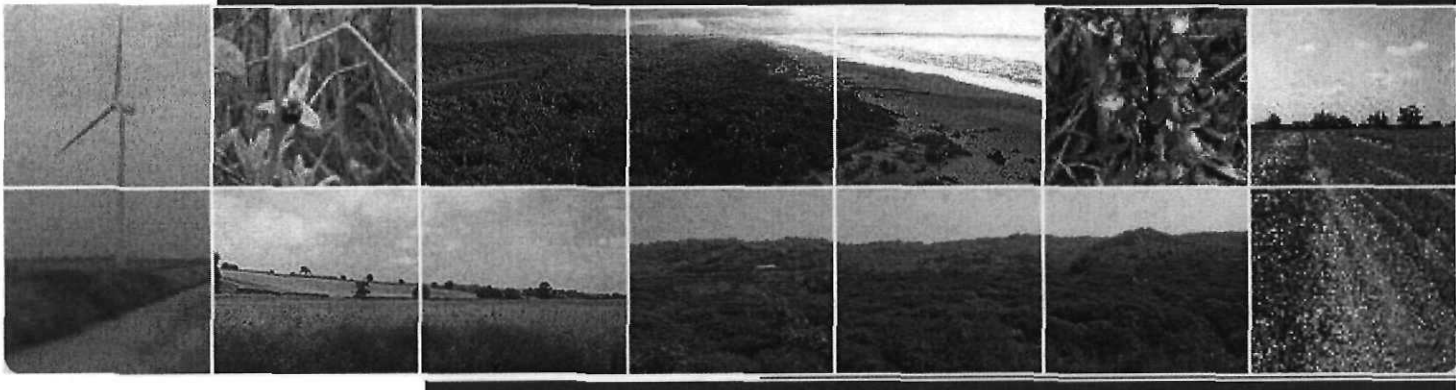
# WILD FRONTIER ECOLOGY

## Treading Wind Farm Proposal



## Eastern Vantage Point Summary Report

April 2011

| Report produced by | Client details |
|---|---|
| Graham Riley BSc AIEEM | Wind Ventures Ltd |
| Unit 2<br>Cold Blow Farm<br>Great Snoring<br>Fakenham<br>Norfolk<br>NR21 0HF | 4th Floor, Brook Henderson House<br>37-43 Blagrave Street<br>Reading<br>RG1 1PZ |
| Tel: 01328 864633<br>graham@wildfrontier-ecology.co.uk | Contact: Richard Lord/ Ross Glover |



## Contents

**1 INTRODUCTION** ..... **2**

**2 METHODOLOGY** ..... **2**

*Table 1: Eastern Vantage Point Survey Details* ..... *2*

**3 RESULTS** ..... **4**

*Table 2: Target Species of Conservation Concern Observed During VP Surveys August 2010 to March 2011* ..... *4*

*Table 3: Target Species of Low Conservation Concern Observed During VP Surveys August 2010 to March 2011* ..... *5*

**4 COLLISION RISK ASSESSMENT** ..... **5**

*Table 4: Vantage Point Summary (Eastern VP covering eastern two turbine positions)* ..... *6*

*Table 5: Collision Risk Summary (easternmost two turbines) August 2010 to March 2011* ..... *6*

*Table 6: 25 year Collision Risk Summary (easternmost two turbines) August 2010 to March 2011* ..... *7*

**5 DISCUSSION** ..... **8**

**6 CONCLUSION** ..... **9**

# 1 Introduction

This report provides a summary and analysis of the data collected from the Eastern vantage point at the proposed Treading Wind farm site, between August 2010 and March 2011. This represents an update to the information presented within the ES Ornithology chapter which concerned the period August to November 2010.

# 2 Methodology

The vantage point observations followed the same methodology detailed within the Treading Ornithology appendix.

The full survey details are tabulated below.

*Table 1: Eastern Vantage Point Survey Details*

| Date of Survey | Survey Time | | Hours | Cloud Cover | | Visibility (G=Good, M=Moderate, P=Poor) | | Wind Direction | | Wind Force (Beaufort Scale) | | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Start | Finish | | Start | Finish | Start | Finish | Start | Finish | Start | Finish | |
| 24/08/2010 | 9:55 | 11:55 | 2 | 2/8 | 7/8 | G | G | SW | SW | 4 | 5 | |
| 24/08/2010 | 12:20 | 14:20 | 2 | 7/8 | 8/8 | G | G | SW | SW | 5 | 5 | Some heavy showers |
| 27/08/2010 | 8:20 | 10:20 | 2 | 8/8 | 6/8 | G | G | NW | NW | 3 | 2 | |
| 27/08/2010 | 10:35 | 12:35 | 2 | 5/8 | 4/8 | G | G | NW | NW | 2 | 2 | |
| 31/08/2010 | 13:55 | 15:55 | 2 | 2/8 | 3/8 | M | M | NW | | 1 | 0 | Heat haze |
| 03/09/2010 | 7:30 | 9:30 | 2 | 8/8 | 4/8 | P | G | | | 0 | 0 | mist for 1st hour then cleared |
| 08/09/2010 | 8:30 | 10:30 | 2 | 8/8 | 8/8 | M | G-M | | | 0 | 0 | misty / hazy |
| 15/09/2010 | 7:45 | 9:45 | 2 | 0/8 | 4/8 | G | G | SW | SW | 3 | 4 | |
| 27/09/2010 | 11:40 | 13:40 | 2 | 8/8 | 8/8 | M | G | N | N | 3 | 3 | Slight haze, mist lifting |
| 27/09/2010 | 13:50 | 15:50 | 2 | 8/8 | 8/8 | G | G | N | N | 3 | 3 | |
| 05/10/2010 | 7:55 | 9:55 | 2 | 8/8 | 8/8 | M | G | SW | SW | 3 | 2 | Rain for approx. 1 hour |
| 05/10/2010 | 10:10 | 12:10 | 2 | 8/8 | 6/8 | G | G | SW | SW | 2 | 2 | |
| 12/10/2010 | 8:15 | 10:15 | 2 | 8/8 | 8/8 | M | M | NE | NE | 2 | 2 | |
| 12/10/2010 | 10:30 | 12:30 | 2 | 8/8 | 8/8 | G | G | NE | NE | 2 | 2 | |
| 26/10/2010 | 8:15 | 10:15 | 2 | 8/8 | 8/8 | G | G | SW | SW | 3 | 3 | Rain throughout |
| 11/11/2010 | 9:30 | 11:30 | 2 | 8/8 | 8/8 | M | M | SW | SW | 5 | 5 | Driving rain for 1st hour |
| 16/11/2010 | 13:10 | 15:10 | 2 | 0/8 | 0/8 | G | G | | | 0 | 0 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18/11/2010 | 14:20 | 16:20 | 2 | 7/8 | 8/8 | G | P | S | S | 2 | 2 | Light rain showers |
| 19/11/2010 | 8:00 | 10:00 | 2 | 8/8 | 8/8 | P | P | | | 0 | 0 | Foggy |
| 19/11/2010 | 10:10 | 12:10 | 2 | 8/8 | 8/8 | P | P | | | 0 | 0 | Foggy |
| 07/12/2010 | 14:00 | 16:00 | 2 | 0/8 | 1/8 | G | P | | | 0 | 0 | Freezing |
| 09/12/2010 | 8:45 | 10:45 | 2 | 1/8 | 0/8 | G | G | NW | NW | 1 | 1 | |
| 15/12/2010 | 11:25 | 13:25 | 2 | 8/8 | 8/8 | M | M | N | N | 3 | 3 | Light rain |
| 15/12/2010 | 13:45 | 15:45 | 2 | 8/8 | 8/8 | M | M | N | N | 3 | 2 | Light rain |
| 21/12/2010 | 11:20 | 13:20 | 2 | 6/8 | 7/8 | M | M | | NE | 0 | 1 | |
| 07/01/2011 | 8:30 | 10:30 | 2 | 8/8 | 8/8 | P | P | SW | SW | 1 | 1 | Heavy rain sleet |
| 07/01/2011 | 10:45 | 12:45 | 2 | 8/8 | 8/8 | M | P | | | 0 | 0 | |
| 13/01/2011 | 8:20 | 10:20 | 2 | 8/8 | 7/8 | G | G | SW | SW | 3 | 2 | |
| 13/01/2010 | 10:40 | 12:40 | 2 | 7/8 | 4/8 | G | G | SW | SW | 2 | 2 | |
| 25/01/2011 | 14:45 | 16:45 | 2 | 7/8 | 6/8 | G | M | NW | | 1 | 0 | |
| 02/02/2011 | 8:45 | 10:45 | 2 | 8/8 | 4/8 | M | G | SW | SW | 4 | 5 | |
| 02/02/2011 | 11:00 | 13:00 | 2 | 5/8 | 8/8 | G | G | SW | SW | 4 | 5 | |
| 15/02/2011 | 9:00 | 11:00 | 2 | 2/8 | 7/8 | G | G | SW | SW | 3 | 4 | |
| 15/02/2011 | 11:10 | 13:10 | 2 | 7/8 | 8/8 | G | G | SW | SW | 5 | 3 | |
| 21/02/2011 | 14:38 | 16:38 | 2 | 8/8 | 8/8 | M | M-P | SW | SW | 2 | 2 | Grey and cold |
| 02/03/2011 | 9:05 | 11:05 | 2 | 8/8 | 8/8 | M | M | NE | NE | 1 | 2 | |
| 02/03/2011 | 11:15 | 13:15 | 2 | 8/8 | 7/8 | M | M | NE | NE | 2 | 3 | |
| 10/03/2011 | 8:35 | 10:35 | 2 | 2/8 | 3/8 | G | G | SW | SW | 5 | 5 | |
| 23/03/2011 | 8:50 | 10:50 | 2 | 8/8 | 7/8 | M | G-M | | | 0 | 0 | Light mist lifting, heat haze at end |
| 23/03/2011 | 11:00 | 13:00 | 2 | 8/8 | 7/8 | G-M | G-M | SW | | 1 | 0 | Warm and hazy |
| TOTAL | | | 80 | | | | | | | | | |

The Eastern Vantage point was set up to comply with the guidelines detailed within Natural England Technical Information Note TIN069 (Natural England, 2010)[1] which recommends a viewing distance of no more than 1 km from each vantage point. Initially it was felt that this new guidance was not strictly applicable to this site, due to the relatively featureless and flat characteristics of the study area; the surveyor was confident that the whole site was observable from the western VP, even though the site extended beyond 1km to the east. However, as the surveys continued into the summer it was noted that a small section around the position of the easternmost proposed turbine was not entirely visible, as a discontinuous line of trees partially obscured views. This issue was less pertinent in the winter, when these trees were bare, but once their foliage thickened the views beyond the trees became partially obscured.

In order to ensure that avian activity within this small section of the site was not going unrecorded a second vantage point was established on the eastern perimeter of the site. The point of this eastern VP was primarily to check that the small section of the

[1] Natural England. 2010. Natural England Technical Information Note TIN069, Assessing the effects of onshore wind farms on birds. Natural England, Peterborough

site which was not wholly visible from the western VP was not being used by birds which might not have been recorded from the other side of the site.

# 3 Results

The eastern vantage point surveys recorded nineteen target species of bird that are considered to be vulnerable to wind turbine collision over the study site.

Vulnerability to wind turbine collision is based primarily on work by Langton & Pullen (2004), Scottish Natural Heritage (2006) and Wind Turbines and birds in Flanders (Belgium) (Everaert and Kruijken 2007)[2].

A species' conservation status is considered in relation to its inclusion on the EC Birds Directive 1979, the Wildlife and Countryside Act (WCA) 1981 (as amended), the Birds of Conservation Concern (BoCC) Red and Amber Lists of species of conservation concern (Eaton et al 2009)[3], the UK Biodiversity Action Plan (UKBAP) lists of globally threatened/declining species and Local Biodiversity Action Plans (LBAP).

*Table 2: Target Species of Conservation Concern Observed During VP Surveys August 2010 to March 2011*

| Species | Conservation status | Occurrence in study area August 2010 - March 2011 | Reference(s) for impact vulnerability |
|---|---|---|---|
| Barn Owl | WCA Schedule 1;<br>BoCC Amber list | 10 observations of single birds hunting over the study area | Langston & Pullan 2004; |
| Golden Plover | EU Annex 1;<br>BoCC Amber list | 10 overflights totalling 963 birds, max flock size 500. | Langston & Pullan 2004; Scottish Natural Heritage 2006 |
| Green Sandpiper | WCA Schedule 1;<br>BoCC Amber list | 8 overflights totalling 9 birds. | Scottish Natural Heritage 2006 |
| Hen Harrier | EU Annex 1;<br>WCA Schedule 1;<br>BoCC Red listed | 18 observations of single birds hunting over the study area. | Scottish Natural Heritage 2006 |
| Kestrel | BoCC Amber list | 102 observations of 103 birds hunting over the study area. | Everaert & Kruijken 2007 |
| Lapwing | BoCC Red listed;<br>UKBAP;<br>LBAP | 19 overflights totalling 1133 birds, max flock size 200. | Langston & Pullan 2004 |
| Little Egret | BoCC Amber list | 2 observations of single birds overflying the study area. | |
| Marsh Harrier | EU Annex 1;<br>WCA Schedule 1;<br>BoCC Amber listed | 39 sightings involving 41 individual birds, hunting over the site. | Scottish Natural Heritage 2006 |

[2] Everaert J. and Kruijken E. (2007). Wind turbines and birds in Flanders (Belgium) - preliminary summary of the mortality research results. Research Institute for Nature and Forest.
[3] Eaton MA, Brown AF, Noble DG, Musgrove AJ, Hearn R, Aebischer NJ, Gibbons DW, Evans A and Gregory RD. 2009. Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds* 102, pp296-341

| Species | Conservation status | Occurrence in study area August 2010 - March 2011 | Reference(s) for impact vulnerability |
|---|---|---|---|
| Merlin | EU Annex 1; WCA Schedule 1; BoCC Amber listed | 6 observations of individuals hunting over the study area. | Scottish Natural Heritage 2006 |
| Peregrine | EU Annex 1; WCA Schedule 1 | 10 sightings of birds hunting over the site. | Everaert & Kruijken 2007; Scottish Natural Heritage 2006 |
| Pink-footed Goose | BoCC Amber listed | 1 overflight of 1 individual. | Langston & Pullan 2004 |
| Redshank | BoCC Amber listed | 6 sightings totalling 9 birds. | Langston & Pullan 2004 |
| Snipe | BoCC Amber listed | 4 overflights totalling 6 birds. | Langston & Pullan 2004 |
| Shelduck | BoCC Amber listed | 2 observations totalling 4 birds overflying the study area. | Langston & Pullan 2004 |

*Table 3: Target Species of Low Conservation Concern Observed During VP Surveys August 2010 to March 2011*

| Species | Conservation status | Occurrence in study area August 2010- March 2011 | Reference(s) for impact vulnerability |
|---|---|---|---|
| Buzzard | Basic protected under WCA 1981; BoCC Green listed | 42 sightings involving 48 individuals over the study area. | Langston & Pullan 2004 |
| Cormorant | Basic protected under WCA 1981; BoCC Green listed | 2 overflights of single birds. | Langston & Pullan 2004 |
| Grey Heron | Basic protected under WCA 1981; BoCC Green listed | 13 overflights of single birds. | Langston & Pullan 2004 |
| Mute Swan | Basic protected under WCA 1981; UK BoCC Green listed | 1 overflight of 2 birds observed over the study area. | Langston & Pullan 2004 |
| Sparrowhawk | Basic protected under WCA 1981; BoCC Green listed | 21 observations of 22 birds observed hunting over the study area. | Langston & Pullan 2004 |

# *4 Collision Risk Assessment*

The collision risk modelling has been updated to include all data up to 23rd March 2011 based on the easternmost two turbine positions. As before, flight-lines were not recorded for any birds seen over the western four turbine positions during vantage point watches from the eastern vantage point.

The risk window height band remains at 29.4m - 139.8m. The following table summarises all recordings from the eastern VP recorded from 24th August to 23rd March 2011.

*Table 4: Vantage Point Summary (Eastern VP covering eastern two turbine positions)*

| Species | Total Number | | | Flight path | Risk Window | | | |
|---|---|---|---|---|---|---|---|---|
| | Flight Events | Birds seen in Buffer | Flight Time (s) | | Birds in RW | Time Below | Time Above | Time Within |
| Barn Owl | 10 | 10 | 1,306 | LP | 0 | 1,306 | 0 | 0 |
| Buzzard | 42 | 48 | 4,349 | LP | 16 | 2,090 | 0 | 2,258 |
| Common Snipe | 4 | 6 | 260 | LP | 5 | 23 | 0 | 237 |
| Cormorant | 2 | 2 | 100 | P | 1 | 60 | 0 | 40 |
| Golden Plover | 10 | 963 | 74,720 | LP | 183 | 61,250 | 0 | 13,470 |
| Green Sandpiper | 8 | 9 | 306 | LP | 4 | 136 | 0 | 170 |
| Grey Heron | 13 | 13 | 568 | LP | 6 | 215 | 0 | 353 |
| Kestrel | 102 | 103 | 11,480 | LP | 31 | 6,991 | 0 | 4,489 |
| Little Egret | 2 | 2 | 110 | LP | 1 | 80 | 0 | 30 |
| Lapwing | 19 | 1,133 | 86,930 | LP | 443 | 64,025 | 0 | 22,905 |
| Marsh Harrier | 39 | 41 | 6,755 | LP | 4 | 6,360 | 0 | 395 |
| Merlin | 6 | 6 | 170 | LP | 0 | 170 | 0 | 0 |
| Hen Harrier | 18 | 18 | 2,518 | LP | 4 | 2251 | 0 | 267 |
| Peregrine | 10 | 10 | 566 | LP | 7 | 167.5 | 36 | 362.5 |
| Pink-footed Goose | 1 | 1 | 40 | P | 1 | 0 | 0 | 40 |
| Redshank | 6 | 9 | 137 | LP | 1 | 81 | 0 | 56 |
| Shelduck | 2 | 4 | 27 | LP | 0 | 27 | 0 | 0 |
| Sparrowhawk | 21 | 22 | 1040 | LP | 8 | 417 | 0 | 623 |

The list of species subject to collision risk modelling after selecting for activity within the risk window is as follows:

Buzzard
Common Snipe
Cormorant
Golden Plover
Green Sandpiper
Grey Heron
Hen Harrier
Kestrel
Lapwing
Little Egret
Marsh Harrier
Mute Swan
Peregrine
Pink-footed Goose
Redshank
Sparrowhawk

*Table 5: Collision Risk Summary (easternmost two turbines) August 2010 to March 2011*

| Species | Band Collision risk (%) | Adjusted* Collision risk (%) | Annual bird mortality at given avoidance | | | |
|---|---|---|---|---|---|---|
| | | | 0% | 95% | 99% | 99.9% |
| Buzzard | 8.03 | 7.63 | 15.81 | 1.51 | 0.30 | 0.03 |
| Common Snipe | 5.76 | 5.48 | 2.94 | 0.15 | 0.029 | 0.0029 |
| Cormorant | 9.5 | 9.02 | 3.04 | 0.15 | 0.03 | 0.003 |

| Species | Band Collision risk (%) | Adjusted* Collision risk (%) | Annual bird mortality at given avoidance | | | |
|---|---|---|---|---|---|---|
| | | | 0% | 95% | 99% | 99.9% |
| Golden Plover | 6.02 | 5.71 | 141.32 | 7.07 | 1.413 | 0.1413 |
| Green Sandpiper | 6.59 | 6.26 | 1.05 | 0.05 | 0.01 | 0.001 |
| Grey Heron | 11.56 | 10.98 | 2.2 | 0.3 | 0.06 | 0.006 |
| Hen Harrier | 9.06 | 8.60 | 2.14 | 0.107 | 0.021 | 0.002 |
| Kestrel | 7.34 | 6.97 | 14.65 | 2.09 | 0.42 | 0.042 |
| Lapwing | 6.72 | 6.38 | 195.5 | 11.54 | 2.30 | 0.23 |
| Little Egret | 9.34 | 8.87 | 0.36 | 0.01 | 0.003 | 0.000 |
| Marsh Harrier | 8.49 | 8.07 | 4.74 | 0.23 | 0.05 | 0.005 |
| Mute Swan | 12.46 | 11.84 | 2.54 | 0.12 | 0.025 | 0.002 |
| Peregrine | 7.51 | 7.14 | 2.16 | 0.21 | 0.04 | 0.004 |
| Pink-footed Goose | 8.11 | 7.71 | 0.5 | 0.03 | 0.005 | 0.0005 |
| Redshank | 8.49 | 8.06 | 0.74 | 0.04 | 0.01 | 0.000 |
| Sparrowhawk | 6.91 | 6.56 | 2.6 | 0.30 | 0.061 | 0.006 |

*Table 6: 25 year Collision Risk Summary (easternmost two turbines) August 2010 to March 2011*

| Species | Bird Mortality at % avoidance | | |
|---|---|---|---|
| | 95% | 99% | 99.9% |
| Buzzard | 38.0 | 7.60 | 0.76 |
| Common Snipe | 3.68 | 0.74 | 0.07 |
| Cormorant | 3.8 | 0.76 | 0.08 |
| Golden Plover | 176.66 | 35.33 | 3.53 |
| Green Sandpiper | 1.31 | 0.26 | 0.03 |
| Grey Heron | 7.20 | 1.44 | 0.14 |
| Hen Harrier | 2.68 | 0.54 | 0.05 |
| Kestrel | 52.42 | 10.48 | 1.05 |
| Lapwing | 288.60 | 57.72 | 5.77 |
| Little Egret | 0.45 | 0.08 | 0.01 |
| Marsh Harrier | 5.92 | 1.18 | 0.12 |
| Mute Swan | 3.18 | 0.64 | 0.06 |
| Peregrine | 5.19 | 1.04 | 0.10 |
| Pink-footed Goose | 0.63 | 0.13 | 0.01 |
| Redshank | 0.92 | 0.18 | 0.02 |
| Sparrowhawk | 3.68 | 0.74 | 0.07 |

*Table 7: Collision Risk Comparison (ES Assessment data and final dataset)*

| Species | Birds calculated to collide with the proposed turbines per year at a 99% rate of avoidance | | Difference (birds per yr) |
|---|---|---|---|
| | Eastern vantage point August to November 2010 | Eastern vantage point August 2010 to March 2011 | |
| Buzzard | 0.158 | 0.30 | +0.142 |
| Common Snipe | 0.029 | 0.029 | 0 |
| Cormorant | 0.03 | 0.03 | 0 |
| Golden Plover | 1.413 | 1.413 | 0 |
| Green Sandpiper | 0.01 | 0.01 | 0 |
| Grey Heron | 0.022 | 0.06 | +0.038 |
| Hen Harrier | 0 | 0.021 | +0.021 |
| Kestrel | 0.145 | 0.42 | +0.275 |
| Lapwing | 1.955 | 2.30 | +0.345 |
| Little Egret | 0 | 0.003 | +0.003 |
| Marsh Harrier | 0.047 | 0.047 | 0 |
| Mute Swan | 0 | 0.025 | +0.025 |
| Peregrine | 0.022 | 0.04 | +0.018 |
| Pink-footed Goose | 0.005 | 0.005 | 0 |
| Redshank | 0 | 0.01 | +0.01 |
| Sparrowhawk | 0.026 | 0.061 | +0.035 |

# 5 Discussion

For 6 of the above species (Common Snipe, Cormorant, Golden Plover, Green Sandpiper, Marsh harrier and Pink-footed Goose) there were no further flightlines observed within the risk window for the period spanning December 2010 to March 2011, and therefore the collision rate remains unchanged from the previous assessment.

Certain species such as Lapwing experienced only a very minor increase in the collision risk over this period, while others such as Little Egret, Mute Swan and Redshank were observed flying within the risk window for the first time, but modelled to have a negligible collision risk.

Of the remaining species, Sparrowhawk is not carried through to full impact assessment, as it is considered to have a *site* ecological value with regard to the study area.

The following species have experienced a slightly greater increase in predicted collision mortality over the remainder of the vantage point observations, and as a result are discussed in more detail below.

*Buzzard*

The collision risk for Buzzard nearly doubled over the remaining period of the vantage point watches, but still remains low at 0.30 collisions per year based on a 99% avoidance rate. Given the strong and increasing populations of Buzzard throughout much of Lowland England, there would appear to be no reason to adjust the original collision risk assessment of *minor negative* effects to the *local/parish* population of Buzzard being *probable*, but not *significant*.

*Hen Harrier*

Not previously recorded from the eastern vantage point during the August to November survey period, and with only 2 sightings in total from the western vantage point, there were 18 observations made during the subsequent survey period, although during only 4 of these did birds enter the collision risk window. It is therefore thought appropriate to upgrade the ecological value of the species in relation to the site from *parish* to *district* level to reflect this increased use of the study area.

However, the modelled collision rate is very low, 0.107 collisions per year at a conservative 95% avoidance rate, and 0.021 at a more realistic 99%. Therefore it is assessed that *intermediate negative* impacts to the *district* population of Hen Harrier as a result of collisions are considered *extremely unlikely* and not *significant*.

*Kestrel*

The predicted mortality for Kestrel was modelled to increase from the previous figure of 0.73 collisions per year to 2.09 over the remaining vantage point observation period at the accepted avoidance rate of 95% for this species. Although seemingly a significant rise, the mitigation proposed within the ES chapter should be adequate to lower this rate to a more acceptable level.

*Peregrine*

There were 6 further flight events observed for this species during the December to march period, 5 of which entered the collision risk window. This resulted in an increase to the modelled collision rate from 0.022 to 0.04 collisions per year, doubling the predicted mortality risk. However despite this increase this still represents a very low risk and the site continues to display a relatively low level of activity for this species. Therefore the original assessment for Peregrine is still judged to be valid.

*Grey Heron*

The flight activity observed from the eastern vantage point remained at a relatively low level, with a further 4 flightlines within the risk window recorded over the December to April period. The collision rate was modelled to increase from 0.022 to 0.06 predicted collisions per year, but once again these numbers are very low, at 99% avoidance 1.44 collisions are predicted over the lifespan of the windfarm. As for the above species the original assessment within the ES remains unchanged.

# *6 Conclusion*

During the final observation period from the eastern vantage point there were flightlines recorded from 13 species of bird considered to be vulnerable to wind turbine collision. Of these species, 5 (Barn Owl, Little Egret, Hen Harrier, Merlin and Shelduck) had not been recorded during the August to November period, although all had been

observed from the western vantage point over the course of the study.

No significant numbers of wintering waders were recorded during this period and there were no observed movements of wildfowl overflying the site.

Activity from certain wintering raptor species such as Hen Harrier and Peregrine was recorded at a higher level than from the western vantage point during the previous winter period, but predicted mortality rates for these species remain very low.

In conclusion it is considered that there were no significant observations to justify any amendments to the original assessments detailed within the Ornithology chapter of the ES.