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MWP

**Desktop Study and Survey
Methodology**
Proposed Moanmore Wind Farm, Co. Clare.

Greensource Ltd

May 2023

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1. Methodology

1.1 Scientific Nomenclature: Conventions

Species nomenclature follows the standard form of the common name, followed by the binomial, on the first instance of usage in the text or the first instance of usage in a table. Thereafter, for any subsequent usage, common names only are used.

1.2 Desktop Study

An initial desktop study was carried out by Malachy Walsh and Partners (MWP) prior to the commencement of the field surveys.

The desktop study provided the opportunity to gain an understanding of the bird populations' occurring within the study area via an investigation of the habitats present and previous species records. The study area includes lands directly affected by the project, as well as habitats that may be geographically distant from the project but whose avian interests may be indirectly affected by the various phases of the project from construction through to decommissioning.

Available ornithological information and data was reviewed, including:

- Ordnance Survey Ireland (OSI) aerial photography and 1:50000 mapping, and other sources of online aerial imagery
- Review of online web-mappers: National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC).
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons *et al.*, 1993; Balmer *et al.*, 2013).
- Review of Birds of Conservation Concern in Ireland (BoCCI) 2020-2026 (Gilbert *et al.*, 2021).
- Review of BirdWatch Ireland I-WeBS (Irish Wetland Bird Surveys) site information.
- General ornithological information available from BirdWatch Ireland (www.birdwatchireland.ie).
- Irish Bird Reports and the journal *Irish Birds*, published by BirdWatch Ireland.
- Review of the 2015 National Survey of Breeding Hen Harrier in Ireland Report (Ruddock *et al.* 2016).
- Other information sources and reports footnoted throughout the report.

1.3 Criteria for Identifying Target Species

Target species are typically those species which are afforded a higher level of legislative protection, or which are considered to be more sensitive to potential impacts from wind farm developments by virtue of their behaviour. Target species should be restricted to those likely to be affected by wind farms (SNH, 2017).

A reconnaissance survey was undertaken by the Project Ornithologist prior to the commencement of bird surveys to review the habitats occurring and the general landscape character of the study area in the context of its potential ornithological importance.

The results of the comprehensive desk-top study, in conjunction with the site reconnaissance survey, were used to identify target bird species which were considered likely to occur. These target species formed the main focus of the bird surveys undertaken.

With regards to drawing up the target species list for the proposed Moanmore Wind Farm, the SNH (2017) guidance was referred to. This guidance outlines important sources of potential target species. In conjunction with the findings of the desk-top study, the target species list was drawn from:

- Annex I of the Birds Directive
- Species protected under the Fourth Schedule of the Wildlife Acts 1976-2012 (buzzards, eagles, falcons, harriers, hawks, kites, osprey, owls)
- Red-listed birds of Conservation Concern (Gilbert *et al.*, 2021).

As outlined above and as set out in SNH (2017), target species typically comprise those species which are afforded a higher level of legislative protection and should be restricted to those likely to be affected by wind farms. Therefore, only red-listed species have been included as target species, unless the species meets one of the other target species selection criteria as outlined above e.g., Annex I. However, to ensure other species which may potentially be sensitive to wind farms were not missed during surveys, all other species of gull, wader, duck, diver, goose, swan, cormorant, and heron were included as secondary species. It is generally considered that passerine species are not significantly impacted by wind farms (SNH, 2017); however, their presence was recorded to provide a complete picture of bird usage of the site.

1.4 Field Surveys

Initial recce walkovers of the site were carried out to assist in determining the scope and extent of the surveys. Field surveys were undertaken to gather detailed information on bird distribution and flight activity to predict the potential effects of the wind farm proposal on birds.

The field surveys comprised two main elements: vantage point (VP) surveys to gather flight data for target species, and targeted distribution and abundance surveys undertaken to gain an understanding of the bird species occurring in the area which may be subject to impacts from the development.

The targeted distribution and abundance surveys comprised the following elements:

- Hinterland surveys
- Shorebird count surveys

Bird surveys have been ongoing at the proposed Moanmore Wind Farm site since Winter 2020.

Season 1.	Winter 2020-21	October 2020 to March 2021
Season 2.	Summer 2021	April to September 2021
Season 3.	Winter 2021-22	October 2021 to March 2022
Season 4.	Summer 2022	April to August 2022

1.4.1 Vantage Point (VP) Surveys

VP surveys were carried out by suitably qualified personnel on a monthly basis between October 2020 and August 2022. The overall aim of these surveys was to quantify the level of target species flight activity within the flight activity survey area. The flight activity survey area was taken to be that area encompassing the potential development area, extending out to a distance of 500 m beyond the development boundary.

1.4.1.1 Selection of VP Locations

VPs are ideally located on elevated areas, or other areas, which provide clear views over the study area. Achieving maximum visibility over as much of the site as possible is important for these surveys. One VP location was selected to cover the site achieving as much visibility as possible and this location was visited monthly during the winter and summer periods.

In order to minimise observer effect on bird behaviour, VPs should ideally be located outside the survey area but should be located as close as possible. SNH (2017) stipulates that where VPs are located within the study area, they should not be used simultaneously with other VPs which overlook them to minimise potential observer effect on birds.

One VP location (VP1) was selected for coverage of the proposed Moanmore Wind Farm site (using the initial survey area red line boundary issued to MWP by the client) and was surveyed over all seasons. The location of this VP, using latitude and longitude co-ordinates, is provided in **Table 1**, below.

Table 1: Vantage point locations at the proposed Moanmore Wind Farm site.

VP No.	ITM Grid Coordinates
1	498209, 657983

The VP was watched for a total of six hours per month. This resulted in a total of 36 survey hours in total over each season except Summer 2022, where a total of 30 hours was completed. The watches were divided into three-hour periods for each individual watch.

1.4.1.2 Viewshed Analysis of VPs

According to SNH (2017), VP viewsheds should extend to 2km. Viewshed analysis was undertaken for each VP location to determine visual coverage of the survey area. Viewsheds were set to observer height of 1.6m showing a view of everything over 25m height. Viewsheds encompassed a 2km radius with 360° views, the full extent of which can be readily viewed using a telescope. Each viewshed was then cropped to an 180° arc showing the relevant direction of view. 100% of the wind farm site was encompassed within the VP viewsheds.

Viewsheds from each VP showing the extent of site coverage are provided in Error! Reference source not found. below.

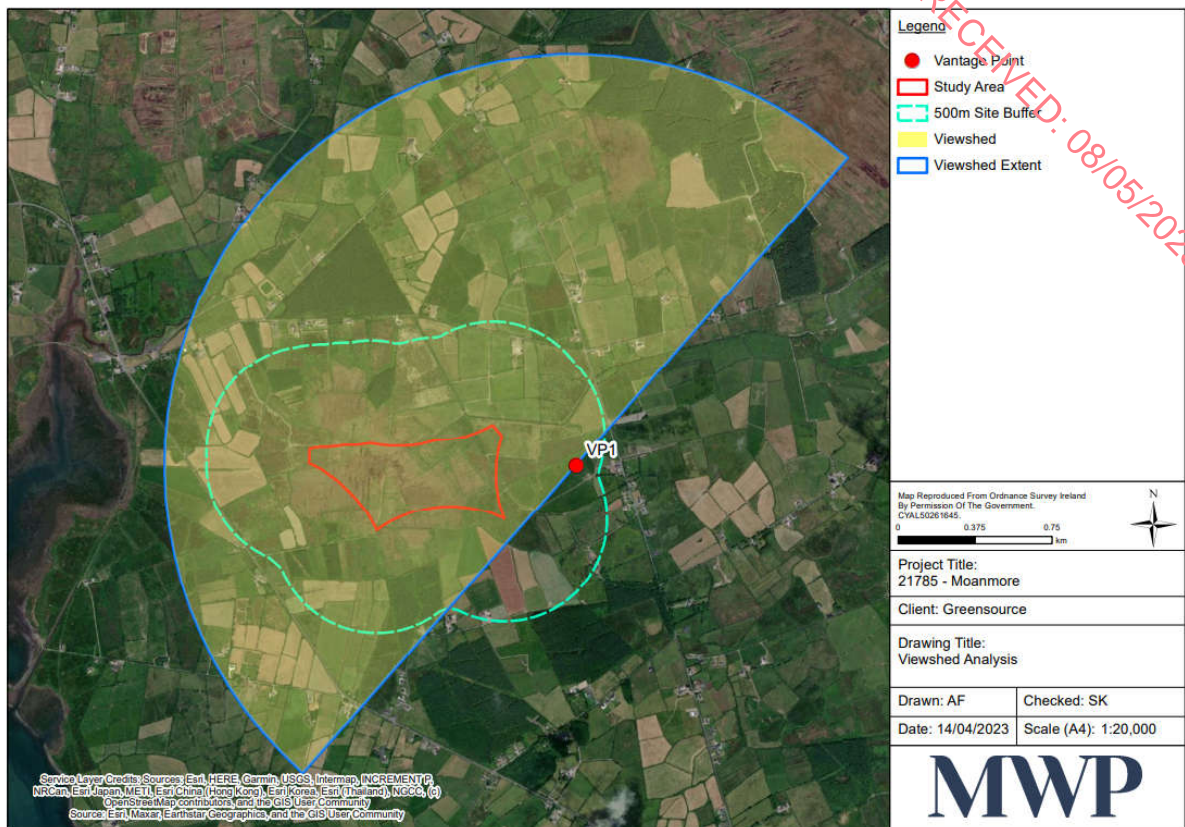


Figure 1: Vantage Point location, with the flight activity survey area 500m buffer, viewshed from the VP and the site boundary.

1.4.1.3 Recording of Flight Data

During VP surveys the flight behavior of target species was recorded. Behavior of secondary species was also recorded; however, the recording of secondary species was subsidiary to recording of target species (SNH, 2017).

At the time of each species observation the following information was recorded:

- The time that the bird was detected.
- The flight duration(seconds) within various flight height categories (0-20m, 20-50m, 50-100, 100-180m and >180)
- Sex and age of the bird(s) (adult/juvenile), where possible to determine.
- Type of activity/behavior such as hunting, flying, displaying etc.
- Estimation of actual flight height
- Habitat(s) where the bird was observed.

Once an initial sighting was made, each target or secondary species was observed until lost from view. Flight paths were recorded as observed, including where birds travelled or were observed outside of the flight activity survey area; such that all flight activity within the broader landscape was encompassed.

1.4.1.4 Recording of Other Species

During the VP surveys, counts of non-target/secondary species were also recorded where recording did not infringe on recording of target/secondary species flight data.

1.4.2 Distribution and Abundance Surveys

1.4.2.1 Hinterland Surveys

For the hinterland survey, a 5 km radius surrounding the proposed development site was surveyed (see Figure 2, below). This was carried out by the use of a driven survey, where the surveyor regularly stopped to record all bird species encountered. The purpose of the counts was to gain a better understanding of the birds using habitats surrounding the site, and of those which may or may not traverse the site. Hinterland surveys were carried out in April and November 2021.

1.4.2.2 Shorebird Count Surveys

Shorebird counts were conducted in accordance with Birdwatch Ireland I-WeBS survey guidelines. Target species for this survey included all species of waterbird. The number of target species seen or heard at each of the survey locations was recorded. Counts were carried out in September and November 2021 during the morning when light conditions were most favorable. Counts were completed at Tullabrack Lough to the east of the site and Moyasta Creek, west of the site (intertidal flats, forming part of the River Shannon and River Fergus Estuaries SPA).

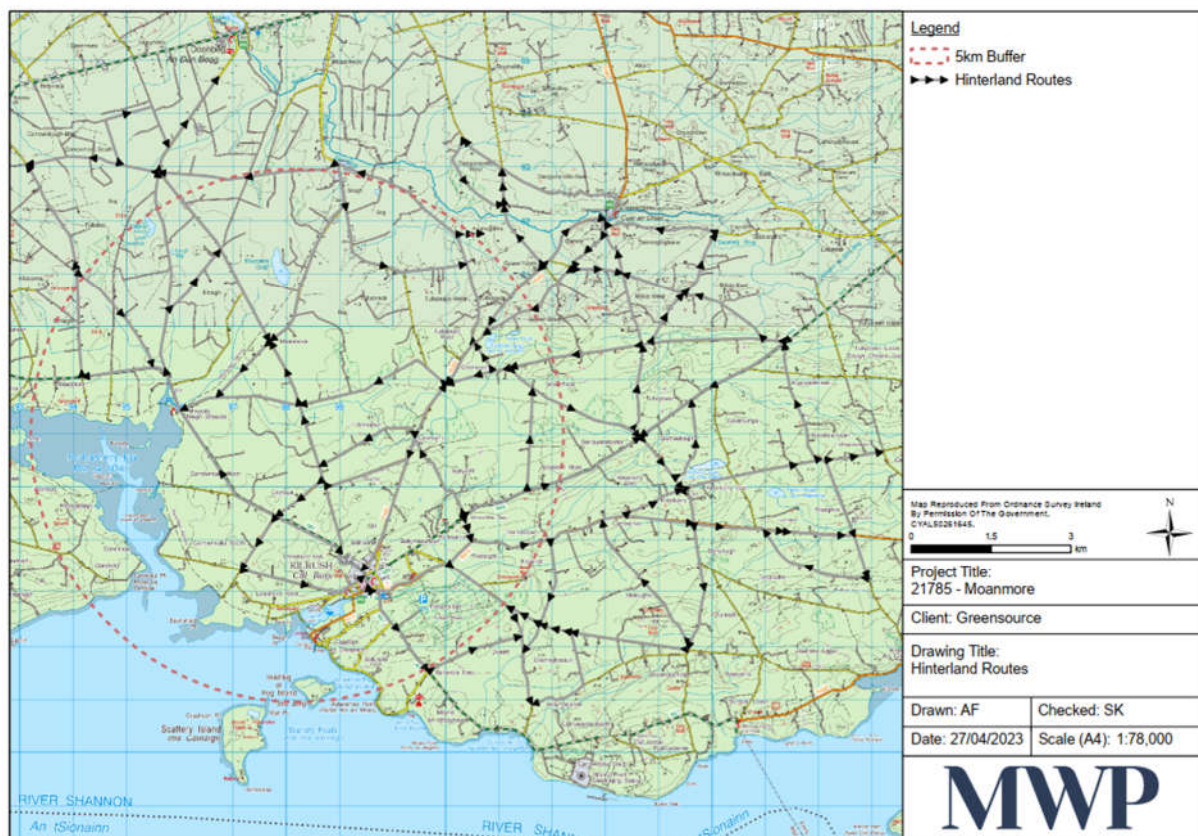


Figure 2: Hinterland survey routes within the 5 km buffer area.

2. Existing Environment

2.1 Site Location

The proposed Moanmore Wind Farm site is located in southwest County Clare, approximately 3 km northwest of Kilrush. The site can be accessed via a local road L2034 which travels northwest from the N67 National Road in Kilrush (see

below). The proposed development site comprises mainly commercial forestry, clearfell and an area of peatland.

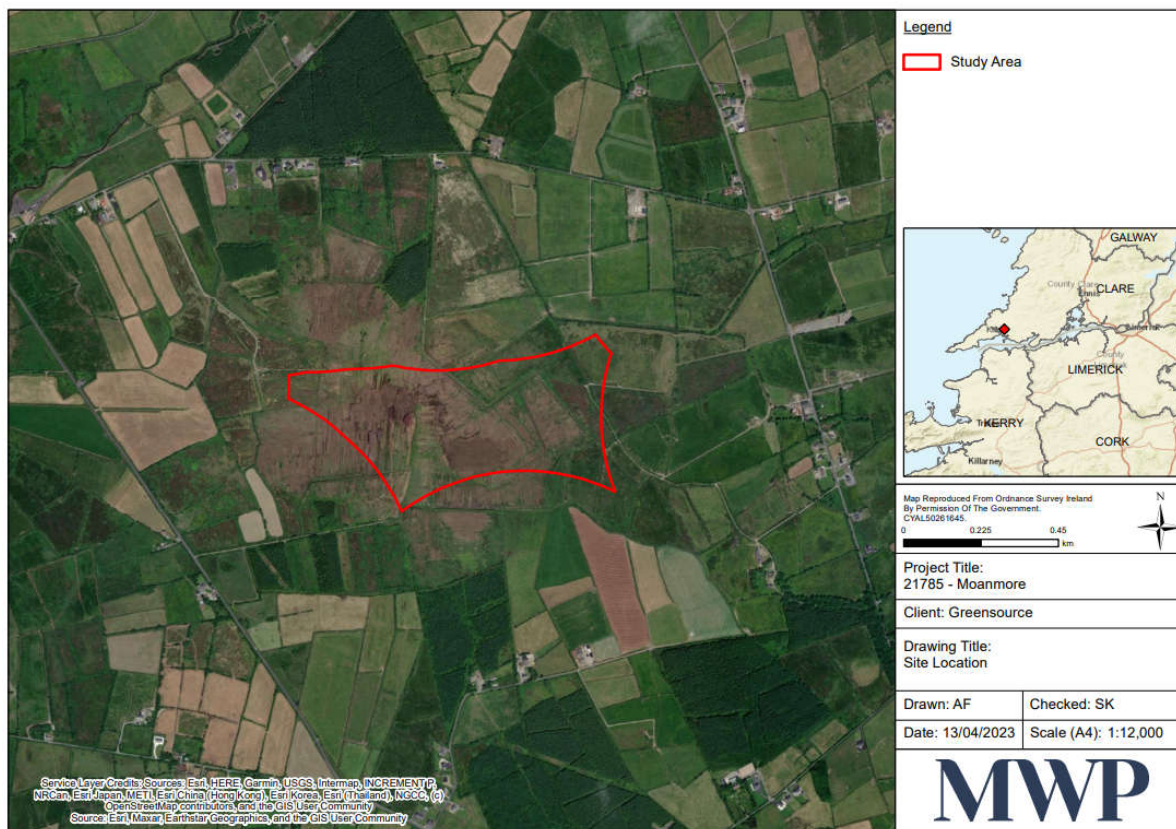


Figure 3: Moanmore wind farm site overview

2.2 Natura 2000 Designated Sites

2.2.1 Special Protection Areas (SPAs)

The European Union Directive on the Conservation of Wild Birds, known as the Birds Directive (Directive 2009/147/EC) requires Member States to designate legally protected areas for the conservation of endangered or migratory species of bird, as listed on Annex I of the Directive. These areas are known as Special Protection Areas (SPAs) and, since 1994, all SPAs form part of the Natura 2000 network of protected sites. The EU Birds Directive is implemented in Irish law under the European Communities (Birds and Natural Habitats) Regulations 2011.

An on-line search for SPAs within 15 km of the proposal site was carried out to identify any potential 'connectivity' between the site and SPAs, and to assess whether pathways exist through which the proposal could impact on qualifying interest species, as recommended in the guidance document 'Assessing Connectivity with Special Protection Areas (SPAs)' (SNH, 2016). Within this Scottish Natural Heritage (SNH) guidance document, core foraging ranges from nest-sites and roost-sites are published for both the breeding and winter seasons for the bird species frequently encountered when considering wind farm development proposals. SNH recommends that typically the core foraging range should be used when determining whether there is connectivity between the proposal and qualifying interest species. Core foraging ranges for wind farm sensitive species can range from <5 km to 20 km (SNH, 2016).

An on-line search determined that there are four SPAs within 15 km of the site, as outlined in **Table 2**, below.

Table 2: Special Protection Areas (SPAs) within a 15 km radius of the development site.

Designated Site	Distance from the wind farm site	Qualifying Interests
River Shannon and River Fergus Estuaries SPA (004077)	2.2 km west of the site	<ul style="list-style-type: none"> • Cormorant (<i>Phalacrocorax carbo</i>) [A017] • Whooper Swan (<i>Cygnus cygnus</i>) [A038] • Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] • Shelduck (<i>Tadorna tadorna</i>) [A048] • Wigeon (<i>Anas penelope</i>) [A050] • Teal (<i>Anas crecca</i>) [A052] • Pintail (<i>Anas acuta</i>) [A054] • Shoveler (<i>Anas clypeata</i>) [A056] • Scaup (<i>Aythya marila</i>) [A062] • Ringed Plover (<i>Charadrius hiaticula</i>) [A137] • Golden Plover (<i>Pluvialis apricaria</i>) [A140] • Grey Plover (<i>Pluvialis squatarola</i>) [A141] • Lapwing (<i>Vanellus vanellus</i>) [A142] • Knot (<i>Calidris canutus</i>) [A143] • Dunlin (<i>Calidris alpina</i>) [A149] • Black-tailed Godwit (<i>Limosa limosa</i>) [A156] • Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] • Curlew (<i>Numenius arquata</i>) [A160] • Redshank (<i>Tringa totanus</i>) [A162] • Greenshank (<i>Tringa nebularia</i>) [A164] • Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] • Wetland and Waterbirds [A999]
Mid-Clare Coast SPA (004182)	8.3 km north of the site	<ul style="list-style-type: none"> • Cormorant (<i>Phalacrocorax carbo</i>) [A017] • Barnacle Goose (<i>Branta leucopsis</i>) [A045]

Designated Site	Distance from the wind farm site	Qualifying Interests
		<ul style="list-style-type: none"> • Ringed Plover (<i>Charadrius hiaticula</i>) [A137] • Sanderling (<i>Calidris alba</i>) [A144] • Purple Sandpiper (<i>Calidris maritima</i>) [A148] • Dunlin (<i>Calidris alpina</i>) [A149] • Turnstone (<i>Arenaria interpres</i>) [A169] • Wetland and Waterbirds [A999]
Illelaunonearaun SPA (004114)	15.2 km west of the site	<ul style="list-style-type: none"> • Barnacle Goose (<i>Branta leucopsis</i>) [A045]
Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA (004161)	19.3 km southeast of the site	<ul style="list-style-type: none"> • Hen Harrier (<i>Circus cyaneus</i>)

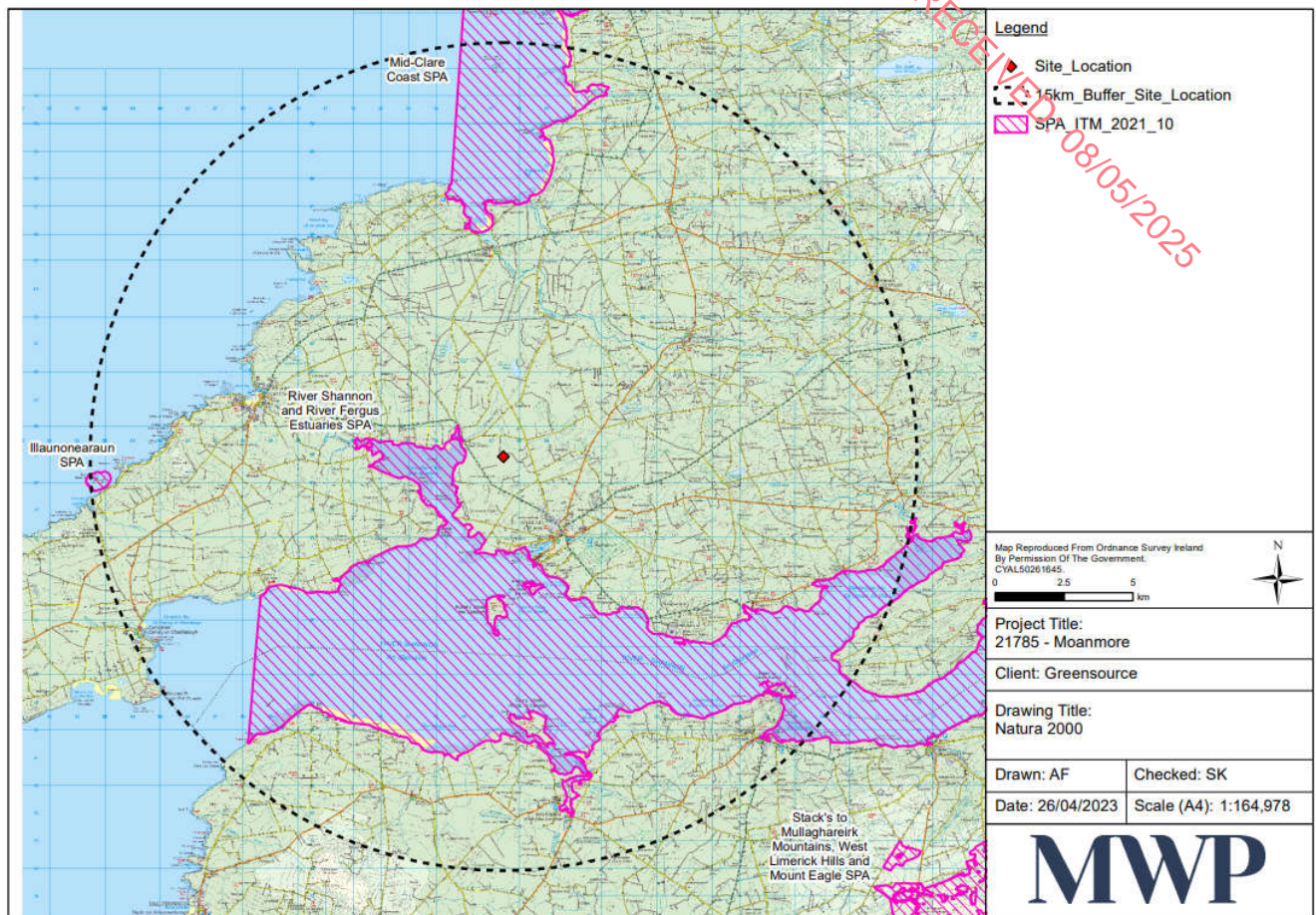


Figure 4: SPA sites within 15 km of the proposed wind farm site boundary

2.3 Ramsar Sites/Important Bird and Biodiversity Areas (IBAs)

The Convention on Wetlands, also known as the Ramsar Convention, is an intergovernmental treaty which aims to conserve and protect wetlands and their resources around the world¹. It was ratified by Ireland in 1984 and came into force on 15th March 1985. While this convention is not legislation, it is an international treaty. Ireland presently has 45 sites designated as Wetlands of International Importance, with a surface area of 66,994 hectares. The desk-top review concluded that there are no Ramsar sites within 20 km of the site boundary.

The Important Bird and Biodiversity Areas (IBAs) Programme, overseen by Birdlife International, aims to identify, conserve, and protect those areas throughout the world considered to be of the greatest significance to bird populations². The desk-top review concluded that there are three IBA sites within 20 km of the site boundary: 'West Clare Uplands'³, approximately 13.2 km northeast of the site, 'Shannon and Fergus Estuaries'⁴, approximately 2.2 km west of the site, and 'Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle'⁵, approximately 19.3 km southeast of the site.

¹ <http://www.ramsar.org/>

² <http://www.birdlife.org/worldwide/programmes/important-bird-and-biodiversity-areas-ibas>

³ <http://datazone.birdlife.org/site/factsheet/27333>

⁴ <http://datazone.birdlife.org/site/factsheet/588>

⁵ <http://datazone.birdlife.org/site/factsheet/27157>

2.4 I-WeBS Sites

I-WeBS (Irish Wetland Bird Survey) is a joint project between BirdWatch Ireland and National Parks and Wildlife (NPWS) in which specific wetland sites are surveyed (BirdWatch Ireland, 2019). In order to count the wetland birds, a 'look-see' method (Bibby *et al.*, 2000) is used in which all birds present within a pre-defined area are counted. The aim of these surveys is to monitor non-breeding birds in Ireland and contribute to population counts. The information is also important to help assess the quality of these wetland areas (BirdWatch Ireland, 2019). The bird groups to be counted for I-WeBS consist of swans and geese, ducks, divers, waders, and gulls. Counts are made once per month from September to March annually (BirdWatch Ireland, 2019).

There are a total of four I-WeBS sites within 15km of the windfarm site. See **Table 3**, below.

Table 3: I-WeBS sites within 15km of the wind farm site

I-WeBS Site	Site code
Tullagher Lough	0H008
Farrihy Lough	0H007
Mid-Clare Coast (Mal Bay - Doonbeg Bay)	0H902
Shannon & Fergus Estuary Aerial	0H462

2.5 BirdWatch Ireland Bird Sensitivity Tool

A Bird Sensitivity Mapping Tool for wind energy development was developed by BirdWatch Ireland and provides a measured spatial indication of where protected birds are likely to be sensitive to wind energy developments. The tool can be accessed via the National Biodiversity Data Centre Website (www.biodiversityireland.ie) and is accompanied by a guidance document (Mc Guinness *et al.* (2015)). The criteria for estimating a zone of sensitivity (i.e., 'low', 'medium', 'high' and 'highest') is based on a review of the behavioural, ecological, and distributional data available for each species.

A review of this mapping tool determined that no bird sensitivity ratings, as above, have been assigned to the area within which the proposed wind farm is encompassed.

2.6 Bird Atlas Records and Distribution

Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland' (Balmer *et al.*, 2013) is the most recent comprehensive work on wintering and breeding birds in Ireland. Previous Bird Atlases have been the primary source of information on the distribution and abundance of British and Irish birds prior to Bird Atlas 2007–11. The three previously published atlases were:

- Sharrock, J.T.R. (1976) The atlas of breeding birds in Britain and Ireland.
- Lack, P.C. (1986) The atlas of wintering birds in Britain and Ireland.
- Gibbons, D.W., Reid, J.B. & Chapman, R.A. (1993) The new atlas of breeding birds in Britain and Ireland: 1988-1991.

The entire wind farm site lies within hectad Q95. **Table 4** presents Breeding Bird Atlas data for potential target species recorded within this hectad.

Table 4: Breeding Bird Atlas data (Q95) with breeding status⁶

Species Name	Breeding Atlas (68-72)	Breeding Atlas (88-91)	Breeding Atlas (07-11)	Conservation Status ⁷
Barn Owl (<i>Tyto alba</i>)	Probable	-	-	RL, IV
Black Guillemot (<i>Cephus grylle</i>)	-	-	Possible	AL
Black-headed Gull (<i>Larus ridibundus</i>)	Confirmed	Seen	Present	AL, SCI
Black-legged Kittiwake (<i>Rissa tridactyla</i>)	-	-	Present	RL
Chough (<i>Pyrrhocorax pyrrhocorax</i>)	Possible	-	-	BD, AL
Common Gull (<i>Larus canus</i>)	-	Seen	Present	AL
Common Tern (<i>Sterna hirundo</i>)	Confirmed	-	-	BD, AL
Cormorant (<i>Phalacrocorax carbo</i>)	Probable	Seen	Present	AL, SCI
Corn Crake (<i>Crex crex</i>)	Probable	-	-	BD, RL
Curlew (<i>Numenius arquata</i>)	-	Seen	Present	RL, SCI
Dunlin (<i>Calidris alpina</i>)	-	Seen	Present	SCI, RL
Eider (<i>Somateria mollissima</i>)	-	Seen	-	RL
Glaucous Gull (<i>Larus hyperboreus</i>)	-	-	Present	
Golden Plover (<i>Pluvialis apricaria</i>)	-	-	Present	SCI, BD, RL
Great Black-backed Gull (<i>Larus marinus</i>)	Probable	Seen	Present	
Great Crested Grebe (<i>Podiceps cristatus</i>)	-	-	Present	AL
Great Northern Diver (<i>Gavia immer</i>)	-	-	Present	BD, AL
Grey Heron (<i>Ardea cinerea</i>)	Possible	Breeding	Confirmed	
Grey Wagtail (<i>Motacilla cinerea</i>)	Possible	Breeding	Confirmed	RL
Hen Harrier (<i>Circus cyaneus</i>)	-	-	Present	BD, AL, SCI, IV
Herring Gull (<i>Larus argentatus</i>)	Probable	Seen	Present	AL
Kestrel (<i>Falco tinnunculus</i>)	Confirmed	Seen	Possible	RL, IV
Lapwing (<i>Vanellus vanellus</i>)	-	Seen	-	RL, SCI
Lesser Black-backed Gull (<i>Larus fuscus</i>)	-	Seen	-	AL
Little Egret (<i>Egretta garzetta</i>)	-	-	Present	BD
Little Grebe (<i>Tachybaptus ruficollis</i>)	-	-	Present	

⁶ Breeding status: Seen = recorded; Possible = possible breeding; Probable = probable breeding; Confirmed = confirmed breeding; - = not recorded; Non-B = non-breeding; Breeding = breeding

⁷ Conservation Status: BD = Annex I of the Birds Directive; RL = BoCCI Red-listed; AL = BoCCI Amber-listed; SCI = Species Conservation Interest of nearby SPA; IV = protected under Schedule IV of the Wildlife Act

Species Name	Breeding Atlas (68-72)	Breeding Atlas (88-91)	Breeding Atlas (07-11)	Conservation Status ⁷
Mallard (<i>Anas platyrhynchos</i>)	Confirmed	Breeding	Probable	AL
Moorhen (<i>Gallinula chloropus</i>)	Confirmed	-	Confirmed	
Mute Swan (<i>Cygnus olor</i>)	Probable	-	Possible	AL
Oystercatcher (<i>Haematopus ostralegus</i>)	Probable	Seen	Present	RL
Peregrine Falcon (<i>Falco peregrinus</i>)	-	-	Present	BD, IV
Pintail (<i>Anas acuta</i>)	-	-	Present	AL, SCI
Red-breasted Merganser (<i>Mergus serrator</i>)	-	Seen	Present	AL
Redshank (<i>Tringa totanus</i>)	Probable	Seen	Present	RL, SCI
Red-throated Diver (<i>Gavia stellata</i>)	-	-	Present	BD, AL
Ringed Plover (<i>Charadrius hiaticula</i>)	Confirmed	Breeding	Confirmed	AL, SCI
Turnstone (<i>Arenaria interpres</i>)	-	-	Present	SCI, AL
Sandwich Tern (<i>Sterna sandvicensis</i>)	Confirmed	Seen	-	BD, AL
Scaup (<i>Aythya marila</i>)	-	-	Present	RL, SCI
Shelduck (<i>Tadorna tadorna</i>)	Confirmed	Breeding	Confirmed	SCI, AL
Short-eared Owl (<i>Asio flammeus</i>)	-	-	Present	AL, BD, IV
Shoveler (<i>Anas clypeata</i>)	-	-	Present	RL, SCI
Snipe (<i>Gallinago gallinago</i>)	Confirmed	Breeding	Present	RL
Sparrowhawk (<i>Accipiter nisus</i>)	Confirmed	Seen	Possible	IV
Teal (<i>Anas crecca</i>)	-	-	Present	AL, SCI
Whooper Swan (<i>Cygnus cygnus</i>)	-	-	Present	SCI, BD, AL
Wigeon (<i>Anas penelope</i>)	-	-	Present	SCI, AL
Woodcock (<i>Scolopax rusticola</i>)	-	-	Present	RL

Table 5 below presents Wintering Bird Atlas data for potential target species recorded within this hectad.

Table 5: Wintering Bird Atlas data (Q95) with wintering status.

Species Name	Wintering Atlas (81-84)	Wintering Atlas (07-11)	Conservation Status ⁷
Barn Owl (<i>Tyto alba</i>)	Present	-	RL, IV
Bar-tailed Godwit (<i>Limosa lapponica</i>)	Present	Present	SCI, BD, RL

Species Name	Wintering Atlas (81-84)	Wintering Atlas (07-11)	Conservation Status ⁷
Black Guillemot (<i>Cepphus grylle</i>)	Present	Present	AL
Black-headed Gull (<i>Larus ridibundus</i>)	Present	Present	AL, SCI
Black-legged Kittiwake (<i>Rissa tridactyla</i>)	Present	Present	RL
Black-tailed Godwit (<i>Limosa limosa</i>)	Present	Present	SCI, RL
Dark-bellied Brent Goose (<i>Branta bernicla</i>)	Present	Present	AL
Common Gull (<i>Larus canus</i>)	Present	Present	AL
Cormorant (<i>Phalacrocorax carbo</i>)	Present	Present	AL, SCI
Corn Crake (<i>Crex crex</i>)	Present	-	BD, RL
Curlew (<i>Numenius arquata</i>)	Present	Present	RL, SCI
Dunlin (<i>Calidris alpina</i>)	Present	Present	SCI, RL
Glaucous Gull (<i>Larus hyperboreus</i>)	-	Present	
Golden Plover (<i>Pluvialis apricaria</i>)	-	Present	SCI, BD, RL
Goldeneye (<i>Bucephala clangula</i>)	Present	-	RL
Great Black-backed Gull (<i>Larus marinus</i>)	Present	Present	
Great Crested Grebe (<i>Podiceps cristatus</i>)	Present	Present	AL
Great Northern Diver (<i>Gavia immer</i>)	Present	Present	BD, AL
Green Sandpiper (<i>Tringa ochropus</i>)	-	Present	
Greenshank (<i>Tringa nebularia</i>)	Present	Present	AL, SCI
Grey Heron (<i>Ardea cinerea</i>)	Present	Present	
Grey Plover (<i>Pluvialis squatarola</i>)	Present	Present	RL, SCI

Species Name	Wintering Atlas (81-84)	Wintering Atlas (07-11)	Conservation Status ⁷
Grey Wagtail (<i>Motacilla cinerea</i>)	-	Present	RL
Hen Harrier (<i>Circus cyaneus</i>)	Present	Present	BD, AL, SCI, IV
Herring Gull (<i>Larus argentatus</i>)	Present	Present	AL
Kestrel (<i>Falco tinnunculus</i>)	-	Present	RL, IV
Kingfisher (<i>Alcedo atthis</i>)	-	Present	BD, AL
Knot (<i>Calidris canutus</i>)	Present	Present	RL, SCI
Lapwing (<i>Vanellus vanellus</i>)	Present	Present	RL, SCI
Light-bellied Brent Goose (<i>Branta bernicla hrota</i>)	-	Present	AL, SCI
Little Egret (<i>Egretta garzetta</i>)	-	Present	BD
Little Grebe (<i>Tachybaptus ruficollis</i>)	-	Present	
Mallard (<i>Anas platyrhynchos</i>)	Present	Present	AL
Merlin (<i>Falco columbarius</i>)	Present	-	BD, AL, IV
Moorhen (<i>Gallinula chloropus</i>)	Present	-	
Mute Swan (<i>Cygnus olor</i>)	Present	Present	AL
Oystercatcher (<i>Haematopus ostralegus</i>)	Present	Present	RL
Peregrine Falcon (<i>Falco peregrinus</i>)	Present	Present	BD, IV
Pintail (<i>Anas acuta</i>)	Present	Present	AL, SCI
Razorbill (<i>Alca torda</i>)	Present	-	RL
Red-breasted Merganser (<i>Mergus serrator</i>)	Present	Present	AL
Redshank (<i>Tringa totanus</i>)	Present	Present	RL, SCI
Red-throated Diver (<i>Gavia stellata</i>)	Present	Present	BD, AL
Ringed Plover (<i>Charadrius hiaticula</i>)	Present	Present	AL, SCI
Turnstone (<i>Arenaria interpres</i>)	Present	Present	SCI, AL

Species Name	Wintering Atlas (81-84)	Wintering Atlas (07-11)	Conservation Status ⁷
Scaup (<i>Aythya marila</i>)	Present	Present	RL, SCI
Shag (<i>Phalacrocorax aristotelis</i>)	Present	-	AL
Shelduck (<i>Tadorna tadorna</i>)	Present	Present	SCI, AL
Short-eared Owl (<i>Asio flammeus</i>)	-	Present	AL, BD, IV
Shoveler (<i>Anas clypeata</i>)	Present	Present	RL, SCI
Slavonian Grebe (<i>Podiceps auritus</i>)	-	Present	BD, RL
Snipe (<i>Gallinago gallinago</i>)	Present	Present	RL
Sparrowhawk (<i>Accipiter nisus</i>)	-	Present	IV
Teal (<i>Anas crecca</i>)	Present	Present	AL, SCI
Whooper Swan (<i>Cygnus cygnus</i>)	-	Present	SCI, BD, AL
Wigeon (<i>Anas penelope</i>)	Present	Present	SCI, AL
Woodcock (<i>Scolopax rusticola</i>)	-	Present	RL

2.7 NPWS Rare and Protected Species Dataset

An information request was sent to the NPWS requesting records from the Rare and Protected Species Database for the hectad Q95 encompassing the proposed wind farm site. No relevant records regarding protected bird species was provided by the NPWS (8th December 2022) for the hectad Q95. However, it was noted that “the absence of information in the NPWS dataset for an area, does not necessarily imply a low biodiversity value for that area”, and that “the NPWS species dataset is incomplete, particularly for birds”.

2.8 Identification of Target Species

The following table (**Table 6**) outlines those species for which past records exist and which meet one or more of the target species selection criteria as outlined in **Section 1.3** above. Wind farm sensitive species meeting the selection criteria that were not identified as having previously occurred within the relevant hectad during the desk-top study search, such as buzzard, were also included as target species on a precautionary basis. The conservation status/level of protection afforded to each species is also included.

Table 6: Identification of target species.

Target Species	Conservation Status	Typical Habitat ⁸
Barn Owl (<i>Tyto alba</i>)	BoCCI Red-listed/ Wildlife Acts IV	<p>Breeding Breeds in ruined buildings, such as castles and to a lesser extent in outbuildings (barns/sheds). Will use special nest boxes. Breeding success heavily dependent on the availability of suitable prey</p> <p>Wintering Largely resident, though young birds will wander in search of new territories</p>
Bar-tailed Godwit (<i>Limosa lapponica</i>)	Annex I EU Birds Directive/ BoCCI Red-listed/ Wildlife Acts/SCI	<p>Breeding Does not breed in Ireland</p> <p>Wintering Wintering distribution is entirely coastal. They are largely confined to estuaries, with largest numbers recorded on sandy estuaries. Small numbers were recorded using non-estuarine coastline</p>
Black-tailed Godwit (<i>Limosa limosa</i>)	Annex I EU Birds Directive/ BoCCI Red-listed/ Wildlife Acts/SCI	<p>Breeding Breed in lowland wet grassland and marshes</p> <p>Wintering Winters in a variety of habitats, both inland (particularly grassland and river deltas) and coastal (particularly estuaries), though seldom seen along non-estuarine coast</p>
Buzzard (<i>Buteo buteo</i>)	BoCCI Green-listed/ Wildlife Acts	<p>Breeding Widespread breeding species. Nests in trees and sometimes on cliffs, usually with access to open land including farmland, moorland, and wetland</p> <p>Wintering Largely resident</p>
Curlew (<i>Numenius arquata</i>)	BoCCI Red-listed/Wildlife Acts/SCI	<p>Breeding Nests on the ground in rough pastures, meadows, and heather. Not a common breeder but is found in most parts of the country.</p> <p>Wintering Winters in a wide range of wetland habitats (coastal and inland) and other good feeding areas including damp fields.</p>
Dunlin (<i>Calidris alpina</i>)	Annex I EU Birds Directive/ BoCCI Red-listed /Wildlife Acts/ SCI	<p>Breeding Nests on the ground in sparse, low vegetation - in Ireland favours machair habitats</p> <p>Wintering Common along all coastal areas - especially on tidal mudflats and estuaries. Very few inland</p>

⁸ birdwatchireland.ie

Eider (<i>Somateria mollissima</i>)	BoCCI Red-listed /Wildlife Acts	<p>Breeding Eider nest colonially on offshore islets, along low-lying coasts, usually where the threat of mammalian predation is minimal. Eider seldom occur far from the sea throughout the year. They breed around the north and northwest coasts of Ireland. Up to 100 pairs have been estimated in Ireland.</p> <p>Wintering Occurs on shallow, inshore coastal waters, near estuary mouths mostly along the northwest and northeast coastlines</p>
Golden Plover (<i>Pluvialis apricaria</i>)	Annex I EU Birds Directive/ BoCCI Red-listed/ Wildlife Acts/ SCI	<p>Breeding Breed in heather moors, blanket bogs & acidic grasslands. Distribution limited to the uplands of north-western counties in Ireland</p> <p>Wintering Throughout the winter, Golden Plovers are regularly found in large, densely packed flocks, and in a variety of habitats, both coastal and inland. Their distribution is widespread in Ireland</p>
Goldeneye (<i>Bucephala clangula</i>)	BoCCI Red-listed/ Wildlife Acts	<p>Breeding Nests in holes in trees and nest boxes, and occasionally in rabbit burrows, usually near water. Reported in Britain during the early 1930s, with no further records until one in Scotland in 1970. Breeding range has since expanded, to 95 nests in 1990. One pair bred at Lough Neagh in 2000 - the first breeding record in Ireland</p> <p>Wintering Winter on coastal estuaries and inland lakes. Relatively widespread distribution in Ireland</p>
Great Northern Diver (<i>Gavia immer</i>)	Annex I EU Birds Directive/ BoCCI Amber-listed/Wildlife Acts	<p>Breeding Does not breed in Ireland</p> <p>Wintering Occur along a variety of coastlines, particularly deeper bays, and inlets, as well as shallow bays with sandy shores</p>
Grey Plover (<i>Pluvialis squatarola</i>)	BoCCI Red-listed/ Wildlife Acts/SCI	<p>Breeding Does not breed in Ireland</p> <p>Wintering Distribution in Ireland is widespread but exclusively coastal. They occur most often on large muddy estuaries.</p>
Hen Harrier (<i>Circus cyaneus</i>)	Annex I EU Birds Directive/ BoCCI Amber-listed/ Wildlife Acts IV /SCI	<p>Breeding Breeding birds are confined largely to heather moorland and young forestry plantations, where they nest on the ground</p> <p>Wintering Spends winter in more coastal and lowland areas throughout Ireland hence most easily seen on the coast in the winter months</p>
Kestrel (<i>Falco tinnunculus</i>)	BoCCI Red-listed/Wildlife Acts IV	<p>Breeding A widespread breeder throughout the country. Nests in trees, buildings or in cracks in cliffs. Will use old Crow nests. Found in a wide variety of open habitats including coasts,</p>

		<p>moor land, farmland, wetlands, roadside verges, and town parks</p> <p>Wintering Largely resident within breeding territory. Some birds move within the country, especially down from the uplands</p>
Kingfisher (<i>Alcedo atthis</i>)	Annex I EU Birds Directive/ BoCCI Amber-listed/ Wildlife Acts	<p>Breeding Kingfishers breed in tunnels dug in vertical banks along streams and rivers</p> <p>Wintering A very sedentary species, Kingfishers rarely move from their territories. However, some may move to lakes and coasts during extended spells of poor weather</p>
Knot (<i>Calidris canutus</i>)	BoCCI Red-listed/Wildlife Acts/SCI	<p>Breeding Breed at low density, and often close to the coast, nesting on well-concealed and sparsely vegetated gravel and rocky slopes</p> <p>Wintering The wintering distribution is entirely coastal, and their preferred habitat mostly includes estuarine sites with extensive areas of muddy sand</p>
Lapwing (<i>Vanellus vanellus</i>)	BoCCI Red-listed/Wildlife Acts/SCI	<p>Breeding They breed on open farmland and appear to prefer nesting in fields that are relatively bare (particularly when cultivated in the spring) and adjacent to grass</p> <p>Wintering Wintering distribution in Ireland is widespread. Large flocks regularly recorded in a variety of habitats, including most of the major wetlands, pasture, and rough land adjacent to bogs</p>
Little Egret (<i>Egretta garzetta</i>)	Annex I EU Birds Directive / BoCCI Green-listed/ Wildlife Acts	<p>Breeding Breeds in lakes, marshes, flooded fields & estuaries</p> <p>Wintering</p>
Long-eared Owl (<i>Asio otus</i>)	BoCCI Green-listed/ Wildlife Acts	<p>Breeding Breeds in lowlands throughout Ireland, usually in a stand of conifers</p> <p>Wintering Largely resident, though young birds will wander in search of new territories. During winter, may occasionally gather in communal roosts of between 5 and 30 birds</p>
Merlin (<i>Falco columbarius</i>)	Annex I EU Birds Directive / BoCCI Amber-listed/ Wildlife Acts IV	<p>Breeding Nests on the ground on moorland, mountain, and blanket bog. Also, nests in woodland and has taken to nesting in forestry plantations adjacent to moorland</p> <p>Wintering</p>

		Merlins move away from high ground at this time of the year and can often be seen on the coast, where concentrations of other birds are attractive as prey species
Oystercatcher <i>(Haematopus ostralegus)</i>	BoCCI Red-listed/ Wildlife Acts	<p>Breeding</p> <p>Nests principally on shingle beaches, dunes, salt marshes and rocky shores around the coast, but also on some large inland lakes.</p> <p>Wintering</p> <p>Use all coastal habitats, and particularly favour open sandy coasts.</p>
Peregrine Falcon <i>(Falco peregrinus)</i>	Annex I EU Birds Directive / BoCCI Green-listed/ Wildlife Acts IV	<p>Breeding</p> <p>Breeds on coastal and inland cliffs. Most birds on the coast breed on the south, west and north coasts, coastal breeding on the east coast is limited by the availability of suitable nesting cliffs. Most inland birds breed on mountain cliffs but will also breed at lower levels</p> <p>Wintering</p> <p>Resident in Ireland but shows some movement away from its breeding areas in the winter. Can be found on the coast, especially on estuaries where they hunt water birds. Some birds move into cities. Wintering birds may also comprise individuals which have arrived from Britain or even further afield</p>
Redshank <i>(Tringa totanus)</i>	BoCCI Red-listed/ Wildlife Acts/SCI	<p>Breeding</p> <p>Nests on the ground in grassy tussock, in wet, marshy areas and occasionally heather. Breeds mainly in midlands (especially Shannon Callows) and northern half of the country</p> <p>Wintering</p> <p>Winters all around the coasts of Ireland, Britain, and many European countries. Favours mudflats, large estuaries, and inlets. Smaller numbers at inland lakes and large rivers</p>
Red-throated Diver <i>(Gavia stellata)</i>	Annex I EU Birds Directive / BoCCI Amber-listed/ Wildlife Acts	<p>Breeding</p> <p>In Ireland, they breed on small freshwater loughs and pairs return to their breeding territories during April and March. Nests are typically a scrape lined with aquatic vegetation and constructed close to or on the waters edge, with the same sites often re-used in successive years</p> <p>Wintering</p> <p>This species is most numerous in Irish coastal waters and are well distributed around the Irish coastline and are typically associated with a shallow sandy bay</p>
Short-eared Owl <i>(Asio flammeus)</i>	Annex I EU Birds Directive/ BoCCI Amber-listed/ Wildlife Acts IV	<p>Breeding</p> <p>Rare and sporadic breeding species in uplands throughout Ireland. The majority of the European population breeds in Scandinavia and Russia.</p>

		Wintering Widespread winter visitor to coastal lowlands (dunes, scrubby fields, machair).
Snipe <i>(Gallinago gallinago)</i>	BoCCI Red-listed/Wildlife Acts/SCI	Breeding Nests on the ground, usually concealed in a grassy tussock, in or near wet or boggy terrain Wintering Highly dispersed distribution in winter. They forage across a variety of wetland and damp habitats. Particularly high concentrations are found on the fringes of lowland lakes
Sparrowhawk <i>(Accipiter nisus)</i>	BoCCI Amber-listed / Wildlife Acts IV	Breeding Probably the most common bird of prey in Ireland. Widespread in woodland, farmland with woods, larger parks, and gardens Wintering Resident in Ireland. Can be seen throughout the country
Scaup <i>(Aythya marila)</i>	BoCCI Red-listed/ Wildlife Acts/SCI	Breeding Does not breed in Ireland Wintering Occur around coastal estuaries and bays, on brackish lagoons and in shallow marine waters, usually less than 10 m in depth
Shoveler <i>(Anas clypeata)</i>	BoCCI Red-listed/ Wildlife Acts/SCI	Breeding Nests on the ground among waterside vegetation, often many nests in close proximity. Breeding in Ireland is centred around Lough Neagh and the mid- Shannon basin Wintering Prefer shallow eutrophic waters rich in plankton, and occur on a variety of habitats while wintering in Ireland, including coastal estuaries, lagoons and inland lakes and callows
Slavonian Grebe <i>(Podiceps auritus)</i>	Annex I EU Birds Directive/ BoCCI Red-listed/ Wildlife Acts	Breeding Does not breed in Ireland Wintering A scarce winter visitor to sheltered bays and estuaries on all Irish coasts. Rarely seen on larger lakes. The majority of the wintering population is of Icelandic birds
Whooper Swan <i>(Cygnus cygnus)</i>	Annex I EU Birds Directive/ BoCCI Amber-listed/ Wildlife Acts/SCI	Breeding The Whooper Swans that are present in Ireland each winter nest in Iceland during the summer. Each year a small number of Whoopers stay in Ireland for the summer and there have been occasional breeding records on lakes in the midlands and northwest Wintering Most on lowland open farmland around inland wetlands, regularly seen while feeding on grasslands and stubble

Woodcock <i>(Scolopax rusticola)</i>	BoCCI Red-listed / Wildlife Acts	Breeding Nests on the ground in forests and woodland, usually well camouflaged amongst dead leaves and low vegetation Wintering Wider distribution in winter, occurring in woodland, also scrub and some open areas (bracken and heather-covered hills)
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