



DOCUMENT DETAILS

Client: **Innogy**

Project Title: **Lyrenacarriga Windfarm**

Project Number: **170749**

Document Title: **Appendix 8-7 – Bird Monitoring Programme**

Document File Name: **170749 – EIAR – 2020.12.16 – F**

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| Rev | Status | Date | Author(s) | Approved By |
|-----|--------|------------|-----------|-------------|
| 01 | Final | 16/12/2020 | PM | PC |
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1. INTRODUCTION

This Bird Monitoring Programme has been prepared by MKO for the proposed Lyrenacarriga Wind Farm, Co. Waterford.

This document provides a timeframe and monitoring schedule for the bird population of the study area during the construction and post-construction phase of the project. Breeding and wintering bird surveys were undertaken during the period September 2016 to September 2018 encompassing two full breeding seasons and two full winter seasons, as well as autumn and spring migration periods. These surveys were in line with SNH guidance entitled “*Recommended bird survey methods to inform impact assessment of onshore wind farms*” (SNH, 2017). The surveys undertaken to date have informed the various proposed bird monitoring measures outlined in this document.

1.1 Key Ornithological Receptors and Birds of Conservation Concern

Table 1-1 lists the Key Ornithological Receptors recorded within the study area during field surveys.

Table 1-1 Key Ornithological Receptors identified during field surveys undertaken at the Lyrenacarriga Wind Farm

| Common Name | Latin Name | Conservation Status |
|--------------------------|----------------------------|---|
| Golden Plover | <i>Pluvialis apricaria</i> | Annex I EU Birds Directive, SCI of SPA within a potential zone of influence, BoCCI Red Listed |
| Hen Harrier | <i>Circus cyaneus</i> | Annex I; EU Birds Directive; BoCCI Amber List & Irish Wildlife Act. |
| Peregrine | <i>Falco peregrinus</i> | Annex I EU Birds Directive |
| Woodcock | <i>Scolopax rusticola</i> | BoCCI Red Listed (Breeding Populations Only) |
| Lesser Black-backed Gull | <i>Larus fuscus</i> | SCI of SPA from wider surroundings |
| Buzzard | <i>Buteo buteo</i> | Raptor Species; Schedule 4 of the Wildlife Act 1976 |
| Sparrowhawk | <i>Accipiter nisus</i> | Raptor Species; Schedule 4 of the Wildlife Act 1976 |
| Kestrel | <i>Falco tinnunculus</i> | Raptor Species; Schedule 4 of the Wildlife Act 1976 |
| Common Snipe | <i>Gallinago gallinago</i> | BoCCI Amber Listed (Breeding & Wintering) |

1.2 Objectives

This document has been prepared having regard to the following objectives:

- To ensure any required pre-commencement/ pre-construction phase monitoring is scheduled to ensure any impacts are avoided.
- To record usage of the site by birds and interaction with operating turbines during the post-construction phase of the development.
- To monitor short-term and long-term effects on bird populations with a particular emphasis on wintering and breeding birds deemed to be of high conservation concern (Annex I; EU Birds Directive and BoCCI red list species).
- To undertake collision monitoring and corpse searches for potential bird fatalities as a result of collision with turbine blades.



- Report on findings of post construction monitoring at the end of each monitoring year (Year 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm).

2. METHODOLOGY

2.1 Pre-construction Bird Monitoring

Pre-commencement surveys will be undertaken prior to the initiation of works at the wind farm.

The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas, where access allows. If winter roost sites or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located, and earmarked for monitoring at the beginning of the first winter season or breeding season (respectively) of the construction phase. If it is found to be active during the construction phase no works shall be undertaken within a 500m buffer (Forestry Commission Scotland, 2006; Ruddock & Whitfield, 2007) in line with best practise. No works shall be permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied.

All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the ‘no-work zone’ will be made available to all construction staff. The restricted area will also be marked off using hazard-tape fencing to alert all personnel on site to the suspension of works within that area.

Where no roosting, nesting or breeding activity of species of high conservation concern is identified in works areas, construction activity can proceed, with ongoing monitoring in parallel to ensure adherence of protection protocols throughout the season.

2.2 Post-construction Bird Monitoring

Survey methods employed for post-construction monitoring will be in line with guidelines issued by the Scottish Natural Heritage (SNH, 2009). Post-construction monitoring will be undertaken in Years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm.

Post-construction monitoring will include vantage point surveys and a programme of regular corpse searching of birds that may potentially collide with operating turbines during the operational phase of the wind farm project.

Bird monitoring will include the following survey methods:

- Flight activity surveys: vantage point surveys
- Targeted bird collision surveys (corpse searches) will be undertaken. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust.

2.2.1 Vantage Point Surveys

Vantage point surveys will be undertaken monthly during operational years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm. The methodology for vantage point watches will follow guidelines issued by the SNH (2009) and SNH (2017). The proposed vantage point watches will adhere to a minimum of 36 hours/VP per season as per guidelines issued by SNH. Monthly visits will be undertaken between January and December inclusive. During each visit, six-hour vantage point watches will be undertaken from each fixed vantage point location of the study area. These surveys will be undertaken from the minimum number of vantage points to ensure sufficient coverage of all turbine locations and to a 500m radius of the outermost turbines is achieved. Vantage point surveys will be timed to provide a spread over the full daylight period including dawn and dusk watches to coincide with the highest periods of

bird activity. Behavioural categories for the observation of bird interactions with operational wind farms will be in line with terminology outlined by Meredith et al., (2002).

2.2.2 Collision Searches (Bird Casualties)

Surveys for bird casualties will follow survey methods broadly based on guidelines issued by the Scottish Natural Heritage (2009) and search methods adopted by Duffy & Steward, *Turbine Search Methods and Carcass Removal Trials at the Braes of Doune Windfarm* (Natural Research Information Note 4. Natural Research Ltd, Banchory, UK, 2008).

It is proposed to undertake a minimum of one visit per month during each survey year. During each visit, searches will be undertaken at each operating turbine location by a trained dog and handler. A square plot measuring 130m x 130m from the centre of each turbine location will be the subject of target searches for bird casualties. Locations and coordinates of transect routes will be confirmed using a portable GPS recording device. Recording sheets will be used to document bird carcasses encountered in the field.

The following details will be considered during field surveys: GPS location of each bird carcass, photographic record, carcass condition (intact (carcass that is completely intact or not badly composed), scavenged (evidence that the carcass was fed upon by a scavenger/predator) or feather spot (ten or more feathers indicating predation or scavenging or two or more primary feathers must be present to consider the carcass a casualty)), distance from the turbine location, date, time, etc.

Corpse searching work will be calibrated to account for the ability to find bird corpses and likelihood of scavenging of corpses by animals. This will ensure a more accurate estimation of the total number of collision victims. To allow for this, sample bird corpses of various bird sizes will be placed within the various habitats found within proximity of the turbine locations. Carcasses will be left out in the trial areas by one worker and searched for by another two days later. A 36-hour period between laying carcasses and searching for them ensures no visual cues will be left by the carcass layer which may deter scavengers. The locations of all carcasses will be logged using GPS by the layer and the finder. Any signs of scavengers will be recorded. Birds will be left in place for a further four weeks before a further examination will occur in order to determine scavenger levels. The scavenger levels which occurs will then be used to help calibrate the detection rate and estimate a likely percentage of collisions that may be removed by scavengers between searches.

Results of bird casualties will be incorporated into a report which will be submitted to the planning authority at the end of each monitoring year.

3. TIMEFRAME OF PROPOSED MONITORING WORKS

It is proposed to undertake bird monitoring surveys during years 1, 2, 3, 5, 10 and 15 of the wind farm operation.

Table 3-1 below describes the proposed bird monitoring work schedule for each monitoring year for the proposed wind farm development

Table 3-1 Proposed bird monitoring work schedule for each monitoring year at the Lyrenacarriga Wind Farm

| Survey Type | Phase | Period | No. of Visits | Survey Method |
|-----------------------------------|----------------------------|--------------------|---|---|
| Vantage Point Surveys | Year 1, 2, 3, 5, 10 and 15 | January - December | 1 visits/ VP / month for each monitoring year | Six fixed, 6-hour, Vantage Point Surveys |
| Corpse Searches (Bird Casualties) | Year 1, 2, 3, 5, 10 and 15 | January - December | 1 visit/month for each monitoring year | Targeted corpse searches at turbine bases |

4. **REPORTING**

A report summarising the findings of the bird monitoring surveys will be submitted to the Planning Authority, within three months of each monitoring year. This will provide details of the various methods employed, the results of field surveys (vantage point watches and corpse searches), potential effects/impacts on birds and any recommendations that may inform additional mitigation measures during the operational phase of the wind farm project.

Maps outlining flight lines of key target species will be produced using GIS software applications to accompany the final report at the end of each monitoring year.

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