scot/Topics/farmingrural/SRDP/RuralPriorities/Packages/SupportBiodiversity/PrioritySpeciesHabitats/PrioritySpeciesBirds> (accessed June 2015)

The wildlife and countryside act 1981 is available from [legislation.gov.uk](http://www.legislation.gov.uk) at <http://www.legislation.gov.uk/ukpga/1981/69> (accessed June 2015)