

# Technical Appendix 7.4: Operational Phase Bird Monitoring Plan

## 7.1 Introduction

Given the low abundance of breeding activity on the site, and the difficulties with estimating abundance and inferring causal links described above, it is considered searching for bird fatalities using the method described below would provide the most useful surveillance of bird impacts on the site during the operational phase.

SPR have an established system for detecting and recording carcasses found under turbines across every windfarm in their portfolio. The system integrates the programme of weekly external turbine inspections to include a visual check of the hardstanding and adjacent access track for dead or injured animals. While not covering the entire area where carcasses could potentially fall, this method provides a systematic sample which can be used to generate estimates of collisions.

The system was reviewed under Scottish Windfarm Bird Steering Group (SWBSG) research contract 1605, and can be effective at providing useful estimates provided the following conditions are met:

1. The threshold number of fatalities to detect is relatively high or the duration of the study is long (e.g. 20 years +)
2. Observer efficiency is high
3. Scavenger removal rates are likely to be high
4. There is no requirement for high precision of estimates

The collision rate for bird species at the site is currently unknown. However, if fatalities occur either frequently over a short period of time, or less frequently over a long period of time, it is probable that at least some carcasses will fall on the hardstanding areas and be detected.

## 7.2 Methodology

SPR will undertake external checks for carcasses at weekly intervals for the entire duration of the operational period.

External turbine checks are part of the routine maintenance programme undertaken by SPR operations, and involve a survey by the site attendant who will run through a checklist at each turbine location. Part of this checklist prompts the site attendant to visually scan the hardstanding areas around the turbine for any dead or injured animal. If any animal is found, it will trigger a detailed recording protocol which will gather the following information which is logged in the ISO140001 Environmental System and in parallel reported to the internal ecology team (4 members of staff) who will review and advise any further actions:

1. Turbine number, distance and direction from the tower
2. Photo of carcass with turbine, close-up photo(s) of the carcass with common object for scale
3. Date and notes of any injuries

Training by way of a “toolbox talk” is provided by a member of the ecology team to the site attendant to ensure familiarity with the detection, recording and reporting procedures.

### 7.2.1 Observer efficiency and carcass removal

Previous testing of the methodology at Whitelee windfarm 2014 – 2016 involving placing decoy carcasses randomly below turbines on hardstandings in order to test observer efficiency generated an estimate of 93% of carcasses in n=105 trials were detected and reported by operational personnel. This figure compares well to other studies in the reported literature, and is likely to be due to the easy visibility of the hardstanding areas.

Scavenger removal rates at the site are currently unknown. Studies of carcass removal rates have reported significant differences depending on species, location and time of year meaning it is difficult to rely on estimates from other studies for a specific project. However, the availability of sufficient numbers of fresh golden plover carcasses to undertake such a site-specific study is practically unachievable. For the purposes of methodological scenario testing, an exponential daily carcass persistence probability value of 0.93 has been assumed (i.e. there is a 93% probability a carcass will persist between days). This value was calculated experimentally at Clachan Flats windfarm using quail, and also at Braes of Doune windfarm using pheasant carcasses, and was also determined to be the best available estimate from a literature review carried out for the SWBSG1. For raptors, the persistence rate is predicted to be higher from studies which have attempted to compare removal rates between raptors and game species.

### 7.2.2 Example Scenario

A realistic minimum objective of this type of study would be to conclude that there is a >80% probability that the total number of bird fatalities of a particular species was <6 over an illustrative 25 years. This calculation is explained below using a worked example based on the following parameters:

1. Carcass persistence: 0.93 (Clachan and Braes estimated this value, was also used in SWBSG)
2. Observer efficiency: 0.933 (Whitelee trials)
3. Proportion of area searched: 0.3
4. Probability of detection PR(det): 0.229

**Table 7.1 Scenarios after an illustrative 25 years**

| No. of carcasses found | Mean estimate of fatalities | 80% credible interval |
|------------------------|-----------------------------|-----------------------|
| 0                      | 2                           | 0 – 6                 |
| 1                      | 6                           | 2 – 15                |
| 2                      | 11                          | 5 – 21                |
| 3                      | 15                          | 8 – 27                |

From the scenarios in Table 7.1, if 0 carcasses are detected using the SPR methodology during the windfarm operation, there is a >80% probability that the true fatality rate is <6.